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DOES THE PHILLIPS CURVE EXIST IN INDONESIA? A PANEL GRANGER CAUSALITY MODEL

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Abstract. The short-term economic problems such as inflation and unemployment are among the most important macroeconomic problems at all times. Emprirical study was conducted with a purpose to analyze the causality of the inflation rate and the open unemployment rate of 33 provinces in Indonesia from 2013 to 2017. Indonesia's geographic condition which consists of thousands of islands is a note that macro policies at the time of implementation require a long process, even need to be adjusted to pay attention to aspects of regional variation. Therefore, the Panel Data Model and Panel Granger Causality becomes an alternative to capture the possibility of variations between regions in the short term. The study showed that there was a one-way causality relationship from the inflation rate to the open unemployment rate. The trade-off between the inflation rate and the open unemployment rate was a short-term economic phenomenon, so the Sticky Price condition still applied. We foud that in provinces of Indonesia the inflation rate was conditioned mainly by Demand-Pull Inflation. Thus, an effective inflation management could reduce the open unemployment. Thus, the role of government in managing the economy cannot be underestimated, both through fiscal and monetary policies. This role isemphasized more on the government's efforts to stimulate the Demand Side Economics.

Keywords: Inflation Rate; Open Unemployment Rate; Panel Data; Panel Granger Causality; Indonesia

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JEL Classifications: E600, E610

1. Introduction

Inflation is a symptom that shows a continuous increase in the general price level (Mishkin, 2011; Sasongko & Huruta, 2018, 2019). This is a problem faced by almost all countries in the world. In Indonesia, inflation problems got into the focus in the transition period (1965 to 1969), especially when Indonesia experienced hyperinflation in 1966. At that time, the inflation reached 1136.25% (World Bank, 2017). The situation began to improve when the rate of inflation in Indonesia began to decline to reach 15.52% in 1969. During the monetary crisis in 1998, the inflation rate in Indonesia increased to 58.39%. However, after the monetary crisis, Indonesia began to be able to control the inflation rate. Even in the last five years (2013 to 2017), Indonesia has been able to maintain its inflation rate during the global financial crisis in early 2009 and the debt crisis in the European Union and the United States in 2011. Figure 1 below is an overview of inflation rate for each province in Indonesia from 2013 to 2017.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2019 Volume 6 Number 3 (March)
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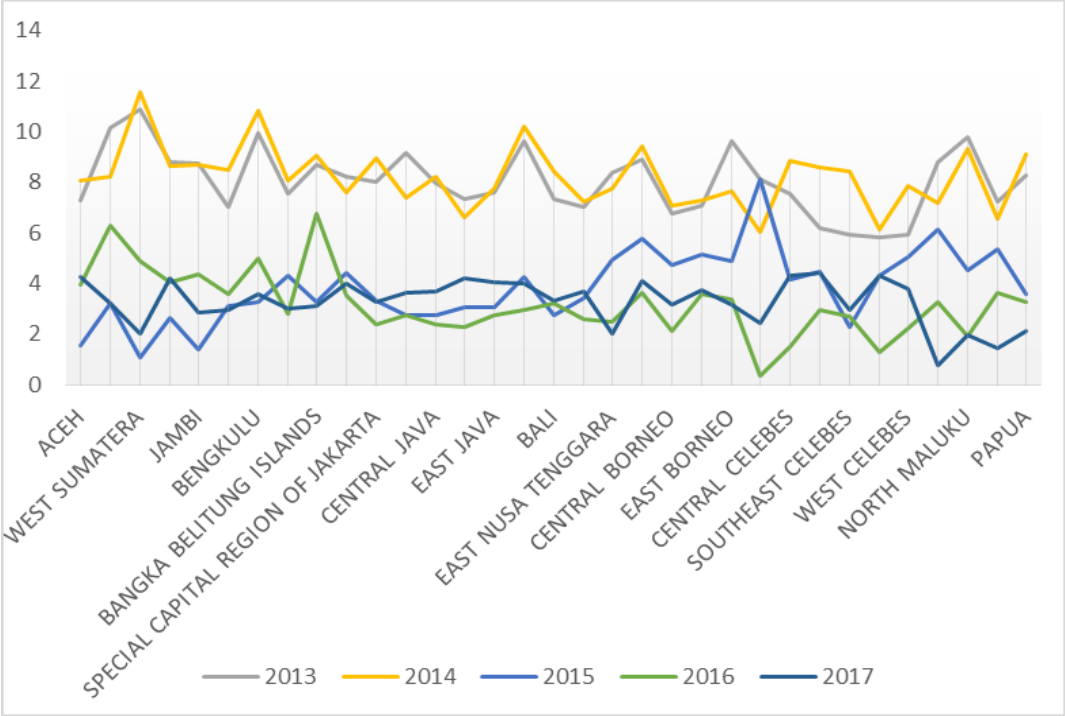

Figure 1. The Inflation Rate by Province (2013 to 2017)
Source: Bank Indonesia (2018)

Figure 1 indicates that the level of inflation in provinces in Indonesia from 2013 to 2017 can be controlled. During the global financial crisis in early 2009 and the debt crisis in the European Union and the United States in 2011, the impact was not so great for Indonesia. Although in 2013 and 2014 the inflation rate in all provinces in Indonesia experienced an increase, this was not the impact of the global crisis, instead it was caused by an increase in the fuel price which caused an increase in production costs or Cost-Push Inflation (Astuti, 2016; Badan Pusat Statistik, 2015).

Another problem that often gets into focus in the economy of every country including Indonesia is unemployment. Keynes (1936) mentioned that a country that has an unemployment rate of 4% or less can be called a country that has reached full employment, yet the unemployment rate in Indonesia is far above 4%. The following is an overview of the Unemployment Rate in each province in Indonesia from 2013 to 2017.

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2019 Volume 6 Number 3 (March)
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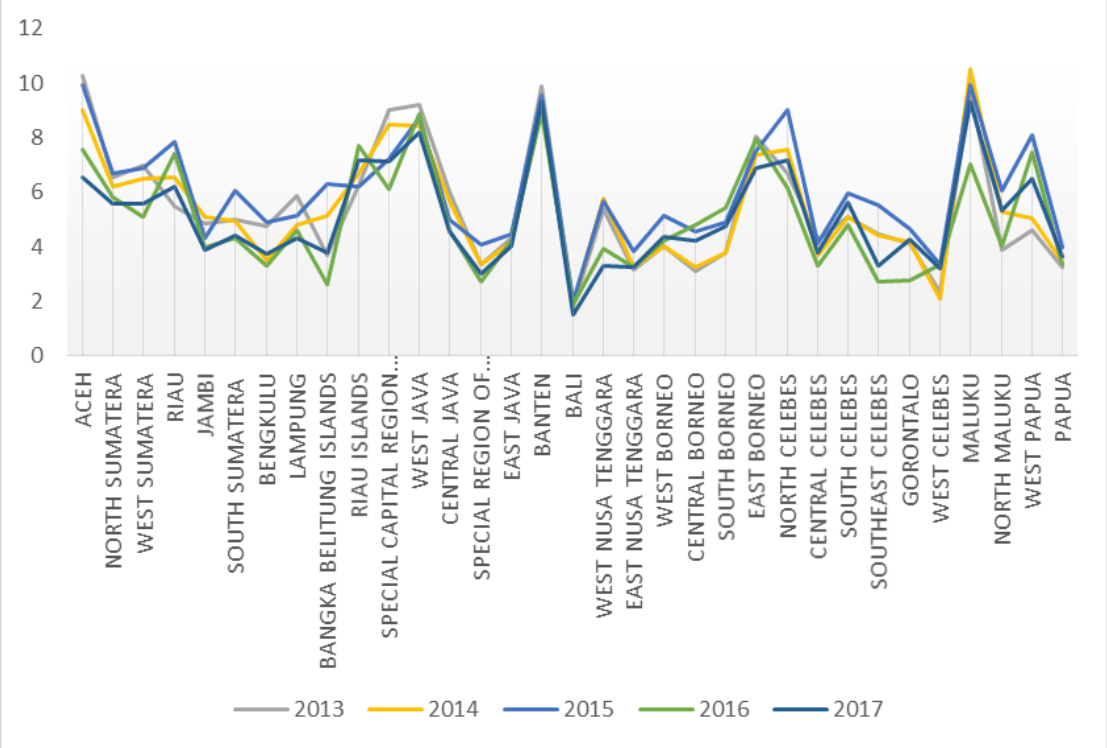

Figure 2. The Open Unemployment Rate by Province (2013 to 2017)
Source: Badan Pusat Statistik (2017)

Figure 2 shows that the open unemployment rate in each province fluctuates. The highest open unemployment rate in 2017 occurred in Maluku province at 9.29% and the lowest occurred in Bali province at 1.48%. This is certainly different from the inflation situation in 2013 and 2014, which has increased, but the open unemployment rate tends to be constant.

Inflation and unemployment are two economic phenomena, which will always occur in the economy of any country (Keynes, 1936; Phillips, 1958; Bhanthumnavin, 2002; Družić, Tica, & Mamić, 2006; Pallis, 2006; Furuoka, 2007; Furuoka, 2008; Furuoka & Munir, 2009; Katria et al., 2011; Kogid, Asid, Mulok, Lily, & Loganathan, 2011; Caporale & Škare, 2011; Zaman, Khan, Ahmad, & Ikram, 2011; Umaru & Zubairu, 2012; Sergo, Saftic, & Tezak, 2012; Touny, 2013; Mahmood, Bokhari, & Aslam, 2013; Thayaparan, 2014; Al-zeaud, 2014; Cioran, 2014; Arshad, 2014; Benati, 2015; Alisa, 2015; Israel, 2015; Sa'idu & Muhammad, 2015; Ştefan & Bratu, 2016; Astuti, 2016; Bhattarai, 2016; Okafor, Chijindu, & Ugochukwu, 2016; Blanchard, 2016; Recher, Matošec, & Pali, 2017; Tung, 2019). With five years of data (2013 to 2017), this study aims to analyze short-term trade-offs between the inflation rate and the open unemployment rate of 33 provinces in Indonesia. Indonesia's geographic condition which consists of thousands of islands is a note that macro policies at the time of implementation require a long process, even need to be adjusted to pay attention to aspects of regional variation. Therefore, the research model with the Panel Data Model and Panel Granger Causality becomes an alternative to capture the possibility of variations between regions in the short term.

2. Literature Review

In the United Kingdom, Phllips (1958) found that there was a negative relationship between the level of unemployment and the level of wage inflation. In the United States, Blanchard (2016) found that there was a

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2019 Volume 6 Number 3 (March)
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negative relationship between the rate of inflation and the unemployment rate. Furthermore, Keynes (1936) argued that the unemployment rate could be stabilized by stimulating aggregate demand through fiscal or monetary policy. Friedman (1968) also proved that the Phillips curve only applied in the short term. This happened because during the period there would be a phenomenon that prices were not easily changed (Sticky Price). Still with the same findings, Caporale & Škare (2011) found a one-way causality between inflation and employment opportunities in countries that are members of the Organization for Economic Co-operation and Development. This encourages policymakers to pay attention to employment growth and output growth in the short and long term. In Malaysia, Furuoka (2007) found a one-way causality between inflation and unemployment. These findings indicate a cointegration relationship and a causal relationship between the rate of inflation and the unemployment rate in Malaysia. Still in the same country, Kogid et al. (2011) found a one-way causality between inflation and unemployment. This finding supported the trade-off relationship between inflation and unemployment in Malaysia. In the United States, Ştefan & Bratu (2016) found a one-way causality between inflation and unemployment. This finding encourages policymakers to carry out programs aimed at reducing the unemployment rate such as creating projects for productive workers and controlling the inflation rate. In Pakistan, Mahmood et al., (2013) found a one-way causality between inflation and unemployment. This finding encourages experts to maintain an equilibrium point between inflation, unemployment and the interest rate. Still in the same country, Zaman et al., (2011) found a long-term relationship and one-way causality between the rate of inflation and unemployment. This study provides a strong empirical evidence about the existence of the Phillips curve in Pakistan, both in the long and short term. In Nigeria, Sa'idu & Muhammad (2015) found a one-way causality between inflation and unemployment. This finding encourages the joint efforts of policymakers to restructure the economy, manage price volatility and improve infrastructure. In Russia, Alisa (2015) found that in the long run there was no existence of the Phillips curve between inflation and unemployment, but in the short term, it showed the existence of the Phillips curve. In Thailand, Bhanthumnavin (2002) found that the Phillips curve applied in Thailand for the short term, precisely when the Asian economic crisis occurred in 1997. Further, Katria et al., (2011) found a negative relationship between inflation and unemployment rates in countries belonging to the South Asian Association for Regional Cooperation. This indicates that collaboration between monetary and fiscal policies can be used to stabilize the business cycle. Meanwhile, Bhattarai (2016) found a long-term and negative relationship between inflation and unemployment in countries that are members of the Organization for Economic Co-operation and Development. In Nigeria, Okafor et al. (2016) found that inflation had a negative effect on unemployment. This finding encourages policymakers not only to rely on monetary targets but also on output targets through economic deepening to maintain optimal inflation rates and minimal unemployment. In the European Union and Romania, Cioran (2014) found inflation had a negative effect on unemployment. This empirical finding indicates that the inflation rate is an effective instrument in preventing an increase in unemployment in the European Union and Romania.

In Egypt, Touny (2013) found that in the long run, unemployment had a positive impact on inflation. This finding encourages policymakers to be able to implement monetary policy to overcome inflationary pressures without fear of their negative impact on the unemployment rate. Further, Israel (2015) found that in the long run there was a positive relationship between inflation and unemployment in France, Germany, the United Kingdom, and the United States.

In Pakistan, Arshad (2014) found a two-way causality between the level of unemployment and inflation. This indicates that inflation has contributed to variations in unemployment compared to economic growth and the unemployment rate has more contribution to variations in inflation compared to economic growth. In Sri Lanka, Thayaparan (2014) found a two-way causality between inflation and unemployment. This condition indicates both unemployment and inflation have a significant role for macroeconomics in Sri Lanka.

In Croatia, Recher, Matošec, & Pali (2017) did not find the existence of the Phillips curve in Croatia. It is therefore important to urge caution from decisive interpretations and conclusions from the empirical research of

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2019 Volume 6 Number 3 (March)
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the Phillips curve and to sustain from suggestions to policymakers due to the sensitivity of the results and ambiguous empirical findings. Sergo, Saftic, & Tezak (2012) found that the causes of unemployment in Croatia occurred due to structural reasons, and not due to the low inflation rate. Still in the same country, Družić, Tica, & Mamić (2006) found that there is not any significant relationship between inflation and unemployment. During the recessions, companies in Croatia does not lay off people. Due to insolvency-based adjustment, factually unemployed are not fired but subsidized (through insolvency) by future generations, which are going to pay back debts accumulated during the recession. Next, Furuoka & Munir (2009) used Pooled Ordinary Least Square modeling and one-way or two-way fixed effects and found that there was a heterogeneity among the five ASEAN countries (Malaysia, Singapore, Indonesia, Thailand, and the Philippines). This indicates a difference in economic conditions among the five countries, which cause that there is no significant relationship between inflation and unemployment. Further, Furuoka (2008) who studied in the Philippines found no causality between inflation and unemployment. It is suspected that socio-economic factors such as output gaps are better able to explain the Phillips curve in the context of the Philippine economy. In Nigeria, Umaru & Zubairu (2012) found no causality between inflation and unemployment. This indicates that the Phillips curve does not apply in Nigeria. Therefore, it is necessary to use the unemployment and inflation theory based on the data and situation of Nigeria. In Jordan, Al-zeaud (2014) found no causal relationship between inflation and unemployment. This condition occurred because foreign workers were not included in the calculation of the unemployment rate, so that it could inhibit the trade-off between the two variables in the short term. In Indonesia, Astuti (2016) and the Central Bureau of Statistics (2015) proved that there was no relationship between inflation and unemployment. This occurred because inflation in Indonesia was not caused by an increase in the number of aggregate demand (Demand-Pull Inflation), but was caused by the rising production costs such as fuel oil prices, electricity rates and other production costs (Cost-Push Inflation).

Overall, previous studies still show varied results such as one-way causality, two-way causality and no causality between the inflation rate and the unemployment rate. In addition, previous studies also used varied econometric modeling. Thus, it can be indicated that there is an uncertain relationship between the rate of inflation and the open unemployment rate in various countries.

3. Research Methods

The data used in this study was the inflation rate and the open unemployment rate originating from Bank Indonesia and the Central Bureau of Statistics. Both of these data were panel data consisting of 33 provinces in Indonesia and the observation period from 2013 to 2017. The initial steps were taken in testing the Panel Data and Panel Granger Causality were conducting panel data stationary testing (Granger, 1969).

$$Y_{it} = \rho_i Y_{it-1} + X_{it}\delta_i + \epsilon_{it} \qquad (1)$$

There are three types of models that can be used in panel data regression, namely Common Effect Model, Fixed Effect Model and Random Effect Model (Winarno, 2015):

$$Y_{it} = \alpha_0 + \beta X_{it} + e_{it} \qquad (2)$$
$$Y_{it} = \alpha_{0i} + \beta_1 X_{it} + \beta_2 d_{1i} + \ldots + \beta_{33} d_{32i} + e_{it} \qquad (3)$$
$$Y_{it} = \alpha_{0i} + \beta X_{it} + e_t \qquad (4)$$

The selection of the best model in the panel data was based on the Chow test or Hausman test (Winarno, 2015). Another thing to note was the need to fulfill various assumptions so that the model could be used as a good predictor. The equation that met the classic assumption was only the equation that used the Generalized Least Square (GLS) method. In the panel data, the estimation model that used the GLS method was only Random Effect Model, while the Fixed Effect Model and Common Effect Model used Ordinary Least Square (OLS). In the panel

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2019 Volume 6 Number 3 (March)
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data that used the Fixed Effect Model only heteroscedasticity tests were conducted (Gujarati & Porter, 2012). The heteroscedasticity test in this study used the Glejser method, which was to regress all the independent variables to the absolute value of the residual |e|. If there was a significant independent variable effect on the residual absolute value, then in the model there was a heteroscedasticity problem (Winarno, 2015).

$$|u|_i = \alpha + \beta X_i + v_i \qquad (5)$$

In the Panel Granger Causality testing, it was necessary to determine the optimal lag (Winarno, 2015). After determining the optimal lag, the Panel Granger Causality test was performed (Granger, 1969).

$$Y_{it} = \alpha_{0i} + \alpha_{1i}Y_{it-1} + \ldots + \alpha_{ki}Y_{it-k} + \beta_{1i}X_{it-1} + \ldots + \beta_{ki}X_{it-k} + \epsilon_{it} \quad (6)$$
$$X_{it} = \alpha_{0i} + \alpha_{1i}X_{it-1} + \ldots + \alpha_{ki}X_{it-k} + \beta_{1i}Y_{it-1} + \ldots + \beta_{ki}Y_{it-k} + \epsilon_{it} \quad (7)$$

Further, in the Panel Granger Causality, the Stacked Causality Test was (Granger, 1969).

$$\alpha_{0i} = \alpha_{0j}, \alpha_{1i} = \alpha_{1j}, \ldots, \alpha_{li} = \alpha_{lj}, \forall_{i,j} \quad (8)$$
$$\beta_{1i} = \beta_{1j}, \ldots, \beta_{li} = \beta_{lj} \forall_{i,j} \quad (9)$$

Panel data was treated as a large data set that was stacked without taking a value behind one cross-section to the next cross-section. This method assumed that all coefficients were the same in all cross-sections.

4. Results

4.1 The Panel Data Stationary Test Results

The stationary test results of panel data is presented in Table 1.

Table 1. The Panel Data Stationary Test Results

Variables	Integration Degree	Prob.		Conclusion
		Levin Test	PP Test	
DInflation Rate	first difference	0.0065	0.0000	I(1)
Open Unemployment Rate	level	0.0000	0.0104	I(0)

*DInflation Rate shows the inflation rate at the first order of integration degree or I(1)
Source: the authors

Table 1 indicates that the open unemployment rate has been stationary at the integration level or I(0). This is proven by a probability value that is smaller than the critical value (α=5%). While the inflation rate is not stationary at the integration level degree, so the first differentiating principle (first order) must be done. The results of first order differentiation or I(1) indicate that the inflation rate has been stationary. This is proven by a probability value which is smaller than the critical value (α=5%).

4.2 The Chow Test and Hausman Test Results

The selection of the best models based on the Chow Test and the Hausman Test. The test results for both models are presented in Table 2.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2019 Volume 6 Number 3 (March)
http://doi.org/10.9770/jesi.2019.6.3(26)

Table 2. The Chow Test and Hausman Test Results

Test	Prob.	Best Estimation Model
Chow	0.0000	Fixed Effect Model
Hausman	0.0377	Fixed Effect Model

Source: the authors

Table 2 indicates that the results of the Chow test show a probability value that is smaller than the critical value (α=5%). This shows that the most appropriate model to explain the phenomenon of the short-term relationship between the inflation rate and the open unemployment rate is the fixed effect model. Further, the results of the Hausman test show that the probability value is smaller than the critical value (α=5%). Thus, the best model used in panel data regression is the fixed effect model.

4.3 The Heteroscedasticity Test Results

After selecting the best model, the next step was to do a classic assumption test. The results of the classical assumption test with heteroscedasticity test are in Table 3.

Table 3. The Heteroscedasticity Test Results

Dependent Variable: RESABS	
Variable	Prob.
Dinflation	0.3464

Source: the authors

Table 3 proves that the residuals contain homoscedasticity. This means that each variant of the residual between observations is the same. This is indicated by the probability value of the RESABS and DInflation regression results which are greater than the critical value (α=5%).

4.4 The Fixed Effect Model Test Results

After determining the best model and heteroscedasticity test, the results of the fixed effect model test are presented in Table 4.

Table 4. The Fixed Effect Model Test Results

Variable	Coefficient	t-statistic	Prob.
C	5.261522	70.22658	0.0000
DInflation	-0.086793	-3.343438	0.0012
R-Squared	0.884986		
Prob (F-statistic)	0.000000		

Source: the authors

Table 4 indicates that the inflation rate has a negative and significant effect on the open unemployment rate. This is evidenced by the probability value of the DInflation which is lower than the critical value (α=5%).

4.5 The Cross Section Effect Results

After testing the Fixed Effect Model, it was necessary to pay attention to the constant differences between objects (although it used the same regression coefficient) (Winarno, 2015). This is presented in Table 5.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2019 Volume 6 Number 3 (March)
http://doi.org/10.9770/jesi.2019.6.3(26)

Table 5. The Cross Section Effect

Province	Effect	Province	Effect
Aceh	2.943405	West Nusa Tenggara	-0.659643
North Sumatera	0.680781	East Nusa Tenggara	-1.996925
West Sumatera	0.562813	West Borneo	-0.920475
Riau	1.649548	Central Borneo	-1.133158
Jambi	-1.066205	South Borneo	-0.599180
South Sumatera	-0.416909	East Borneo	2.031397
Bengkulu	-1.544212	North Celebes	2.097130
Lampung	-0.640533	Central Celebes	-1.612875
Bangka Belitung	-0.930951	South Celebes	0.058903
Riau Islands	1.581598	Southeast Celebes	-1.325302
Special Capital Region of Jakarta	1.876969	Gorontalo	-1.326313
West Java	3.187462	West Celebes	-2.314592
Central Java	-0.385489	Maluku	3.758562
Special Region of Yogyakarta	-2.043277	North Maluku	-0.260942
East Java	-1.119872	West Papua	1.375723
Banten	3.821185	Papua	-1.795819
Bali	-3.532804		

Source: the authors

Table 5 indicates that approximately 60% of 33 provinces in Indonesia have negative constant values. This means that when inflation was zero, unemployment would decrease by its constant value. These provinces included Jambi, South Sumatra, Bengkulu, Lampung, Bangka Belitung, Riau Islands, Special Capital Region of Jakarta, West Java, Central Java, Special Region of Yogyakarta, East Java, Bali, West Nusa Tenggara, East Nusa Tenggara, West Kalimantan, Kalimantan Tengah, South Kalimantan, East Kalimantan, Central Sulawesi, Southeast Sulawesi, Gorontalo, West Sulawesi, North Maluku and Papua. While the remaining 40% of the 33 provinces in Indonesia have a positive constant value. This means that when inflation was zero, unemployment would continue to increase by the constant value.

4.6 The Lag Length Test Results

The results of the Lag Length Test are in Table 6.

Table 6. The Lag Length Test Results

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-128.1420	NA	9.131016	7.887394	7.978091	7.917911
1	-88.62019	71.85784	1.061634	5.734557	6.006649	5.826108
2	-75.02529	23.07013	0.595709	5.135048	5.606535	5.305633
3	-66.21600	13.88132*	0.448836*	4.861576*	5.496458*	5.075194*

*Indicates the optimal lag

Source: the authors

Table 6 indicates that the optimal lag to describe the influence of a variable on its past variables and other endogenous variables is lag 3. This means that lag 3 was used to determine the causality between the inflation rate and the open unemployment rate. This was proven by the Akaike Information Criterion (AIC) value of 4.861576 which is smaller than the AIC value in other lags.

4.7 The Panel Granger Causality Test Results

The Panel Granger Causality test results using Stacked Test Causality can be seen in Table 7.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2019 Volume 6 Number 3 (March)
http://doi.org/10.9770/jesi.2019.6.3(26)

Table 7. The Panel Granger Causality Test Results

Null Hypothesis	F-stat	Prob.
DInflation Rate does not Granger Cause Open Unemployment Rate	3.35522	0.0341
Open Unemployment Rate does not Granger Cause DInflation Rate	1.46758	0.2464

Source: the authors

Table 8 indicates that the hypothesis stating that there is no Granger Causality between the DIinflation rate and the open unemployment rate is rejected. The rejection of the null hypothesis is based on the probability value of 0.0341 which is smaller than the critical value (α=5%). While the hypothesis stating that there is no Granger Causality between open unemployment and DInflation rates is accepted. The acceptance of the null hypothesis is based on a probability value of 0.2464 which is greater than the critical value (α=5%). Thus, the DInflation rate caused the open unemployment rate, but not vice versa.

5. Discussion

The results of the Panel Data and Panel Granger Causality analysis in this study are supported by the findings of Phllips (1958), Blanchard (2016), Keynes (1936), Friedman (1968), Caporale & Škare (2011) Furuoka (2007), Kogid et al. (2011), Ştefan & Bratu (2016), Mahmood et al. (2013), Zaman et al. (2011), Sa'idu & Muhammad (2015), Alisa (2015), Bhanthumnavin (2002), Katria et al. (2011), Bhattarai (2016), Okafor et al. (2016), and Cioran (2014) which stated that there was a negative relationship between the inflation rate and the unemployment rate.

There were several factors influencing the relationship between the inflation rate and the open unemployment rate in the short term. First, the Phillips curve phenomenon of the trade-off between the rate of inflation and the unemployment rate was a short-term economic phenomenon, so Sticky Price applied, whereas in the long run flexible prices applied. In other words, the unemployment rate would return to its natural level and then the relationship between inflation and unemployment becomes positive (Friedman, 1968; Keynes, 1936). This view emerged as a criticism of the weaknesses of the idealistic (utopian) classical theory of market assumptions and over-supply of Supply Side Economics. In reality, the market structure tended to be monopolistic, information was imperfect and asymmetrical, and inputs and outputs were exchanged heterogeneously. Thus, the market was unable to balance. As a result, there were economic disturbances that tended to bring about a recession. Therefore, the active means of government wereneeded in managing the economy, both through fiscal and monetary policies. Government needs to put efforts to stimulate the Demand Side Economics. Second, the inflation rate in provinces in Indonesia was caused more by the demand-side pull or Demand-Pull Inflation (Phillips, 1958; Sa'idu & Muhammad, 2015; Keynes, 1936; Bhattarai, 2016; Katria et al., 2011; Alisa, 2015). Unlike the findings of Astuti (2016) and Badan Pusat Statistik (2015), they mentioned that inflation in Indonesia was caused by cost-push inflation. A finding by Sukirno (2014) explained that inflation that occurred due to demand-pull would cause a decrease in the unemployment rate. An increase in demand would result in an increase in prices. In this condition, the producer increased its production capacity. In the context of an economy that focused on Intensive Labor, efforts to increase production capacity would encourage additional workforce. This ispresented in Figure 3 providing information about the addition of labor in the three main sectors, namely Industry, Trade, Restaurants and Accommodation Services as well as Financial Institutions, Real Estate, Rental and Corporate Services.

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2019 Volume 6 Number 3 (March)
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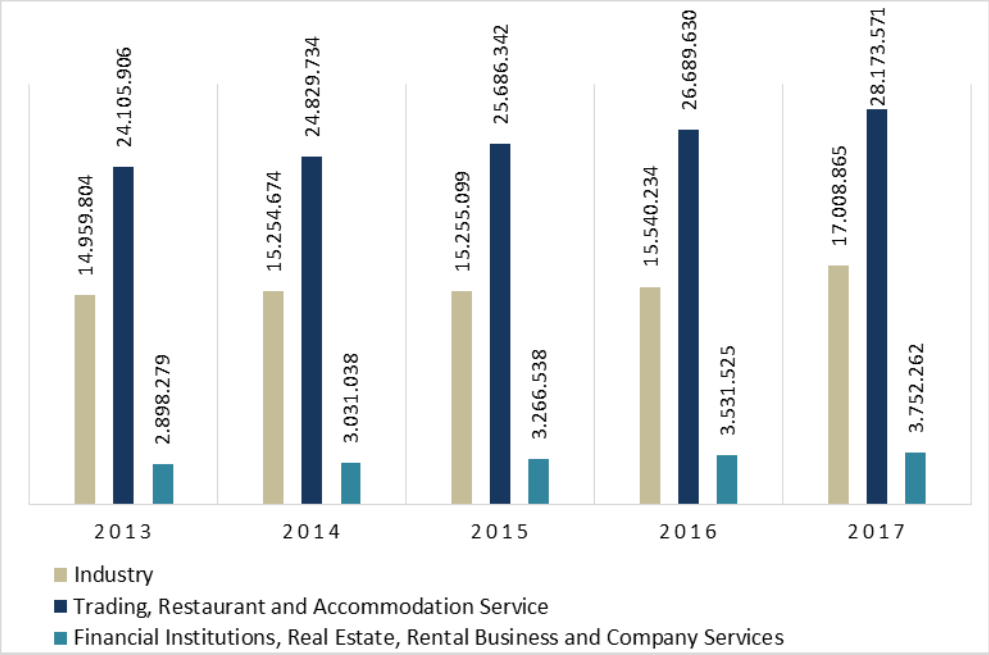

Figure 3. The Population of 15 Years and Older Who Work Based on The Main Employment Field (2013 to 2017)
Source: Badan Pusat Statistik (2018b)

Figure 3 indicates that the high inflation rate from 2013 to 2014 has an impact on increasing employment opportunities on the three main sectors above. This condition continues from 2016 to 2017 which shows an increase in employment such as in the Industry, Trade, Restaurants and Accommodation Services, Financial Institutions, Real Estate, Rental and Corporate Services sectors which experience a 2% increase in percentage; 3.9%; 8.1% in 2015 to 2016 and 9.4%; 5.5%; 6.2% in 2016 to 2017. Thus, these three sectors were considered as a sector that relied heavily on labor in an effort to increase its production.

In addition, from the demand side, it is also indicated by the increase in household consumption (Keynes, 1936; Friedman, 1968; Mahmood et al., 2013; Sa'idu & Muhammad, 2015). Facts prove that household consumption in Indonesia from 2013 to 2014 was higher than the previous period. This can be seen in Figure 4.

ISSN 2345-0282 (online) http://jssidoi.org/jesi/
2019 Volume 6 Number 3 (March)
http://doi.org/10.9770/jesi.2019.6.3(26)

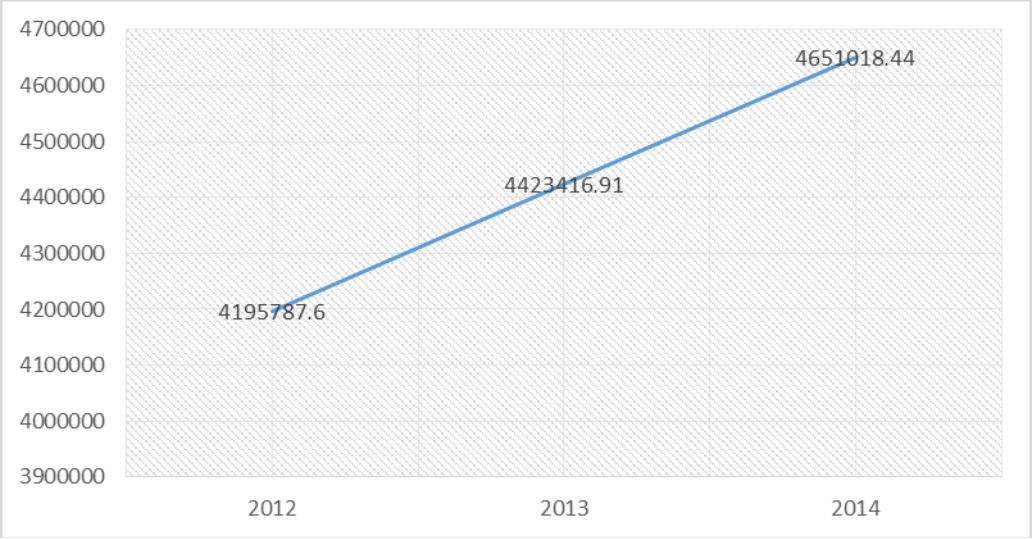

Figure 4. The Gross Domestic Product on The 2010 Constant Price Based on The Expenditures (Billions of Rupiah) (2012 to 2014)
Source: Badan Pusat Statistik (2018)

Figure 4 indicates that household consumption in 2013 increases from 5.4% in the previous year. The same also happens with the consumption in 2014 with a percentage increase of 5.14%. This indicates that during this period there was an effect of increasing demand which resulted in Demand-Pull Inflation (Phillips, 1958; Sa'idu & Muhammad, 2015; Keynes, 1936; Bhattarai, 2016; Katria et al., 2011; Alisa, 2015).

Indonesia consists of 33 provinces that have diverse cultural and economic backgrounds. The inflation rate from 2013 to 2017 had a downward trend. On the other hand, the open unemployment rate in the same period was relatively constant, although there was a tendency for a decline. This can be seen in Figure 5.

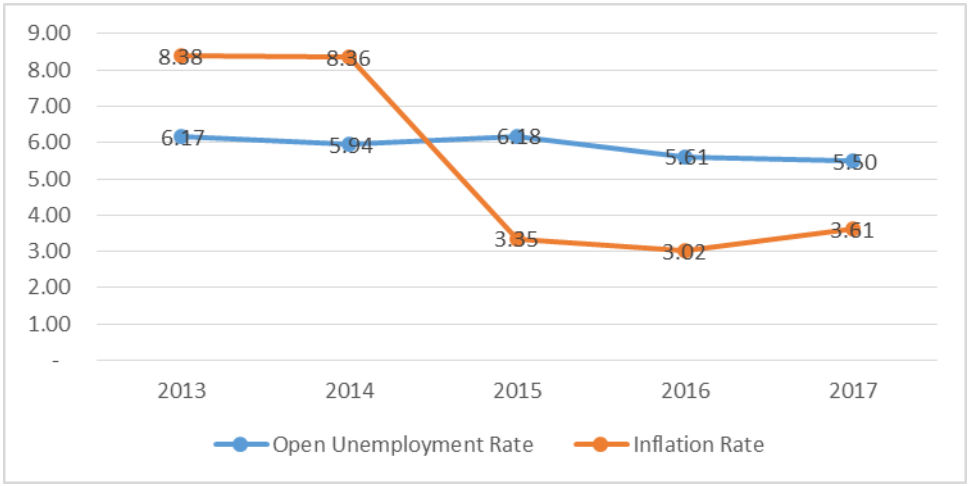

Figure 5. The Inflation Rate and Open Unemployment Rate (2013 to 2017)
Source: Badan Pusat Statistik (2017b); Bank Indonesia (2018)

Figure 5 indicates that in 2013 and 2014, the inflation rate in Indonesia is quite high, reaching 8.38% and 8.36%. This condition was caused by the increase in the fuel oil price (Astuti, 2016; Badan Pusat Statistik, 2015). However, for the period of 2015 to 2017, there was an inflation rate which was below the Bank Indonesia inflation target of ± 4%. The decline in the inflation rate was supported by the development of price transparency

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2019 Volume 6 Number 3 (March)
http://doi.org/10.9770/jesi.2019.6.3(26)

in every region of Indonesia, which was getting better. On the other hand, the open unemployment rate does not experience significant changes. However, it has a fluctuating trend in 2013 (6.17%) which decreases in 2014 (5.94%). Furthermore, it increases to 6.18% in 2015 and then continues to decline in 2016 to 2017 (5.61% and 5.50%).

Furthermore, there were five provinces with the highest average inflation rate and two provinces with the lowest average inflation rate. This can observed in Figure 6.

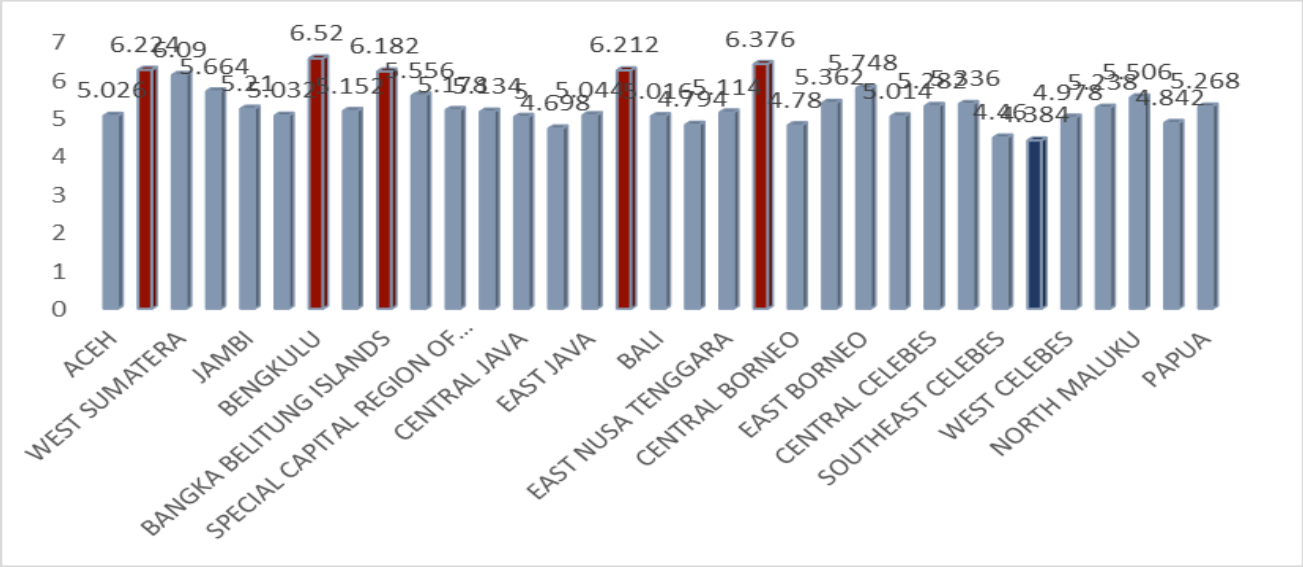

Figure 6. The Average of Inflation Rate by Province (2013 to 2017)
Source: Bank Indonesia (2018)

Figure 6 indicates that there are five provinces with the highest average of inflation rate in 2013 to 2017, which includes Bengkulu, West Kalimantan, North Sumatra, Banten and Bangka Belitung Islands with an average inflation rate of more than 6%. The lowest average inflation rate in 2013 to 2017 is Gorontalo and Bali with an average of less than 4,384%. The analysis was based on a comparison with the inflation target of Bank Indonesia in 2013 to 2014 as high as ± 4.5% and in 2015 to 2017 of ± 4%.

In addition to the average inflation rate, the average of open unemployment rates by province from the highest and the lowest open unemployment rate can be seen (Figure 7).

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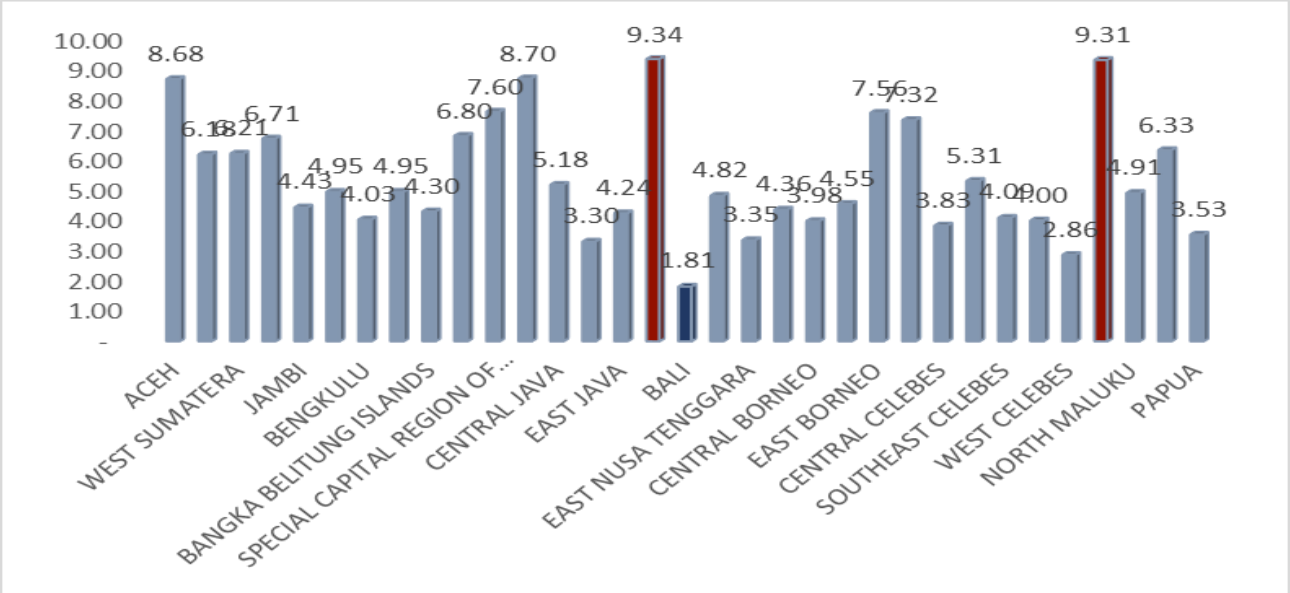

Figure 7. The Average of Open Unemployment Rate by Province (2013 to 2017)
Source: Badan Pusat Statistik (2017a)

Figure 7 indicates that provinces with high open unemployment rates include Banten and Maluku, each reaching 9.34% and 9.31%, while the lowest include Bali at 1.81%. The interesting thing was, that there were several provinces in Indonesia that showed the relationship between the rate of inflation and the open unemployment rate. This means that the inflation rate and the open unemployment rate were equally high or vice versa. This condition occurred in Banten province (one of the five provinces with the highest inflation rate and the highest open unemployment rate in Indonesia). While the opposite condition was shown by the provinces of Bali and Gorontalo which had an average inflation rate that reached the target and the average low open unemployment rate. Furthermore, there were also those who had inversely related relationships. This means that there were provinces that had high inflation rates, while the open unemployment rate was low and vice versa. This condition was demonstrated by the provinces of Bengkulu and West Kalimantan, which had an average inflation rate that was above the target of Bank Indonesia compared to the average of open unemployment rate, which was fairly low. Furthermore, the provinces of Maluku, Aceh and West Java showed the average inflation rate that reached Bank Indonesia's target compared to the high average open unemployment rate.

Conclusion

This study showed that there was a one-way relationship from the inflation rate to the open unemployment rate. This finding was proven through an analysis of Data Panel and Granger Causality Panel. This finding ultimately proved that the Phillips curve is still alive and well of 33 provinces in Indonesia. There were several factors supporting this finding such as (1) the sticky price was still in the short term, whereas in the long run flexible prices applied. In the long run, the unemployment rate would return to its natural level. As a result, the relationship between inflation and unemployment became positive. (2) the inflation in provinces in Indonesia was caused more by demand-pulling (Demand-Pull Inflation), not due to the cost-push inflation.

Inflation is an effective policy instrument to overcome the problem of unemployment in Indonesia. This argument implies that inflation management is effective to reduce the unemployment rate. Therefore, the role of government is needed in managing the economy, both through fiscal and monetary policies. This role is emphasized more on the government's efforts to stimulate the demand side (Demand Side Economics).

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Indonesia's geographical condition which consists of thousands of islands might lead to the adoption of macro policies to take longer time. This happens because of the greater need to adjust differences between regions. Thus, the use of the Data Panel and Panel Granger Causality models is more appropriately used to explain the trade-off between the inflation rate and the open unemployment rate in the short term.

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