Unemployment and Inflation in the Philippines: New Evidence from Vector Error Correction Model

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ABSTRACT
This article empirically analyzes the relationship between unemployment rate and inflation rate in the Philippines over the period 1980–2006. The negative association between unemployment and inflation is known as the Phillips Curve because the trade-off relationship between these two variables was first pointed out by William Phillips in 1958. Since then, the Phillips Curve has remained an important foundation for macroeconomic management in various countries. The main finding of this study is that there exists a cointegrating relationship - but no causal relationship - between unemployment rate and inflation rate in the Philippines.

INTRODUCTION
In 1958, William Phillips published his seminal paper entitled “The Relationship between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom 1861–1957.” In the paper, Phillips pointed out the existence of a trade-off relationship between unemployment and inflation in the United Kingdom. Since then, the inverse relationship between these two variables had been commonly referred to as the “Phillips Curve.” Despite some criticisms regarding the basic tenets in the hypothesis, the Phillips Curve remains one of the most important foundations for macroeconomics. Since 1958 up to the present time,

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numerous research studies have been done on the Phillips Curve. As Hart (2003, 108) observed, “The Phillips Curve still plays a prominent role in macroeconomic theory and associated empirical work.”

The basic tenets of the Phillips Curve can be understood by using the concept of labor demand and supply. If labor demand is bigger than labor supply, the excess in demand can put an upward pressure on the wage rate, which will cause high inflation in the country. In this situation, it would be easy for workers to find employment and as a result, unemployment rate would remain at low levels. By contrast, if labor supply is bigger than labor demand, the excess in the supply of labor would lower the wage rate which, in turn, would lead to a lower inflation rate. In this situation of excessive labor supply, it would be difficult for workers to find employment and unemployment would be at high levels.

In other words, during the years of economic boom in a country, companies would attempt to increase their production output and employ more workers. During such economic upturns, low unemployment would co-exist with a high inflation rate. On the other hand, during economic recessions, companies would try to decrease the volumes of production and lay off their workforce. In such a situation, high unemployment would be accompanied by low inflation.

Besides providing a solid theoretical foundation, the Phillips Curve hypothesis has important political implications because it highlights an uncomfortable choice that political leaders and central bankers in various countries may face from time to time. Since one of the main policy targets of central banks is price stabilisation, which can be achieved through control of the inflation rate in the country, many central banks devise their monetary policies to keep inflation rate as low as possible. However, assuming that there exists an inverse relationship between inflation and unemployment, maintaining low inflation could be achievable provided that unemployment is high. This means that central banks may be confronted with an unpleasant dilemma of whether to choose a combination of low-inflation and high-unemployment or vice versa.

Undoubtedly, high unemployment is one of the most serious domestic economic and political problems in any country. In a country with high unemployment, political leaders may oppose the central bank’s initiatives aimed at price stabilization if the proposed monetary policies would exacerbate unemployment rate. In other words, central bankers and political leaders may have different opinions about the consequences of the price stabilization measures which could further complicate economic policies.

Since its inception, the Phillips Curve hypothesis has remained an essential criterion for decisionmakers in central banks. Highlighting the Phillips Curve significance, Islam et al. (2003, 107) wrote,
“In the 1960s and 1970s, the Phillips Curve was used as an important macroeconomic policy tool in the developed as well as less developed countries. It acted as a reminder for the macroeconomic policy formulat-ors and the governments how far they were able to push down inflation rate or unemployment rate without unduly risking the other because of the trade-off relationship between these two key macro-economic variables.”

However, a number of research studies done by economists in the 1980s began casting doubts on the hypothesis’ validity.

Considering the importance of this topic and the fact that the majority of available research studies on the Phillips Curve have been done in the context of developed economies, the present paper chooses a developing country—the Philippines—as a case study to analyze the relationship between unemployment and inflation. The main research question the current paper addresses is: “Does the trade-off relationship exist between unemployment and inflation in the Philippines?” This study uses several econometric techniques to analyze the Phillips Curve hypothesis in the Philippine context.

This paper consists of five parts. Following this introduction, Part 2 briefly reviews the most relevant literature on the Phillips Curve for this current study. It also highlights the debate and reports the opposing views that the Phillips Curve hypothesis has generated among economists belonging to different schools of economic thought. Part 3 discusses the research methodology employed in this study while Part 4 reports the research findings. Concluding remarks are offered in Part 5.

LITERATURE REVIEW
In his seminal paper “The Relationship between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom 1861–1957,” William Phillips argued that there existed a strong negative association between unemployment and inflation in the United Kingdom over the observation period. Since the study’s publication, numerous academic inquiries have been devoted to this topic. The findings of these academic inquiries have either confirmed or refuted the Phillips Curve hypothesis.

Among prominent economists who support the existence of the Phillips Curve are Paul Samuelson and Robert Solow (1960). Samuelson and Solow examined the relationship between these two macroeconomic variables in the context of the United States economy and concluded that there existed an inverse relationship between unemployment and inflation in the country.
Significant contributions to the research on the Phillips Curve were made by Solow (1970) and Gordon (1971) whose studies on the United States’s economy confirmed the existence of a negative trade-off relationship between unemployment and inflation in that country. The empirical findings from Solow’s and Gordon’s research studies have been known as the “Solow-Gordon affirmation” of the Phillips Curve.

However, despite a solid theoretical foundation and a number of studies that confirmed the validity of the Phillips Curve, some economists voiced their strong disagreement that there exists an inverse relationship between unemployment and inflation. These criticisms of the Phillips Curve began as early as the 1960s. As Islam et al. (2003, 107) observed, “Since its inception, the Phillips Curve hypothesis has been open to debates.”

Such prominent economists as Friedman (1968) and Phelps (1967) criticised the Phillips Curve hypothesis and offered counter-argumentations to the existence of the trade-off relationship between unemployment and inflation. Both Friedman (1968) and Phelps (1967) conceded that there could exist a negative relationship between unemployment and inflation but only in the short run. In the long run, unemployment rate would conform to the vertical pattern and the trade-off relationship between the two variables would cease to exist.

According to Friedman (1968) and Phelps (1967), policymakers may be concerned about the short-run consequences of the price stabilization policy that may have a negative impact on unemployment rate. However, in the long run, unemployment rate would stabilize around an equilibrium level. Taking into consideration this consequence, policymakers can proceed to devise monetary policies without worrying about the negative impact of these policies on unemployment rate. A recent study by Cashell (2004) supported this argumentation. The researcher asserted that in the long run, unemployment would move toward an equilibrium level which is dubbed as a natural rate of unemployment or “non-accelerating inflation rate of unemployment (NAIRU).”

Robert Lucas (1976), a prominent economist belonging to the Chicago school of economic thought and among the critics of the Phillips Curve, argued that the trade-off relationship between unemployment and inflation would exist only if workers do not expect that policymakers could create an artificial situation of high inflation combined with low unemployment. If the workers foresee an impending high inflation they would demand an increase in wages. In this situation, high unemployment and high inflation would co-exist, which contradicts the Phillips Curve hypothesis. This line of argumentation is known as the “Lucas critique.”

A systematic and thorough criticism of the Phillips Curve put forward by Lucas in the 1970s led to a loss of interest in this topic among the academics. As Debelle and Vickery (1998, 384) put it, “The Phillips Curve fell into a period of
neglect in academic circles during the 1980s, while remaining an important tool for policymakers.” However, in the 1990s, there occurred a revival in the Phillips Curve research and the topic became “the subject of intensive debate (e.g., the symposium in the *Journal of Economic Perspectives*)” (Debelle and Vickery 1998, 384). Among the numerous studies in the 1990s, a study by King and Watson (1994) examined the Phillips Curve hypothesis using the U.S. post-war macroeconomic data. Their findings provided empirical support to the existence of the trade-off relation between unemployment rate and inflation rate in the United States. The researchers maintained that there could exist an inverse relationship between unemployment and inflation provided that the long-run and the short-run noises are eliminated from the data.

Hogan (1998) examined the Phillips Curve using the U.S. macroeconomic data for the period from 1960 to 1993. The results of the inquiry supported the existence of a significant and negative relationship between unemployment and inflation although the traditional Phillips Curve seemed to over-predict the rate of inflation.

Recent improvements in the methods of data analysis allow a more thorough examination of the Phillips Curve hypothesis. Some research studies employed panel data analysis to analyze the “common” Phillips Curve in different countries over the same period of time. For example, DiNardo and Moore (1999) used the panel data analysis and the methods of ordinary least squares (OLS) and generalized least squares (GLS) to test the existence of the Phillips Curve in nine Organisation for Economic Co-operation and Development (OECD) member countries. Their findings confirmed the existence of the “common” Phillips Curve. As DiNardo and Moore (1999, 19) concluded, “In sum, we believe that our results show a remarkable robust relationship between relative inflation and relative unemployment.”

Turner and Seghezza (1999) employed the panel data method to examine the Phillips Curve in 21 OECD countries over the period from the early 1970s to 1997. To analyze the pooled data, they used the method of seemingly unrelated estimation (SURE) rather than the OLS. The findings of Turner and Seghezza’s (1999) study provided a “strong support” for the existence of “common” Phillips Curve among 21 OECD member countries.

Arratibel et al. (2002) analyzed New Keynesian Phillips Curve with forward-looking expectations and used the panel data for this purpose. They found that unemployment rates had a significant relationship with the non-tradable inflation rates. However, Masso and Staehr (2005) who used the dynamic panel data method failed to ascertain a significant relationship between unemployment and inflation.
RESEARCH METHODOLOGY

This paper uses Vector Error Correction Model (VECM) analysis to test the existence of the Phillips Curve in the Philippines over the period from 1980 to 2006. All data are annual data. The Philippines’ National Economic and Development Authority (NEDA) (2008), was the source of data on the unemployment rate while information on the inflation rate was obtained from the Philippines’ National Statistics Office (2008).\(^1\)

Three econometric methods are used in this study. These are: (1) unit root test, (2) Johansen cointegration test, and (3) Granger causality based on the VECM. In order to test the simple Phillips Curve, many researchers have used the following simple equation:

\[
IFR_t = \alpha_0 + \gamma_1 UER_{t-1} + \epsilon_t
\]  

where \(\alpha_0\) is constant, \(\gamma_1\) are slope coefficients, \(IFR_t\) is inflation rate in the Philippines in the year \(t\), \(UER_t\) is unemployment rate in the Philippines in the year \(t\), and \(\epsilon_t\) is the error term. Support for the Phillips Curve hypothesis would require a negative and significant coefficient for the unemployment rate, i.e. \(\gamma_1 < 0\).

The trade-off relationship between inflation rate and unemployment rate could be described as the “short run” Phillips Curve. On the other hand, the “long run” Phillips Curve could be vertical at the natural rate of unemployment \((NUER)\). The long-run relationship can be expressed as

\[
IFR_t = \alpha_0 + \beta_1 IFR^E + \gamma_1(UER_t - NUER) + \epsilon_t
\]  

where \(\beta_1\) is slope coefficient, and \(IFR^E\) is the expected rate of inflation. In the long run, the unemployment rate would be equal to the natural rate of unemployment and the inflation rate would be constant.

This paper estimates the “augmented Phillips Curve” rather than the simple Phillips Curve. The equation could be written as

\[
\Delta IFR_t = \alpha_0 + \sum_{i=1}^{n} \beta_i \Delta IFR_{t-i} + \sum_{i=1}^{n} \gamma_i \Delta UER_{t-i} + \epsilon_t
\]  

\(^1\) An important methodological issue to consider is whether the natural logarithm of the variables or the variables themselves should be used to examine the Phillips Curve. A number of studies used the natural logarithm of the variables while some papers used the variables themselves. It should also be noted that some economies in Asia, such as Singapore and Japan, have suffered from deflation problem. Normally, the natural logarithm is unsuitable to be used for a negative value. Thus, it cannot be used to examine the Phillips Curve in countries with deflationary trends. Although the Philippines has not suffered from deflation, this paper uses a method which is more generally applicable (i.e., the variables themselves) rather than the natural logarithm of the variables.
The Phillips Curve, in the context of the Philippine economy, is assessed by this present study in three stages. In the first stage, a unit root test is used to examine the stationarity of the data sets. For this purpose, the augmented Dickey-Fuller (ADF) unit root test (Dickey and Fuller 1979, 1981) is employed. The ADF test is based on the following regression:

\[ \Delta y_t = \mu + \theta t + \delta y_{t-1} + \sum_{i=1}^{n} \gamma_i \Delta y_{t-i} + \varepsilon_t \tag{4} \]

where \( t \) is a linear time trend, \( \mu \) is constant, \( \Delta \) is the difference operation, \( \theta, \delta, \gamma \) are slope coefficients, \( \varepsilon_t \) is the error term. The ADF test tends to be sensitive to the choice of lag length \( n \) which can be determined by minimizing the Akaike information criterion (Akaike 1974).

In the second stage, implications stemming from equation (1) are tested. The OLS regression model could be used for this purpose provided that the variables are integrated of order zero, I(0). On the other hand, if the variables are integrated of order one, I(1), Johansen cointegration test could be employed to check the long-run movement of the variables (Johansen 1988, 1991). Johansen cointegration test is based on maximum likelihood estimation of the \( k \)-dimensional Vector Autoregressive (VAR) model of order \( p \):

\[ Z_t = \mu + A_1 Z_{t-1} + A_2 Z_{t-2} + \ldots + A_p Z_{t-p} + \varepsilon_t \tag{5} \]

where \( Z_t \) is a \( k \times 1 \) vector of stochastic variables, \( \mu \) is a \( k \times 1 \) vector of constants, \( A_j \) is \( k \times k \) matrices of parameters, and \( \varepsilon_t \) is a \( k \times 1 \) vector of error terms. The model could be transformed into an error correction form:

\[ \Delta Z_t = \mu + \Gamma_1 \Delta Z_{t-1} + \Gamma_2 \Delta Z_{t-2} + \ldots + \Gamma_{p-1} \Delta Z_{t-p+1} + \Pi Z_{t-1} + \varepsilon_t \tag{6} \]

where \( \Pi \) and \( \Gamma_1, \ldots, \Gamma_{p-1} \) are \( k \times k \) matrices of parameters. On the other hand, if the coefficient matrix \( \Pi \) has reduced rank, \( r < k \), then the matrix can be decomposed into \( \Pi = \alpha \beta' \). Johansen cointegration test involves testing for the rank of \( \Pi \) matrix by examining whether the eigenvalues of \( \Pi \) are significantly different from zero. There could be three conditions, (1) \( r = k \), which means that \( Z_t \) is stationary at levels, (2) \( r = 0 \), which means that \( Z_t \) is the first differenced VAR, and (3) \( 0 < r < k \), which means there exist \( r \) linear combinations of \( Z_t \) that are stationary or cointegrated.

The current study uses Trace (Tr) eigenvalue statistics (Johansen 1988; Johansen and Juselius 1990). The likelihood ratio statistic for the trace test is:
for $r = 0, \ldots, k-1$, where $\hat{\lambda}_i$ is the $i$th largest estimated eigenvalue. The null hypothesis for Johansen test is that there are at most $r$ cointegrating vectors. Johansen cointegration test is sensitive to the choice of lag length $n$ and model specification which is determined by minimizing the Akaike information criterion (Akaike 1974) and Schwarz information criterion (Schwarz 1978).

In the third stage, this study runs a Granger-causality test based on the following VECM:

$$\Delta IFR_t = b_1 + \sum_{i=1}^{n} b_{2i} \Delta UER_t - i + \sum_{i=1}^{n} b_{3i} \Delta IFR_t - i + b_4 ECT_{r,t} + \varepsilon_t \tag{8}$$

where $ECT_{r,t}$ is the lagged values of error correction term.

Granger test based on VECM is also sensitive to the choice of lag length $n$ which is determined by minimizing the Akaike information criterion (Akaike 1974) and Schwarz information criterion (Schwarz 1978). There are two advantages in using this method rather than the standard Granger causality test. First, the F-test of the independent variables indicates the short-run causal effect. Second, a significant and negative error correction term indicates the long-run causal effects.

**EMPIRICAL RESULTS**

In the first stage of this study, the ADF root test was used to examine stationarity of the variables. The results of the ADF test are shown in Table 1.

Despite minor differences in the findings as reported in the table, the obtained results indicate that the two variables – $IFR$ and $UER$ — are integrated of order one, $I(1)$.

<table>
<thead>
<tr>
<th>Table 1. Augmented Dickey-Fuller (ADF) unit root test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levels</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>$IFR_t$</td>
</tr>
<tr>
<td>$UER_t$</td>
</tr>
<tr>
<td>Notes:</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
In the second stage, Johansen cointegration test was used to test the long-run movement of the variables. As Engle and Granger (1987) pointed out, only variables with the same order of integration can be tested for cointegration. In the present study, both variables – \textit{IFR} and \textit{UER} – could be examined for cointegration. The results of the cointegration test are reported in Table 1.

It should be noted that Johansen cointegration test can be biased when the number of observations is small. Thus, the maximum lag length for the test was set at two (2) due to a limited number of observations. According to the Akaike information criterion (AIC) and Schwarz information criterion (SIC), optimal lag length could be one (1). Therefore, the empirical results of Johansen test and Granger causality test will be based on the lag length of one (1).

Among the major problems that stem from the use of Johansen cointegration test is that the test statistics are very sensitive to the choice of model specification and the lag length. In this study, the following five different model specifications are used for Johansen cointegration test:

Model 1: no intercept in cointegrating equation and no trend in VAR
Model 2: an intercept in cointegrating equation and no trend in VAR
Model 3: an intercept in cointegrating equation and an intercept in VAR
Model 4: an intercept and linear trend in cointegrating equation and an intercept in VAR
Model 5: an intercept and linear trend in cointegrating equation and an intercept and linear trend in VAR

The AIC was again used to determine the most appropriate model specification for Johansen cointegration test. As Table 3 shows, the best model specification is Model 4, and the number of cointegrating equations is one (1).

The findings of the present study indicate that there existed a long-run relationship between the two variables, i.e., \textit{IFR} and \textit{UER}. This means that these variables are cointegrated. In other words, although the variables are not stationary at levels, in the long run, they closely move with each other.

\begin{table}
\centering
\begin{tabular}{lll}
\hline
Lags & Akaike information criterion & Schwarz information criterion \\
& (AIC) & (SIC) \\
\hline
1 & 10.53664* & 10.83116* \\
2 & 10.81720 & 11.30806 \\
3 & 10.97655 & 11.66375 \\
\hline
\end{tabular}
\caption{Optimal lag length selection for the Johansen test (maximum lag length=3)}
\end{table}

* Indicates optimal lag length
Table 3. Optimal model specification selected by the Akaike Information Criterion (AIC)

<table>
<thead>
<tr>
<th>Model</th>
<th>Number of CEs = 0</th>
<th>Number of CEs = 1</th>
<th>Number of CEs = 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1</td>
<td>10.94017</td>
<td>10.80738</td>
<td>11.12212</td>
</tr>
<tr>
<td>Model 2</td>
<td>10.94017</td>
<td>10.88111</td>
<td>11.02372</td>
</tr>
<tr>
<td>Model 3</td>
<td>11.09946</td>
<td>10.96050</td>
<td>10.81734</td>
</tr>
<tr>
<td>Model 4</td>
<td>11.09946</td>
<td>10.68233*</td>
<td>10.81734</td>
</tr>
<tr>
<td>Model 5</td>
<td>11.19654</td>
<td>10.69944</td>
<td>10.81734</td>
</tr>
</tbody>
</table>

CE — denotes "cointegrating equation"
* Indicates optimal model selected by the AIC

Table 4. Johansen cointegration test (trace statistic)

<table>
<thead>
<tr>
<th>Eigenvalue</th>
<th>Trace statistic</th>
<th>5 percent critical value</th>
<th>1 percent critical value</th>
<th>Number of cointegrating equations</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.558</td>
<td>27.053</td>
<td>25.32</td>
<td>30.45</td>
<td>None*</td>
</tr>
<tr>
<td>0.232</td>
<td>6.624</td>
<td>12.25</td>
<td>16.26</td>
<td>At most 1</td>
</tr>
</tbody>
</table>

The result corresponds to VAR with one lag
* Indicates significance at 5% level

Table 5. Optimal lag length selection for Vector error correction model (VECM) (maximum lag length=3)

<table>
<thead>
<tr>
<th>Lags</th>
<th>Akaike information criterion (AIC)</th>
<th>Schwarz information criterion (SIC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>11.30921*</td>
<td>11.79676*</td>
</tr>
<tr>
<td>2</td>
<td>11.78961</td>
<td>12.47680</td>
</tr>
<tr>
<td>3</td>
<td>12.26112</td>
<td>13.14976</td>
</tr>
</tbody>
</table>

* Indicates optimal lag length

Granger-causality method based on VECM was employed to examine the long-run and short-run casual relationships between the two variables. First, the AIC and SIC were used to determine optimal lag length for the causality test. As Table 5 shows, optimal lag length for causality test is one (1) which minimizes the AIC and SIC.

The findings show that the error correction term ($ECT_{t-1}$) is statistically significant. The adjustment coefficient is -0.91. This means that the inflation rate was adjusting toward the equilibrium level at the rate of 91 percent.

On the other hand, the empirical results show that the independent variable ($\Delta UER$) is not statistically significant. This means that unemployment rate did not
This paper uses annual data. Thus, a very short lag length (i.e., lag length equal to one (1) selected by the Akaike information criterion (AIC) and Schwarz information criterion (SIC) can be acceptable. On the other hand, if the lag length is equal to two (2) or three (3), the Granger causality tests will yield approximately similar results.

Finally, Granger causality test was used to examine the possibility of a feedback effect. The AIC and SIC were used to determine optimal lag length for the causality test. As Table 7 shows, optimal lag length for the causality test is one (1) which minimizes the AIC and SIC.

Table 6. Granger-causality test based on VECM
dependent variable: $\Delta UFR$

<table>
<thead>
<tr>
<th>Variable</th>
<th>Degree of Freedom</th>
<th>Wald Test Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\Delta UER$</td>
<td>1</td>
<td>0.825</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>t-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>$ECT_{t-1}$</td>
<td>-0.912</td>
</tr>
</tbody>
</table>

Note: To test for causality when variables are cointegrated, the following Granger causality test based on the VECM could be used:

$$\Delta(\text{IFR})_t = b_1 + \sum_{i=1}^{n} b_{2i}\Delta(\text{UER}_t - i) + \sum_{i=1}^{n} b_{3i}\Delta(\text{IFR}_t - i) + b_4 ECT_{t-1} + \epsilon_t$$

1) Short-run causality: the joint significance of the coefficients is determined by the Wald Test
2) Long-run causality: the level of significance for error correction term ($ECT_{t-1}$) is determined by the t-statistics.

The result corresponds to VAR with one lag

** Indicates significance at 1% level

Table 7. Optimal lag length selection for Granger causality test (maximum lag length=3)

<table>
<thead>
<tr>
<th>Lags</th>
<th>Akaike information criterion (AIC)</th>
<th>Schwarz information criterion (SIC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>11.24121*</td>
<td>11.53743*</td>
</tr>
<tr>
<td>2</td>
<td>11.32440</td>
<td>11.81809</td>
</tr>
<tr>
<td>3</td>
<td>11.44283</td>
<td>12.13400</td>
</tr>
</tbody>
</table>

* indicates optimal lag length

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2 This paper uses annual data. Thus, a very short lag length (i.e., lag length equal to one (1) selected by the Akaike information criterion (AIC) and Schwarz information criterion (SIC) can be acceptable. On the other hand, if the lag length is equal to two (2) or three (3), the Granger causality tests will yield approximately similar results.
Table 8. Granger-causality test

<table>
<thead>
<tr>
<th>Variable</th>
<th>F-statistics</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>UER → IFR</td>
<td>0.806</td>
<td>0.378</td>
</tr>
<tr>
<td>IFR → UER</td>
<td>2.409</td>
<td>0.134</td>
</tr>
</tbody>
</table>

The result corresponds to VAR with one lag

The empirical results indicate that unemployment rate did not seem to Granger-cause inflation rate. Furthermore, neither did inflation rate Granger-cause unemployment rate. This means that there was neither causal relationship nor feedback relationship between unemployment and inflation in the Philippines.

In a nutshell, empirical findings of the present study imply that there existed a long-run cointegrating relationship—but no causality—between inflation rate and unemployment rate in the Philippines.

CONCLUDING REMARKS
The negative association between unemployment and inflation is an important theoretical foundation for macroeconomic management and economic policies in various countries. The present study empirically analyzed the relationship between unemployment rate and inflation rate in the Philippines.

Since the unit root tests done in this study showed that the inflation rate could be considered as integrated of order one and the unemployment rate also could be considered as integrated of order one, Johansen cointegration method was used to examine the long-run relationship between unemployment and inflation in the Philippines. The findings indicate that there existed a long run cointegrating relationship—but no causality—between inflation and unemployment in the Philippines.

The results of this study encourage a closer look at various socioeconomic factors that may influence unemployment rate and inflation rate in the country. For example, future research studies on the topic of the Phillips Curve may want to incorporate other variables such as output gaps to examine in greater detail the workings of the Phillips Curve in the context of the Philippine economy.

REFERENCES


