



Inclusive Growth, Educational Attainment and Morbidity Rate in Papua Province

I Gede Agus Ariutama^{1✉}, Anisa Fahmi²

Politeknik Keuangan Negara Sekolah Tinggi Akuntansi Negara

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Abstract

This study aims at determining inclusive growth and exploring the relationship between inclusive growth, educational attainment and morbidity rate in Papua province. This is due to the fact that Papua Province with special autonomy status attempts to catch up with economic growth from other provinces and increases income equity by focusing on education and health. This study exploits Social Mobility Curve (SMC) and Panel VAR to comprehend inclusive growth and determine the reciprocal relationship between Social Mobility Index, average years of schooling and morbidity rate in Papua Province in 2011-2016. Based on the results, there was economic growth in Papua Province which was still accompanied by an increase in income disparity, thus, it could be concluded that economic growth in Papua was still not inclusive. Regarding the results of the Panel VAR, there was no reciprocal relationship between the three variables with education and health having a positive and significant effect on inclusive growth. The positive influence of education and health is probably due to individual productivity and globalization factors. To increase inclusive growth, Papua Province is advised to improve student education so that later students most likely be more productive and get better jobs and salaries.

✉ Corresponding author :

Address: Jalan Bintaro Utama Sektor V Jurang Mangu Timur,
Pondok Aren, Banten, Indonesia
E-mail: igedeagus@pknstan.ac.id

INTRODUCTION

Economic growth without equitable distribution of income will not be sufficient to produce sustainable welfare of society (OECD, 2014) because inequality increases (Klasen, 2010) and encourages criminal acts from community groups who feel their rights are not fulfilled (ADB, 2011). Several studies have tried to overcome this issue by raising the concept of inclusive growth, growth which not only creates new economic opportunities, but also guarantees equal access to opportunities created for all segments of society (Ali and Son, 2007).

This study uses the concept of inclusive growth by Anand et. al. (2013) defining that inclusive growth refers to the speed and distribution of interrelated growth so that the measurement of inclusive growth is influenced by factors of economic growth and distribution. Indonesia which experiences economic growth with increasing inequality in various regions (Fauzia and Suseno, 2018), is obliged to pursue inclusive economic growth. To overcome these trade-offs, the concept of inclusive growth in Indonesia needs to be explored further. So far there have been several studies related to inclusive growth in Indonesia nationally (eg Dartanto, 2014; Vujanovic, 2015) and provincial-based ones such as South Sulawesi Province (Azwar, 2016) and provinces on Java (Juliansyah, 2017); however, no one has conducted research on inclusive economic growth in Papua Province.

Papua as one of the provinces in Indonesia is still lagging behind in terms of economy, health, and education based on the Papua Human Development Index (HDI) in 2016 of 58.05, which is far below the national HDI 70.18 (BPS, 2017), even though Papua has a status special autonomy based on Law No. 21 of 2001 concerning Special Autonomy for the Papua Province. Special autonomy is a special authority recognized and granted by the Central Government to the Papua Province to regulate and manage the interests of local communities in accordance with their own initiatives based on the aspirations and basic rights of the Papuans. In connection with special autonomy status, Papua Province receives special autonomy funds of two percent of the total General Allocation Fund, which is primarily aimed at financing education and health where the funds increase from year to year (BPS, 2017). The funds are given to improve people's welfare and reduce disparity of the Papua Province with other provinces. In other words, the provision of special autonomy funds is aimed at creating inclusive and sustainable economic growth by increasing public services in the education and health fields. In addition, the Papua Province also experienced a gap in the formation of the regional economy in 2016 because there were only two cities/regencies contributing more than 10% to Papua's Gross Regional Domestic Product (GRDP), namely Jayapura City and Mimika Regency as listed in Figure 1.

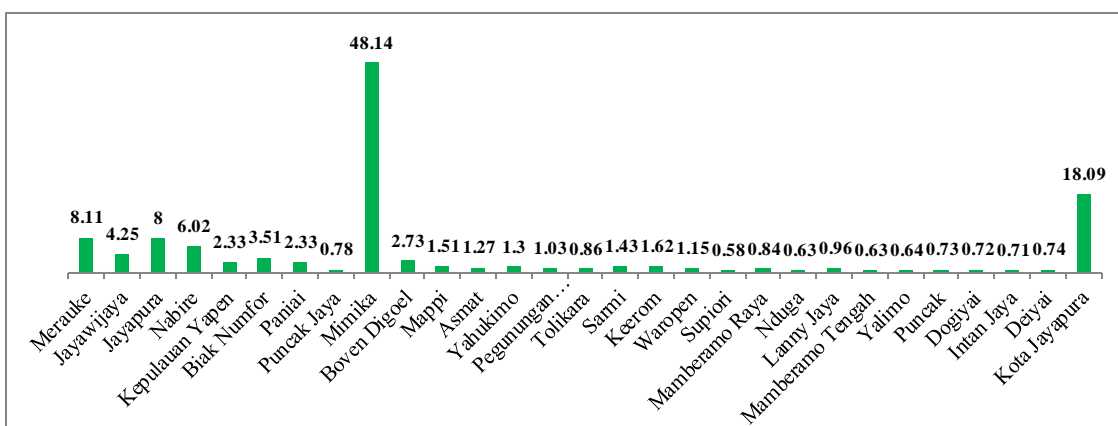


Figure 1. Role of Regencies/City in Formation of Papua GRDP in 2016 (%)

Source: processed from BPS

Based on those facts, an evaluation of Papua's special autonomy and the effectiveness of the use of special autonomy funds need to be carried out. One model of evaluation is by measuring inclusive growth of Papua Province along with its regencies/cities to analyze the participation and contribution of the Papuans and equitable distribution of the benefits of economic growth. Based on that, the focus of this research is Papua Province. Then, based on Law No. 21 of 2001, autonomy funds are specifically aimed mostly at financing education and health to produce high economic growth and equitable distribution of development to all Papuans, so that the influences of education and health on inclusive growth needs to be analyzed.

Research that explores the influence of education and health on inclusive growth has been carried out several times. Education has a positive effect on inclusive economic growth (Azwar, 2016; Juliansyah, 2017; and Anand, Mishra, and Peiris, 2013). In addition, Ali and Son (2007) also added that inclusive growth is possible if people get access to education and health and equality of opportunity to get education and health for all levels of society. Interestingly, Devaux and Sassi (2017) and Pocas (2013) argue that there is a two-way relationship between inclusive economic growth, health and education. Alleyne and Cohen (2002) argue that regions with inclusive growth tend to provide broad opportunities for people to access basic facilities such as education and health so that educational outcomes will increase and health complaints decrease. Conversely, education and health can be seen as a form of human capital which is an input from the process of economic growth, so that educated and healthy populations have better opportunities to become a prosperous and just region. Kaplan et. al. (1996) argued that regions with less inclusive growth tended to set small education budget so that the quality of education in the area was not good since there were priority differences between the upper classes and the majority of other citizens .

Pocas (2013) in his study argued that the condition of education and health in a community has a two-way relationship. Higgins,

Lavin, and Metcalfe (2008) found that people with lower education had a tendency to die at a younger age than those with higher education. Then, Pampel, Krueger, and Denney (2010) found that less educated people would have limited knowledge and information regarding behaviors and healthy eating patterns with a tendency not to have the motivation to live a healthy life which would eventually lead to an increase in morbidity rate. In contrast, Pradono and Sulistyawati (2013) found in their research that there is a positive relationship between health status and education level. Additionally, Currie and Hyson's study (1999) found that better health would improve educational outcomes with healthier students who would be more efficient.

Based on the review of previous researches related to the inclusive growth, education and health, a study on the reciprocity of the aforementioned in Papua Province is required as there are only few studies on that issue (Ariutama and Syahrul, 2016). This research will contribute to the development of existing studies related to the endogenous relationship between inclusive growth, education and health and evaluation of special autonomy policies in Papua Province. The panel VAR provides features to overcome endogenous problems by considering endogenous relationships between variables in the study (Boubtane, Coulibaly, and Rault, 2013). In other words, the Panel VAR can process the possibility of education influencing inclusive growth and education can be determined by inclusive growth simultaneously. By exploiting the Panel VAR, this study analyzes the two-way relationship between inclusive growth, education, and health by using data from 29 regencies / cities in the Papua Province in 2011-2016.

This study uses the concept of inclusive growth from Anand et.al. (2013) because it is accompanied by measurement of inclusive growth through the Social Mobility Curve (SMC) approach, in accordance with the absolute definition of pro-poor growth and includes aspects of equality of opportunity in terms of access to resources, markets, and regulations that

are fair to companies and individuals. The level of inclusiveness of economic growth depends on two factors, namely income growth and income distribution. This measurement was originally put forward by Ali and Son (2007), by applying the Social Opportunity Function in terms of equality in accessing education and health. Then the measurement was adopted by Anand et al. (2013) to be applied to the income side. The form of the Social Mobility Curve can be seen in Figure 2.

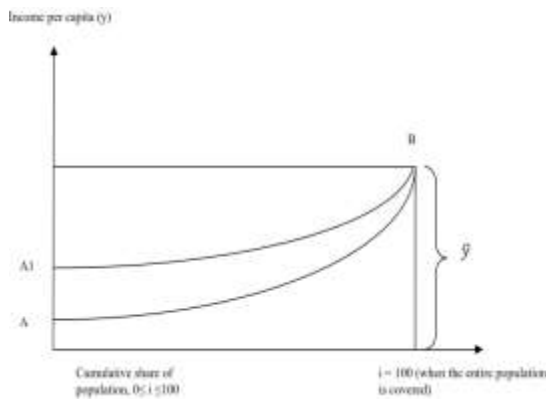


Figure 2. Social Mobility Curve

Source: Anand *et al.*(2013)

Figure 2 shows the higher the curve, the more inclusive the economic growth. Growth will be inclusive if the social mobility curve moves upwards. If \bar{y} is the average income of 100 percent of the population, then \bar{y}_i is the average income below i percent of the population. If \bar{y}_i for different values i is the same, then the sum \bar{y}_i will be the same as \bar{y} , or in other words the income distribution is evenly distributed. Figure 2 also shows that the A1B curve is more inclusive compared to AB.

Thus, the level of inclusiveness depends on changes in average income and changes in income distribution. To capture changes in income distribution, social mobility index can be calculated from the area below the social mobility curve, as follows:

$$\bar{y}^* = \int_0^{100} \bar{y}_i di \dots \dots \dots (1)$$

If the income of each person in a population is the same, then the value \bar{y}^* will be

the same as \bar{y} . If \bar{y}^* smaller than \bar{y} then the income distribution is uneven. Then income equality can be known from the Income Equity Index (IEI).

$$\omega = \frac{y^*}{\bar{y}} \dots \dots \dots (2)$$

Value ω is between 0 to 1. If there is perfect equity then $\omega = 1$. The closer the value to number one shows that the income distribution is more evenly distributed, this is in contrast to the gini coefficient. From equation (b), equation (c) is obtained.

$$\bar{y}^* = \omega * \bar{y} \dots \dots \dots (3)$$

From equation (c) to increase the value of \bar{y}^* , it is necessary to: (i) increase \bar{y} , by increasing the average income through growth; (ii) increase the income equity index through an increase in income distribution or; (iii) combine (i) and (ii). Differentiation of the above formula is as follows:

$$d\bar{y}^* = \omega * d\bar{y} + d\omega * \bar{y} \dots \dots \dots (4)$$

From the formula (d), it can be explained that $d\bar{y}^*$ is a change in the level of inclusiveness of growth. Growth will be inclusive if the value of $d\bar{y}^* > 0$. From equation (d) growth and equality are integrated in the calculation of inclusive growth.

Equation (d) can also be written:

$$\frac{d\bar{y}^*}{\bar{y}^*} = \frac{d\bar{y}}{\bar{y}} + \frac{d\omega}{\omega} \dots \dots \dots (5)$$

information:

- $\frac{d\bar{y}^*}{\bar{y}^*}$: inclusive growth
- $\frac{d\bar{y}}{\bar{y}}$: Percentage change of average income
- $\frac{d\omega}{\omega}$: Percentage change of income equity index

RESEARCH METHODS

The type data used in this study is panel data from 29 regencies/cities in Papua Province from 2011 to 2016. The data used are secondary data derived from Indonesian Central Bureau of Statistics (BPS) publications, specifically National Socio-Economic Survey (SUSENAS) data which include inclusive growth, educational attainment, and morbidity rate. Inclusive growth

is calculated through per capita expenditure adjusted to the assumption that all income is used for expenditures analyzed using SMC developed by Anand et al. (2013) so as to produce data on average income and income distribution called social mobility index. The educational attainment in this study was estimated using the average length of school while the health complaint variable was calculated based on the morbidity rate that were also obtained from BPS Papua Province.

In this study the research model was conducted in two stages. The first stage measures inclusive growth in the regencies/cities of the Papua Province from 2011-2016 based on the Social Mobility Curve. The second stage analyzes the reciprocal effects of inclusive growth and education, inclusive growth and health, as well as education and health in the Papua Province. The SMC measurement method with the income approach is as follows :

$$\frac{dy^*}{y^*} = \frac{d\bar{y}}{\bar{y}} + \frac{d\omega}{\omega} \dots\dots\dots(6)$$

To measure the reciprocal effects, the method used in this study refers to the research of Ariutama and Syahrul (2016), which uses the Panel Vector Auto Regression (PVAR). The description of the relationship between variables can be known through PVAR. The PVAR model used in this study is as follows :

$$P_t = \alpha + \sum_{j=1}^k \beta_j P_{t-j} + \sum_{j=1}^k \gamma_j R_{t-j} + \mu_{1t} \dots\dots(7)$$

$$R_t = \alpha' + \sum_{j=1}^k \theta_j P_{t-j} + \sum_{j=1}^k \nu_j R_{t-j} + \mu_{2t} \dots\dots(8)$$

Information :

- P_t : Education / health level in the period t
- P_{t-j} : Education / health level in the previous period
- R_t : The level of inclusiveness of growth in the period t
- R_{t-j} : The level of inclusiveness of growth in the previous period
- μ : Impulse or innovation

The data analysis model in this study was conducted to observe the reciprocal effects between each variable. In accordance with the purpose of the study, the use of PVAR is useful

to show the reciprocal relationship between each variable. The use of PVAR to obtain a model requires two conditions that must be met from variables, namely stationary data and causal relationships between variables. For this reason, the testing steps are as follows:

Stationarity Test, according to Tambunan and Nawawi (2017) this test is to prove the stability of each variable by using the Augmented Dickey-Fuller value (ADF) as the value of the testing criteria and followed by a cointegration test to determine the possibility of a long-term balance relationship between variables. If there are differences in the level of the stationary test results, then the cointegration test does not need to be continued.

Granger Causality Test, according to Tambunan and Nawawi (2017) this test is to find out the existence of a causality relationship between two variables. It is expected to show the causality and direction of influence.

Stability Test, Stability test in the Panel VAR is carried out by looking at the eigenvalue. Impulse Response Function (IRF) and Forecasterror Variance Decomposition (FEVD), IRF and FEVD are conducted to see the impact of exogenous changes on each endogenous variable with other variables in the Panel VAR system (Ariutama and Syahrul, 2016).

RESULTS AND DISCUSSION

The first stage in this study focuses on measuring the inclusive growth of the Papua Province using the Social Mobility Curve (SMC) developed by Anand et al. (2013). The overall results of the SMC method can be used as an input for the government to focus on one or both of these factors in achieving inclusive growth. Data on income from each regency / city of the Papua Province in the study period were grouped into ten groups (deciles). These deciles sequentially reflect the lowest income group (first decile) to the highest income group (tenth decile). Table 1 explains that the economic growth in the Papua Province has not yet achieved perfect inclusive growth. This can be seen from the value of the Income Equity Index in the study period,

which in 2011 and 2016 is still worth less than 1, equal to 0.488 and 0.495 indicating that economic growth has not been evenly distributed and has not been siding with the poor.

Table 1. Income Equity Index of Papua Province Year 2011 and 2016

Decile to-	2011	2016
1	4.015	4.242
2	4.196	4.416
3	4.849	5.058
4	4.924	5.210
5	5.322	5.601
6	5.951	6.254
7	6.820	7.361
8	8.459	8.714
9	9.603	9.726
10	13.960	14.319
Income Index	6.810	7.090
Income Equity Index	0,488	0,495

Source: data processed

Information:

First decile to tenth : The cumulative income per capita in each decile from all regencies / cities in Papua Province in 2011 and 2016

Income Index : On average from the first decile to tenth decile

Income Equity Index : The results of the income index division with the tenth decile value, the closer to number one, the more evenly distributed the income equity.

Changes in per capita income for the Papua Province from 2011 to 2016 can be

illustrated in Figure 3 which indicates that the Papua Province SMC moved up indicating that there was an increase in income from 2011 to 2016. Nonetheless, the increase in SMC tended to be sloping in the lowest income group (deciles 1- 5) and start moving steeply in the top income group (deciles 6-10). This shows that the income distribution is relatively unbalanced as presented in the Income Equity Index results.

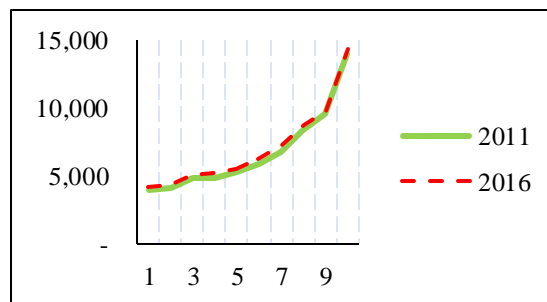


Figure 3. Social Mobility Curve of Papua Province in 2011-2016
Source: data processed

Figure 4 shows the inclusiveness matrix of the SMC analysis for the regency/city level in Papua Province from 2011 to 2016. The inclusiveness matrix takes into account changes in inclusive growth rates (dy^*) that are integrated with change of income (dy) and change of distribution ($d\omega$). Figure 4 also shows that there are only 17 of the 29 regencies / cities in the Papua Province which are in the first quadrant. Based on the inclusiveness matrix, the seventeen regencies / cities are included in the absolute inclusive category. This is because the regencies / cities have a change of income (dy) and change of distribution ($d\omega$) that are positive indicating an increase in income accompanied by an equitable distribution of income. Whereas the other twelve regencies / cities are in quadrant II, so that they cannot be said to be inclusive and will be inclusive if the dy value is greater than $d\omega$. The twelve regencies / cities are Jayawijaya, Tolikara, Lanny Jaya, Central Mamberamo, Supiori, Mappi, Yahukimo, Mimika, Waropen, Pegunungan Bintang, Deiyai, and Kota Jayapura

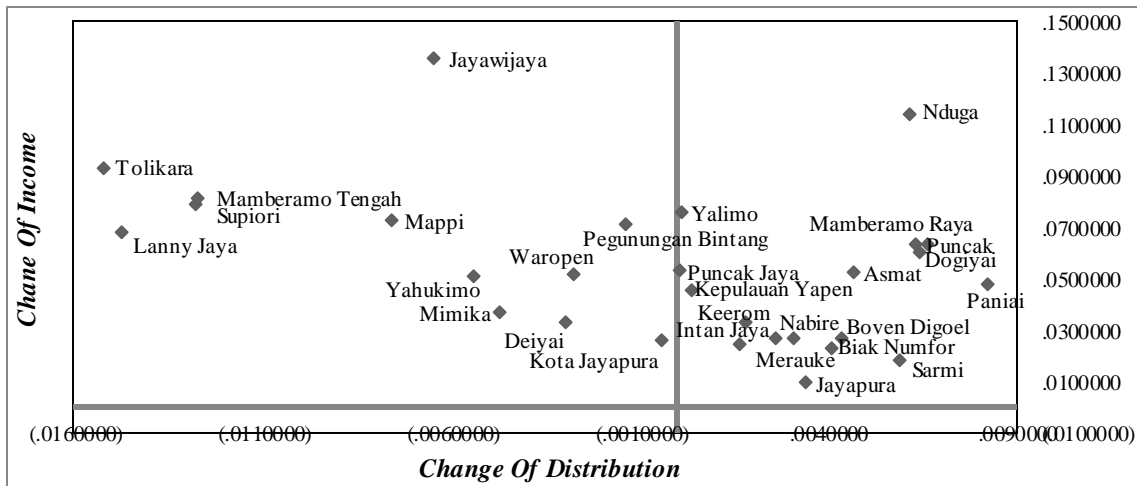


Figure 4. the Papua Province Regency / City Inclusiveness Matrix for 2011-2016

Source: data processed

The second stage in this study analyzes the reciprocal effects among inclusive growth, education, and health in the Papua Province using the Panel Vector Auto Regression. Stationarity tests on Inclusive Growth (IG), Average Years of Schooling (RLS), and Morbidity Rate (PKK) during the

observation period was conducted using the Levin-Lin-Chu Root Unit Test in the Stata 14.2 application. The results of data stationarity test are in Table 2 which concluded that IG, RLS and PKK were stationary as indicated by the Prob value. = 0.0000, smaller than the 5% significance level.

Table 2. Unit Root Test

	IG		RLS		PKK	
	Statistic	p-value	Statistic	p-value	Statistic	p-value
Unadjusted t	-44.3678		-81.2452		-32.1346	
Adjusted t*	-47.3904	0.0000	-86.1057	0.0000	-34.1664	0.0000

Source: data processed, September 2018

Testing the causality relationship between variables was carried out using the Granger Causality Test. The results of testing the Granger causality relationship are shown in Table 3 illustrating the causality relationship between IG, RLS, and PKK. The estimation regression equation of the Panel VAR model with lag1 based on the calculation shown in Table 4 are as follows :

$$\begin{aligned}
 IG &= 0.628*IG(-1) + 0.0104*RLS(-1) + 0.0185*PKK(-1) \\
 RLS &= -7.822*IG(-1) + 0.770*RLS(-1) + 0.204*PKK(-1) \\
 PKK &= 4.421*IG(-1) + 0.0250*RLS(-1) + 0.711*PKK(-1)
 \end{aligned}$$

Table 3. Granger Causality Test

Equation/ Excluded	Chi 1	df	Prob > chi 2
IG			
RLS	17.867	1	0.000
PKK	3.930	1	0.047
ALL	18.717	2	0.000
RLS			
IG	3.246	1	0.072
PKK	0.635	1	0.425
ALL	5.030	2	0.061
PKK			
IG	2.332	1	0.127
RLS	0.984	1	0.321
ALL	2.636	2	0.268

Source: data processed, September 2018

To see the impact of exogenous changes on each endogenous variable with other variables in the Panel VAR system, estimating impulse response functions (IRF) and forecast error variance decompositions (FEVD) was accomplished. However, the stability condition must be checked first from the Panel VAR estimation. The results of Table 5 regarding the eigenvalue confirm that the estimation / estimate of the Panel VAR is stable.

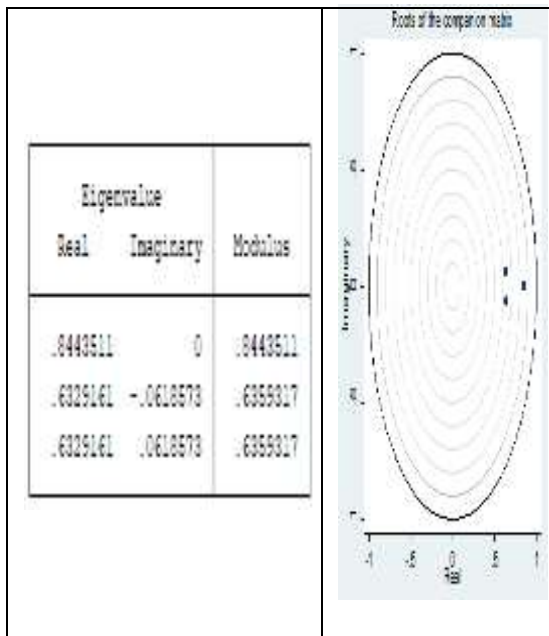
Table 4. Regression Results

Variables	IG	RLS	PKK
L.IG	0.628** (0.292)	-7.822* (4.341)	4.421 (2.895)
L.RLS	0.0104*** (0.00245)	0.770*** (0.0791)	0.0250 (0.0252)
L.PKK	0.0185** (0.00935)	0.204 (0.256)	0.711*** (0.107)

*** p<0.01, ** p<0.05, * p<0.1

Source: data processed, September 2018

Table 5. Eigenvalue Stability Conditions



Source: data processed, September 2018

The Panel VAR estimation related to the relationship between health and inclusive growth indicates that health complaints and inclusive growth variables have no reciprocal relationship with health variables having a positive and

significant effect on inclusive economic growth, not vice versa. Globalization, especially in cities that have an impact on population health, is one of the factors causing the economy to become increasingly inclusive (Anand et.al., 2013). The globalization and economic growth in Papua have brought about a lot of changes in people's behavioral and lifestyle and fairly drastic environmental conditions, causing reduced physical activity and increasing environmental pollution so that public complaints have increased (Papua Provincial Health Office, 2016). These changes have not been realized to have an effect on the occurrence of epidemiological transitions with increasing cases of non-communicable diseases such as hypertension, stroke, heart disease, diabetes, etc. which are accompanied by the handling of infectious diseases that have not been well addressed (e.g. malaria, tuberculosis, and HIV/AIDS). This causes the percentage of community complaints to increase, so it can be concluded that health complaints are positively correlated with inclusive growth.

A positive relationship between health complaints and inclusive growth may also occur because the government responds to the large number of people experiencing health complaints by increasing state budget allocations to overcome health sector problems as this study uses the Panel VAR lag 1, where the percentage of health complaints last year only affects inclusive growth this year. Based on the data published by BPS, the number of villages / kelurahan that have health facilities in Papua Province has increased as shown in figure 5. Although the number of hospitals is constant, to increase the reach and quality of health services for the community, the government has increased the number of villages having community health center, community health sub-center and polyclinic so that the health care unit in 2014 increased compared to 2011. Thus, economic growth is increasingly inclusive because the opportunity for the community to gain access to health is more evenly distributed without being limited to socio-economic status and geographical location.

This study confirms that education has a positive and significant influence on inclusive growth but not vice versa so the reciprocal relation between variables is not supported in this study. The average length of school indicates the higher level of education achieved by the community in an area. The higher a person's education, knowledge, expertise, and skills will also increase, thereby encouraging the productivity of that person. Thus, people having higher levels of education generally get better jobs and wages. This is in accordance with the paper of Anyanwu (2013) which states that education increases individual productivity and facilitates the movement of people from low income jobs to industries or services with higher income levels.

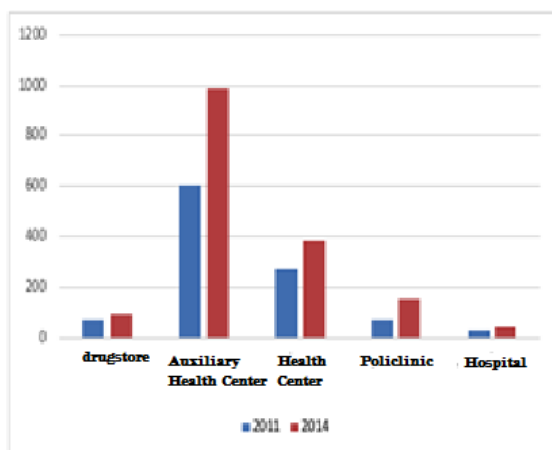


Figure 5. Number of Villages Having Health Facilities in Papua Province
Source: www.bps.go.id

Other finding from this study indicates that inclusive growth does not have a significant effect on the number of health complaints and educational attainment that might be explained by changes in public consumption and the conservative view of society. The level of morbidity does not always decrease with increasing income (Todaro and Smith, 2006). Increased income often makes many families in developing countries divert their consumption from nutritious food to foods that contain "zero calories" which may be considered modern or a symbol of economic success. The opinion of Todaro and Smith is relevant to the challenges

facing Papua today in health development, namely the increase in diseases including degenerative diseases and the emergence of new diseases. Regarding education, the conservative view of most people, especially the poor and the people living in the isolated areas, considers that education is not the most important part of changing people's lives. This is one of the factors reflecting the ineffectiveness of the inclusive growth on education attainment. The evidence presented by Todaro and Smith (2006) illustrated that increasing family income did not automatically improve health status or educational achievement. Some important non-economic variables such as the influence of cultural traditions, gender, social status, parental education, and the size of family members also influenced one's education level.

For education achievement and health complaints variables, the results of this study are different from those examined by Higgins, Lavin, and Metcalfe (2008) and Pampel, Krueger, and Denney (2010) that education is positively correlated with health. The data in this study indicate that education, as measured by the average length of school does not have a significant effect on morbidity rate. This is because the pattern of disease in Papua is still dominated by infectious diseases such as malaria, pulmonary TB, HIV/AIDS, diarrhea and others (Papua Provincial Health Office, 2016).

The spread of infectious diseases by water-borne microbes has also increased as a result of urban arrangements that pay less attention to environmental health and increasingly large population inflows to cities resulting in not maintaining individual and household sewage systems. The study also concluded that health did not affect education levels, in contrast to the results of research by Currie and Hyson (1999). This is possible because the quality of education is still low in Papua. The lack of educators in remote rural areas, the limited availability of school buildings and infrastructure have resulted in the learning process not being able to proceed properly so that there are quite a lot of Papuan children who cannot get education well

CONCLUSION

The results of this study also show that 17 of the total 29 regencies / cities in Papua fall into the category of absolute inclusive growth, while economic growth in 12 other regencies / cities is still uneven. Then, related to the analysis of causality relationships, this study shows there is no reciprocal relationship between the three variables with education attainment and health complaints significantly influencing inclusive growth, and not vice versa.

Educational variables have a positive and significant effect on inclusive growth as a result of increased productivity due to an increase in educational outcomes. However, inclusive growth has no significant effect on education because of the view that education is not the most important part of changing life status. The health complaint also shows a positive and significant influence on inclusive growth due to globalization factors and the government's response to public health.

Yet, inclusive growth has no effect on the number of health complaints in Papua because of the changes of public consumption to "zero calorie" foods which are considered modern, resulting in an increase in degenerative diseases and new diseases. Finally, educational attainment has no significant effect on health complaints, and vice versa. It can be concluded that to achieve inclusive growth in Papua, the government must improve infrastructure and access to education and health, so that the poor and people living in the remote areas have the opportunity to obtain these services more evenly and change the conservative views of some people about education is less important to change the degree of life by providing information about the importance of both formal and informal education.

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