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Reexamining Phillips curve: An empirical analysis from structural vector autoregression

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***Abstract**: In the literature, the existence of the Phillips curve in every country has been extensively explored. The goal of this research is to investigate the inflation-unemployment trade-off in Indonesia. We used secondary data for 1977 through 2019 from the World Bank for analysis. The Structural Vector Autoregression (SVAR) results revealed a negative connection between unemployment and inflation. There is a one-way relationship between unemployment and inflation in particular. We discovered several factors that influence unemployment. Those factors include working population over 15 years old according to the primary employment (both field and status) and Gross Domestic Product at constant prices according to expenditures.*

***Keywords**: Phillips Curve, Unemployment, Inflation, SVAR, Indonesia*

Preispitivanje Filipsove krive: empirijska analiza primenom strukturne vektorske autoregresije

***Apstrakt**: U literaturi je opširno istraženo postojanje Filipsove krive u svakoj zemlji. Cilj ovog istraživanja je da se istraži odnos između inflacije i*

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nezaposlenosti u Indoneziji. Za analizu smo koristili sekundarne podatke Svetske banke za period od 1977. do 2019. godine. Rezultati strukturne vektorske autoregresije (SVAR) otkrili su negativnu vezu između nezaposlenosti i inflacije. Tačnije, postoji jednosmerna veza između nezaposlenosti i inflacije. Otkrili smo nekoliko faktora koji utiču na nezaposlenost. Ti faktori obuhvataju radno sposobno stanovništvo starije od 15 godina prema primarnom zaposlenju (i oblasti i status) i bruto domaći proizvod u stalnim cenama prema izdacima.

Ključne reči: *Filipsova kriva, Nezaposlenost, Inflacija, SVAR, Indonezija*

1. Introduction

The main goal of every economy in a country is to achieve economic growth, which provides jobs and stable prices (Al-zeaud & Al-hosban, 2015). Unemployment and inflation rate are essential to measure the economic performance of every country in the world. Jalaee, Lashkary, and GhasemiNejad (2019) stated that the Phillips curve explains the relationship between these two important economic variables. Policymakers must understand the Phillips curves in various economic systems to keep inflation under control.

Inflation is a term used to describe a situation where the cost of goods and services continues to rise (Astuti, 2016; Jaradat, 2013; Sasongko et al., 2019). It results in an inefficient allocation of resources, and simultaneously the potential for economic growth will also decrease. Incredibly high inflation will harm the community, especially the poor, as it imposes a high and excessive cost, which affects their income (Azam et al., 2015). Inflation was a major concern in Indonesia during the 1998 economic crisis and the 2008 global financial crisis. Indonesia had no indication they would face a catastrophe in early 1997 because inflation was still regarded manageable at 6.23%. In 1998, inflation sharply jumped at 58.45% (World Bank, 2018). However, in 2008, Indonesia could still control its inflation rate at 10.23%.

Another problem that has also been the primary concern in Indonesia is unemployment (Astuti, 2016). Unemployment arises because of the lack of job opportunities available. Yet, there is a growing number of job seekers with low skills and abilities (Central Bureau of Statistics, 2018a). In 2018, the proportion of employment was 44.13% (Central Bureau of Statistics, 2018c). The total labor in 1996-2018 had increased to 78.18% (Central Bureau of Statistics, 2018b). This condition indicates an imbalance between job opportunities and labor demand. Unemployment would result in harm in productivity and the real

income of the community. If it remains unchecked, it will cause poverty and social problems (Adenomon et al., 2018; Jaradat, 2013; Moise, 2015).

The relationship between inflation and unemployment is based on the idea of A. W. Phillips. Between 1861 and 1975, Phillips performed research in Britain to determine the relationship between inflation and unemployment rates. Since then, the Phillips curve has been used to describe the negative correlation between inflation and unemployment (Abbas, Sgro, 2011; Al-zeaud & Al-hosban, 2015; Anning et al., 2017; Chletsos et al., 2016; Gul et al., 2012; Haq et al., 2012; Hindrayanto et al., 2019; Naish, 1988; Phillips, 1958; Seyfried & Ewing, 2001). Only the short-run trade-off between inflation and unemployment is considered. Therefore, inflation policy will not reduce unemployment (Anning et al., 2017; Friedman, 1968; Hindrayanto et al., 2019). If companies try to increase their job opportunities, they will pay its cost. When the government attempts to create job opportunities, the price of products and services will grow where the laborers are placed. In other words, if the government intends to decrease the unemployment rate, it would have inflation in the national economy (Jaradat, 2013).

In the past 42 years (1976-2019), the inflation rate in Indonesia has shown fluctuations (World Bank, 2019). The highest inflation rate was in 1998, which reached 58.45%. During the period, there were economic shocks, such as the monetary crisis. The Rupiah (IDR) exchange rate on the dollar (USD) was decreased from an average of IDR 2,000 to IDR 16,000 (Bank Indonesia, 2018). The Rupiah (IDR) exchange rate versus the dollar has dropped due to an increase in the number of persons purchasing dollars (USD). In 1998, the unemployment rate was still manageable at 5.46%. However, from 2000 through 2005, it had increased to 7.94% (World Bank, 2019). Many companies declared bankruptcy after the global financial crisis, producing unemployed workers.

A low wage level is also one of the main problems in unemployment. If the level of wage increases, then unemployment decreases. The downward slope of the Phillips curve proves it. Besides, high unemployment is correlated with low productivity in the economy. It suggests that an unemployed workforce could not increase productivity in a country (Afzal & Awais, 2012; Orji et al., 2015).

Inflation has both negative and positive effects. Inflation alleviates the burden of public or private debt and keeps the interest rate above zero, allowing the central bank to maintain economic stability. And it also reduces unemployment with nominal wage rigidity. On the other hand, inflation increases opportunity costs and uncertainty over future economic situations. It may prevent people from investing and saving (Muchdie, 2016a). Inflation is explained by two fundamental theories: demand-pull and cost-push inflation. According to the

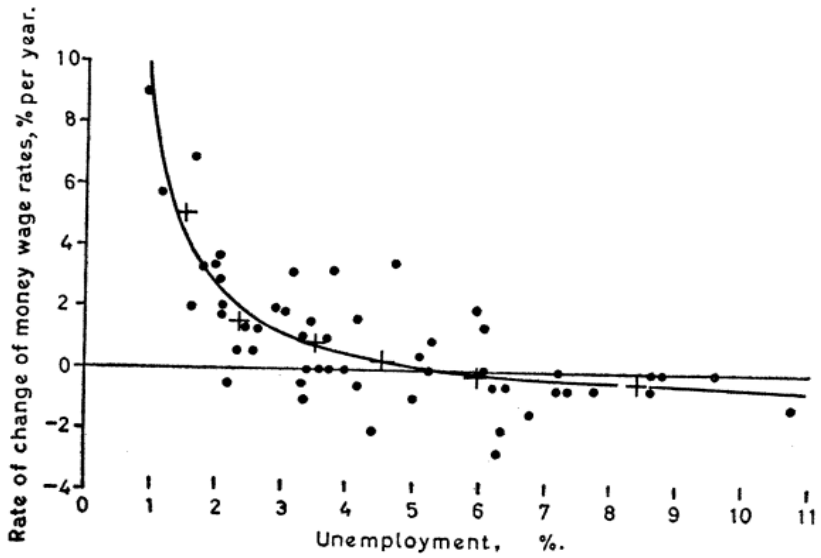
demand-pull theory, aggregate demand growth is faster than aggregate supply growth. Total demand consists of investment, household expenditure, government, and foreign sector expenditure. The existence of community demand helps to increase the aggregate demand.

Meanwhile, the cost-push theory explains factors causing inflation from the supply side. Wage is the main factor except for additional production costs (Afzal & Awais, 2012). Inflation and unemployment are considered leading indicators of economic performance by the government, and they are closely monitored. Statisticians collect the inflation and unemployment data to assess the economy's health. In the short run, if fiscal and monetary authorities improve aggregate demand, the unemployment rate will fall despite rising inflation. In contrast, if they reduce aggregate demand in the short run, they may be able to keep inflation under control, but the unemployment rate will rise briefly (Mankiw et al., 2013; Sasongko & Huruta, 2019). This study explores the trade-off between unemployment and inflation in Indonesia by considering these phenomena.

2. Theoretical Background and Related Literature

Phillips observed a strong negative link between wage inflation and unemployment. (Phillips,1958). High inflation was linked to low unemployment. According to Phillips (1958), wage inflation is driven by tight labor markets. Figure 1 depicts a scatter diagram of wage rate changes and unemployment from 1861 to 1913 in the United Kingdom.

Figure 1. Relationship between Unemployment and Wage Rates



Source: Phillips (1958).

In 1862, Schlote's index of the average price of imports revealed a 12.5% increase in import prices over the previous year. In 1872, there was a 7.0% growth. Then, there was a 7.6% growth from 1900 to 1910. Between 1861 and 1913, no other year experienced a 5% increase in import prices. A slight increase in import prices in 1862 may have been enough to initiate a wage-price spiral if the hypothesis is true. However, changes in import prices will not affect wage rate adjustments for the rest of the period. The Phillips curve tradeoff was rapidly adopted as the starting point for macroeconomic policy matters.

Samuelson and Solow (1960) repeated these findings for the United States in a 1960 study, emphasizing that the relationship also applied to price inflation. Figure 2 shows Solow and Samuelson’s description of the Phillips curve.

Figure 2. Relationship between Unemployment and Price Stability

Source: Samuelson and Solow (1960).

The figure represents a menu for varying levels of unemployment and price stability, based on data from the United States during the last twenty-five years. The Phillips curve tradeoff was rapidly adopted as the starting point for macroeconomic policy matters. Lower unemployment might be attained, but only at the expense of increased inflation, as policymakers faced a tradeoff. On the other hand, Friedman (1968) provided a timely and powerful critique of the Phillips curve's theory. Friedman expected that real wages would influence wage bargaining. High nominal wage inflation is insufficient if low unemployment indicates a strong bargaining position for workers. In this case, the workers want the wage inflation to be higher than price inflation. Friedman claimed that if policymakers attempted to take advantage of an apparent Phillips curve tradeoff, the public would become accustomed to expecting high inflation. The previously existing tradeoff between inflation and output would disappear as inflation expectations rose. Friedman (1968) proposed the concept of a natural rate of unemployment. However, the efforts to keep unemployment below this level may not be effective in the long run. Around the world, monetary and fiscal policy in the 1960s was expansionary. The Phillips

curve appeared to work initially. However, the Phillips tradeoff got worse. Even though unemployment had increased by the late 1960s, inflation grew. The outcome is similar to Friedman's prediction.

The inflation rate is currently determined by expected inflation, cyclical unemployment, and supply shock. These three forces are depicted in the Equation below (Mankiw, 2016).

$$\pi = E\pi - \beta(u - u^n) + v \quad (1)$$

Where,

π : Inflation

$E\pi$: Expected Inflation

β : Inflation response to cyclical unemployment

$u - u^n$: Cyclical Unemployment

v : Supply Shock

The Phillips curve can be derived from the aggregate supply equation as follows.

$$P = EP + (1/\alpha)(Y - \bar{Y})$$

$$P = EP + (1/\alpha)(Y - \bar{Y}) + v$$

$$(P - P_{-1}) = (EP - P_{-1}) + (1/\alpha)(Y - \bar{Y}) + v \quad (2)$$

In other words, $P - P_{-1}$ is changed into π, and $EP - P_{-1}$ is changed into $E\pi$, separately.

$$\pi = E\pi + (1/\alpha)(Y - \bar{Y}) + v \quad (3)$$

The entire procedure demonstrates that the Phillips curve equation and the aggregate supply equation propose similar macroeconomic ideas in the short run. Friedman (1968) explained that the Phillips curve only applies in the short run. It occurred as a result of the Sticky Price phenomena that occurred simultaneously. Adenomon et al. (2018) found that interest and inflation rates were adversely connected to unemployment in Nigeria, but only interest rates were significant. Maqbool et al. (2013) found a significant and negative association between unemployment and inflation in Pakistan, both in the long and short run. Inflation increased by 1%, resulting in a 0.34% fall in unemployment. Dammak and Boujelbene (2009) found a short-term and long-term trade-off between unemployment and nominal wages in Tunisia. A 1% fall in unemployment would result in a 4% boost in nominal wage growth. Hindrayanto et al. (2019) used the Trend-Cycle Model to find a negative and

substantial association between unemployment and inflation in European countries. Conversely, Siahaan et al. (2017) discovered that inflation considerably impacts Indonesian unemployment.

Inflation and unemployment do not always have a strong link. Muchdie (2016a) established a negative but insignificant link between inflation and unemployment rate in 49 Asian, 52 African, 39 European, and 29 American nations after conducting a cross-sectional analysis. Data from Australia, South Korea, and Indonesia were also used by Muchdie (2016b). He discovered a negative but insignificant link between inflation and the unemployment rate in the long run. Anning et al. (2017) reported a negative but insignificant connection in Iraq. However, Afzal and Awais (2012) found that the Okun coefficient was insignificant for 1981 through 2000, although the Phillips Curves was applicable in Pakistan.

Haq et al. (2012) found that inflation had a positive and significant connection with unemployment, contrary to earlier findings. This study supported Locus's critique, which contradicts the Phillips curve hypothesis. In Indonesia, Sunarsih (2018) found that the Phillips theory is not applicable because of a positive and significant relationship between minimum wages and inflation on unemployment. Inflation has a negative influence on unemployment, according to Okafor et al. (2016), whereas money supply and exchange rate have a positive impact. In addition, Orji et al. (2015) found a positive and considerable link between inflation and unemployment. In Indonesia, Sasongko et al. (2019) stated that there is one-way causation between inflation and the unemployment rate in the short run. A one-way causality from unemployment to inflation was also supported by Sasongko and Huruta (2019). Various literature discussed above shows multiple results. This differentiation was caused by various factors, such as different research models, economic systems, and underlying macro assumptions. As a result, the existence of the Phillips curve is interpreted differently in developing and developed countries. The following hypothesis was proposed based on these findings:

H1: Inflation and unemployment have a negative relationship

3. Research Methodology

The World Bank provided the data for the analysis. The time-series data was collected from 1976 to 2019. The stationarity test is used to demonstrate time-series consistency (Winarno, 2015). We provide a model to perform the data stationarity.

$$\Delta y_t = \beta_1 + \beta_{2t} + \delta y_{t-1} + \mu_t \quad (4)$$

We also applied the Akaike Information Criterion to identify the best lag length (Ivanov & Kilian, 2005). This study utilized a Granger causality model after performing a lag length test. (Rosadi, 2012).

$$Unemployment_t = \sum_{i=1}^{m} a_i \, Unemployment_{t-1} + \sum_{j=1}^{n} b_j \, Inflation_{t-1} + \mu_t \quad (5)$$

$$Inflation_t = \sum_{i=1}^{r} a_i \, Inflation_{t-1} + \sum_{j=1}^{s} b_j \, Unemployment_{t-1} + v_t \quad (6)$$

Apart from Granger causality, Vector Autoregression (VAR) approach is used to calculate the structure of interrelated time series. But, the VAR model is based not on theory but on data. Thus, it is better to use Structural VAR to count those theories in the model. This study begins with the specific relationship of SVAR with the least square VAR, assuming that the *A* cannot reverse.

$$y_t = A_1 y_{t-1} + ... + A_p \, y_{t-p} + CD_t + \epsilon_t \quad (7)$$

Where y_t is the set of endogenous variables (inflation and unemployment), Ai is (K × K) coefficient matrices for i = 1,..., p, and ϵ_t is a K dimensional of white noise process. The coefficient matrix of potentially deterministic regressors of dimension (K x M) is the matrix C, and D_t is a (K × 1) column vector holding the appropriate deterministic regressors (e.g., constant, trend, and dummy variables) (Pffaf, 2008).

The following is the simplified form of error structure:

$$\epsilon_t = A^{-1} B u_t = S u_t$$

$$E(\epsilon_t \epsilon_t') = \Sigma\epsilon = A^{-1} BB' A^{-1}' = SS' \quad (8)$$

Previous theories suggest restrictions on structural matrices, enabling researchers to identify and estimate the SVAR parameters. This model allows researchers to determine limits in impulse representation of short-run responses. The development of the short-run A-B model is as follows:

$$\epsilon_t = A^{-1} B u_t$$

$$A\epsilon_t = B u_t$$

$$\Sigma_\epsilon = A^{-1} BB' A^{-1}' \quad (9)$$

Where ϵ_t and u_t are vectors with the length of k, ϵ_t is observed residual, and u_t is unobserved structural innovation. A and B are estimated matrices of k × k. The u_t has an identity covariance matrix. And u_t counts restrictions on A and B as $A\sum A' = BB'$ (Pffaf, 2008). The series model will be collected in the 2×1 vector. It can be seen in Equation 10 below:

$$\text{Inflation}_t = \text{-}a_{21}\,\text{Unemployment}_t + b_{22}\,e_{2t} \quad (10)$$

The Equation indicates that inflation is simultaneously related to unemployment and instantaneously affected by supply disturbances.

4. Empirical Results

The stationarity test is used to understand the time series consistency of data. The results are shown in Table 1.

Table 1. Result of Stationarity Test

Variable	Degree of Integration	Probability	Conclusion
Unemployment	Level	0.6219	Series has no stationary
D(Unemployment)	1st Difference	0.0000***	Series has no stationary
Inflation	Level	0.0001***	Series has no stationary

*Note: *** p < 0.01 level*
Source: Authors' calculation.

At the degree of integration level [I(0)], inflation is stationary. At first difference [I(1)], unemployment is constant, as shown in Table 1. Table 2 shows the results of the lag length test.

Table 2. Result of Lag Length Test

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-169.6921	NA	28.80925	9.036426	9.122615*	9.067092
1	-167.9822	3.149867	32.52018	9.156956	9.415523	9.248952
2	-157.3014	18.55087*	22.93468*	8.805335*	9.236279	8.958662*
3	-156.9423	0.585782	27.93051	8.996965	9.600286	9.211622
4	-156.5770	0.557587	34.15283	9.188264	9.963963	9.464252
5	-154.9234	2.349857	39.25493	9.311759	10.25984	9.649077

Note: * It denotes the lag order determined by its criterion.
Source: Authors' calculation.

Table 2 shows that the optimal lag is lag 2. Based on the lag length test, the results of the Granger causality test are shown in Table 3.

Table 3. Result of Granger Causality Test

Null Hypothesis:	Obs.	F-Statistic	Prob.
Inflation does not Granger Cause D(Unemployment)	41	0.93723	0.4011
D(Unemployment) does not Granger Cause Inflation		10.5015	0.0003***

Note: *** $p < 0.01$ level
Source: Authors' calculation.

Table 3 implies that unemployment causes inflation in a one-way relationship. The findings of Vector Autoregression are presented in Table 4 after the Granger causality test.

Table 4. Result of Vector Autoregression Test

Variable	D(Unemployment)		Inflation	
	Coefficients	t-stat	Coefficients	t-stat
D(Unemployment)(-1)	0.044370	0.27844	2.337584	1.23017
D(Unemployment)(-2)	0.172633	1.10739	8.298882	4.46424
Inflation(-1)	0.014469	1.27572	0.121780	0.90040
Inflation(-2)	-0.007585	-0.65697	-0.239911	-1.74261

Source: Authors' calculation.

Table 4 appears to indicate that D(Unemployment)(-1), D(Unemployment)(-2), Inflation(-1) and Inflation(-2) all have a significant impact on unemployment. D(Unemployment)(-1), D(Unemployment)(-2), Inflation(-1) and Inflation(-2) all have a substantial impact on inflation. The outcomes of the VAR stability test back up the Vector Autoregression estimate.

Table 5. Result of VAR Stability Test

Root	Modulus
-0.225888 - 0.411418i	0.469351
-0.225888 + 0.411418i	0.469351
0.308963 - 0.047687i	0.312622
0.308963 + 0.047687i	0.312622

Source: Authors' calculation.

VAR meets the stability requirements if the modulus has an average value of less than one (Table 5). Then, table 6 summarizes the results of White Noise Residual test.

Table 6. Result of White Noise Residual Test

Lags	Q-Stat	Prob.*	Adj Q-Stat	Prob.*	df
1	0.689739	NA*	0.706982	NA*	NA*
2	0.949344	NA*	0.979901	NA*	NA*
3	2.732266	0.6036	2.903580	0.5741	4
4	2.932237	0.9385	3.125169	0.9263	8
5	5.804782	0.9256	6.396679	0.8948	12
6	9.277410	0.9016	10.46461	0.8413	16
7	13.41767	0.8588	15.45728	0.7497	20
8	17.61408	0.8213	20.67100	0.6580	24
9	19.56369	0.8798	23.16894	0.7245	28
10	21.70242	0.9151	25.99759	0.7637	32

Source: Authors' calculation.

Table 6 demonstrates no correlation between residues (white noise residues met). It is shown by probability values larger than 1%, 5%, and 10% significance levels. Table 7 displays the results of the cointegration test.

Table 7. Result of Cointegration Test

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.
None	0.180245	10.25638	15.49471	0.2615
At most 1	0.075451	2.902639	3.841466	0.0884

Source: Authors' calculation.

Results of the cointegration test do not indicate any cointegration or long-run relationship. The trace statistic exceeds the 0.05 critical value. Therefore, the SVAR modeling should use short-run restrictions.

Table 8. Result of SVAR (Short-run Restriction) Test

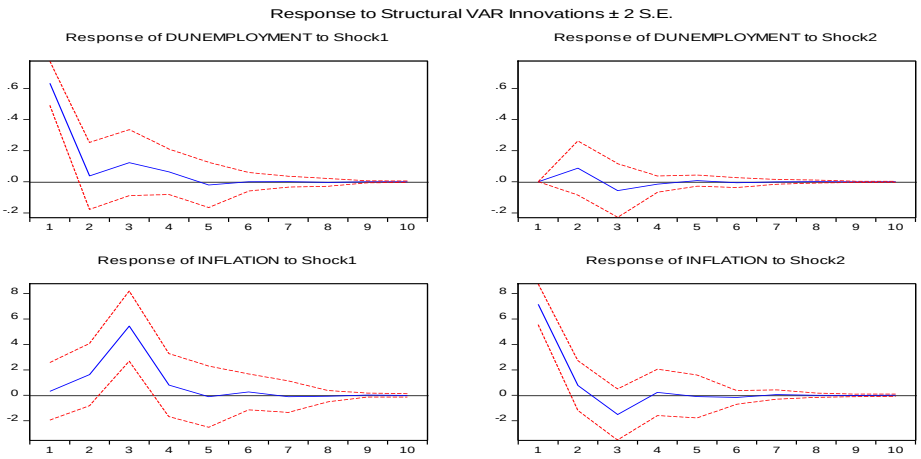
	Coefficient	Std. Error	z-Statistic	Prob.
C(1)	-1.036704	1.855283	-0.558785	0.5763
C(2)	0.599512	0.066205	9.055384	0.0000
C(3)	7.121969	0.786490	9.055384	0.0000
Log-likelihood	-175.8663			

Source: Authors' calculation.

Table 8 implies that unemployment and inflation have a negative connection. These findings support the Phillips curve theory. The Structural Impulse

Response Functions (SIRFs) and Structural Variance Decomposition (SVD) are developed due to the restriction in SVAR.

Figure 3. Structural Impulse Response Function



Source: Authors' calculation.

Figure 3 illustrates that each shock starts from the first period. And, it tends to be stable for the eighth through the tenth period. The SIRFs results are also supported by the SVD results. It is shown in Table 9.

Table 9. Variance Decomposition (D(unemployment))

Period	S.E.	Shock 1	Shock 2
1	0.599512	100.0000	0.000000
2	0.609345	97.13999	2.860012
3	0.622480	96.90806	3.091937
4	0.626943	96.92579	3.074208
5	0.627014	96.90483	3.095166
6	0.627066	96.90190	3.098103
7	0.627091	96.90183	3.098171
8	0.627093	96.90158	3.098420
9	0.627093	96.90155	3.098445
10	0.627093	96.90155	3.098447

Source: Authors' calculation.

In the first period, shock 1 is 100% substantially impacts the SVD of unemployment. The proportion of shock 1 on the unemployment variable is 96.90% from the first to the tenth period. It confirms that shock 1 has a more significant impact on unemployment. The SVD of inflation is shown in Table 10.

Table 10. Variance Decomposition (Inflation)

Period	S.E.	Shock1	Shock2
1	7.149036	0.755806	99.24419
2	7.351379	4.751984	95.24802
3	9.044264	34.80328	65.19672
4	9.092268	35.30117	64.69883
5	9.092613	35.30363	64.69637
6	9.103310	35.42777	64.57223
7	9.103457	35.42806	64.57194
8	9.103488	35.42843	64.57157
9	9.103556	35.42911	64.57089
10	9.103557	35.42910	64.57090

Source: Authors' calculation.

Table 10 shows that the SVD of inflation is strongly influenced by shock 2 of 99.24% in the first period. The proportion of shock 2 to inflation has been 64.57 % from the first to the tenth period. It proves that shock 2 has a more considerable influence on inflation.

5. Discussion

Previous research studies back up the findings of Granger causality and SVAR. Several studies have discovered that unemployment and inflation have a negative association (Adenomon et al., 2018; Afzal & Awais, 2012; Anning et al., 2017; Dammak & Boujelbène, 2009; Friedman, 1968; Hindrayanto et al., 2019; Maqbool et al., 2013; Muchdie, 2016a; Phillips, 1958; Sasongko et al., 2019). In this case, inflation did not affect unemployment. Thus, it was necessary to analyze the factors influencing unemployment. Table 11 provides information about the number of the working population aged over 15 years old based on the primary employment status.

Table 11. Population Aged Over 15 Years Old According to Main Employment Status

Main Employment Status	2001		2019	
	Abs.	%	Abs.	%
Entrepreneur	17,451,704	19.22	24,804,688	19.17
Entrepreneur with Temporary/Unpaid Labor	20,329,073	22.39	20,940,707	16.19
Entrepreneur with Regular/Paid Labor	2,788,878	3.07	4,655,158	3.60
Labor/Employee	26,579,000	29.27	50,617,810	39.13
Freelancer in Agriculture	3,633,126	4.00	4,703,981	3.64
Freelancer in Non-Agriculture	2,439,035	2.69	5,881,133	4.55
Family-related/Unpaid Worker	17,586,601	19.37	17,762,715	13.73
Not answered	-	-	-	-
Total	90,807,417	100	129,366,192	100

Source: Central Bureau of Statistics (2020b).

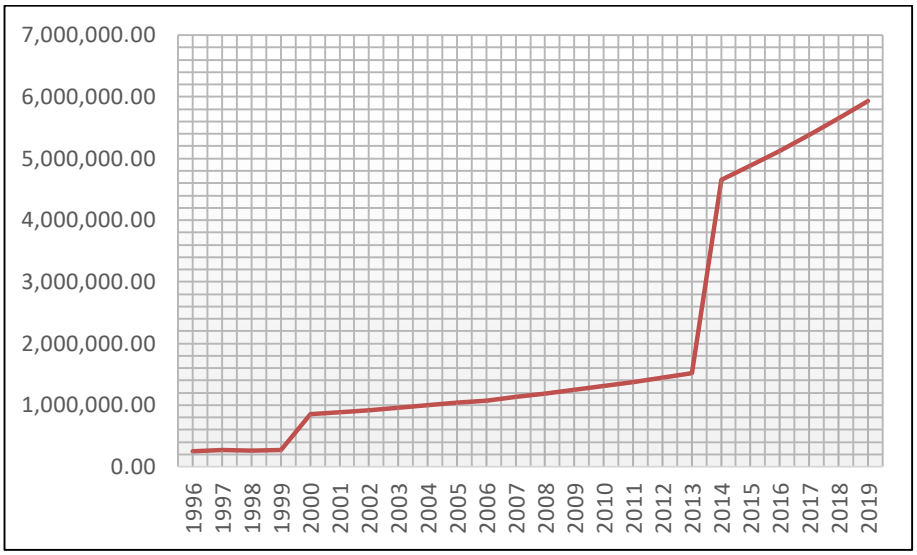
Table 11 indicates that the working population has increased significantly (amount and percentage of employment). In 2001, there were 26,579,000 employees (29.27% of the total working population). In 2019, the number increased to 50,617,810 (39.13% of the total working population). Several factors influenced inflation and unemployment. In the beginning, inflation indicates a surge in aggregate demand. As aggregate demand rises, the demand lof aw would be applied. If the demand increases, the price will increase. With high prices, manufacturers increase their production capacity by adding labor on the same concept as increasing an input to increase output. Thus, a decline in unemployment is caused by an increase in labor demand, and in turn, the price rises (inflation). Figure 4 shows an increase in the working population in three main sectors.

Figure 4. Number of Population Aged Over 15 Years Old Working on Main Employment in 1996-2019

Source: Central Bureau of Statistics (2020a).

Inflation produced a decrease in unemployment from 2007 to 2010. Consequently, the three sectors needed more labor to increase production. Then, household consumption (Friedman, 1968; Sa'idu & Muhammad, 2015) rose in Indonesia from 1996 through 2019.

Figure 5. GDP at Constant Prices by Expenditure 1996-2019 (Billion IDR)



Source: Central Bureau of Statistics (2020b).

Figure 5 shows that household consumption had increased from 1996 through 2019. Compared to the previous period, there was the most significant increase from 2013 to 2014. It grew from IDR 1,518 billion to IDR 4,651 Billion. It implied that increasing demand led to demand-pull inflation (Keynes, 1936; Phillips, 1958; Sa'idu & Muhammad, 2015).

6. Conclusions

Unemployment and inflation have generated severe problems in developing countries, including Indonesia. Inflation and unemployment have a negative association, according to this study. This finding was also strengthened by the results of the Structural Vector Autoregression. It demonstrated that the Phillips curve holds in Indonesia.

It's reasonable to believe that a link between inflation and unemployment reflects a rise in aggregate demand. The law of demand would undoubtedly be applied with an increase in aggregate demand. In Indonesia, inflation is driven by demand-pull inflation rather than cost-push inflation. The government needs to increase capital assistance for small and medium-sized businesses in terms

of policy. Such governmental policies can stimulate Demand-side economics. The geographical condition causes policy implementation to take longer. The Panel Structural Vector Autoregression (SVAR) model could be used in future research to explain the long-run trade-off between inflation and unemployment.

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