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The relationship of real Gross Domestic Product (GDP), inflation, and unemployment in the Philippines (1970-2011)

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Abstract

The study was made to examine the relationship among GDP, inflation, and unemployment in the Philippines (1970-2011). Augmented Dickey-Fuller Test was used to check the unit root property of the variables, resulted in all the variables having a unit root at single differencing. The Engle-Granger Test was used to test cointegration of each variable—showed no cointegration (there is no long-run relationship among the variables). The researchers could still study the short-run relationships between and among the variables using the VAR model which was interpreted using the Short-Run Model, IRF, Variance Decomposition, and Graph Residuals. Diagnostic checking was used to check on heteroscedasticity, normality, and serial correlations. The Granger Causality Test was used to know if changes in a variable would impact other variables which showed that all variables do not Granger-cause each other. After performing the tests, there exist significant short-run relationships between real GDP and CPI; between real GDP and UP; and between CPI and UP. The verifications of inverse relationship between real GDP and CPI, Okun's Law, and Phillips curve in the Philippines were not justified since the models do not have long-run relationships. Reasons enumerated to explain the relationships existing among the variables in the Philippines: (1) heavy dependence on external finance and response on crises (relationship between GDP and CPI); (2) structural issues, relatively high redundancy cost, heavily regulated hiring/firing practices (relationship between GDP and UP); (3) implementation of inflation targeting, globalization of markets, and rigidity in the labor market (relationship between CPI and UP).

Keywords: economic growth/health; economic indicators; economic theories variable relationships; short-run relationships

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1. Introduction

Despite its huge human and natural resources, the Philippines has experienced a boom-bust economy for decades until recently when Socioeconomic Planning Secretary Arsenio M. Balisacan announced that the country has been said to no longer deserve the title, "Sick Man of Asia," since it is one of the emerging markets today. The Philippine economy is said to be improving continuously though some problems have not yet been fully solved. Some of these problems are the constant increase of the price of Filipino necessities and commodities and the increasing trend of unemployment (Cagahastian et al., 2015). So, the research sought to know how these problems have really affected the economic growth of the Philippines.

The performance of the country's economy indicates that it is improving with the continuous growth of GDP and slowdown in the increase of the prices of commodities. However, despite the economic growth, Asian Development Outlook (ADO) 2013 noted that there is still a significant unemployment rate that needs to be addressed so that the country's economic development is felt by all Filipinos. There are economic indicators being observed to assess the country's health. The three most significant are gross domestic product, inflation, and labor market data. These can have a huge impact on the decisions made by the government and individuals thus it is important to interpret and analyze them.

GDP is one of the most known economic indicators that is used when measuring the country's economic health. Real GDP is an inflation-adjusted measure of the total monetary value of all the finished goods and services produced within the borders of a country over a year course. It is the expenditure on final goods and services minus imports: final consumption expenditures, gross capital formation, and exports less imports. It includes all private and public consumption, government outlays, investments and exports less imports that occur within a defined territory (Mankiw, 2012).

In the Philippines, real GDP has shown to have improved compared to the last decades. Overall, the real Gross Domestic Product (GDP) in the Philippines has an increasing trend. Moreover, a Bloomberg survey of economists shows the Philippines is one of the fastest-growing economies and will be the second fastest-growing economy in the world in 2015, second to China with a growth of 6 percent or more (Robinson, 2015). Therefore, knowing the movement of GDP through the years can help economists, investors, and citizens understand the country's economic situation.

Inflation and unemployment are the usual indicators that are observed through in relation to economic growth. According to Samuelson (1973), inflation is a period of generally rising prices for goods and services and factors of production over time. It is usually measured using the consumer price index (CPI), which is an indicator of the change in the average retail prices of a fixed basket of goods and services commonly purchased by households relative to a base year. The CPI is used in calculating the inflation rate (Bangko Sentral ng Pilipinas, n.d.). The consumer price index (CPI) in the Philippines grew slowly from 1970 to 1994, gradually rising in 1994 with index points of 98.9 from 63.3 but fell the next year. Nevertheless, CPI increased to 173.40 index points in 2011 from 73.2 index points in 1995. Overall, it has an increasing trend (Bradsher, n.d.).

Changing prices have effects on output and employment. An increase in prices is associated with high employment or low unemployment. According to Samuelson (1973), nothing good can be said for a rapid increase of prices. Production and even the social order can be then disorganized. The total wealth of large groups of the population can be wiped out as money becomes worthless.

On the other hand, unemployment occurs when a person who is actively searching for employment is unable

to find work. Unemployed persons include those who are not employed, were available for work, and had tried to find employment during the previous four weeks. Also included are those waiting to be recalled to a job from which they had been laid off. Furthermore, the unemployment rate is the percentage of people in the labor force who do not have a job but were actively looking for a job divided by the number of people in the labor force (Mankiw, 2012).

There is a fluctuating trend in the number of unemployed persons from 1970 to 2004. The rate fell gradually in 2005 which might be caused by the new definition of unemployment adopted by the government in April 2015. This change in definition resulted in a reduction of the number of the unemployed persons by some 800 thousand to 1.5 million depending on the quarter of consideration. Nevertheless, it started to have a slow increasing trend again in the succeeding year. In general, it can be said that the graph has an increasing trend (Esguerra, 2010).

In a report released in January 2014 by the International Labor Organization (ILO), the Philippines had the highest unemployment rate for the previous year among the Association of Southeast Asian Nations (ASEAN) members with a 7.3 percent unemployment rate. Since real GDP, CPI, and number of unemployed persons matter to most people, it is important to understand their relationships. Each of these variables is intertwined with one another.

Another relationship is the Okun's Law, which states that there is a negative relationship between GDP and unemployment. Typically, growth slowdowns coincide with rising unemployment. This negative correlation between GDP growth and unemployment has been named "Okun's Law," after the economist Arthur Okun who first documented it in the early 1960s.

The researchers have become interested to know the real relationship existing between the real GDP and unemployment in the Philippines since although the country's GDP is growing, unemployment is still rising. According to Norio Usui, ADB senior economist, stated that "the Philippine economy continues to grow but Filipinos continue to suffer due to lack of job opportunity", (Xinhua, 2013). Furthermore, according to Asian Development Outlook (ADO) 2013, "persistently high" levels of unemployment remain a major concern in the country (Xinhua, 2013). About 7 percent of the 40 million labor force is unemployed based on the latest data on the National Statistics Office.

Determining whether the Philippines follows the relationship of real GDP and unemployment, as stated in the Okun's Law, can be useful for the country as the model can be used as a forecasting tool. As concluded in a study conducted by the Federal Reserve Bank of St. Louis, the "Okun's Law can be a useful guide for monetary policy." Hence, with the economic history of the Philippines and the relationships of gross domestic product, inflation, and unemployment, the researchers analyzed these three Philippine economic indicators in terms of their relationships and whether the said economic theories are applicable in the Philippine setting. Recognizing these three indicators as important variables for measuring economic health, their relationships were used as a guide in making government policies and strategies.

Ideally, economic growth is attached with a decrease in inflation and unemployment, while an increase in inflation is attached with a decrease in unemployment. However, in the Philippines, economic growth is usually accompanied with an increase in inflation and unemployment, which also shows that inflation and unemployment are moving in the same direction contradicting the ideal relationship. These make economists and policy makers confused leading to policies and strategies with inappropriate objectives.

For the government to further develop better policies and strategies for the improvement of the country's economy, the study empirically examined the relationship among these three indicators in the Philippines using the Philippines' real GDP, CPI, and number of unemployed persons from 1970 to 2011. It also attempted to add on studies about what contributes to the economic growth of the country through analyzing the relationship of these three indicators and it aimed to help government agencies (such as Bangko Sentral ng Pilipinas and Department of Labor and Employment) in doing programs directed at improving economic growth and also policy makers

because the results can serve as a guide in setting objectives when doing policies for the development of economic growth. In addition, investors would be able to use this as a reference if the economy is at its best since economic growth, inflation and unemployment are good indicators in analyzing economic health. This would also help the researchers in further understanding the economic theories.

1.1 Objectives of the study

The goal of the study was to empirically examine the relationship among real GDP, inflation, and unemployment in the Philippines and specifically aimed to:

- determine the relationship between real GDP and inflation;
- determine the relationship between real GDP and unemployment; and
- determine the relationship between inflation and unemployment.

However, there were limitations as to the data since the data is only from 1970 to 2011—as all the variables were only available on these years, only inflation and unemployment were considered as determinants of real GDP—these variables were the two most important measures of economic health, and the empirical results—attained from the ADF test, Engle-Granger Cointegration test, VAR Model, and Granger Causality test.

2. Review of related literature

2.1 GDP and inflation

In Bangladesh, the present relationship between inflation and economic growth using annual data set on real GDP and CPI for the period 1980 to 2005 (Ahmed & Mortazam, 2005), showed that there is a statistically significant long-run negative relationship between the two. While, in Ethiopia, Girma (2012) also made a study about the short-run and long-run relationships between inflation and economic growth for the period 1980 to 2011 since he saw that the country's recent growth performance and considerable development gains were challenged by macroeconomic problems of high inflation. Using the Vector Auto Regression (VAR) model, it was shown that an increase in economic growth decreases inflation, whereas inflation does not have a significant effect on economic growth in the short run.

In the Philippines, a study was conducted by the Philippine Institute for Development Studies (Yap, 1996) that the relationship of economic growth and inflation was considered to explain the importance of controlling inflation. The determinants of inflation were reviewed to have a basis on the discussion of the policy regimes in the country. It showed that the Philippines is heavily dependent on external finance and has a myopic macroeconomic management, that is why the Philippines was led to a problem of coordinating the policies for economic growth with the policies for moderating inflation.

2.2 Unemployment and real GDP

In the Philippines, with the study of IMF (Ide et al., 2011), the relationship between output growth and unemployment rate appears relatively weak. Multivariate time-series mode approach (VAR) including quarterly data on output growth and unemployment rate was used in this study to determine the strengths of the relationship among them. Although Okun's Law captures the relationship between these two variables, the correlation has been weaker in the Philippines. There may be some structural issues in the Philippine labor market as suggested by this weak relationship. One issue could be the high proportion of self-employed workers and unpaid family workers (40 percent of total employment), another is redundancy costs in the Philippines are relatively high and hiring/firing practices are relatively heavily regulated.

Nain (2012) also made a study on unemployment and real GDP in a macroeconomic model and examined the validity of Okun's Law in selected ASEAN countries. He found out that whether a country is developed or still developing, it still has the problem of increasing unemployment. The Philippines in the 1980's showed a rapid decrease in economic growth while the unemployment rate was increasing. Okun's Law is non-existent in Indonesia and in the Philippines. Okun's Law is useful for policymakers and economists and can be used as a forecasting tool.

In the article by Pitterle and Zhang (2014) about the growth and unemployment rates of the Philippines, it stated that even though there had been outpouring growth from 2011 to 2013, there were no improvements in the labor market. Using a graph with GDP, unemployment, and underemployment rates from years 2005 to 2013, the Philippines remained high compared to other East Asian countries. Economists refer to this situation as "jobless growth".

According to Wen and Chen (2012), Okun's Law intends to show how much of a country's GDP may be lost when the unemployment rate is in its natural rate. This law is a good guide for monetary policies. The study also explained the logic behind the Okun's Law. Since labor is needed to produce output, there is a positive relationship between employment and output. From the formula stating that the total employment is equal to the labor force minus the unemployed, a negative relationship can be derived between output and unemployment. Nevertheless, the constancy and significance of Okun's Law depend on how the long-run movement of GDP and unemployment rate are defined. Okun's Law can only be a good guide for monetary policy if the natural rate of unemployment is correctly measured.

2.3 Inflation and unemployment

In the Philippines, in the newsletter of Faith Cacnio (2012), the relationship of inflation and unemployment has been perceived to have weakened from 2002 to 2011, which means that the Phillips curve has flattened. The newsletter also enumerated some reasons why there was a weakening link between the two variables. On the other hand, in the study of Furuoka, Harvey, and Munir (2013), the empirical findings found a long-run negative and causal relationship between unemployment and inflation, which can be an evidence for the existence of the Phillips curve. It was emphasized that unemployment rate is a "cause" in the relationship of these two variables. A decline in unemployment rate would cause an increase in inflation rate; inflation rate would not cause a decline in unemployment.

In Nigeria, Donga et al. (2013) examined the effect of inflation and unemployment on Nigeria's economic growth from 1986 to 2010, motivated by the Nigerian economy, which still has low per capita income and high inflation and unemployment rate despite its vast human and natural resources. The results showed a one-way causation running from inflation and unemployment to RGDP. Johansen Cointegration was also used in order to know if there is a long-run relationship between the variables, and it showed that despite the fact that there is no causation between inflation and unemployment, two cointegrating equation existed which means that there is a long-run relationship between economic growth, inflation, and unemployment. The results also discovered that inflation and unemployment have a positive impact on economic growth and that unemployment does not significantly affect economic growth, but a good performance of an economy in terms of per capita growth may be attributed to the inflation in the country.

3. Theoretical framework

3.1 Gross Domestic Product

The economy's condition is usually assessed based on its total income earned by everyone in the economy or from the total expenditure on the economy's output of goods and services, a concept covered by GDP. These are both assumed to be equal because they both have two parties: a buyer and a seller. These are also the same because

in a perfect economy, it is assumed that a household spends all its income to buy all goods and services from firms, which then pays for the factors of production (Mankiw, 2012). For a more precise definition, GDP, as focused on total expenditure, is the market value of all final goods and services produced inside the country in a specific period, which adds up different kinds of products and services into a single value of economic activity. It includes all final goods that are currently produced in the economy and sold legally in the markets. The included goods and services are the tangible goods and intangible services. It measures the production within the geographic confines of a country, regardless of the nationality of the producer, and within a specific interval of time, usually per year (Mankiw, 2012).

The composition of GDP should be known to further explain it because people have different ways of spending their scarce resources. The equation below shows that GDP (Y) is divided into four components: consumption (C), investment (I), government purchases (G), and net exports (NX):

$$Y = C + I + G + NX$$

According to Mankiw (2012), consumption (C) is the spending of households on goods (durable and nondurable goods) and services (intangible, and education). Investment (I) is the purchasing of goods (capital equipment, inventories, and structures) that will be used in the future to produce more goods and services. Government Purchases (G) is the spending on goods and services by local, state, and federal governments. Net exports (NX) is equal to the foreign purchases of domestically produced goods (exports) minus the domestic purchases of foreign goods (imports). There are two types of GDP according to market prices used for valuing goods and services: (1) nominal GDP which uses current prices to put value on the economy's production of goods and services, and (2) real GDP which uses constant base-year prices to put value on the economy's production of goods and services. Economists use real GDP in analyzing the total quantity of the economy's produced goods and services to separate the effect of the changes in prices from time to time in the economy's production. Hence, since real GDP shows the economy's ability to satisfy people's needs and desires, real GDP is a good measure of economic well-being (Mankiw, 2012).

3.2 Inflation

Inflation is a sustained rise in the price level. Macroeconomists typically look at two measures of the price level at two price indexes: the GDP deflator and the Consumer Price Index. Consumer Price Index measures the cost of living by the cost of a specific list of goods and services over time while GDP deflator presents the average price of the final goods produced in the economy (Blanchard & Johnson, 2013).

3.3 Unemployment

People who would like to work but do not have jobs are not contributing to the economy's GDP. Therefore, unemployment affects the production of goods and services, which then affects the economic growth. When a country keeps all its workers fully employed, it attains a higher GDP (Mankiw, 2012). Unemployment is measured by the number of unemployed persons that includes people in the labor force who are not employed but can work and have tried to find work during a specific period, and those who are waiting to be recalled to a job they have been laid off (Mankiw, 2012).

3.4 Classical economics

According to Arnold (2013), in the classical economics economists believe that:

- Say's law exists, wherein supply creates its own demand and there is no overproduction or underproduction. Even if consumption decreases and savings increase, economic forces produce an equal increase in investment.
- Interest rates are flexible that move to a level where savings and investments are equal.
- The economy is self-regulating, wherein there is full employment and it produces Natural Real GDP

norm.
- Prices and wages are flexible.
- Laissez-faire should be the policy prescription.

3.5 Keynesian theory

Aggregate Demand (AD) and Aggregate Supply (AS) curves compose the traditional Keynesian model suitably showing the relationship between inflation and growth (GDP).

3.6 Aggregate supply

In the short run, the model illustrates a critical feature that the AS curve is upward sloping rather than vertical. If the AS curve is vertical, a change on the demand side affects only prices. On the other hand, if it is upward sloping, both prices and output will be affected, holding that there are many factors affecting inflation and growth (Gokal & Hanif, 2004).

The 'dynamic adjustment' of the short-run AD and AS curves yields an adjustment path which exhibits an initial positive relationship between inflation and growth. However, this turns negative towards the latter part of the adjustment path. Based on the concept, producers feel that only their products' prices have increased while others are operating at the same price level. However, overall prices have risen. Thus, the producer continues to produce more, and output continues to rise. Blanchard and Kiyotaki (1987) also believe that the positive relationship can be due to agreements by some firms to supply goods later at an agreed price. Therefore, even if the prices of goods in the economy have increased, output would not decline, as the producer must fulfill the demand of the consumer with whom the agreement was made (Gokal & Hanif, 2004).

The adjustment process has two important features. One, there are instances when the output decreases and the inflation rate rises, indicating a negative relationship between inflation and growth. This phenomenon is termed as stagflation wherein inflation increases but output diminishes or remains stable. Two, the economy does not move directly to a higher inflation rate. Nevertheless, it follows a transitional path where inflation rises then falls. There is a short-run trade-off between output and the change in inflation, but no permanent trade-off between output and inflation (Gokal & Hanif, 2004).

3.7 Okun's law

Okun's Law is named after Arthur Okun who made an empirical relationship between unemployment and output. According to this law, the relationship between unemployment and the real GDP is negative or inverse, indicating that an increase in unemployment will have a decrease effect in real GDP (Vanita, 2010). This theory was used to have a reference on what relationship exists between gross domestic product and unemployment. Using this theory, the researchers were able to draw an assumption that there should be an inverse relationship between gross domestic product and unemployment.

3.8 Phillips curve

Phillips curve opposes that the economy must maintain a low unemployment rate because it will lead to an upward pressure on inflation. This relation was discovered in 1958 by a New Zealand economist, A. W. Phillips. Since then, the Phillips curve has been redefined as a relation between the change in the rate of inflation and the unemployment rate (Blanchard & Johnson, 2013). The Phillips curve was used as the basis for the relationship between inflation and unemployment. Through this, the researchers could assume that there is a negative relationship between inflation and unemployment.

3.9 Nominal money growth

The relationship among the three variables namely inflation, unemployment, and GDP can be illustrated by

the effects of nominal money growth. Using aggregate demand relation, lower nominal money growth leads to lower real money growth given the initial rate of inflation, leading to a decrease in output growth. Moreover, Okun's Law illustrates that output growth below normal leads to an increase in unemployment. Finally, using Phillips Curve Relation, unemployment above the natural rate leads to a decrease in inflation. Initially, lower nominal money growth decreases output growth and increases unemployment. But after some time, inflation becomes sufficiently low that real money growth and output start to increase faster than the normal growth rate. Unemployment will start to turn around and start decreasing (Blanchard & Johnson, 2013).

3.10 Conceptual framework

*Figure 1***.** Conceptual framework of the study

As shown in Figure 1, three models were formulated for this study. The first model shows that real GDP is a function of the number of unemployed persons, which represents the relationship between economic growth and unemployment. The second model shows that real GDP is a function of CPI representing the relationship between economic growth and inflation. The third model shows that CPI is a function of the number of unemployed persons depicting the relationship between inflation and unemployment.

Table 1

Summary of the Models

Model	Independent Variable	Dependent Variable
GDP = *f*(CPI)	CPI	GDP
GDP = *f*(UP)	UP	GDP
CPI = *f*(UP)	UP	CPI

Note. GDP = Real Gross Domestic Product in Philippine peso (millions).
UP = Number of unemployed persons in thousands. CPI = Consumer price index.

3.11 Hypotheses

1. Ho: There is no relationship between real GDP and inflation.

   H1: There is a relationship between real GDP and inflation.

2. Ho: There is no relationship between real GDP and unemployment.

   H1: There is a relationship between real GDP and unemployment.

3. Ho: There is no relationship between inflation and unemployment.

   H1: There is a relationship between inflation and unemployment.

4. Research methodology

4.1 Data requirements

A collection of quantitative and secondary data was accomplished to empirically analyze the relationship

between the variables. Secondary data were accurate to use since the researchers believe that the data from government agencies are factual in measuring the economic health of the Philippines. Since the tests used in this study required the quantitative data to be in their absolute amounts, the researchers did not use data in percentage form. The following variables were necessary for this study: real Gross Domestic Product, Consumer Price Index, and number of unemployed persons. The secondary time-series data used cover forty-two (42) years from 1970 to 2011.

Table 2

Variable codes, definition, and sources

Variable	Code	Definition	Source
1. Real Gross Domestic Product (constant 2000 prices)	GDP	- the inflation-adjusted measure of "the total output within the geographic boundaries of the country, regardless of the nationality of the entities producing the output." (BSP, 2013)	Bangko Sentral ng Pilipinas
2. Consumer Price Index (2000 as base year)	CPI	- indicates the change in the average retail prices of a fixed basket of goods and services commonly purchased by households relative to a base year. (NSO, n.d.)	Philippine Institute for Development Studies
3. Number of Unemployed Persons	UP	- sums up all persons who are 15 years old and over as of their last birthday and are reported as: (a) without work, b. currently available for work, and c. seeking work. (BLES, n.d.)	Department of Labor and Employment

4.2 Research techniques

Different research approaches were employed in this study for the generation and analysis of data. This study is a quantitative research which is based on the analysis of the relationship of certain variables (Radwan, 2009). It is considered as quantitative research because it used numerical data like real Gross Domestic Product (GDP) in millions, consumer price index (CPI) for inflation, and number of unemployed persons for unemployment of the Philippines. Under quantitative research is the correlational design that allows the researchers to define the relationship of two or more measured variables that are not being controlled or being experimented (Jackson, 2011). Multiple regression analysis in Microsoft Excel was not used because it is not always appropriate to use the model for a time-series data, particularly if the series is not cointegrated.

Another approach used was the time-series analysis which shows the internal structure (such as autocorrelation or trend) of data taken through time that can be considered by the researchers (NIST/SEMATECH, 2012). Deductive research approach, which is usually known in testing a theory, was used. A deductive research approach was applied by the researchers in order to make a hypothesis to test a current theory. The researchers tested the relationships between real GDP and unemployment; real GDP and inflation; and inflation and unemployment to know if they exist in the country.

The study used the simple linear regression. According to Seltman (2009), the simple linear regression is the most considered analysis method when examining the relationship between a quantitative outcome (dependent variable) and a single explanatory variable (independent variable) in a given model. The researchers set the level of significance at 5% in conducting several tests that are as follow:

Augmented Dickey-Fuller Test - Augmented Dickey-Fuller Tests were used to determine the existence of unit roots. Unit root series, also known as a non-stationary series, has a time-varying mean, while no unit root series (a stationary series) is a series with mean value that does not differ with the sampling period and steadily returns to its mean value when fluctuations occur. When it is a unit root series, first differencing is done to become stationary (Paul, 1987).

For this test, the null hypothesis is that the variable has a unit root (non-stationary) and the alternative hypothesis is that the variable does not have a unit root (stationary). The decision rule is to reject the null hypothesis if the *p*-value of the ADF test statistic is less than the 0.05 level of significance. In contrast, accept the null hypothesis if the *p*-value of the ADF test statistic is greater than the 0.05 level of significance. When the test

accepts the null hypothesis at the levels, then there is not enough evidence to conclude that the variable has no stochastic trend. Therefore, it is assumed that there is a stochastic trend, a higher degree of integration is required, which is called differencing, having the same decision rule with the first test. In the test for variables that are single differenced or I(1), the null hypothesis should be rejected to make the variables stationary (Tsay, 2001).

Engle-Granger Cointegration Test - Engle-Granger Test was used to test the cointegration when one independent variable was tested with a dependent variable at a time. This test determines if two variables have a long-run relationship. The null hypothesis is that it has no cointegration while the alternative hypothesis is that it has cointegration implying that the integrated dependent variable has a long-run relationship with at least one of the independent variables (Sjo, 2008). The study has the same null hypothesis and alternative hypothesis above, the decision rule is that when the *p*-values of Engle-Granger statics are greater than the .05 level of significance, the null hypothesis is accepted, and the series are not cointegrated. Therefore, linear regression is not a valid model for the long-run relationship of the variables. In contrast, when the *p*-values of Engle-Granger statics are less than the .05 level of significance, the null hypothesis is rejected and the alternative hypothesis is accepted indicating that the series are cointegrated and linear regression can be a valid model for the long-run relationship of the variables (Tsay, 2001).

Vector Autoregressive (VAR) Models - Vector Autoregressive Models was used to show the relationship of variables due to minor fluctuations in the series even if the variables were not cointegrated. These models are extensions of the univariate autoregressive model to a multivariate time series. These have also proven to be especially useful for describing the dynamic behavior of economic time series and for forecasting (Tsay, 2001).

In order to know whether the short-run relationship between variables is significant, the short-run model should be examined. For the test statistic to be significant in a 0.05 level, it should be greater than 1.96. There should be at least one significant test statistic per lag period for the short-run relationship to be significant. One way to interpret the estimated VAR model is the impulse response function which, according to Rossi (n.d.), is used to determine the impact of one standard deviation increase in each of the other variables on the dependent variable. Another way of interpreting the estimated VAR model is the variance decomposition which is used to determine the contribution of each of the other variables on the change in the dependent variable.

Graph residuals were also used in order to assess the quality of the regression. The residuals should be randomly distributed around zero and the scatter plot of the residuals should be disordered if the regression is good. The residuals should not show any trend since a trend would indicate that the residuals were not independent (Graphic Residual Analysis, n.d.).

Granger Causality Test - Another test done by the researchers was for causality. This test answers the question whether the two time series variables, *x* and *y,* cause each other, "*y* causes *x*" or "*x* causes *y*". Clive Granger (1969) defines *simple causality* as *"x* causes *y*" if the known past *x* decreases t variance of the errors in forecasting *y* apart from the variance of the errors from the known past *y* alone (Schwert, 1979). For this test, Granger Causality was used. Granger Causality examines whether changes in a variable will have an impact on other variables. For example, if a series *x* causes series *y*, then changes of *x* happened first then followed by changes of *y*. The null hypothesis states that xt does not Granger-cause yt and the alternative hypothesis that states xt does Granger-cause yt. The decision rule is that if the *p*-value is less than the .05 level of significance, then the null hypothesis is rejected. On the other hand, if the *p*-value is greater than the .05 level of significance, then the null hypothesis is accepted (Tsay, 2001).

Diagnostic Tests - It is important to determine if there was any violation of the assumptions on normality, homoscedasticity, and no serial correlation, so diagnostic tests such as Jarque-Bera Test, White's Noise Test, and Serial Correlation LM Test were implemented in the VAR models.

Test on Normality – Jarque-Bera Test using Cholesky Orthogonalization - The calculation of p-values for hypothesis testing typically is based on the assumption that the population distribution is normal. Therefore, a test

of the normality assumption may be useful to conduct. The Jarque-Bera test is based on the sample skewness and sample kurtosis (Jarque Bera Test, 2012).

Test on Heteroscedasticity – White's Noise Test for Heteroscedasticity - Having a heteroscedastic trend is a violation of the use of linear regression models since models should be homoscedastic. Heteroscedasticity, or non-constant variability, refers to the circumstances present when the size of the error term differs across values of an independent variable ("Heteroskedasticity," n.d.). For testing heteroscedasticity, the researchers focused on White's test primarily because it would not require explicit formulation of the form of heteroscedasticity. In a single equation, setting the test amounts to adding the squares and cross-products of the original regressors to an auxiliary regression of the squared residuals on a constant term and testing the significance of these added terms (Doornik, 1996).

Test on Serial Correlation – Serial Correlation LM Test - Serial correlation occurs in time-series studies when the errors associated with a given time period carry over into future time periods. Serial correlation will not affect the unbiasedness or consistency of OLS estimators, but it does affect their efficiency. For this test, the serial correlation using Lagrange Model was used (Pindyck & Rubinfeld, 1991).

5. Results

5.1 Data processing procedures

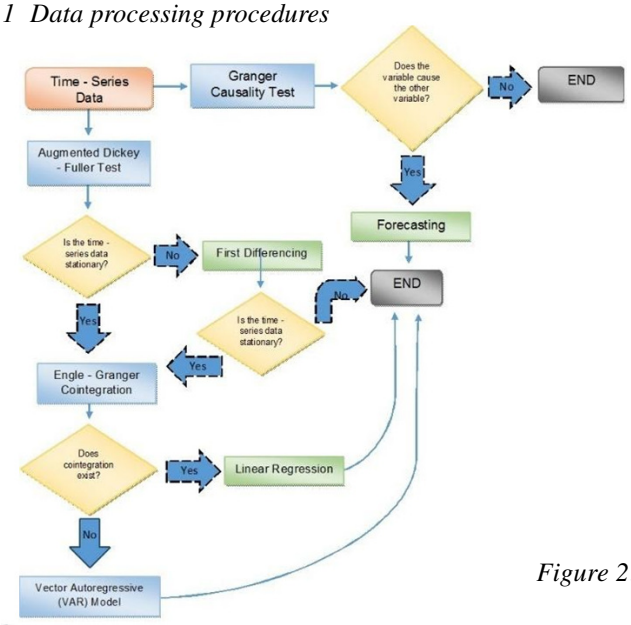

Figure 2. Flowchart of data processing procedures

It was important to test if the gathered data's stochastic process was stationary or nonstationary since the study is time series which is under a stochastic process. To determine whether the time - series data was stationary or nonstationary, ADF test was conducted first. As shown in Figure 2, if the ADF test showed that the time-series data was nonstationary, the data could undergo through first differencing. Following the ADF was the Engle-Granger Cointegration test. If cointegration among variables existed, the linear regression model would be valid, and thus, the variables would have a long-run relationship.

If the variables did not exhibit cointegration or long-run relationship, Vector Autoregressive (VAR) Model would be employed to show relationship of variables due to minor fluctuations in the series and to capture the short-run relationship of the variables. The VAR model would be interpreted in four ways: the short-run model, impulse response function, the variance decomposition, and graph residuals. The short-run model would be used to determine whether the short-run relationship between the variables was significant or not. The impulse response function, on the other hand, would be used to find out the impact of one standard deviation increase in each of the

other variables on the dependent variable. Meanwhile, variance decomposition would be analyzed to determine the contribution of each of the other variables on the change in the dependent variable. Graph residuals would also be used in order to assess the quality of the regression.

The estimated VAR models would be tested if there was any violation of the assumptions on normality, homoscedasticity, and no serial correlation using the Jarque-Bera Test, White's Noise Test, and Serial Correlation LM Test, respectively. Finally, a Granger Causality test would also be conducted to examine whether changes in a variable will have an impact on other variables.

Augmented Dickey-Fuller Test - This test was first done to determine the stochastic trend of the variables, whether it was non-stationary or stationary. Each ADF test of the variables showed that at level, the null hypothesis was accepted since its p-value was greater than the 0.05 level of significance. This implies that there is no stochastic trend. Hence, a higher degree of integration was done wherein the variables were integrated in the order one, I(1) or single differencing was needed to make it stationary.

Table 3

Summary of ADF test results

Variables	*p* - value ADF (at level)	*p* - value ADF (at 1st Difference)	Order of integration
GDP	.3245	.0102	I(1)
CPI	.0758	.0000	I(1)
UP	.9134	.0000	I(1)

Therefore, these three variables have a stationary series, which means that the shocks in the trend were temporary and can be modeled since non-stationary data cannot be modeled.

Engle-Granger Cointegration Test - After testing the stochastic trend of the variables, variables with I(1) order of integration were tested for cointegration. The Engle-Granger cointegration test is done to know if the models had long-run relationships. In the three models, the null hypothesis was accepted because p-values were greater than the 0.05 level of significance. This means that there is no cointegration between the series. Therefore, a long-run relationship does not exist among the three models.

Table 4

Summary of Engle-Granger cointegration test results

Model	Dependent Variable	Engle-Granger tau static (*p*-value)	Engle-Granger z-static (*p*-value)	Cointegration test results
GDP-CPI	GDP	.9590	0.9507	Not cointegrated
GDP-UP	GDP	.8436	0.8202	Not cointegrated
CPI-UP	CPI	.0351	0.0759	Not cointegrated

Since long-run did not exist, the ordinary least squares (OLS) regression was not applicable for this study. However, the researchers had another option, which was to check the short-run relationship of the models.

Vector Autoregressive Models - Since none of the models were cointegrated, Vector Autoregressive (VAR) Models were used to check the short-run relationships of the models. These could show the relationships existing between the variables due to minor fluctuations in the series even if the variables were not cointegrated. There are three VAR models used in this study. Under the VAR model, the short-run model, the impulse response function (IRF), and the variance decomposition were formulated. The short-run model was used to know whether the short-run relationship between variables was significant. The impulse response function (IRF) was used to know the response of one standard deviation increase in each of the other variables on the dependent variable, in this case, GDP and CPI. Moreover, the variance decomposition was employed to determine the contribution of each of the independent variables and the past values of the dependent variable on the change in the dependent variable. Graph residuals were also used in order to assess whether the residuals showed any trend since a trend should not appear because it would indicate that the residuals were not independent. Major fluctuations or shocks in the movement of

the variables could also be seen from graph residuals.

GDP-CPI Model

Table 5

GDP-CPI Model: Short-run model from VAR model

Variable	Parameter Estimate	Std. Error	Test Statistic
DLOG(GDP(-1))	0.501618	0.24684	2.03220
DLOG(GDP(-2))	-0.414953	0.21303	-1.94784
DLOG(GDP(-10))	0.031201	0.23545	0.13252
DLOG(GDP(-11))	-0.354194	0.21231	-1.66827
DLOG(CPI(-1))	-0.035152	0.06745	-0.52117
DLOG(CPI(-2))	-0.025091	0.06732	-0.37271
DLOG(CPI(-10))	-0.048097	0.05373	-0.89515
DLOG(CPI(-11))	-0.077882	0.05645	-1.37956
C	0.058030	0.02227	2.60569

Since there is at least one test statistic that is greater than 1.96, the short-run relationship between GDP and CPI is significant.

Impulse Response Function (IRF) of GDP-CPI Model

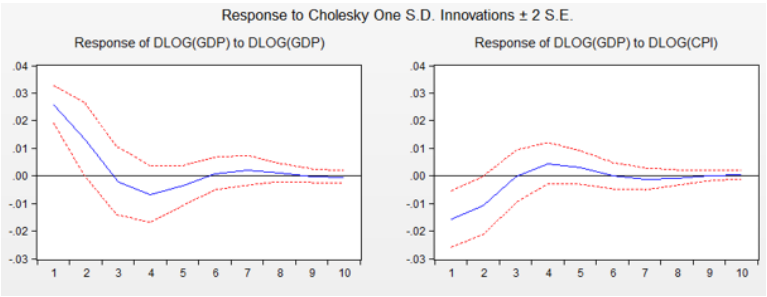

Figure 3. IRF of GDP-CPI model

Looking at Figure 3, a unit increase of CPI resulted in a 0.015 decrease in standard deviation of GDP. The effect of the change from CPI would take GDP three periods to return to its regular short-run movement. Then in the 4th period, it increased to 0.05, which went down again in the 6th period. Through the 6th period to 10th period, the effect of a unit increase of CPI resulted in a stable or near the regular short-run movement of GDP. These mean that the initial response of GDP to a shock in CPI is a decrease.

Variance Decomposition of GDP-CPI Model

Table 6

Variance decomposition of GDP-CPI model

Period	S.E.	DLOG(GDP)	DLOG(CPI)
1	0.030190	73.03567	26.96433
2	0.034584	69.66143	30.33857
3	0.034650	69.76911	30.23089
4	0.035589	69.75682	30.24318
5	0.035888	69.59194	30.40806
6	0.035894	69.60228	30.39772
7	0.035966	69.60135	30.39865
8	0.035987	69.58885	30.41115
9	0.035988	69.58979	30.41021
10	0.035993	69.58969	30.41031

Note. Cholesky Ordering: DLOG (CPI) DLOG (GDP).

Although there had been an increase from the 1st to the 2nd period in CPI's contribution for GDP, which was around 3.4%, it increased by just a very minimal amount from the 2nd to the 10th period. Thus, the changes in

GDP were mainly attributed to itself through its past values. For example, looking at the decomposition of period 5, when GDP experiences some shock, 69.59% of the time GDP is the source and the remaining 30.41% could be traced back to CPI. With this, it can be said that GDP is influenced by 69.58% to 73.04% of GDP itself while 26.96% to 30.41% is by CPI. Nevertheless, it cannot be said that the contribution of CPI to GDP is insignificant although it is small.

Graph Residuals

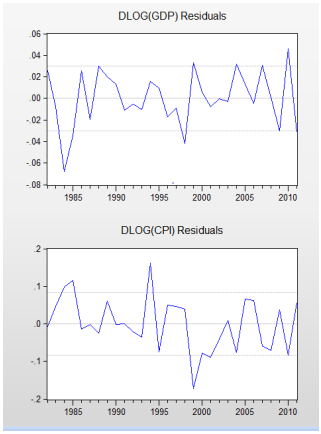

Figure 4. Graph residuals of GDP-CPI model

Figure 4 shows the graph residuals for GDP and CPI respectively. As seen in the first graph, GDP moved outside the Bartlett band (broken lines) in 1984. The Philippines in 1984 faced serious challenges to its political and economic stability—the aftermath of martial law which became visible after the death of Benigno Aquino Jr. This event made some people lose their confidence over the government and doubt the Philippine's ability to commit to its international obligations, which caused a sharp decrease in domestic economic activity (Malin, 1985). Also, industrial utilization largely declined because the allocation of foreign exchange heavily affected the import-substituting industries. This was worsened by a high interest policy that attempted to capture the private capital outflows and negated the inflationary effects of devaluation. Thus, real GDP in 1984 declined by 7.3 percent (Yap, 1996).

GDP-UP Model

Table 7

GDP-UP model: Short-Run model from VAR model

Variable	Parameter Estimate	Std. Error	Test Statistic
DLOG(GDP(-1))	0.490726	0.14568	3.36849
DLOG(UP(-1))	-0.003730	0.03048	-0.12235
C	0.018644	0.00736	2.53390

Since there is at least one test statistic that is greater than 1.96, the short-run relationship between GDP and UP is significant.

Impulse Response Function (IRF) of GDP-UP Model

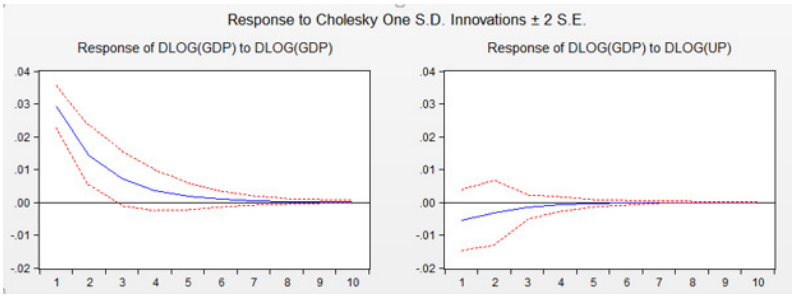

Figure 5. IRF of GDP-UP model

Looking at Figure 5, a unit increase of UP resulted in a 0.005 decrease in standard deviation of GDP. The effect of the change from UP would take GDP around four periods to come back to its regular short-run movement. Then in the next period the effect of a unit increase of UP resulted in a stable movement of GDP.

These mean that the initial response of GDP to a shock in UP is a decrease.

Variance Decomposition of GDP-UP Model

Table 8

Variance decomposition of GDP-UP model

Period	S.E.	DLOG(GDP)	DLOG(UP)
1	0.029688	96.43843	3.561572
2	0.033120	96.14697	3.853032
3	0.033904	96.12462	3.875384
4	0.034092	96.11601	3.883985
5	0.034138	96.11433	3.885671
6	0.034149	96.11388	3.886123
7	0.034152	96.11377	3.886229
8	0.034153	96.11375	3.886255
9	0.034153	96.11374	3.886261
10	0.034153	96.11374	3.886263

Note. Cholesky Ordering: DLOG(UP) DLOG(GDP).

In Table 8, there was a very minimal increase from the 1st to the 4th period in UP's contribution for GDP. However, after the 4th period, UP's contribution was almost not moving. With these, it is shown that the changes in GDP could be mainly attributed to itself through its past values. For example, looking in the decomposition of period 5, when GDP experienced some shock, 96.11% of the time GDP was the source and the remaining 3.89% could be traced back to UP. It can be said that GDP is influenced by 96.11% to 96.44% of GDP itself while 3.56% to 3.89% is because of UP. Nevertheless, it cannot be said that the contribution of UP to GDP is insignificant although it is very small.

Graph Residuals

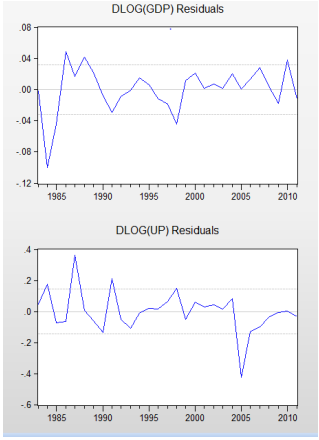

Figure 6. Graph residuals of GDP-UP model

Figure 6 shows the graph residuals for GDP and UP respectively. As seen in the first graph, GDP moved outside the Bartlett band in 1984. During this year, the capital inflow in the country decreased so there is not enough investment for new jobs. Therefore, there has not been enough employment in the country. This can affect the domestic production of the country.

CPI-UP Model

Table 9

CPI-UP model: Short-Run model from VAR model

Variable	Parameter Estimate	Std. Error	Test Statistic
DLOG(CPI(-1))	-0.471091	0.19360	-2.43330
DLOG(CPI(-10))	0.412282	0.16406	2.51294
DLOG(UP(-1))	0.013404	0.14897	0.08998
DLOG(UP(-10))	0.023162	0.12736	0.18186
C	0.068056	0.03074	2.21382
@ISPERIOD("1985")	0.300753	0.13235	2.27236

Since there is at least one test statistic that is greater than 1.96, the short-run relationship between CPI and UP is significant.

Here, there might be something significant that had happened during 1985, for it appeared as a significant period affecting CPI according to the test employed. In 1985, the Philippines experienced the strongest storm—Typhoon Nitang, which affected the level of prices. It might also be due to the shifts in government monetary and fiscal policy to capture the effects of increased disaster - induced inflation or to finance additional government expenditure (Benson, 1997).

Impulse Response Function (IRF) of CPI-UP Model

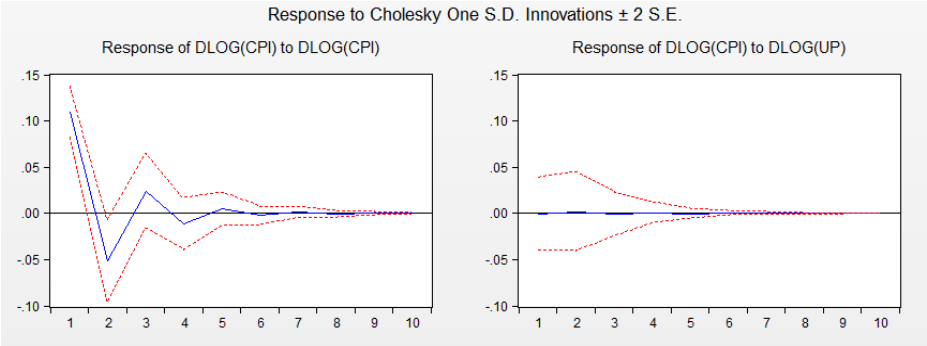

Figure 7. IRF of CPI-UP model

Figure 7 shows a unit increase of UP did not result in an increase or decrease in standard deviation of CPI. This means that CPI has no initial response to a shock in UP and might be due to the minimal contribution of UP to CPI, as shown in the next table.

Variance Decomposition of CPI-UP Model

Table 10

Variance decomposition of CPI-UP model

Period	S.E.	DLOG(CPI)	DLOG(UP)
1	0.109990	99.99887	0.001128
2	0.121598	99.97481	0.025192
3	0.124013	99.96861	0.031389
4	0.124539	99.96721	0.032787
5	0.124654	99.96690	0.033096
6	0.124680	99.96684	0.033164
7	0.124685	99.96682	0.033179
8	0.124686	99.96682	0.033182
9	0.124687	99.96682	0.033183
10	0.124687	99.96682	0.033183

Note. Cholesky Ordering: DLOG(UP) DLOG(CPI).

In Table 10, there was a very minimal increase from the 1st to the 4th period in UP's contribution for CPI. However, after the 4th period, UP's contribution was almost not moving similar to the case of the GDP-UP model. It is shown that the changes in CPI are mainly attributed to itself through its past values. For example, looking in the decomposition of period 5, when CPI experienced some shocks, 99.97% of the time CPI was the source and 0.03% could be traced back to UP. It can be said that CPI is influenced by 99.97% to 99.99% of CPI itself while 0.001% to 0.033% is because of UP. Nevertheless, it cannot be said that the contribution of UP to CPI is insignificant although it is very small.

Graph Residuals

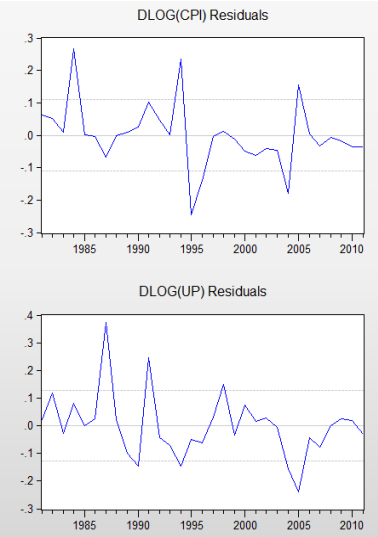

Figure 8. Graph residuals of CPI-UP Model

Figure 8 shows the graph residuals for CPI and UP, respectively. As seen in the first graph, CPI moved outside the Bartlett band (broken lines) in 1984. This movement might be because of certain events during that year as mentioned earlier.

In 1984, the Philippines faced serious challenges like natural disasters and shifts in government monetary and fiscal policy. Typhoons affected the economy as lower growth rate, higher inflation, and an increase in the rate of unemployment were achieved. Typhoon Nitang (1984), affected 1.6 million people as 108, 219 homes were destroyed and 142,653 more were damaged. These resulted in Marcos' declaration of state of calamity. The said typhoon contributed to price inflation during the years 1984-1985. The increases in the price index followed a very erratic path due to macroeconomic instabilities, as well as the presence of El Niño in the northern islands of the Philippines (National Disaster Coordinating Council, n.d.).

Furthermore, the impact of world recession on Philippine export markets influenced this period as adverse movements in the country's high interest rates and excessive reliance on foreign borrowing with short-term maturities lingered (Benson, 1997).

5.2 Diagnostic checking

This checking was necessary to determine if the estimated VAR models had any violation on the assumptions of no serial correlation, homoscedasticity, and normality. The following tests were implemented under 5% level of significance in which the null hypotheses would be rejected for each of the tests if any of the values would be less than .05. To determine if there was any violation of the assumptions on normality, homoscedasticity, and no serial correlation, the estimated VAR models were tested. The following tests were implemented under 5% level of significance. The null hypotheses would be rejected for each of the tests if any of the values was less than .05.

Test on Normality – Jarque-Bera Test using Cholesky Orthogonalization.

Test on Heteroscedasticity – White's Noise Test for Heteroscedasticity.

Test on Serial Correlation – Serial Correlation LM Test

Table 11

Test on normality

Dependent Variable	Independent Variable	Jarque-Bera	*p*-value	Result
GDP	CPI	5.369763	.2514	Normal
GDP	UP	30.79723	.0000	Non-normal
CPI	UP	16.68241	.0022	Non-normal

The error terms of the GDP-CPI model were normally distributed at the 0.05 level of significance. However, the models for GDP-UP and CPI-UP rejected the null hypothesis that the model's residuals are on normality because their *p*-values were less than the .05 level of significance. Therefore, the two models have a problem with non-normality. Nevertheless, it was accepted because according to Luetkepohl (2011), the normality assumption is not a necessary condition for validity of many statistical procedures related to VAR models as long as the normality assumption was rejected due to kurtosis and skewness as was the case for the two models.

Table 12

Test on heteroscedasticity

Dependent Variable	Independent Variable	*p*-value	Result
GDP	CPI	.1377	Homoscedastic
GDP	UP	.4142	Homoscedastic
CPI	UP	.1494	Homoscedastic

As shown in Table 12, at the .05 level of significance, all null hypotheses were accepted, and all the variables are homoscedastic. Therefore, the models do not have problems on heteroscedasticity.

Table 13

Test on serial correlation

Dependent Variable	Independent Variable	Result
GDP	CPI	Serial Correlation (10^{th} lag)
GDP	UP	No Serial Correlation
CPI	UP	No Serial Correlation

For the assumption on serial autocorrelation, the Serial Correlation LM test showed that there is a serial correlation between the error terms for the GDP-CPI model but there appears no correlation between the error terms for VAR models of GDP-UP and CPI-UP at the .05 level of significance.

Granger Causality Test - Another test used was the Granger Causality Test. This test examined whether changes in *x* variable would have an impact on *y* variable and vice versa. The null hypothesis stated that *x* variable does not Granger-cause *y* variable and the alternative hypothesis stated that *x* variable does Granger-cause *y* variable.

Table 14

Summary of the Granger Causality test results

Decision	*F*-statistic	*p*-value
DLOG(CPI) does not Granger Cause DLOG(GDP)	1.03090	.3676
DLOG(GDP) does not Granger Cause DLOG(CPI)	0.76535	.4730
DLOG(UP) does not Granger Cause DLOG(GDP)	0.64465	.5311
DLOG(GDP) does not Granger Cause DLOG(UP)	1.68772	.2001
DLOG(UP) does not Granger Cause DLOG(CPI)	0.08085	.9225
DLOG(CPI) does not Granger Cause DLOG(UP)	0.37179	.6923

As shown in Table 14, all the null hypothesis was accepted because the p-values were greater than the 0.05 level of significance. This means that the variables do not Granger-cause each of their respective pair variables. Therefore, the changes in one variable does not have an impact on its respective pair variable.

5.3 Summary

All Three variables exhibit an I(1) order of integration and have a stationary series and can be modeled as shown by the ADF test results. The Engle-Granger cointegration test states that all the models are not cointegrated, which means that they do not constitute long-run cointegrating relationships. Hence, the researchers have not used regression to see the relationships among the variables. Despite the variables being not cointegrated, the researchers were still able to test the short-run relationships between each variable using the VAR model.

There is an existing significant short-run relationship in all models as shown by the short-run model. Also, from the VAR model, the IRF depicts that when a shock happens with independent variable CPI, the dependent variable GDP is affected only in the first three years before it returns to its short-run trend. Meanwhile, when a shock happens with UP, GDP is affected only in the first four years before its return to its short-run trend. However, in the CPI-UP model, CPI has no initial response to a shock in UP.

Using the variance decomposition, the GDP-CPI model shows that the contribution of CPI to GDP is small since the change in GDP is caused by 69.58% to 73.04% of GDP itself through its past values while 26.96% to 30.41% is because of CPI. Then, in the GDP-UP model, the contribution of UP to GDP is very minimal since GDP is changed by approximately 96% of GDP itself while 3.56% to 3.89% is because of UP. Similarly, the independent variable UP has a very minimal contribution to its dependent variable CPI in the CPI-UP model since the change in CPI is influenced by approximately 99% of CPI itself while 0.001% to 0.033% is because of UP. Nevertheless, although the contributions range from small to very minimal, it still cannot be said that these contributions are insignificant.

In order to be sure that there are no violations on any of the model assumptions, all models have been tested for normality, heteroscedasticity, and serial correlation. Granger Causality Test was also to know whether changes in a variable have an impact on other variables. Unfortunately, all the variables do not Granger-cause each other.

6. Conclusion

This study empirically examines the relationships among real GDP, inflation, and unemployment in the Philippines using the yearly data collected from government agencies for the period 1970 to 2011. The researchers conclude that there exist significant short - run relationships between real GDP and CPI; between real GDP and UP; and between CPI and UP. Therefore, in the short-run, the null hypotheses of the study should be rejected, and the following alternative hypotheses should be accepted:

- H1: There is a relationship between real GDP and inflation.
- H1: There is a relationship between real GDP and unemployment.
- H1: There is a relationship between inflation and unemployment.

The model of GDP and CPI shows that an increase in CPI initially decreases real GDP in the first year, but the decrease lessens until the third year, and then it returns to its short-run trend. It is also found that the contribution of CPI to the change of real GDP ranges from 26.96% to 30.41%. Meanwhile, in the model of GDP and UP, an increase in UP initially decreases real GDP in the first year but the decrease lessens until the fourth year and returns to its short-run trend. The contribution of UP to the change of real GDP ranges from 3.56% to 3.89%. Unfortunately, the direction of change in the model of CPI and UP is not identified, but it is found that the contribution of UP to the change of CPI ranges from 0.001% to 0.033%.

Simply put, there is an inverse relationship between CPI and real GDP until the third year as it returns to its short-run trend because of the fluctuating tendency. As for the relationship between UP and real GDP, there is an inverse relationship also until the fourth year as it returns to its short-run trend due to the fluctuating tendency, too. Unluckily, the direction of change of CPI and UP is not determined. Moreover, the verifications if inverse

relationship between real GDP and CPI, Okun's Law, and Phillips curve exist in the Philippines are not fully justified since the models do not have long-run relationships only short-run trends. Hence, the researchers have enumerated some reasons to further explain the relationships existing among the variables in the Philippines.

To support relationship existing between GDP and CPI, a study conducted by PIDS (Yap, 1996) behind the fundamental problem of reconciling the relationship between economic growth and inflation cited the following reasons: (1) heavy dependence on external finance and (2) the response on crises (like major devaluation and oil price shocks).

On the relationship of GDP and UP, a study stated that Okun's Law does not exist in the Philippines (Nain, 2012). Also, the study of International Monetary Fund (Ide et al., 2011) states that the correlation of GDP and unemployment has been historically weaker in the country because (1) of the structural issues in the Philippines (such as the high proportion of self-employed workers and unpaid family workers); (2) redundancy cost in the Philippines are relatively high; and (3) hiring and firing practices are heavily regulated (Ide et al., 2011). Moreover, on the Phillips curve, it cannot be asserted to exist in the Philippine, for the effect of CPI on UP is very small. According to Cacnio (2012), this can be a weakening link between inflation and unemployment. Some of the reasons behind this relationship are: (1) the implementation of inflation targeting that helps anchor inflation expectations, (2) the international competition caused by the globalization of markets, and (3) the excess supply of workers in the Philippines that results to rigidity in the labor market and in the country's wage structure.

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