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Economic and Non-Economic Factors Effect Per Capita Income in Indonesia

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Abstract

Indonesia per capita income tends to increase during 2013 – 2016. It indicates that Indonesian people are able to achieve welfare improvement. This research aims to analyze the effects of inflation, Human Development Index (HDI), population, Gross Regional Domestic Product (GRDP) growth, Minimum Wage, and technology utilization on per capita income in Indonesia. It becomes a reference for local economic policies at local governments in Indonesia. The estimation model uses panel data under the Fixed Effects Model (FEM). FEM is chosen based on the Chow and Hausman test. This research uses time series from 2013 – 2016 and cross-section of 34 provinces in Indonesia. The findings show that inflation and GRDP have a significant effect on per capita income with negative direction, while HDI and minimum wage have a significant effect with positive direction, whereas population and technology utilization for workers do not have a significant effect. The coefficient of determination (Adjusted R2) is about 0.999754. It means that 99.975% of the dependent variable is explained by the variation of the independent variables. The implication of policies, namely: a) the local governments should control the inflation rate; b) the local governments should increase the domestic investment in health, education, and accessibility; and c) the local governments should promote technology utilization to the workers.

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INTRODUCTION

The high level of per capita may be determined by high urbanization (Tjiptoherijanto, 2016), investment and savings (Masniadi, 2012). Meanwhile, the relatively low per capita income can be influenced by the low level of workers' minimum wage (Lubis & Kodoatie, 2013). Furthermore, some empirical studies that analyze the determinant factor of per capita income are done by (Xu, et al., 2015), (Ilter, 2017), and (Peterson, 2017). In contrast, other empirical studies estimate per capita income (inequality) cross-countries analysis such as (Paweenawat & McNown, 2014), (Hajamini, 2015), (Baliamoune-Lutz & McGillivray, 2015), (Lynn, et al., 2015), (Cabral, et al., 2016), (Yang & Greaney, 2017) and (Otsuka et al., 2017).

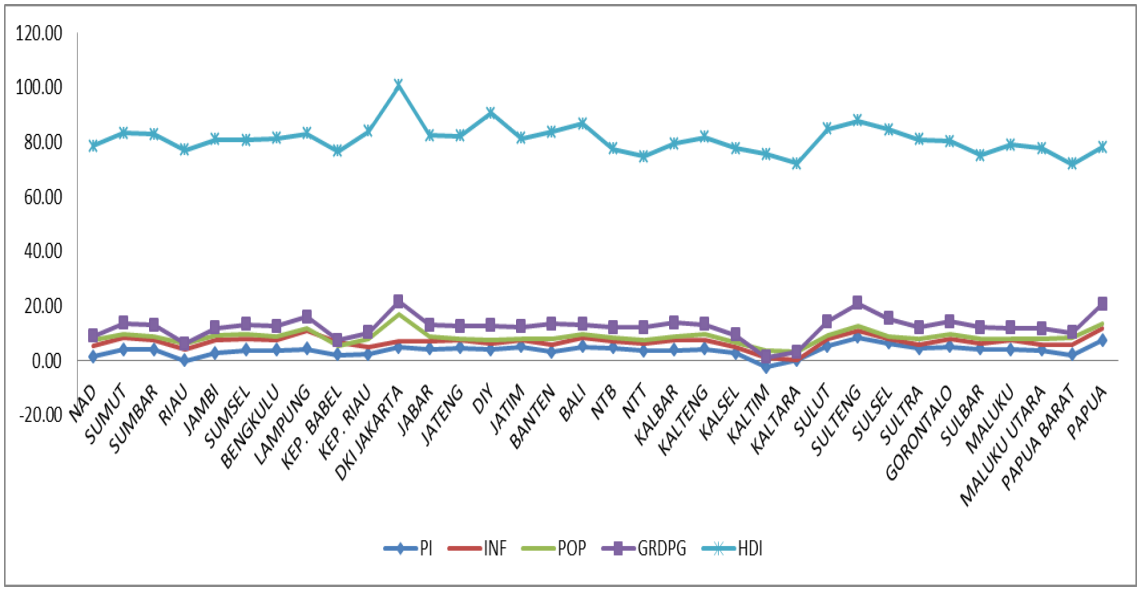

Figure 1. The Development of Research Variables in 2016
Source: Statistics Indonesia (2016, Processed)
Note: Research variables: PI = growth of per capita income (%); INF = inflation (%0; HDI = human development index (index); POP = population growth (%); GRDPG = growth of gross regional domestic product (%)

Figure 1 exhibits the growth of per capita income, inflation, human development index (HDI), population, and GRDP growth in 34 provinces in Indonesia in 2016. In that period, the highest value of each variable consists of the growth of per capita income is about 8.29% (Central Sulawesi), inflation is about 6.75% (Lampung), HDI is about 78.99 (Jakarta), the population growth is about 9.54% (Jakarta), and GRDP growth is about 8.29% (Central Sulawesi). In addition, the good quality of human resource exists in the Java region, while the improvement of economic conditions occurs in the area outside Java. In contrast, the lowest value of each variable such as growth of per capita income is about -2.50% (East Kalimantan, inflation is about 0.35% (North Kalimantan), HDI is about 57.25% (Papua), population growth is about -1.20% (Bangka Belitung Islands), and GRDP growth is about -2.50% (East Kalimantan). It means that the economic development in regions outside Java is relatively slow. In addition, Suradi (2012) suggests that the government can conduct the top-down approach to increase regarding the welfare of Indonesian people.

This study examines the effect of economic and non – economic factors in 34 provinces in Indonesia. Selection of economic and non – economic variables is intended to describe whether per capita income can be influenced by the two factors or just one factor.

This research uses panel data method. The research finding shows that inflation, HDI, GRDP growth, and wage have a significant effect on per capita income. Meanwhile, population and technology do not have a significant effect on per capita income. It means that economic and non – economic factors influence the level of Indonesian welfare.

The contribution to existing literature consists of the selection of economic and non-economic factors as determinant factors of per capita income at the provincial level of Indonesia. The number of provinces is regulated by Government Regulation Number 20 of 2012 on The Establishment of New Autonomous Regions in Indonesia.

In the perspective of economic development, the level of prosperity and welfare can be measured by per capita income. It is assumed that the level of prosperity of a country is reflected by the average income of its population (Meier & Rauch, 2000). In addition, the growth of per capita income reflects the development progress (Todaro & Smith, 2009). This condition can be seen from economic growth which is influenced by capital accumulation, population and technology. Moreover, Seshaiah & Tripathy (2018) found that the real exchange rate, real interest rate, consumer price index (CPI), and money supply are influential to per capita income.

This research also analyzes the effect of inflation and wage on per capita income in Indonesia. Chisti, et al. (2015) and Ilter (2017) have found that inflation has a significant effect on per capita income. When inflation decreases, the per capita income will increase. Thus, the focus of inflation stability at a relatively low level will be able to help people increase per capita income. It means that the correlation between inflation and per capita income is negative. In addition, (Xu, et al., 2015) explained that wage has a significant effect on per capita income. The increase in wages will influence the increase in per capita income.

Awe & Rufus (2012) identified that employment rate, inflation, and government education expenditure are the determinants of per capita (distribution) income. Those variables have a long-term relationship. This confirms that wage is the reflection of people's welfare, which is also connected to the amount of labour, price fluctuations, and people's expenses for education. Furthermore, the increase in education quality in Indonesia will stimulate the increase of per capita income. Previous empirical research found that inflation has eroded per capita income while economic growth can stimulate per capita income (Li & Zou, 2002).

In short-term, the existence of population has not been able to boost per capita income, but in long-term population will become a demographic surplus (Peterson, 2017). Moreover, Balisacan, et al. (2006) show that demographic bonus has an important role in the increase of per capita income.

Human development index (HDI) has an important role in increasing per capita income. Ilter (2017) shows that HDI has a positive effect on per capita income. In similar, Crespo & Fontoura (2007) illustrated that the quality of human resources has driven an increase in per capita income in Indonesia. Therefore, it is correct to use HDI as a non – economic factor that affects per capita income in Indonesia. Furthermore, Sudarlan (2015) informs that variables such as inflation, education, and health have a significant effect on people's welfare in the form of poverty reduction. Hence, HDI in Indonesia that consists of components such as education, health, and income reflects the level of positive and life quality of Indonesian people.

The utilization of technology for workers will be able to stimulate per capita income. This empirical finding has been carried out by Lubis & Kodoatie (2013). Thus, the existence of technology in the industry can improve the skills of the workforce. It is expected to be able to encourage improvement in people's welfare.

This paper consists of several parts. They are the introduction, research method, result and discussion, and conclusion. The research method covers the data set and panel data model. Meanwhile, result and discussion will discuss the result of descriptive statistics, panel data estimation, Chow test, Hausman test,

autocorrelation test and heteroscedasticity test. Chow test and Hausman's test are employed because the final result of the panel model is the Fixed Effects Model (FEM).

RESEARCH METHODS

The Indonesian government has ratified Government Law Number 20/2012 on The Establishment of New Autonomous Regions. After the enactment of the law, Indonesia has 34 provinces. The initial period of this study is 2013, in which covers 34 provinces as the research areas. Therefore, the data of this research cover per capita income, inflation, human development index (HDI), GDRP growth, wage, technology, and population. The data is collected from the Central Bureau of Statistics (BPS). The description of the research variables are shown in Table 1.

Table 1. Description of Research Variables

Variables	Description	Measurement/Unit
Per capita income	Per capita income is the ratio of GRDP to population in each province in Indonesia in a year.	IDR
Gross Regional Domestic Product (GRDP) Growth	GRDP Growth is the changes in the value of GRDP every year in 34 provinces with constant prices in 2010.	Percent (%)
Inflation	Inflation is the percentage of the change in price of goods and services in a period of a year in 34 provinces.	Percent (%)
Minimum Wage	Minimum wage is the minimum provincial wage which has been set by each regional government of the 34 provinces.	IDR
Human Development Index (HDI)	HDI is the index that explains the components of human development such as health and welfare in the 34 provinces.	Index
Technology for Workers	Technology for workers is the capital value per worker in each province in Indonesia per year.	US Dollars
Population	Population is the amount of population in a year in each province in Indonesia.	Person

The dependent variable is per capita income, while the independent variables consist of inflation, Human Development Index (HDI), population, Gross Regional Domestic Product (GRDP) growth, Provincial Minimum Wage, and technology utilization by the workers. The data in this research consist of time series from 2013 – 2016 and cross-section of 34 provinces in Indonesia. Therefore, the total observation is about 136 observations. In addition, the basic model of panel data refers to Gujarati and Porter (2009) and Greene (2003).

The empirical research by Barro (1991), Lubis and Kodoatie (2013), Sabia (2015), Xu, Huo, Shang (2015), Ilter (2017) and Peterson (2017) become the references for panel modeling of this study. Ilter (2017) added that other than economic growth, population and education also have a significant effect on per capita income. Peterson (2017) argued that population will stimulate people's welfare in the long-term. Meanwhile, technology utilization also affects per capita income (Lubis and Kodoatie, 2013). Furthermore, Sabia (2015), and Xu, Huo, & Shang (2015) have identified the significant effect of wage on per capita income.

The research panel's data modelling function is as follows:

PI = f(GRDPG, INF, WAGE, HDI, POP, TW)……(1)

The above function can be formulated into the following panel data equation:

$$PI_{it} = \alpha + \beta_1 GRDPG_{it} + \beta_2 INF_{it} + \beta_3 WAGE_{it} + \beta_4 HDI_{it} + \beta_5 POP_{it} + \beta_6 TW_{it} + \varepsilon_{.it} \ldots\ldots\ldots\ldots(2)$$

PI is per capita income, GRDPG is the growth of the gross regional domestic product, WAGE is provincial minimum wage, HDI is development index, POP is population, and TW is technology (capital) for workers. The "α" symbol is the intercept of the panel data equation, while β1, β2, β3, β4, β5 and β6 are the

parameters/slope of data panel equation. The value of β1, β3, β4, β5 and β6 are > 0, while β2 is < 0. Meanwhile, the "i" is the cross-section of 34 provinces, "t" is the period of research from 2013-2016, and "ε" is the error term.

Equation 2 will be converted into the logarithm equation as follows:

$$LogPI_{it} = \alpha + \beta_1 GRDPG_{it} + \beta_2 INF_{it} + \beta_3 LogWAGE_{it} + \beta_4 HDI_{it} + \beta_5 LogPOP_{it} + \beta_6 LogTW_{it} + \varepsilon_{it} \quad (3)$$

Equation 3 will be estimated using Common Effects Model (CEM), Fixed Effects Model (FEM), and Random Effects Model (REM). There are three stages of testing to choose one of the best models of the three models. The Chow Test is used to choose the best model between CEM or FEM. The Hausman test is utilized to choose the best model between FEM or REM. Meanwhile, the Lagrange Multiplier (LM) test is employed to decide the best model between CEM or REM. The three tests do not have to be done under the assumption that there are two test results that consistently produce one of the best models.

The next step for selecting the best model panel data is the multicollinearity test, autocorrelation and heteroscedasticity. These three tests are used to analyze the robustness of the best model to produce a BLUE parameter (see Gujarati & Porter, 2009; and Greene, 2003)..

RESULTS AND DISCUSSION

Descriptive statistics is addressed to describe the distribution of research data. The data distribution does not only discuss the minimum, maximum and average values but also the normality of the data. The good research data are those which are distributed well. The descriptive results of this research variable statistics can be seen in Table 2. Based on the table, there are three variables that tend to be normally distributed: inflation, wage, and HDI. The normality of the data can be seen from the skewness, kurtosis, and Jarque-Bera value with a probability of < 1%. If seen from the average value of each variable, the mean of PI, GRDPG, INF, WAGE, HDI, POP, and TW are IDR37 million, 3.88%, 5.85%, IDR16 million, 67.99, 7 million people, and USD15, 194.

Table 2. Descriptive Statistics of Research Variables

Variables	PI	GRDPG	INF	WAGE	HDI	POP	TW
Mean	37046.50	3.88	5.85	1627230	67.99	7368977	15194.17
Median	28145.07	3.95	5.92	1617500	68.19	3862650	6635
Maximum	149779.40	20.21	11.58	3100000	78.99	46709600	120411
Minimum	10396.76	-3.37	0.35	830000	56.25	547986	664
Std. Dev.	29128.61	2.55	2.70	435835.70	4.12	10606354	20721.12
Skewness	2.41	1.74	0.08	0.54	0.04	2.60	2.457166
Kurtosis	8.33	16.31	1.85	3.56	4.16	8.68	9.88
Jarque-Bera	289.27	1056.37	7.59	8.23	7.59	330.26	399.26
Probability	0.00	0.00	0.02	0.02	0.02	0.00	0.00
Sum	4964231	519.69	784.51	2.18E+08	9111.83	9.87E+08	2036019
Sum Sq. Dev.	1.13E+11	867.92	970.36	2.53E+13	2321.47	1.50E+16	5.71E+10
Observations	134	134	134	134	134	134	134

Source: BPS (Processed)

Note: PI = per capita income (000 IDR);

GRDPG = growth of GRDP (%); INF = inflation (%); WAGE in IDR; HDI in index; POP = population (person); TW = technology (capital) for workers (USD).

The first step of panel data analysis is selecting the best models. They are Common Effects Model (CEM), Fixed Effects Model (FEM), and Random Effects Model (REM). Some testing methods used in selecting the best model are the Chow test and the Hausman test. The final result of the best model of this study is FEM based on the Chow (Table 3) and the Hausman test (Table 4). Table 3 informs the result of the Chow test. This test will inform whether the best model is from the CEM or FEM panel data estimation. The determination of the best model refers to the following hypothesis:

H0: Common Effects Model

H1: Fixed Effects Model

Hypothesis testing uses a Likelihood Ratio. The result shows that the F test value is significant at α = 1%. This means that H0 is rejected or H1 is accepted. The best model based on this test is FEM.

Table 3. The Chow Test Result

Effects Test	Statistic	Prob.
Cross-section F	29.929086	0.0000
Cross-section Chi-Square	43.707368	0.0000

Source: Secondary data (processed)

However, the Hausman test is employed to decide the best model between FEM or REM. This testing procedure is carried out through a hypothesis:

H0: Random Effects Model

H1: Fixed Effects Model

The Hausman test result is shown in Table 4. Based on this table, the number of Chi-Square tests is significant at α = 1%. It means that the best model of the Hausman test is the FEM.

Table 5 expresses the best FEM estimation. The finding explains that per capita income in Indonesia is influenced by inflation, human development index (HDI), GRDP growth, and minimum wage. It means that there are three economic factors and one non – economic factor that have an effect on per capita income. Meanwhile, population and technology for workers do not have a significant effect on per capita income. If seen from the result of F statistics, the result is significant. So, simultaneously the economic and non – economic factors have a significant effect on per capita income in Indonesia in 2013 – 2016. In addition, the coefficient of determination as a robustness indicator of the model is 0.999754 or 99.9754%.

Table 4. The Hausman Test

Correlated Random effect – Hausman Test
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross- section random	46.235520	6	0.0000

Source: Secondary data (processed)

Inflation has a negative significant effect, which means that inflation's role is to reduce per capita income. The higher the inflation, the lower the per capita income is. This research is also relevant to Chisti, et al. (2015) and Ilter (2017). Thus, the central and local government needs to maintain a relatively low and stable inflation rate. Policies on the supply of goods and services, commodity trading and optimization of the Regional Inflation Control Team are key strategies.

HDI has a significant positive effect, which means that the better the quality of the people, the better their per capita income is. This information confirms to the public and local governments in each province in Indonesia that there is a trend towards an improvement in HDI and per capita income. This research is significant to empirical research by Ilter (2017). Hence, HDI tends to be a reflection of per capita income in Indonesia. Moreover, the central and local governments are expected to maintain the sustainability of programs to improve the quality of education, health, and welfare of the people

GRDP growth has a negative significant effect. It means that the economic growth at the

local level has not been a determinant that per capita income will improve. This phenomenon needs a deeper understanding by observing how the economic structure in each province promotes the economic growth. The formation of economic growth which is supported by the majority of productive sectors will stimulate per capita income to improve. Meanwhile, the economic growth supported by the competitive sector can be an obstacle to increasing per capita income. Therefore, the central and local government should direct the productive sectors more dominantly to increase per capita income.

Table 5. Fixed Effects Model Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.190649	0.127606	48.51383	0.0000*
INF?	-0.003459	0.000313	-11.06209	0.0000*
HDI?	0.015720	0.002127	7.389448	0.0000*
LOGPOP?	0.000270	0.003896	0.069363	0.9448
GRDPG?	-0.002601	0.000801	-3.247702	0.0016*
LOGWAGE?	0.041000	0.011909	3.442664	0.0009*
LOGTW?	-0.002687	0.002771	-0.969880	0.3346
R-squared	0.999826	F-statistic		13858.41*
Adjusted R-squared	0.999754	Prob(F-statistic)		0.000000

Source: Data analysis
Note: a) FEM uses GLS; b) dependent variable is LOGPI; c) * = significant

The provincial minimum wage has a positive significant effect on per capita income. It confirms that there are improvements in the level of wages received by workers in each province in Indonesia. The arrangement of the minimum wage is discussed by three parties: labour unions, business actors, and local government. Thus, the three parties should arrange wages that are able to increase per capita income of the people and maintain/increase the sustainability of the business in the company. This finding is relevant to the research by Xu et al. (2015).

Figure 2 shows the result of the autocorrelation test using the Durbin – Watson *d* test. The procedure of the test is preceded by the following hypothesis formulations (Gujarati and Porter, 2009):

1. $H0$: $\rho = 0$ versus H1:$\rho>0$. Reject $H0$ at α level if $d < dU$. which is, there is statistically significant positive autocorrelation.

2. $H0$: $\rho = 0$ versus $H1$:$\rho<0$. Reject $H0$ at α level if the estimated $(4 - d) < dU$, which is, there is statistically significant evidence of negative autocorrelation.

3. $H0$: $\rho = 0$ versus $H1$: ρ _= 0. Reject $H0$ at 2α level if $d < dU$ or $(4 - d) < dU$, which is, there is statistically significant evidence of autocorrelation, positive or negative. Based on the FEM estimation result, the value of the Durbin-Watson test is 1.924245, while the value of Durbin-Watson table is dL = 1.6445 and dU = 1.79672. Therefore, there is no autocorrelation in the FEM estimation result.

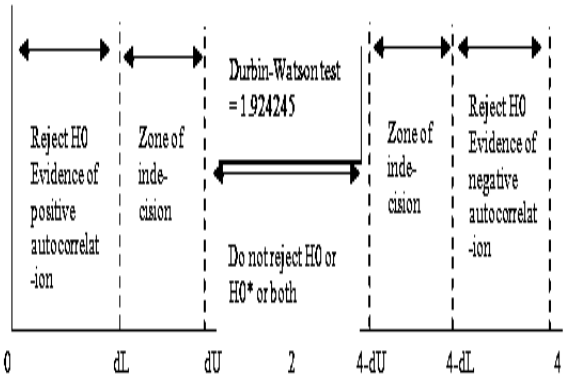

Figure 2. The Result of Durbin-Watson *d* Test

Table 7 explains the result of Park test in order to identify the heteroscedasticity problem in the FEM estimation model. The result of the test shows that there are 5, out of 6 independent variables, that are not significant. It means that the FEM estimation result has probably been pass from heteroscedasticity problem. The last classical assumption procedure in this study is the multicollinearity test. The approach used in this test is collinearity matrix. The result can be seen in Table 8.

Based on the table, the correlation between independent variables tends to be weak. However, the correlation between HDI and technology for workers is relatively strong. It may be caused by the technology utilization by workers in Indonesia which become an indicator of education and welfare level in HDI measurements. Generally, there is no multicollinearity problem in the FEM estimation.

Table 7. The Result of Park Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.051554	0.083670	0.616159	0.5389
INF	0.000220	9.42E-05	2.337624	0.0210
HDI	-1.11E-05	8.52E-06	-1.300434	0.1958
LOGPOP	-6.15E-05	0.000496	-0.123901	0.9016
GRDPG	-1.96E-05	6.17E-05	-0.317768	0.7512
LOGWAGE	-0.000165	0.001801	-0.091543	0.9272
LOGTWTW	0.000462	0.000383	1.206065	0.2301

Source: Secondary Data (Processed)
Note: dependent variable is RESID

Table 8. The Result of Collinearity Matrix

	INF	HDI	LOGPOP	GRDPG	LOGWAGE	LOGTW
INF	1.000000	-0.065099	0.030397	0.023309	-0.390682	-0.054589
HDI	-0.065099	1.000000	0.169402	-0.248681	0.140414	0.797855
LOGPOP	0.030397	0.169402	1.000000	-0.094481	-0.211976	0.089716
GRDPG	0.023309	-0.248681	-0.094481	1.000000	-0.102570	-0.184292
LOGWAGE	-0.390682	0.140414	-0.211976	-0.102570	1.000000	0.156167
LOGTW	-0.054589	0.797855	0.089716	-0.184292	0.156167	1.000000

Source: Secondary Data (Processed)

CONCLUSION

This study analyzes the effect of economic and non-economic factors consisting of GDP Growth, inflation, minimum wage, HDI, population and technology on per capita income in Indonesia. The FEM estimation result shows that three variables significantly influence per capita income. In addition, the non-economic factors such as population, HDI, and technology for workers are also estimated in FEM. The result is that only HDI has a significant effect on per capita income. Therefore, per capita income in Indonesia tends to be determined by economic factors. Furthermore, HDI is also relatively good to reflect people's life quality to describe their per capita income condition. The better the HDI, the better the per capita income is

The findings can be taken into consideration by local governments in Indonesia to maintain the local and national economic conditions in improving per capita income of the people. Policies that lead to price stability, pro-growth, pro-human being, pro-health, and pro-human capital are maintained and improved. In addition, local governments also need to encourage the active role of the people, especially workers to increase their productivity in order to achieve higher HDI, continuous economic growth, and more adequate wage.

The limitation of this study is the macroeconomic perspective. For that reason, further research can examine economic and non-economic factors from a microeconomic perspective. This perspective is not only at the level of research subjects such as households and companies but also their behaviour in forming per capita income in each region in Indonesia.

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