
| RESEARCH ARTICLE

The Impact of Inflation, Unemployment, and Population Growth on Philippine Economic Growth

Lubbock, Katja Jannika B.¹ ✉ Merin, Marvin A² and Gonzalez, Andrew, MBA³

¹²³*Department of Economics, University of Santo Tomas, Manila Philippines*

Corresponding Author: Lubbock, Katja Jannika B., **E-mail:** katjajannika.lubbock.ab@ust.edu.ph

| ABSTRACT

This study aims to investigate the impacts of inflation, unemployment, and population growth on Philippine economic growth over the period of 1991 to 2020. The data of this study was obtained from the World Bank Open Data. To investigate the impact of the following variables, the researchers will be employing the following tests: a.) Unit Root Test and b.) Johansen Cointegration Test. The findings of this study reveal that The Ordinary Least Square (OLS) results suggest that inflation has a positive impact on economic growth. Meanwhile, unemployment and population growth indicate a negative impact on economic growth. The Unit Root Test confirms that unemployment, population growth, and economic growth are non-stationary while inflation happens to be stationary. However, the 1st difference shows unemployment, population growth, and economic growth became stationary through the Augmented Dickey-Fuller Test. Further, Johansen's Cointegration Test result shows that the variables are cointegrated, and there is an existence of a long-run relationship.

| KEYWORDS

Inflation rate, unemployment, population growth, economic growth

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1. Introduction

1.1 Background of the Study

Throughout the years, inflation, unemployment rate, and population growth are macroeconomic indicators and determinants of economic growth and development. The impacts of these macroeconomic indicators on economic growth were seen in various economies (Tenzin, 2019). Hence, it only shows that these macroeconomic indicators are not just a primary concern of less developed and developing countries but also in developed countries (Ademola & Badiru, 2014). Further, these indicators can transpire either a positive or negative growth and development of a certain economy of specific countries.

Inflation is defined as a situation in which prices change due to the increase in the production cost of goods over a given period. If inflation is too high, then an economy might suffer macroeconomic imbalances (United Nations, 2007). The relationship between inflation and unemployment was established by Philips (1958), which shows an inverse relationship between inflation and unemployment; when inflation increases, then it corresponds to a low level of unemployment.

On the other hand, unemployment is defined as an individual without a job but actively seeking work in the past four weeks and being ready to start working in the next two weeks International Labour Organisation (2020). Moreover, it is a useful indicator to determine the economy's health and shows the inadequacy of an economy to respond and produce jobs for those individuals who want to work. Hence, unemployment tends to aggravate household disposable income, worsen purchasing power, and diminish economic output. Keynesian Economics (1930) argues that unemployment is caused by a lack of aggregate demand in the economy, which can be reduced by an effective fiscal policy to increase its demand.

Population growth refers to an increase in the number of people in a certain region or country (Kuhe, 2019). It shows that population growth tends to have a positive effect on economic growth (Dauda, 2015). However, large population sizes might differ across countries depending on their labor structures and other factors. Meanwhile, economic growth plays an important role in the economy because it measures the production of goods and services in a specific period and can reduce government debt and borrowing. As a result, it can generate profits for business and increase its employment. Furthermore, if a country experiences rapid economic growth, then it could lead to a surge of inflation. However, if economic growth is too slow, then it can transpire to high unemployment (Cashell, 2006). In addition, a rapid increase in population can hinder economic growth and reduces its standard of living.

The Philippines is recognized as one of the competitive economies in the East Asia Pacific region due to its sustainable annual growth rate of 6.4% between 2010-2019 and an average of 4.5% between 2000-2009. Further, the country is now shifting to upper-middle-income countries whose per capita income ranges from US\$4,046–\$12,535, coming from a lower-middle-income country with a gross national income of US\$3,850 in 2019. The vigorous economy of the country is anchored by increasing urbanization, growing middle class, powerful remittances, strong consumer power, and, lastly, a dynamic labor market (World Bank, 2021). Despite the tremendous growth of the country, the Philippines experienced average inflation of 4.5% and 8.9% unemployment. However, the country had a significant drop in its annual population growth of 1.3% compared to the annual population growth rate of 3.3% in 1960.

The study was conducted to examine whether there is a positive or negative correlation between the determinants of economic growth like unemployment, population growth, and inflation towards economic growth in the Philippines.

1.2 Statement of the Problem

In a study conducted by Mohseni & Jouzaryan (2016), it was found that unemployment, population growth, and inflation are significant determinants that affect economic growth. During times of higher inflation, it corresponds with low unemployment and vice versa (Depersio, 2020). In the economic model, when unemployment is high, it indicates that the economy is operating below its natural rate, thus resulting in lower output and income (Pettinger, 2020). The study aims to determine the correlation between unemployment, population growth, inflation, and economic growth. Moreover, the researchers will make use of unemployment, population growth, and inflation to determine the effects on economic growth.

1.3 Formulation of Hypothesis:

To fully understand the correlation between unemployment, population growth, and inflation towards economic growth, the researcher will be using multiple regression analysis. Multiple regression is used to estimate the relationship between a dependent variable and independent variables, and it allows to determine if the model is fitted (Bevans, 2020). Hence, the hypotheses of this study are the following:

Null Hypothesis (Ho): There is no significant correlation between unemployment, population growth, inflation, and economic growth in the Philippines.

Alternative Hypothesis (Ha): There is a significant correlation between unemployment, population growth, inflation, and economic growth in the Philippines.

1.4 Significance of the Study

This study aims to have a significant standpoint and awareness on the correlation between unemployment, population growth, inflation, and economic growth in the Philippine Economy, whether it has a negative or positive impact. Future researchers will benefit from this study because they will have an idea of how unemployment, population growth, inflation affects economic growth. Moreover, the results of this study will help policymakers in conceptualizing greater policies to increase economic output despite the continuously rising population and to be able to reduce unemployment and inflation.

1.5 Research Scope and Delimitations

The study will cover the correlation between unemployment, population growth, inflation, and economic growth in the Philippine economy. The data used in this study is gathered from the World Bank. The software that will be used in Ordinary Least Square (OLS) Regression, Johansen's Cointegration Test, and Unit Root Test is EViews. The study will make use of annual time-series data to be able to analyze the correlational effects of the dependent and independent variables over the period of 1991 to 2020. The researchers are aware that there are other determinants of economic growth to consider and can affect its correlation, but this study will only focus on three determinants, namely, unemployment, population growth, and inflation. Furthermore, the results and observation may or may not be applicable to other countries.

2. Review of Related Literature

2.1 Related Literature

2.1.1 Inflation and Economic Growth

A study conducted in Bhutan examined the relationship between economic growth, inflation, and unemployment from 1998 to 2016 using the autoregressive distributed lag (ARDL) model. The empirical analysis results state that there is a relationship between unemployment and inflation in the short run. However, in the long run, the inflation rate has a positive relationship with the unemployment rate. If the inflation rate is uncertain, then the economic growth will decrease and can lead to higher unemployment. Moreover, the impact of economic growth and inflation on unemployment depends on the labor market structure (Tenzin, 2019). In India, the relationship between economic growth and inflation is one of the important macroeconomic factors. The study used the Unit root test, Co-integration test, Granger causality test, and Vector correction model. After a series of tests using the annual time series data from 1992 to 2017, it shows that both inflation and GDP are stationary based on Augmented Dickey-Fuller (ADF) test. While in the Vector Error Correction Model shows that inflation has no significant long run impacts on the economic growth of the Indian Economy. Moreover, the Granger causality results show inflation and GDP growth are not correlated in an Indian context (Manjunath et al., 2018). In addition, a study conducted by Xia (2021) states that inflation and low employment indicate serious threats to any country's economic growth. Moreover, the rate of potential output, in the long run, was determined by the changes in GDP and low employment. Further, the result using the Bi-variate regression model supports the null hypothesis that it has no significant correlation between the inflation rate and India's lack of employment rate. A study conducted by Muhammad et al. (2017) examined the relationship of inflation and gross domestic product growth in Pakistan using the country's annual data of inflation and GDP growth from 1972 to 2016 through various techniques like; OLS, FMOLS, TAR, and dummy method threshold model, to evaluate the true relationship between the concerned variables. As a result, the OLS results showed an insignificant negative impact on inflation rate towards GDP growth which could also be the reason for the nonlinear relationship between the variables. In addition, to have fixed economic growth, we must have a single-digit inflation rate which can transpire a positive effect towards economic growth. Meanwhile, there is statistical insignificance, and positive impact of inflation on economic growth in Nigeria both short and long run based on various tests conducted such as ARDL approach to co-integration and error correction mechanism (ECM) to test both the short and long run impact of inflation on economic growth. The value of the F statistic is 19.44020. It is more than the upper bound of the Pesaran table at 1%, 5%, 2.5%, and 1%, which means it has a long run relationship among GDP, Inflation, and for long-run coefficient. It also shows that foreign exchange has a significant positive impact on economic growth in Nigeria (Enejoh et al., 2017).

Anning et al. (2017) examines the impact of inflation and unemployment on the economic growth in Iraq using annual time series data from 1990-2014 and utilizes the Vector Autoregressive (VAR) Model Approach. The study tends to adopt the multiple regression analysis wherein rate of growth (ECGR) is to be the dependent variable while unemployment rates (UN) inflation rates (INF) serve as the explanatory variables which to formulate models that will catch the relationship among the variables of interest in the study. The results indicate the negative relationship between unemployment and inflation and its impact on growth in the economy of Iraq, which tends to be statistically and economically significant.

In examining the relationship between unemployment rate, economic growth, and the inflation rate for the period 1991-2018 in Senegal, they used the autoregressive distributed lag (ARDL) modeling approach, and the bound test of cointegration was applied. Moreover, the Augmented Dickey-Fuller Test (ADF) and Phillips Perron (PP) were applied to the test unit root or stationary issue. Lastly, the Granger Causality Test to examine if there is unidirectional or bidirectional causality among variables. The results show that there is no Granger causality relationship among unemployment, economic growth, and inflation. In addition, it was found that economic growth, industry, and age dependency ratio have a negative effect in the long run and short run on unemployment and inflation (Diakhoumpa, 2020).

In a study conducted by Smith (2021), in determining the causal relationship between inflation and economic growth in Malaysia, he uses annual data from 1961-2019. In his study, he used the Vector Error Correction Model and the Vector Auto-regression Model to be able to identify the short run and long run relationship between inflation and economic growth. The results show that there is a possible relationship between inflation and economic growth based on the covariance and correlation matrix. Further, as growth positively affects current inflation in the long run, there is a possibility of long run causality from growth to inflation.

Abdennadher & Sahnoun (2019) studied the relationship between unemployment rate, economic growth, and inflation rate in North African countries between 1965 and 2016 using the vector error-correction model. They used the following techniques: the Granger causality, the unit root test (Dickey-Fuller test and Phillips-Perron), and Johansen co-integration test. The study tends to have different results. First, in the short run, it shows inflation to economic growth has unidirectional causal flow. Second, in both the short and long run, unemployment indicates a unidirectional relationship. Lastly, in both the short and long run, it shows a unidirectional relationship between inflation to unemployment. On the other hand, a study conducted in five ASEAN countries, namely: the Philippines, Malaysia, Indonesia, Singapore, and Thailand, showed impressive economic growth. Moreover, they tested

if the variables could predict a country's GDP, especially for the five ASEAN countries. These five ASEAN countries' inflation rates are significantly different from each other and don't affect the inflation of the whole ASEAN countries. Their findings show that these five ASEAN countries' GDP will continuously rise in the next seven years (from 2019-2025) in a linear upward trend and could be the next Tiger cub of the economy of the ASEAN region. In conclusion, once a GDP is strong, then companies tend to hire more employees and pay higher wages that can result in higher consumption of household goods and services (Atento R. et al., 2017).

2.1.2 Unemployment and Economic Growth

The strategy of pursuing economic growth to reduce unemployment is based on Okun's Law (Suryono et al., 2020). The relationship between economic growth and the rate of change in unemployment is called Okun's law (Louail & Riache, 2019). Okun's law explains the negative relationship between unemployment and GDP growth.

Makaringe & Khobai (2018) studied the impact of unemployment on economic growth over the period of 1994: Q1-2016: Q4 in South Africa. They used the autoregressive distributed lag (ADRL) bounds testing approach, where results proved that there is a long run relationship between economic growth and unemployment in South Africa. Similarly, Niranjala (2019) applied the Augmented Dickey-Fuller (ADF) and ARDL bounds testing approach to investigate the relationship between growth and unemployment over the period of 1991-2016 in Sri Lanka. The results demonstrate that there is a long run relationship between economic growth and unemployment in Sri Lanka. In parallel, Louail & Riache (2019) used annual data from Saudi Arabia and found out that there is the existence of Okun's law in the Saudi economy.

Galvez & Bulayog (2017) proved the existence of Okun's law in the Philippine economy in both the long and short run. An increase in GDP by 1% reduces unemployment by 0.7% in the long run. On the other hand, an increase in GDP by 1% results in a decrease in unemployment by 0.95% in the short run. Likewise, Suryono et al. (2020) demonstrated Indonesia's economic growth in 1986-2018 was able to reduce the number of unemployed people in Indonesia and indicates a long-term equilibrium between real GDP and unemployment rate. Therefore, Okun's law exists in Indonesia's economy. However, Godara et al. (2020) estimated Okun's coefficient using the OLS method along with the latest World Bank data on Indian unemployment and economic growth, where results prove that India fails to comply with Okun's law. They concluded that there is no negative relationship between unemployment and GDP growth; instead, there is a positive relationship between them.

In the study of Mojica & Tatlonghari (2017), they observed that it is early to conclude that the Philippine Labor Market is more elastic in reducing unemployment as the economy grows because of the possibility that the economic growth could be higher in the Philippines. Furthermore, the economy must grow at a more robust rate than potential output to get a lower rate of unemployment in the Philippines. On the other hand, Aydin & Esen (2017) investigated the role of the inflation threshold effect in the relationship between unemployment and economic growth in Turkey during 1980-2014. They used the threshold autoregressive (TAR) model, where results showed the threshold values for the inflation rate were 10.44% and 54.38% for the given duration, which led to their conclusion that there is a linear and inverse relationship between growth and unemployment, and it can only be valid in situations where there is a low inflation rate allowing price stability.

Lewis et al. (2019) analyzed the effects of gross domestic product growth and inflation rate on the unemployment rate in Ghana's economy during 1991-2017. They used covariance matrix and multiple regression models, and results showed that one predictor variable (inflation or GDP growth) affects the unemployment rate in the covariance matrix model. Both covariance matrix and multiple regression model showed that high inflation rate results in higher unemployment rates, and high GDP growth rates lessen the unemployment rate in Ghana. On a similar note, a study conducted in Nigeria shows that unemployment and economic growth have a negative and insignificant relationship. Further, Okun's Law in Nigeria does not explain the relationship between unemployment and economic growth (Dankumo, 2019).

2.1.3 Population Growth and Economic Growth

Population growth plays a vital role in overall economic growth and can be a factor in an increase in the growth of per capita output. Moreover, it states that if population growth and per capita GDP growth are independent, therefore the higher population growth rates can transpire into higher economic growth rates. However, if population growth rates tend to affect per capita output growth, then it can lead to either a positive or negative overall economic growth rate. Further, high-income countries with low population growth can lead to economic and social issues. Meanwhile, low-income countries with high population growth can hurdle their economic development (Peterson, 2017).

Bakari & Peter (2018) examined the impact of population growth on African countries' economic growth using a panel data approach from 1980 to 2015. To analyze the data, they employ descriptive statistics, dynamic panel models of difference, and the system of GMM. The study shows that the difference and the system of GMM indicate that population growth implies a positive impact on Africa's economic growth. On the other hand, fertility shows a negative impact on Africa's economic growth. Hence,

African countries should devise and implement pragmatic policy measures to enhance the population's productivity and obtain demographic dividends. On a similar note, a study conducted in Nigeria shows that total population growth, urban population growth, and rural population growth have a significant and positive impact on economic growth. Further, the study also found out that there is an existence of a long run relationship between real GDP and population growth in Nigeria (Kuhe, 2019). Hence, large population size can be beneficial to Nigeria because it transpires a higher growth in the future (Mubarak et al., 2018). In addition, Akindobe et al. (2017) stated that the effects of population on GDP could lead to an increase in labor supply and capital stock. However, even population growth shows a significant impact on economic growth, the results of the Granger causality test confirm that neither economic growth caused population growth nor population growth caused economic growth in Nigeria (Hakeem et al., 2016).

A study conducted in Mexico by Rodriguez et al. (2016) examines the relationship between population growth and economic growth using structural break cointegration analysis for the period of 1960-2014. The result of the Gregory-Hansen test shows that there is a long run equilibrium between population growth and economic growth. However, in the short run analysis, it was found that economic growth has a negative effect on population growth. Thus, population growth and economic growth in Mexico might have a bi-directional causality. Alemu and Mitiku (2019) conducted a study in Ethiopia to examine the impact of population growth on economic growth using annual time series data from 1981-2017. The result of Autoregressive Distributed Lag models confirms that there is a long run relationship between population growth and economic growth and the Granger causality states that there is a bidirectional relationship between population growth and economic growth. Further, the empirical models show population growth has a positive impact on economic growth both in the short and long run.

Balubayan (2019) conducted a study in Region XI, Philippines, to investigate the causal relationship between population growth and economic growth. The study utilizes a stationary test, Vector Autoregressive estimation, and Granger causality test. The result of the Augmented Dickey-Fuller for unit root test indicates that time-series data for population growth and economic growth were both stationary. Hence, there is no need to conduct a differencing approach. Moreover, the result of the Vector Autoregressive estimation shows that the current Annual Population Growth Rate is affected by its previous lag. Thus, Gross Regional Domestic Product affects the growth rate of Annual Population Growth Rate in the Davao Region. Nevertheless, the result of the Granger causality test shows that there is an existence of unidirectional causality between Gross Regional Domestic Product and Annual Population Growth Rate in Region XI. Meanwhile, in Indonesia, it shows that economic growth and population growth rate are proportional. It means that if population growth increases, then economic growth will also increase. Therefore, population growth positively influences Indonesia's economic growth (Rajagukguk, 2016).

2.2 Synthesis

Based on the literature review, it occurred that there is plenty of studies and research that were already conducted across the world; it tests the existence of Okun's law and the Phillips curve with different perspectives and has different outcomes. However, previous studies and research do not usually focus on the Philippine setting. In this research, the inflation rate, unemployment, and population growth are the variables affecting the Philippines' economic growth.

2.3 Research Gap

Various literature reviews show that there is a minimal nor updated study conducted in the Philippine setting. Hence, the researchers will be conducting research in determining the correlation between unemployment, inflation, population growth, and economic growth in the Philippines. In addition, if the inflation rate is uncertain, then the economic growth will decrease, and that can result in higher unemployment. Moreover, the impact of economic growth and inflation on unemployment depends on the labor market structure (Tenzin, 2019).

3. Research Methodology and Design

3.1 Research Design

In conducting this study, the researchers will be utilizing the correlational-quantitative research method. Correlational research is a form of study that measures a relationship between two or more variables. A correlation can be positive, negative, or zero. This method of research will help to assess whether there is a significant or insignificant causal impact of inflation, unemployment, and population growth on economic growth.

3.2 Research Locale

This study will be conducted in the Philippines, a third-world and developing country in Asia. The Philippines is one of the active economies in the East Asia Pacific region. It envisions rapid and sustainable development and improves the quality of life for every Filipino. The place of execution will help the researchers to determine the correlation between inflation, unemployment, population growth, and economic growth.

3.3 Model Specification

In order to conduct the objectives of the study, a multiple regression model is utilized in estimating the relationship between the variables, namely, economic growth, unemployment, inflation, and population growth. The multiple regression model utilized is as follows:

$$GDP_t = \beta_0 + \beta_1 INF_t + \beta_2 UN_t + \beta_3 PG_t + \mu$$

Equation 1

Whereas:

GDP = Economic Growth

UN = Unemployment

PG = Population Growth

INF = Inflation

μ = standard error term

t = 1991, ..., 2020

3.4 Data Gathering Procedure

The researchers gathered the data using a secondary method for data collection to answer the problems of the study. It aims to focus on the correlation between unemployment, population growth, inflation, and economic growth. The annual time series data is collected from the World Bank.

3.5 Research Statistical Treatment

In this study, the researchers will employ statistical tools such as EViews and Microsoft Excel to determine the correlation and discover possible output of the dependent variable and independent variables.

The data gathered will undergo a series of tests such as Ordinary Least Square (OLS) regression, Unit Root Test, and Johansen's Cointegration test. Moreover, the regression analysis will help the researcher to assess the effects of the confounding variables in the study. Hence, the following statistical techniques will be used in the study:

3.5.1 Ordinary Least Square (OLS) Regression

The Ordinary Least Square is a statistical method that estimates the relationship between one or more independent variables and dependent variables. The OLS least-squares tend to minimize the sum of the squared errors.

3.5.2 Unit Root Test

The Unit Root Test examines the stationarity of data. To avoid spurious estimates, the unit root test of stationery should be conducted because most of the economic time series shows a non-stationary.

The two-unit root tests used in this study include Augmented Dickey-Fuller (ADF) and Phillips and Perron (PP) tests to check the stationarity of the variables and their order of integration.

3.5.3 Johansen's Cointegration Test

Johansen's Cointegration Test is utilized to test the cointegrating relationship among several non-stationary time series data. It also estimates the short and long run models.

4. Results and Data Analysis

In this chapter, the researchers will be discussing the results of the following test: the unit root test and the Johansen cointegration test. The unit root test aims to assess if the variables are stationary or non-stationary in each time series. On the other hand, the Johansen cointegration test is to determine if three or more time series are cointegrated. Hence, these tests will help the researchers to assess the significance of the variables.

4.1 Descriptive Statistics

In this paper, the researchers used 30 observations as a sample, and the summary statistics of all variables that are used in the study is given by the following table:

Table 1. Descriptive Statistics of variables

	GDP	INF	UN	PG
Mean	1.70E+11	5.315667	3.471667	1.904333
Median	1.18E+11	4.775000	3.610000	1.840000
Maximum	3.77E+11	19.26000	4.050000	2.490000
Minimum	4.54E+10	0.670000	2.240000	1.350000
Std. Dev.	1.11E+11	3.566529	0.443311	0.354184
Skewness	0.564140	2.051983	-1.694750	0.067394
Kurtosis	1.757412	8.839785	4.841852	1.676040
Jarque-Bera Probability	3.521303 0.171933	59.75444 0.000000	18.60141 0.000091	2.213798 0.330583
Sum	5.11E+12	156.9000	104.1500	57.13000
Sum Sq. Dev	3.57E+23	361.9269	5.699217	3.637937
Observations	30	30	30	30

4.2 Ordinary Least Square (OLS) Regression Results

4.2.1 Regression of Coefficient Model

Table 2. Regression of the Coefficient Model

Variable	Coefficients	Standard Errors
C	8.68E+11	5.49E+10
INF	7.33E+08	2.48E+09
UN	-6.91E+10	1.90E+10
PG	-2.42E+11	2.94E+10

Estimated equation:

$$GDP_t = 8.68E+11 + 7.33E+08 INF_t - 6.91E+10 UN_t - 2.42E+11 PG_t + \mu_t$$

Regression results show that $\beta_0 = 8.68E+11$, so when the constant (C) increases by one unit the GDP increases by 8.68E+11; $\beta_1 = 7.33E+08$, so when the inflation rate increases by one unit the GDP increases by 7.33E+08; $\beta_2 = -6.91E+10$, so when the unemployment rate increases by one unit the GDP decreases by -6.91E+10; $\beta_3 = -2.42E+11$, so when the population growth increases by one unit the GDP decreases by -2.42E+11.

4.2.2 Regression Statistics of the Model

Table 3. Regression Statistics of the Model

R-squared	0.905851
Adjusted R-squared	0.894987

The R squared reveals that the observation is 0.905851 significant in the equation. It indicates that the dependent variable variance was explained in the model at 90%. Hence, the regression model is well fitted on the observed data.

4.2.3 Significant Relationship between Dependent and Independent Variables

Table 4. t-statistics and Probabilities Result

Variable	t-Statistics	Prob.
C	15.80091	0.0000
INF	0.295800	0.7697
UN	-3.641196	0.0012
PG	-8.245208	0.0000

Based on the result of the t statistics and probabilities at Table 4, it shows that unemployment and population growth has a p-value of 0.0012 and 0.0000, respectively, which is less than the level of significance of 0.05, implies that we shall accept the null hypothesis that there is a significant relationship between unemployment, population growth, and economic growth. In contrast, the p-value of Inflation which is 0.7697, indicates that it is greater than the level of significance of 0.05; therefore, we shall reject the null hypothesis that there is no significant relationship between inflation and economic growth.

4.3 Unit root tests

Table 5. Results of Unit Root test with PP and ADF test (with trend and intercept).

	Phillips and Peron		ADF	
	t-statistics	Prob.	t-statistics	Prob.
Level				
GDP	-1.507678	0.8035	-1.487854	0.8106
INF	-7.430842	0.0000	-7.345639	0.0000
UN	-2.538124	0.3090	-2.497831	0.3267
PG	-2.077223	0.5263	-1.921787	0.6157
1st Difference				
GDP	-3.784796	0.0327	-3.761238	0.0344
INF	-18.05514	0.0000	-8.204802	0.0000
UN	-3.506365	0.0581	-3.552152	0.0530
PG	-2.194766	0.4740	-4.054886	0.0188

The test of stationary shows that at level, the economic growth, unemployment, and population growth are all non-stationary because their probability is greater than 0.05, which indicates that we need to reject the null hypothesis that there is no unit root or they are non-stationary. Besides these variables, inflation is stationary at a level. To overcome the non-stationary evolution, an Augmented Dickey-Fuller Test was conducted again for the 1st difference.

Results show that the economic growth, unemployment, and population growth became stationary at the 1st difference. All their probabilities are less than 0.05, which indicates that we should accept the null hypothesis that there is a unit root or it is stationary.

4.4 Johansen Cointegration Test

Table 6. Results of Johansen cointegration test

Unrestricted Cointegration Rank Test (Trace and Max Eigen value)				
Hypothesized No. of CE(s)	Fisher statistics Trace test	Prob	Fisher statistic Max-Eigen value	Prob
None*	66.29092	0.0004	41.84704	0.0004
At most 1	24.44387	0.1823	17.16850	0.1642
At most 2	7.275347	0.5458	7.261995	0.4586
At most 3	0.013378	0.9077	0.013378	0.9077

The results of the cointegration tests are shown in Table 6. The null hypothesis states that there is no cointegration equation and should be accepted at a 0.05 level of significance. At most 1, at most 2, and at most 3 shows that there are cointegrating equations because their probabilities are greater than 0.05, which indicates that we need to reject the null hypothesis that there is no cointegration equation.

5. Conclusion and Recommendations

5.1 Conclusion

Many economists are taking into consideration that inflation, unemployment, and population growth might have a positive or negative impact on economic growth. The literature review shows that inflation and economic growth have an inverse relationship. Hence, if inflation rises, then economic growth will tend to decline. On the other hand, population growth tends to have a positive impact on economic growth.

This study aims to assess the impacts of inflation, unemployment, and population growth on Philippine economic growth over the period of 1991 to 2020 was analyzed through Unit Root Test and Johansen’s Cointegration Test. The Ordinary Least Square (OLS)

results suggest that inflation has a positive impact on economic growth. Thus, if inflation increases, then economic growth also increases. Meanwhile, unemployment and population growth indicate a negative impact on economic growth. Hence, if unemployment increases, then economic growth tends to decline. Further, population growth has a negative impact on economic growth. Consequently, if population growth tends to increase, then economic growth will decline.

The Unit Root Test confirms that unemployment, population growth, and economic growth are non-stationary while inflation happens to be stationary. Further, to overcome the non-stationary evolution, the researchers employ the Augmented Dickey-Fuller Test, and the result indicates that unemployment, population growth, and economic growth became stationary at 1st difference. The Johansen's Cointegration Test confirms that variables are cointegrated. Hence, there is a long run relationship between the variables.

5.2 Recommendations

After a series of tests and various literature reviews, this study recommends the following:

- There is a need to assess the current labor market structure in order to know if the current labor structure is still applicable or there is a need to reform it.
- The Philippine government should increase its employment by creating more jobs in the country to decrease unemployed workers.
- Provide an adequate healthcare service to meet the increasing population demand because an increase in population can transpire positive economic growth.

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