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The determinant effect of industry sub-sectors on the gross regional domestic product in Maluku

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A B S T R A C T

The development that takes place in a province as a whole and sustainable society has improved the economy. The achievement of development outcomes are strongly felt by society as the aggregate of development of 11 districts or cities in the province of Maluku which is inseparable from the endeavors jointly undertaken between the government and society. GDP of Maluku province is ranked 31 out of 33 provinces in Indonesia, an interesting problem to be studied, when considering the natural resources, infrastructure support, and even the location of Maluku as the archipelago. This is considered to have strategic value. This study uses panel data to measure GDP growth through industrial sector based on the effect of investment, employment, and the number of companies located in it. The results show that the number of the companies, labors, and investment, in general industrial subsector, have effect on the increase in GDP, which in turn can affect the economic growth in Maluku.

A B S T R A K

Perkembangan yang terjadi di provinsi secara keseluruhan dan masyarakat yang berkelanjutan telah meningkatkan perekonomian. Pencapaian hasil-hasil pembangunan yang sangat dirasakan oleh masyarakat sebagai agregat dari pengembangan 11 kabupaten atau kota di Provinsi Maluku tidak terlepas dari upaya bersama yang dilakukan antara pemerintah dan masyarakat. PDB provinsi Maluku menduduki peringkat 31 dari 33 provinsi di Indonesia, masalah yang menarik untuk dipelajari, ketika mempertimbangkan sumber daya alam, dukungan infrastruktur, dan bahkan lokasi Maluku sebagai nusantara. Hal ini dianggap memiliki nilai strategis. Penelitian ini menggunakan data panel untuk mengukur pertumbuhan PDB melalui sektor industri berdasarkan pengaruh investasi, tenaga kerja, dan jumlah perusahaan yang berlokasi di dalamnya. Hasil penelitian menunjukkan bahwa jumlah perusahaan, tenaga kerja, dan Investasi, di subsektor industri umum, memiliki efek pada peningkatan PDB, yang pada gilirannya dapat mempengaruhi pertumbuhan ekonomi di Maluku.

1. INTRODUCTION

The macro economic growth rates are achieved by a country and the analysis is done by measuring is it from the development of real national income which is reached in a country or region. In this case, the Neo classical economic growth theory states that economic growth in the region is measured by the GDP growth. It depends on the development of the factors of production, namely; capital, labor and technology, regional development. It is an integral part of national development which is implemented based on the principle of local autonomy and the setting of national resources that provide opportunities for improving the performance of local democracy and to improve the welfare of society towards civil society that is free of collusion, corruption, and nepotism.

In this condition, one of the criteria that are often used to determine the state of the economy in a country or region is the growth of Gross Domestic Product (GDP). In more detail, it often reviews the factors that affect economic growth. However, there are lots systematically addressing the sources or factors of production that contri-

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bute to GDP growth. Similarly, no one can predict how big the contribution of each factor the GDP has. But, theoretically, economic growth is driven only by the accumulation of investment that is not a healthy economic growth. Moreover, when the capital is acquired by foreign loans it will be and inefficient. Similarly, if the output growth is driven only by the use of labor, it will mean that the level of the workers' lives has not changed because the level of wages and salaries are not increased. It is the output growth is due to the growth of inputs (capital and labor), it means that productivity is not increased.

For sustainable economic growth, the investment should be the trigger because, theoretically, it can provide a greater multiplier effect. Besides the increase in income and employment, the opportunities of the population will increase the Aggregate Supply. Shifting Aggregate Supply, theoretically, can be derived from the aggregate production function and balance of the labor market. Increased labor, technology, capital and human resources will lead to increased production function so that the aggregate supply also increased, (Dornbusch, Fischer 2004). The regional economic development is a process by which local governments and communities manage resources-resources that exist and form a pattern beetwen of local government partnership with the private sector. This is intended to create a new job and stimulate the development of economic activity (growth) in the region.

To develop the industrial sector, it also requires adequate investment in order to development of the industrial sector. This, in turn, will be implemented as the destination. In addition, the venture capital accumulation can be done through investments that will drive the economy through the mechanism of aggregate demand. This can also increase the production and, finally, increase the demand for labor (Sudarsono et al. 1998). Again, Aziz Prabowo (1997) argues that the number of business units has a positive effect on the demand for labor. This means that if the business of an industrial unit increases, the demand for labor will also increase. The more the number of companies or business units, the more the addition of labor.

It is clear that general investment is done by investors. Dornbusch and Fischer (2004) describe the investment as demand for goods and services to create or increase production capacity or revenue in the future. To develop the industrial sector, it needs an adequate investment in order to development of the industrial sector that will be implemented as the destination. Venture capital accumulation can be done through investments that will drive the economy through the mechanism of aggregate demand. This can also increase the production and, finally, increase the demand for labor. (Sudarsono 1998).

The development that took place in the Province as a whole and sustainable has increased the community's economy/ This is indicated by the achievement of development outcomes that are felt by the society as an aggregate of development of the Regency or City in Maluku Province. This is inseparable from the endeavor jointly between government and society. However, there are various obstacles in maximizing the potential of human resources and capital resources. These are still found by policy makers at the provincial and district or city.

The GDP in Maluku Province is ranked at 31 out of 33 provinces in Indonesia. Thus, it appears to be an interesting problem for investigation, considering the natural resources, infrastructure support, and even the location of Maluku province as the archipelago. It is considered to have strategic significance of its own and one study on how to increase the value of GDP by industry sectors based on the effect of investment, employment, and the number of companies located in the province of Maluku.

Industrial development in Maluku is on 5 sectors (food industry, clothing industry, chemical industry, electronics and metal industry craft industry). This is influenced by many factors, but there are several factors that affect the rise and fall of the industrial sector. They are the number of companies, labor employment, and investment. It also occurs in the development of the industrial sector in the districts or cities in the province of Maluku.

Any movement in one of the determinant factors of industrial sector will lead to another factor in change such as the rise and fall of GDP of Maluku, which in turn, affects the economic growth. For that reason, this study focuses on the effect of industry sub-sectors on the GDP Determinants in Maluku. The problem lies in the value of GDP which is relatively little for Maluku Province. In other words, it is less compared with other provinces in Indonesia. This is due to the lack of industry sub-sector donations in Maluku. Besides that, there are several factors that seem to be a major influence on GDP growth in this region, especially in the industrial sectors such as labors, investment, and the number of companies.

2. THEORETICAL FRAMEWORK

Economic Growth

Economic growth is defined as growth in economic activity led to the goods and services produced within the community. It can increase social welfare (Sukirno 2004). The economic growth is basically a long-term macro conditions on the issue of economic problems in each period, in which people try to improve them in producing goods and services. The goal is to increase the real output and living standards through the provision and deployment of production factors.

Economic growth model of Harrod-Domar

This model explains that the investment in the economic growth process has a crucial role, especially dual characters that are owned investment. This occurs during the net investment in real income and output that continues to expand. The model was developed by Harrod-Domar.

Domar model is based on questions that the investment on the one hand generates revenue and on the other to raise the production capacity. The investment must be increased so that the increase in revenue is equal to the increase in production capacity. By this increase, there is full employment that can be maintained. Harrod model is based on the three rate of growth, namely: 1) Actual Growth Rate (G) is determined by the ratio of savings in output ratio. The growth rate will show a classic variation in the rate of short-term economic growth. 2) The rate of growth is assured (GW) is a revenue growth rate of an economy's full capacity. 3) The rate of natural growth (Gr) by Harrod considered as "optimum welfare" can also be referred to as the potential growth rate.

The acceleration principle says that the level or amount of investment proportionate to the change of the output (GNP). In a simple principle, this acceleration can be explained as follows: Employers want a certain relationship or a certain proportion and the desired capital with production or output. (Nopirin 2000).

The Model of Mankiw, Romer, and Weil

Solow-Swan model assumes that factor affecting the long-term economic growth is the effectiveness of labor, A and the exogenous capital. From empirical testing, mainly using US economic growth data, it turns out the results of Solow-model estimation can generate capital share of output levels that are too high. Mankiw-Romer-Weil argued that physical capital is less accurate for measuring the contribution of capital to economic growth. Therefore, MRW improves Solow-Swan model by changing the specification of the production function to include human capital factors.

Regional Economic Growth Theory

Regional economic growth is a process of local governments and communities to manage existing resources for new jobs and stimulate economic activity developments in the region. According to the theory of economic, Arsyad (2004) states that the factor of a region is directly related to the demand for goods and services from outside the region and the growth of industries that use local resources, including labor and raw materials to be exported will generate local wealth and employment creation.

Economic growth is influenced by the level of human capital through growth technology. Aggregate production function is modified as follows: Y = AF (K, H, L), in which **H** is the accumulation of human resources education and training. According to Mankiw, Romer, and Weil (1992), the contribution of each input on these equations to national output is proportional. Investment to human resources through the education sector will generate higher national income compared with countries that are less invested in the sector.

The uncertainty of the relationship between economic growth and investment in general, and FDI in particular, can be partly due to econometric problems. For one thing, the statistical analysis is hampered by the scarcity of long-term data. For another thing, the multinational companies have expanded or investment business more than a century. The large volume of foreign direct investment being observed now is really a phenomenon of the last two decades.

There is evidence suggesting that the developed countries and sophisticated technological progress cannot take advantage of foreign investment at the same level as in developing countries. Coe and Helpman (1995) examined how the activities of R & D affect total factor productivity (TFP) in the country and abroad in 22 developed countries. Their results showed that the TFP in large developed the benefit over the country. Bernstein (1996) examined the R & D and TFP in the samples of Canadian and US industries. He found that in Canada the effect of foreign R & D activity is greater than the effect of domestic R & D, but in the United States domestic R & D activities are accounted for a much larger part of the profits TFP of foreign R & D.

Labor Force, Employment, and Economic Growth

Todaro (2004) suggests that population growth and

labor force growth (AK) is traditionally regarded as one of the positive factors that spur economic growth. Greater total labor can increase the level of production, while the larger population growth means a larger size of its domestic market. However, it is still questionable whether the rapid population growth rate actually will give a positive or negative impact on economic development.

It is stated that the positive and negative effect of population growth depends on the ability of the regional economic system to absorb and productively utilize the added labor. These capabilities are influenced by the level and type of capital accumulation and availability of inputs and supporting factors such as managerial and administrative skills.

In general, the simple model of economic growth, the notion of labor is defined as labor force that is homogeneous. According to Nicholson W. (1991) that a function is the production of certain goods or services (q) is q = f (K, L) where **K** is capital and **L** is labor which shows the maximum amount of goods or services that can be produced by using alternative combinations between K and L. Then, if one of the inputs plus one additional unit and other inputs held constant, it will cause an additional output that can be produced. Additional output produced is called the marginal physical product.

It is also stated that if the amount of labor plus the continuous medium and other production factors held constant, it will initially show an increase in productivity. However, at a certain level, it will show a decline in productivity as well as after reaching the maximum output level of each additional manpower will reduce expenditure. Human resources (HR) or Human Resources involve two meanings. First, human resources imply the work effort or services that can be provided in the production process. In this case, it reflects the quality of human resource effort given by a person in a certain time to produce goods and services. Secondly, the capable human resources can provide services or work effort. Being able to work means being able to engage in activities that have economic value, namely that these activities generate goods or services to meet the needs of the community. Physically, the ability to work is measured by age. In other words, people of working age are considered able to work. Groups of the population of working age are called labor or Man power. Briefly, labor is defined as the population of working age (Payaman J. Simanjuntak 2001).

Previous Studies

Studies on economic growth and the factors that influence it, have has been mostly conducted by many researchers. At the beginning of the economic development of a country's, the general economic development plan is problem-oriented growth. Some of these studies were conducted in Indonesia as the following.

Beddies (1999) conducted a study on the relationship between GDP growth and the growth of labor (human capital augmented by proxy) for the State of The Gambia in 1964-1998. It indicates that the accumulation of human capital has a major influence on economic growth. Based on this evidence, the policy authorities need to increase capital accumulation through increasing the level and quality of education for the workforce.

Tri Wahyu Rejekiningsih (2004) measured the amount of Small Industry in Economic Role in the province of Central Java. It measures the small industries in the economy in the province of Central Java. The role includes: the absorption of labor, contribution to GDP, estimated revenue multiplier as well as the relationship between the variable number of business units and the production value of the number of workers who are absorbed in the small industry.

Lestari and Woyanti (2009) found that investment has a positive effect on employment. The increase in investment in an industry will lead to an increase on employment. Also, Nelsen Diyan Pratama (2012) found that the industry sector is a sector that plays an important role in contributing to GDP Jepara district and also in employment, especially in small industries. The study aims to analyze the growth of employment in small industries and to know the variables that influence.

3. RESEARCH METHOD

Location of the Research

The scope of this study is in the province of Maluku, using eight data of the regencies or cities, namely West Southeast Maluku District, Southeast Maluku regency, Central Maluku district, Buru, Aru Islands regency, West Seram regency, East Seram District, and Ambon. The data were taken from 2008 to 2013. The eighth districts are the main areas and have a range of data that can be reached while three districts were taken from other districts.

Types and Sources of the Data

Data are secondary data from the Central Bureau of Statistics in Maluku, Regional Development Planning Board (BAPPEDA) of Maluku and other

sources related to this research. In detail, the data are as the following.

1. Economic Growth: using data on GDP growth in Maluku province on the basis of constant prices of 2000. The data are the data of 2008 until 2013, expressed in percent (%).
2. Labor: Labor used data on Industrial Sector in the Province of Maluku; the data used is data of 2008 until 2013 in the state in the unit.
3. Investments: Using data Investment in the Industrial Sector in the Province of Maluku, the data are of 2008 until 2013.
4. Total Company: Company uses data on Industrial Sector in the Province of Maluku; the data are of 2008 until 2013.

Data Collection Method

The data are secondary data from institutions, agencies or other sources that are relevant. They were processed and analyzed quantitatively.

Operational Definition of the Variables

Some operational definitions of variables are as the following:

a. Labor is the number of working age (aged 15 years and above) who work, that carry out economic activities that produce goods or services continuously for at least one hour a week in the Province, expressed in units of the person.
b. Investment is placing of assets, either property or money, on something expected to provide revenues to increase in value in the future (domestic and foreign investments, realization 2008-2013 in Rupiah)
c. The company is a unit of production activities that cultivate economic resources to provide goods and services for society with the aim of obtaining profits and satisfy the needs of the community (Number of Companies in the subsectors of the industry from 2008 to 2013)
d. Industry is an economic activity that process raw materials, semi-finished goods, and finished goods into goods with higher value use.
e. Gross Domestic Product is the total value-added goods and services by the various sectors of the economy in an area within a certain time (Rupiah / year). GDP data used is GDP at constant prices in Maluku Province in 2000 without gas and oil. Expressed in units of dollars
f. Economic growth: is the relative change in the real value of Gross Domestic Product (GDP) in the Province on the basis of constant prices in 2000 and expressed in terms of percent rate of economic growth in any given year (year t)

Analysis Method

Linear Regression Model Analysis of Panel Data

This study uses the panel data which can explain the two kinds of information, namely: a cross-section of information on the differences between subjects, and time series information which reflects the changes on the subject of time. When both the informations are available, the analysis of panel data can be used.

With repeated observations, the cross section data is sufficient, and the panel data analysis allows us to study the dynamics of the changes with the time series data. The combination of time series data and cross section can improve the quality and quantity of data with an approach that is not possible using only one of these data (Gujarati 2003). Panel data analysis can be studied for the group of subjects if considering both dimensions of the data or time dimension.

The research process is encountered with constraints of data. If the estimated regression with time series data or cross-sectoral, the observation will be too little to produce efficient estimates. One solution to produce an efficient estimate is a linear regression model with panel data. In this case, there are three methods that can be used to work with panel data. The first method is the approach of pooled least square (PLS) simply combining (pooled) across the time series and cross section and then estimate the model using ordinary least squares (OLS). Second, the approach fixed effect (FE) take into account the possibility that researchers face problem of omitted variables which might bring a change in intercept time series or cross section. Third, the approach of random effects (random effect) improve process efficiency by calculating the least square error of cross section and time series.

Root Unit Panel Tests

The panel data or group of data is necessary to test stationary with the root panel unit test. The root unit panel test is in addition to see stationery of data, as well as to determine the level of integration (order of integration) of the data group. Time series data that is used has a problem, especially on its stationery. When analyzing the data that is not stationary, it will generate false regression and less meaningful conclusions (Enders 1995 and Thomas 1997). Therefore, the first step is to test and make these data become stationary. This study uses five types of root unit test by using EViews software version 6, namely: (i) Levin, Lin and Chu (2002), (ii) Breitung (2000), (iii) Pesaran and Shin (2003).

Selection of Estimation Model in Panel Data

To select the model estimation in panel data, according to the Judge in Insukindro (2003), there are some factors that must be considered to determine which approach is chosen, namely Fixed Effect Model (FEM) or Random Effects Model (REM) in the estimation of panel data, one of which is if T (number series) large and N (number of units) is small, then the FEM is preferred.

In addition to determining which approach is chosen, the panel data estimation (Gujarati 2003), is the hypothesis that if the source data comes from a sample of the alleged random effect model of panel is sufficient, but if the data source is a data aggregate, the tendency is fixed effect. However, with the Hausman test, the researchers can decide the panel data or Fixed Effect or Random Effect.

Hausman Test

Hausman test is used to determine which model is the best between the fixed effects models (FEM) and random effects models (REM). Thus, it can be used as a tool to analyze data. Hausman test is obtained through the command of Eviews contained in the directory panel.

Hypothesis testing:

H_0: b is consistent but inefficient

$\hat{\beta}$ is consistent and efficient

H_1: b is consistent but inconsistent

$\hat{\beta}$ is not consistent

The null hypothesis of the Hausman test is as follows:

H_0 = random effect

H1 = fixed effect

If the Chi square count > Chi Square table and a significant p-value, then H_0 is rejected and fixed effect models were used, and vice versa (Gujarati 2003).

4. DATA ANALYSIS AND DISCUSSION

General Model:

The model is panel data which can mathematically be written as follows:

$$Y_{it} = \beta_i + \Sigma \beta_k \, Xk_{it} + \varepsilon_{it} \quad (1)$$

where $\mathbf{Y_{it}}$ is the proxy variable of economic growth by using the gross regional domestic product of industrial sectors, $\mathbf{Xk_{it}}$ are the factors that influence economic growth, εit are individual effects are constant over time t and specific to each unit of data cross section i. i = 1,2, ..., n shows the cross section, and t = 1,2, ..., t indicates time. While the factors that influence economic growth, $\mathbf{Xk_{it}}$ is the number of companies, employment, and investment. Thus, the factors that affect the economic growth can be written as follows:

$$Y_{it} = a_0 + a_1X_{1it} + a_2X_{2it} + a_3X_{3it} + e_{it} \quad (2)$$

where:

t = time (2008 - 2013)

i = County / State

Y = GDP

X1 = Total Company (in the table is represented by "PRUSH")

X2 = Labor (in the table, it is represented by "TK")

X3 = Investment (in the table, it is represented by "INV")

e = error term

This study examined whether the factors that affect components include the effects of time and the effect of individual or only one of the components of the existing effects by using Hausman test (Baltagi 2005).

Empirical Model

Industrial Sector Model:

1. Model Sub Sector Food Industry

$$Yit = a\,0 + a1X1it + a2X2it + a3X3it + EIT \quad (3)$$

2. Model Sub Industry Sector Clothing

$$Yit = a\,0 + a1X1it + a2X2it + b3X3it + EIT \quad (4)$$

3. Sub-Sector Model of Chemical Industry

$$Yit = a\,0 + a1X1it + a2X2it + b3X3it + EIT \quad (5)$$

4. Model Sub Sector Metal Industry electronics

$$Yit = a\,0 + a1X1it + a2X2it + b3X3it + EIT \quad (6)$$

5. Sub-Sector Model Craft Industry

$$Yit = a\,0 + a1X1it + a2X2it + b3X3it + EIT \quad (7)$$

Panel Unit Root Test

The variables that are not stationary at the level of the data ate then performed differencing data to reduce the data with the previous data so that the data obtained in the form of the first difference or the second difference to be stationary. The 4 variables above do not pass the test at the stage level. After being tested again at the first difference, then there are four variables qualified to be stationary. From the results of calculations in Table 1, it can be seen that the existing variable, already stationary and escaped Unit Root Test.

Results of the Panel Data Regression Model for Sub Sector of Food Industry

The fixed effect of Mechanical engineering and random effect are almost as good in explaining the variables in the model. It is then to determine which techniques which will be used in the food industry sub-sector model of this. It, would have been either one of these two techniques, to determine which technique is the best between the two.

Table 1
Results of Panel Unit Root Test at First Level, First Difference and Second Difference

Variables	Types of Root Test Units	Level	First Difference	Second Difference
PDRB	LLC, Breitung, IPS, ADF & PP	Non Stationary	Stationary	
PRUSH	LLC, Breitung, IPS, ADF & PP	Non Stationary	Stationary	
TK	LLC, Breitung, IPS, ADF & PP	Non Stationary	Stationary	
INV	LLC, Breitung, IPS, ADF & PP	Non Stationary	Stationary	

Table 2
Results of Data Analysis for Food Sub-Sector Industries

Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	13.982955	3	0.0029

Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	52595.50	20563.52	2.557709	0.0148
PRUSH?	18.04379	21.19881	1.951170	0.0402
TK?	-18.78111	5.009752	-3.748910	0.0006
INV?	0.000296	0.002825	2.504070	0.0170

Source: Data processed.

The technique is performed with Hausman test (Hausman Test). Hausman test is to observe the error covariance matrix to determine whether the fixed effect model suitable for the estimation of panel data model, with the assumption as then following.

H_0: There is no measurement error or individual effect which is not associated with other significant repressor, meaning that *random effect* model is selected.

H_1: There is an error of measurement or individual effects associated with other significant repressor, meaning that fixed effect model are chosen.

Testing criteria: If the value of χ2-statistic > χ2-table then H_0 is rejected.

From the test results of Hausman, the value of χ2-statistic is 13.982955 > 7.81473, which means that the proper technique is the fixed effect techniques.

The Interpretation of Data Analysis Results for the Model of Sub Sector Food Industries

Panel data regression is to estimate economic growth in Maluku province used approaches, namely fixed effect regression results based approach used which can be seen in Table 2.

The regression result uses a fixed effect approach, showing that all the variables included in the model have a significant effect on the economic growth as it is seen from the probability that is less than 5% (4.02%; 0.06%; 1.70%) where the variable of the number of companies and investment have a positive effect (the hypothesis is proven), while the workforce negatively affect economic growth. And *r-square* value is significant (0.93 = 93%) explaining that the ability of the model to explain variations in the dependent variable is excellent.

The results suggest that changes in number of companies and investments in the sub sector of the food industry will have a significant impact on economic growth in Maluku. Therefore, to encourage the industrial sector can grow well and can make a major contribution to economic growth, based on the results and findings of the field required increasing the number of companies engaged in the food industry sector and the need to increase the value of investments in the food industry so that later will encourage economic growth that is reflected in the increase in this sector's contribution to GDP Maluku province. But, the labor variables have a negative impact; it means here that labor in the industrial sector would make a contribution of this sector to the GDP declining, which in turn will affect the economic growth in Maluku province.

Results of panel data regression models of clothing industry sub-sector

The technique of fixed effect and random effect are almost as the same in explaining the variables in the model, determining which techniques will be used in the clothing industry in sub-sector model. This would be either one of these two techniques, to determine which technique is the best between the two. The technique will use Hausman test. Hausman test is used to observe the error covariance matrix to determine whether the fixed effect model is suitable for the estimation of panel data

Table 3
Results of Data Analysis for Clothing Sub-Sector Industries

Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	13.089962	3	0.0044

Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-9980.701	12061.90	-0.827457	0.0133
PRUSH?	230.8992	122.6749	2.022904	0.0477
TK?	32.10289	18.95686	2.693470	0.0328
INV?	-0.001454	0.002384	-2.239937	0.0456

Source: Data processed.

Table 4
Results of Data Analysis for Chemical Sub-Sector Industries

Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	5.498896	3	0.1387

Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-5969.998	21821.49	-0.273583	0.7857
PRUSH?	21.19769	25.74442	1.823390	0.0617
TK?	4.189077	7.877573	1.531773	0.0976
INV?	0.001475	0.001543	1.956078	0.0443

Source: Data processed.

model, with the assumption being built as follows:
H_0: There is no measurement error (error covariance) or individual effect which is not associated with other significant repressor, meaning that *random effect* model is selected.
$H_{1:}$ There is a measurement error (error covariance) or individual effects associated with other significant repressor, meaning that fixed effect model is selected.
Testing criteria: If the value of χ2-statistic > χ2-table then H0 is rejected.

From the test results, it obtained Hausman χ2-statistic value of 13.089962 > 7.81473, which means that the proper technique is the *fixed effect* techniques.

Interpretation of Analysis Data Results for Model of Sub Industry Sector Clothing

Panel data regression is used to estimate economic growth in Maluku province. This is then used for the approaches, namely *fixed effect*. Results of regression are based approach and it can be seen in Table 3.

The regression result using a *fixed effect* approach shows that all the variables included in the model have a significant effect on the economic growth, seen from the probability that is less than 5% (4.77%; 3.28%; 4.56%). The number companies and labors have a positive effect (hypothesis proven), while the investment negatively affects economic growth. The *r-square* value is significant at (0.93 = 93%) explaining that the ability of the model to explain variations in the dependent variable is very good.

The result indicates that if there is an increase or decrease in the number of companies and workers in the clothing industry sub-sector, it will have a significant impact on economic growth in Maluku. It means that both of these variables play an important role in promoting economic growth if managed properly. Therefore, encouraging the industrial sector can grow well and make a major contribution to economic growth. Again, it is necessary to increase the number of companies engaged in the clothing industry sectors and increase in employment in the clothing industry sectors that will encourage economic growth as reflected in the increase in this sector's contribution to GDP in Maluku province. However, investment has a negative impact, meaning that the increase in investment in the industrial sector will actually make the GDP decrease, which in turn will affect the economic growth in Maluku.

Results of Panel Data Regression Model for Sub Sector of Chemical Industry

The techniques of *fixed effect* and *random effect* are also almost as good in explaining the variables in

Table 5
Results of Data Analysis for Metal Electronic Sub-Sector Industries

Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	5.250971	3	0.1543

Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	14710.92	23563.64	0.624306	0.3357
PRUSH?	184.8859	179.1907	1.031783	0.0778
TK?	29.46248	21.31744	1.982083	0.0439
INV?	146.0190	0.012903	2.147271	0.0336

Source: Data processed.

Table 6
Results of Data Analysis for Craft Sub-Sector Industries

Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	12.060650	3	0.0080

Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	19779.84	18373.47	1.876544	0.0887
PRUSH?	166.1638	182.0764	2.312605	0.0374
TK?	28.18492	21.40284	2.916878	0.0160
INV?	0.001868	0.014062	3.232827	0.0050

Source: Data processed.

the model, and to determine which techniques will be used in the chemical industry sub-sector model. It would be either one of these two techniques can determine which technique is the best between the two. The technique uses Hausman test. Hausman test is used to observe the error covariance matrix to determine whether the fixed effect model suitable for the estimation of panel data model, with the assumption as follows.

H0: There is no measurement error or individual effect which is not associated with other significant regressor, meaning that random effect models is selected.

H1: There is an error of measurement error or individual effect associated with other significant regressor, meaning that *fixed effect* model is selected.

Testing criteria: If the value of χ2-statistic > χ2-table then H0 is rejected.

From the test results obtained Hausman χ2-statistical value is equal to 5.498896 < 7.81473, which means that the proper technique is the technique of random effect.

Interpretation of Results Analysis Data for the Model of Sub Sector Chemical Industry

Panel data regression is used to estimate economic growth in the Province as the approach, namely *random effect*. Results of regression based on the approach can be seen in Table 4.

Regression results using a random effect approach, indicating that the variable number of companies and labor variables did not significantly affect the growth, as seen from the figure the probability that is greater than 5% (6.17%; 9.76%) while the investment variable has a positive and significant at (4.43%), on economic growth. *R-square* of 0.33% indicates that the ability of the model explaining the variations in the dependent variable is quite good. The hypothesis is proven on investment variables, while the other two variables are not proven.

These results indicate that that investment plays an important role in increasing revenue at industry-sector, which in turn, it will provide a good contribution to GDP so as to encourage economic growth in Maluku. Thus, the strategy and policy of the local government in the chemical industry must be driven by investment, because it can create a multiplier effect. Yet, the two variables that change in the number of companies and workers in the chemical industry subsector cannot provide a significant impact on economic growth in Maluku.

Results of Panel Data Regression for the Model of Sub Sector Metal Electronic Industry

The techniques of *fixed effect* and *random effect* are almost good for explaining the variables in the

model, and then it can also determine which techniques will be used in the metal industry sub-sector model. It would be either one of these two techniques, to determine which technique is best between the two. The technique will be performed Hausman test (Hausman Test). Hausman test is used to observe the error covariance matrix to determine whether the *fixed effect* model is suitable for the estimation of panel data model, with the assumption as follows.

H0: There is no measurement error or individual effect which is not associated with other significant repressor, meaning that *random effect model* is selected.

H1: There is an error of measurement error or individual effects associated with other significant regress, meaning that *fixed effect* model is selected.

Testing criteria: If the value of χ2-statistic > χ2-table then H0 is rejected.

From the test results obtained Hausman χ2-statistical value is equal to 5.250971 < 7.81473, which means that the proper technique is the technique of random effect.

Interpretation of Analysis Data Results of Model for Metal Electronic Industry Sub-Sector

Sub Panel data regression is used to estimate economic growth in Maluku as the approach, namely *random effect*. Results of regression based approach used can be seen in Table 5.

Regression results using a random effect approach, suggest that labor is not a significant variable affecting the growth, as seen from the figure the probability that is greater than 5% (10.83%) while the variable number of companies and investment variable has a positive effect (hypothesis proved) and significant at (0.30%; 4.67%) on economic growth. *R-square* of 71% indicates that the ability of the model to explain variations in the dependent variable was excellent.

These results suggest that the number of companies and investment in the metal industry subsectors of electronics have an important role in contributing to the GDP in Maluku, which in turn, it will facilitate economic growth in this province. Any increase or decrease in the number of companies and investments can make the GDP grow towards the positive. The strategies and policies are taken by the government in these sub-sector areas, and it should lead to increasing the number of companies and increased investment so as to give a great effect on economic growth in Maluku, especially donations of electronic metal industrial subsector.

Results of Panel Data Regression for the Model of Sub Sector Craft Industry

The techniques of *fixed effect* and *random effect* are almost as good in explaining the variables in the model, and able to determine which techniques will be used in the metal industry sub-sector model. It would be either one of these two techniques, to determine which technique is the best between the two. The technique is performed using Hausman test. Hausman test is used to observe the error covariance matrix to determine whether the fixed effect model suitable for the estimation of panel data model, with the assumption as the following.

H0: There is no measurement error or individual effect which is not associated with other significant repressor, meaning that *a random effect model is* selected.

H1: There is an error of measurement error or individual effect associated with other significant regressor, meaning that a fixed effect model is selected.

Testing criteria: If the value of χ2-statistic > χ2-table then H0 is rejected.

From the test results obtained in Hausman, the χ2-statistic value is at 12.060650 > 7.81473, which means that the proper technique is the *fixed effect* technique.

Interpretation of Results of Analysis Data for Craft Industries Sub-Sector Model

Panel data regression is used to estimate economic growth in Maluku as the approach, namely fixed effect. Results of regression based approach used can be seen in Table 6.

Regression results using a random effect approach, indicates that the variable number of companies did not significantly affect the growth seen from the figure the probability of greater than 5% (7.78%) while the labor and investment variables have a positive and significant at (4.39%; 3.36%) on economic growth. *R-square* of 0.73 or 73% indicates that the ability of the model to explain variations in the dependent variable is good either.

These results indicate that the variable labor and investment and influence greatly the industrial sector, especially the handicraft industry. That is any change in these two variables has an impact on the increase in GDP, which in turn, it can drive economic growth in Maluku. Thus, the strategies and policies adopted by the government can encourage economic growth of the industrial sector, especially the craft industry sub-sector. It should lead to an increase in the quality and quantity of labor as well as increased investment, which will

provide a multiplier effect for the economy in Maluku.

5. CONCLUSION, IMPLICATION, SUGGESTION, AND LIMITATIONS

Conclusion

The industrial sectors in this regard of the fifth subsectors are Food Industry, Clothing Industry, Chemical Industry, Metal Industry, and Handicraft Industry in terms of contribution to GDP in Maluku. It cannot be denied that they are strongly affected by the number of companies, labor, and investment. In other words, the industrial sectors to boost economic growth, it requires the contribution of a number of companies, labor and investment.

Company number in each subsector of the industry has a strategic role in pushing up the contribution of industry sector to the increased GDP from the industrial sector, which in turn will encourage economic growth occurs Maluku province. Labor in each industrial subsector is an instrumental in contributing to the industrial sector for the GDP in Maluku. Therefore, increase and decrease of the workforce both in quality and quantity in general are very influential for economic growth in Maluku.

Investment plays an important role in the industrial sector. Furthermore, in most sub-sectors, they need investment. This shows that the investment has a great influence for the industrial sector. Due to the investment, the industrial sector can grow bigger and able to provide a wider multiplier effect.

National and local governments should make a strategy and a policy in favor of the sub-sectors of the industrial sectors to encourage the growth of the number of businesses in the industrial subsectors in Maluku. It is good for preparing the workforce both in terms of quantity and quality. It should be encouraged by the government to the maximum, given that the labor has a very considerable role in the sub-sectors of the industry to increase GDP in Maluku. Local and central government intervention is needed in stimulating the investment growth in Maluku both Domestic and Foreign Investment. It is necessary for the growth of investment in Maluku. It greatly affects the growth and contributes to industry for increasing the GDP in Maluku.

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