Macroeconomic Indicators as Predictors of Country GDP of the ASEAN 5 (1991-2016)

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ABSTRACT

The ASEAN economies have shown remarkable economic growth that is measured in terms of growth of the Gross Domestic Product (GDP). This quantitative research examined the Macroeconomic Indicators which are the Inflation rate and Unemployment rates, and its effect on the Gross Domestic Product (GDP) of the five (5) ASEAN countries: Philippines, Malaysia, Indonesia, Singapore, and Thailand. The data collected came from a secondary data of the United Nation World Development Indicator Database. In terms of Gross Domestic Product, the findings show that the economy of the 5 ASEAN countries will continue rising in a linear upward trend. Among the 5 ASEAN countries, Philippines has the highest Inflation and unemployment rate that explains the 76.1% of the GDP. The 23.9% is explained by other variables, maybe the wage rate, currency, foreign, exchange rate, etc. The findings show the Gross domestic product of the 5 ASEAN countries will continuously rise in the next seven years (from 2019-2025) in a linear upward trend. It also explains that the ASEAN 5 countries can be the next Tiger cub of the economy of the ASEAN region.

Keywords: ASEAN Five (5), Gross Domestic Product, Inflation rate, Unemployment rate, forecast

INTRODUCTION

Studies have been conducted to further understand the factors affecting the economy's rise and fall. The ASEAN 5 countries (Philippines, Malaysia, Indonesia, Singapore, and Thailand) are among the most active economic countries of the world. They are part of the *Asian Miracle* that has been well studied by economists around the world. The Asian Miracle was embraced by the economists since the World Bank published a book in 1993, *The East Asian Miracle: Economic Growth and Public Policy*. Many economists briefly analyzed that the Asian Miracle could be the new stage of the global economic development. The countries that belong to *Asian Miracle* are Singapore, Hong Kong, Taiwan and South Korea which are called as the *Four Asian Tigers* or *Four Asian Dragons* of Asia. The rapid growth of these countries is exceptionally high among Asia that serves as models for the developing countries of the *Tiger Cub Economies* of the Southeast Asia which are Indonesia, Malaysia, the Philippines, Thailand, and Vietnam. These five (5) countries are attempting to follow the economic development of the rich industrialized developed country of the *Four Asian Tigers*.

The different indicators created by various international groups of specialists have become extensive through the years. These indicators are the figures that indicate to track the efficiency and development of an economy. The inflation and unemployment are among the indicators of the GDP growth rates. These indicators are the medium used in this study to predict the gross domestic product of the ASEAN 5.

The gross domestic product (GDP) is the overall charge of goods and services created in a state in a year. It is the medium for associating the economic performance of countries, but these judgments are increased to measure and estimate the living standards. The gross domestic product is standardized as an economic indicator by the United Nations System of National Accounts, determining the overall output of goods and services of a state during a certain period of time. Higher GDP of an economy replicates a healthy image as it specifies an improved position of the economy. Hence, every country attempt to maximize the growth rate of GDP. Economic growth is feasible development in the number of goods and services formed in a country's economy within a certain time.

There are factors operating in the economic environment that affect the GDP growth rate. One of these is inflation, which is a rate where the level of prices for goods and services are increasing due to the devaluation of currency. Monetary crises are a sudden change in the events of effective environment that have a negative impression on economic growths. Another indicator of GDP is the unemployment rate. It is a rate of people among labor force that is not employed or jobless. The unemployment rate is generally dependent to the economic growth of the nation. The unemployment rate is expected to increase if the economic growth is low, while the economy that is healthy has a higher job available. GDP has a great effect on almost everyone within the economy. Once GDP growth is robust, companies hire more workers and can pay for higher salaries and wages that lead to further expenditure by consumers on goods and services.

In this study, the researchers explored and analyzed the economic performance of the ASEAN 5 countries (Philippines, Indonesia, Singapore, Thailand, and Malaysia). The researchers also tried to understand more the different macroeconomic variables that are vital in determining the country's economic status. Further, the researchers tested if the variables can predict the country's GDP especially for the ASEAN 5 where they are the regional bloc's top 5 economies.

Review of literature

According to Global Business Policy Council, it is the first time that the worldwide economy is on a synchronous upswing. The affirmative stance arises as the global economy involve in a cyclical retrieval, replicating an overall growth in investment, industrial activity and trade. According to Global-is-Asian (2018), the over-all viewpoint of growth in ASEAN was positive and has been continued over the past few years. The economic development is part of a recurring recovery, and to sustain this growth in long-standing to alleviate the threats of a downfall. According to the report of ASEAN Economic Progress of 1967-2017 (2017), the healthy economic development in the area has progressively elevated the standard of living. ASEAN average GDP per capita increased meaningfully from US$122 at its establishment in 1967 to US$4,021 in 2016. Through these developments in the region, IHS Global Insight Rajiv Biswas said that the ASEAN economic growth is projected to remain robust over the next decade with GDP attainment USD6.4 trillion in 2027 (Crismundo,2017).

According to McCaffrey, Peterson, and Laudicina (2018), Asian countries aim to lead the economic growth in the world for the next five years. The exports are progressively compelled as an outcome of robust worldwide economic growth that will upkeep a higher production in South Asia and the Association of Southeast Asian Nations (ASEAN). The ASEAN-5 markets are predicted to regular annual economic growth rates close to 5 percent over 2022. This healthy development is an outcome of moderately competitive business situations compared to other developing markets, promising demographics in most nations, and resilient integration in the global value sequence (McCaffrey, Peterson, & Laudicina, 2018). Inflation's effects on development are subject to definite macroeconomic circumstances that can differ significantly starting one country to another (Eggoh & Khan, 2014). Hence, in experiential readings numerous factors are measured as strong forces for defining and monitoring price inflation. These issues comprise money supply, interest rate, potential output, exchanges rate, wage rate, trade honesty and prospects (Zaman et al., 2011; Naz et al., 2012; Bhattacharya, 2014; Ghosh, 2014). Jiranyakul and Opiela (2010) claim that ASEAN countries have low inflation comparative to other developing marketplaces. Certainly, in the ASEAN's area setting, research in inflation development non-linear association has remained few. Thanh, Su Dinh (2015), estimated outcomes deliver strong indication that the relationship between inflation and growth is non-linear. The projected edge for the inflation rate for the ASEAN-5 countries is 7.84% and statistically significant at the 1% level both PSTR and GMM-IV estimation.

According to paper written by Berentsen et al., (2011), where it documents constructive relationships between inflation and unemployment at 21 low frequencies. The paper also improves a basis where money and unemployment are shown by means of explicit micro foundations, providing a unified concept to examine labor and goods markets. According to Tarelli (2014), as the relation between unemployment &

inflation is very little there is no need to make a trade-off among these two. As a result, the capable organizations can take measures to lessen both unemployment & inflation. These literatures on the effect of unemployment on GDP growth would show stability, there appears to be more observed sign of a negative relationship between unemployment rate and GDP growth. But, the analysis of this occurrence is still an issue for argument and more experimental research. According to Bittencourt (2010), he studied inflation and economic growth and observed poor macroeconomic performance at great inflation rates in four countries in Latin America (Argentina, Bolivia, Brazil, Peru) from 1970 to 2007 using panel data. To make stronger the assertions on the connection of unemployment and inflation, a detailed illustration of the Phillips Curve is open. The Phillips curve created by Sir A. W. Phillips in 1958 and was titled after him, planned 95 years of data of UK wage inflation contrary to unemployment. It appeared to propose a short-run trade-off between unemployment and inflation. The concept behind this was justly straightforward. Ortansa (2014) examined the relationship between inflation and unemployment over time. For this resolution, Phillips curve was analyzed based on the collected data. The outcomes presented that the relationship between inflation and unemployment was not either contrary or direct among the individuals; however, an opposite relationship anticipated by Philips was found in some years. In fact, these two disparities countered inversely to measure economic guidelines. So, it is not likely to simply focus on single inequality. According to the study of Shahid (2014) on the result of economic growth in Pakistan, the period series statistics from 1980 to 2010 collected from the World Bank shows that the economic growth was the dependent variable. Inflation and unemployment were the independent variables. The prior study meant to determine the effect of unemployment and inflation on economic growth. Dropping unemployment might cause rising inflation and a reduction in inflation might merely be possible by allowing unemployment to rise.

From the above literature review, it appeared that there is a lot of researches and studies had already conducted in many different countries, testing the existence of Okun's law & Philips curve, different approaches and have different results. In this research, the inflation rate and the unemployment rate have been considered as variables that are affecting the gross domestic product. And also, the five (5) ASEAN growing economy countries have been considered as research locale of this study. The researchers want to test if these theories and laws are applicable to the relationships of these five (5) countries. Also, the researchers want to test the strength of predictability of Inflation Rate and Unemployment Rate to predict Gross Domestic Product among the five (5) ASEAN countries unlike the previous studies only test the existence of said theories and laws in their respective research countries.

Conceptual framework

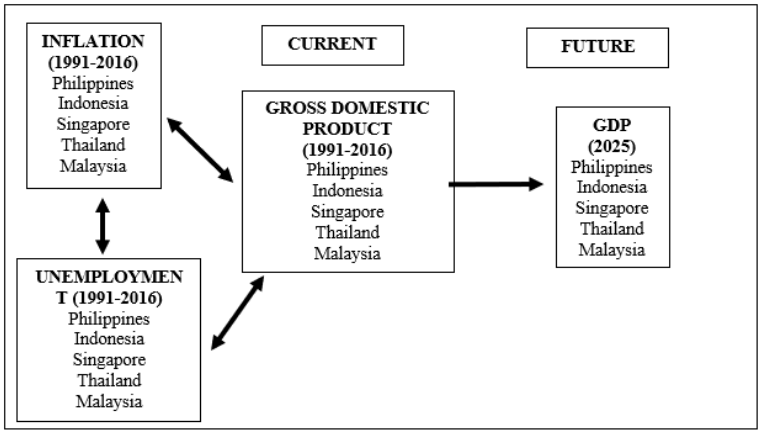

Figure 1. Conceptual framework of the study

The independent variables used for this research are the Inflation Rate and Unemployment Rate, while the dependent is the Gross Domestic Product (GDP). As shown in Figure 1, the study undertakes the concept that Unemployment and Inflation rates will impact the growth of the Gross Domestic Product (GDP) in the long run. The study focused on determining the correlation between Inflation rate and the Unemployment rate, Inflation rate and Gross Domestic Product (GDP), and the Unemployment rate and Gross Domestic Product (GDP) for the current year. The study aims to prove that the Inflation rate and Unemployment rate can predict the Gross Domestic Product (GDP) of the ASEAN 5 countries using the data from the United Nation World Development Indicator Database. For the future, the researchers will forecast the Gross Domestic Product (GDP) from the year 2016 until 2025 for the sustainability of the economy of ASEAN 5 countries.

Objectives of the study

The ASEAN 5's Economic Growth is affected by various macroeconomic variables such as inflation, unemployment, and Gross Domestic Product (GDP). There are several studies that have been done focusing on the relationship between these variables on economic growth. Therefore, this study aimed to determine the relationship of Macroeconomics Indicators towards the GDP of ASEAN 5. Specifically, it aimed to 1) describe the economic profile of the ASEAN 5 in terms of a. unemployment, b. inflation rate, c. Gross Domestic Product; 2) determine if relationship exists between a. inflation rate and Gross Domestic Product (GDP) of ASEAN 5, b. unemployment rate and Gross Domestic Product (GDP) of ASEAN 5, c. inflation Rate and Unemployment Rate of ASEAN 5; 3) test the significant difference of Inflation among the five (5) countries; 4) determine through automatic linear modeling the strength of predictability of Inflation and Unemployment to predict Gross Domestic Product of each ASEAN Five (5) countries from 1991-2016; and 6) forecast Gross Domestic Product (GDP) for the ASEAN 5 countries until 2025.

METHODOLOGY

This study used a descriptive-correlation approach because it describes the economic indicators of ASEAN 5 and it attempts to relate the variables (Inflation and Unemployment) to GDP among the 5 countries. The data gathered in this study is a secondary data from the United Nation World Development Indicator Database. This study is also predictive, because it attempts to predict the future scenario of the variables used in the study. The subject of the study is the ASEAN 5, consisting of Philippines, Singapore, Thailand, Indonesia, and Malaysia. The researchers followed proper ethics in gathering data and information that is needed in our research paper. They gathered their research data from United Nation World Development Indicator Database, it is one of the most reliable and trusted sources of economic data. The gathered information was solely used for academic purposes only.

RESULTS AND DISCUSSION

Figure 2 exhibits that the Gross Domestic Product of the ASEAN 5 economies has a linear projection. The country that has the highest GDP from the past 26 years is Indonesia. The reason for its high GDP is because Indonesia transformed into a more stable economy where the part of manufacturing surpasses that of agriculture and through microeconomics stabilization. Singapore has the lowest GDP among the five countries because it is the smallest in terms of area and population.

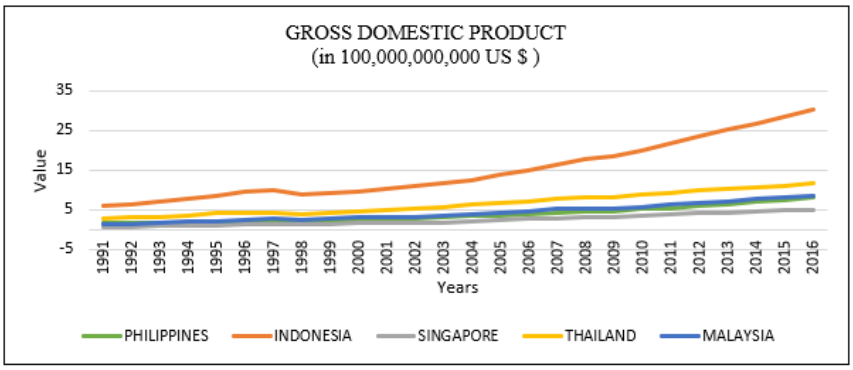

Figure 2. Gross Domestic Product of 5 ASEAN countries (1991-2016)

Figure 3 shows that Indonesia has the highest inflation rate with 58.39% among the 5 ASEAN countries. There was a sharp economic contraction that happened during the1997–1998 due to the Asian financial crisis (Elias and Clare, 2016). The Asian Financial Crisis of 1997 affected various Asian countries including the ASEAN 5 countries. The crisis raised worries to worldwide economic breakdown due to financial contagion or the spread of market disturbances. In 2007-2008, almost all of the ASEAN 5 countries had an increase the inflation rate, this was due to the financial crisis of 2007–2008 or the global financial crisis. It was deliberated by many economists to have been the most horrible financial crisis since the Great Depression of the 1930s. The four others countries have unstable inflation varies among the last 26 years.

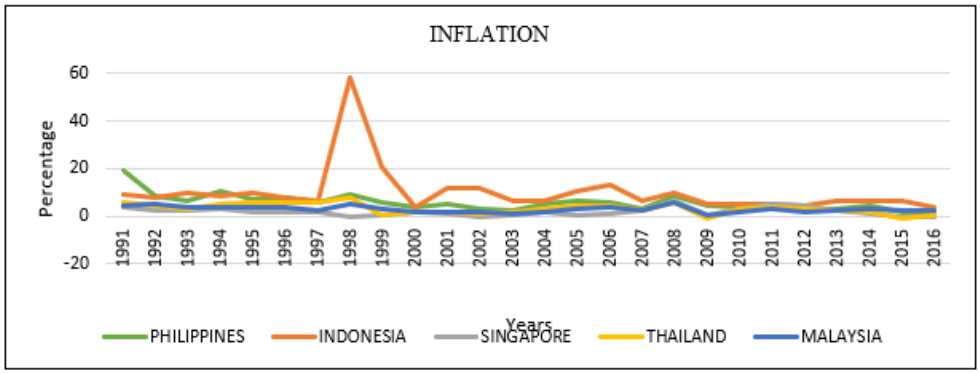

Figure 3. Inflation rate of 5 ASEAN countries (1991-2016)

Based on Figure 4, Philippines has the highest unemployment rate of 11.08 for the year 2004. This is because the number of jobs produced by the economy derived to only 707,000 every year between 1990 to 1999 and 1.1 million in 2001 to 2003 (Probing the Unemployment Problem, 2004). Since employments have not kept up with the rise in the labor force, more individuals are added to the previously enlarged

ranks of unemployed every year. Following the crisis of 1997-1998, it indicates the increase of the unemployment rate in 5 ASEAN countries.

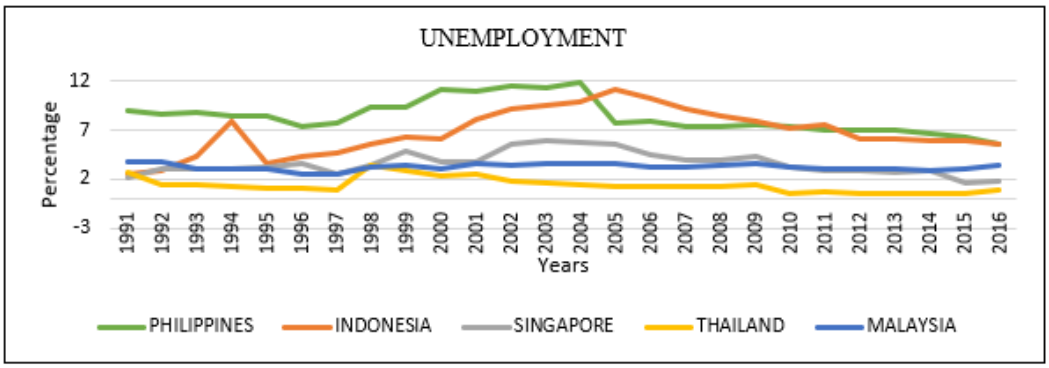

Figure 4. Unemployment rate of 5 ASEAN countries (1991-2016)

The country that has the lowest unemployment rate is Thailand that has a 0.49% rate. This is because there are more than 40% of Thailand's residents who are involved in agriculture, which has a high level of underemployment and offseason unemployment. Another reason is the problem of babies, or rather the lack of them (Fernquest, 2015). Thailand's fertility rate from 2010-2015 is projected at 1.4 by the United Nations Population Fund compared with 3.4 in the Philippines.

Table 1 shows the correlation of Gross Domestic Product and Inflation, Gross Domestic Product and Unemployment, and Inflation and Unemployment. For the Philippines, it shows that there is a high inverse relationship between GDP and Inflation and a 35.64% of the variance in Gross Domestic Product is explained and predicted by the Inflation rate. The GDP and Unemployment of the country also has a high inverse relationship. A percentage of 41.31% coefficient of determination, shows the significance of the Unemployment rate in determining and explaining the variance of GDP. For the Inflation and Unemployment in the Philippines, there is 0.11 relationship which means that for every positive increase in Inflation, there is a positive increase in unemployment. It can also be noticed that there is a very low percentage of variance that unemployment can explain and predict the dependent variable which is the inflation.

Table 1. Correlation coefficient and coefficient of determination of the 5 ASEAN Countries

Country	GDP & Inflation		GDP & Unemployment		Inflation & Unemployment	
	r	r^2	r	r^2	r	r^2
Philippines	-0.60	35.64%	-0.64	41.31%	0.11	1.26%
Indonesia	-0.31	9.85%	0.17	2.79%	-0.06	0.41%
Singapore	0.05	0.22%	-0.30	9.28%	-0.23	5.23%
Thailand	-0.48	23.30%	-0.66	43.29%	0.13	1.81%
Malaysia	-0.35	12.15%	-0.07	0.44%	-0.10	1.04%

For Indonesia, there is a weak inverse relationship between the GDP and inflation. It shows that there is a low significant between the GDP and the Inflation in Indonesia with 9.85%. The GDP and Unemployment result in a positive relationship of 0.17, and there is a 2.79% that the unemployment in Indonesia is not significant in explaining the GDP of the country. For the inflation and unemployment, it results in a negative or an inverse relationship of -0.06. It follows the study and theory of William Phillips

(1958), Philip's Curve describing a historical inverse relationship between rates of unemployment and corresponding rates of rises in wages that result within an economy. And a 0.41% coefficient of determination that shows that the unemployment is not significant in determining and explaining the inflation of the country.

The result for Singapore shows that there is a very low positive relationship between the GDP and Inflation in a country, and a 0.22% coefficient showing that there is no significance for inflation to explain the country GDP of Singapore. The GDP and unemployment of the country result into an inverse relationship with -0.30 and there is a 9.28% that the unemployment in the country can explain the GDP. For the inflation and unemployment, it results in a negative relationship of -0.23 and the 5.23% is not significant in explaining the inflation. It also shows that a developing country like Singapore follows the theory of Philip's Curve.

Meanwhile, Thailand has a moderate inverse relationship between GDP and Inflation, meaning if the GDP is high the Inflation is low in the country and vice versa, and 23.30% is the significance of the inflation in predicting and explaining the GDP. The GDP and Unemployment of the country has a high negative relationship. A percentage of 43.29% shows the significance of the Unemployment rate in determining the GDP. For the Inflation and Unemployment in Thailand, there is 0.13 positive relationship. A 1.81% means that unemployment is not significant in determining the inflation rate.

For Malaysia, the GDP and inflation indicate a low inverse relationship of -0.35 and the 12.15% implicates that the inflation is not significant in predicting and explaining the GDP of Malaysia. The GDP and unemployment result into an inverse relationship with -0.07 and the percentage of 0.44% means that the unemployment is not significant in explaining the GDP. For the inflation and unemployment, there is an inverse relationship of -0.10 and the 1.04% indicates that the unemployment is not significant in explaining Inflation.

Table 1. Significant Difference of Inflation among the Five ASEAN Countries

Country	MEAN	N	Standard deviation
Philippines	5.7133	26	3.62730
Indonesia	9.9850	26	10.50416
Singapore	1.7578	26	1.76573
Thailand	3.1425	26	2.28313
Malaysia	2.7667	26	1.28904

Table 2 displays the significant difference of the Inflation in the ASEAN 5 countries. Indonesia being highly significant with 9.9850 and Singapore having the lowest significant among ASEAN 5 countries. It shows that the ASEAN 5 countries have a significant difference in terms of the Inflation rate.

In Table 3, there is a 0.000 P-value which means that there is an at least one significant difference between the groups. And Table 2 also shows that Singapore is the most stable country in terms of their Inflation rates from 1991-2016 based on the results of their Standard Deviation.

Table 2. ANOVA Table

Inflation * Countries	Sum of Squares	df	Mean Square	F	Sig.
Between Groups (Combined)	1138.134	4	284.533	10.658	.000
Within Groups	3337.171	125	26.697		
Total	4475.304	129			

Inflation in the five members of the Association of Southeast Asian Nations (ASEAN) has experienced significant changes over the last 20 years. The Philippines' inflation has been on a stable descending trend of around 4% from 1995-2008 towards 2.9% in 2016. Singapore's inflation shows significantly higher difference over time than the other ASEAN economies. Malaysian inflation rates have continued into a remarkably unchanging compared to the other ASEAN-5 countries since the Global Financial Crisis. The main indicators of Indonesian inflation have altered over a period of time to become less reliant on real economic movement and import inflation. Thailand's inflation has been considerably stronger after the Asian Financial Crisis, it was not able to balance new disinflationary burdens stopping after oil price failures (Dany-knedlik, 2018).

Table 3. Prediction Summary

Country	Percentage	Inflation	Unemployment
Philippines	76.1%	53%	47%
Indonesia	20.6%	100%	NA
Singapore	5.5%	NA	100%
Thailand	55.6%	31%	69%
Malaysia	8.5%	100%	NA

Percentage - Strength of Predictability of Inflation and Unemployment in predicting country GDP

As gleaned in Table 4, the Philippines has the highest percentage of predictability strength of two variables used in predicting the GDP. It also appears that Singapore has the lowest strength of predictability in predicting GDP. Only the Philippines and Thailand are the countries where the two variables, inflation, and the unemployment rate, are applicable used in predicting their country GDP while Indonesia and Malaysia are the countries that only Inflation has been used in predicting their country GDP. It can be other variables to be used in predicting their GDP. And Singapore was the only country that only the unemployment rate has been used in predicting their GDP.

Table 4. Forecasted GDP of each ASEAN Five (5) countries until the year 2025

Year Forecasted	Philippines	Indonesia	Singapore	Thailand	Malaysia
2017	7.1010	27.2788	4.7768	11.3841	8.0463
2018	7.3427	28.1983	4.9491	11.7412	8.3252
2019	7.5844	29.1177	5.1213	12.0983	8.6041
2020	7.8261	30.0372	5.2936	12.4555	8.8830
2021	8.0678	30.9566	5.4659	12.8126	9.1619
2022	8.3095	31.8760	5.6381	13.1698	9.4408
2023	8.5512	32.7955	5.8104	13.5269	9.7197
2024	8.7929	33.7150	5.9827	13.8845	9.9986
2025	9.0346	34.6344	6.1550	14.2412	10.2775

Table 5 shows that all of the five ASEAN countries (Philippines, Indonesia, Singapore, Thailand, and Malaysia) follow a direction of linear upward trend and it also shows that there is a continuous increase in the gross domestic product of all the five ASEAN countries. The forecasted data per year is computed by multiplying the slope and year series number plus the value of the intercept.

CONCLUSIONS AND RECOMMENDATIONS

For Gross Domestic Product, the findings show that the economy of the 5 ASEAN countries will continue rising in a linear upward trend. Indonesia shows a remarkable trend in stabilizing its economy by engaging people more in the agricultural industry and by utilizing properly its farmlands to develop into more beneficial and developed Agricultural Farmlands. They also enhanced their microeconomics stabilization by supporting the micro-entrepreneurs and small-scale enterprise. If this development will be followed by other ASEAN 5 countries, it will result in a more productive and resourceful country and ASEAN region. In terms of Inflation among the countries in the region, it shows that from the past 16 years, way back in 2000, it shows that there is a stable trend of inflation. The Philippines has shown a remarkable trend in the unemployment rate having a spike increase in 2004. The unemployment rate is one of the biggest problems nowadays in the Philippines. Each year, more individuals are added to the previously enlarged ranks of unemployed. The Philippines has a high fertility rate of 3.4 compared to 1.4 of Thailand. It means that every year there is a rapid increase in population growth. There is a growth in population but there is a decrease in employability, that is why the population of unemployed also rapidly growing.

Regarding the inflation and unemployment, the Philippines has a positive relationship of Inflation and Unemployment Rate, it means that for every positive increase in Inflation, there is a positive increase in unemployment. The positive association between inflation and unemployment is a unique challenge for the policymakers. When unemployment decreases, discretionary income rises, demand rises and consequently price increases. On the other hand, when unemployment is high, demand falls and consequently price decreases. During this stagflation period (1950-2017) in the Philippines, as it hinders economic growth. Interest rates could be increased to reduce the inflation rate. GDP should be forced to regain the job losses. However, as long as inflation rate and unemployment rate both are low, it could be good for the economy while low unemployment rate can trigger global demand for goods which could maintain a lower inflation rate. There is a positive relationship between inflation and annual wage rate but wage growth in relation to inflation is low, which may cause low productivity or per hour output. In such a situation, labor productivity or per hour output should be increased to grow the average yearly wage. There exists a negative relationship between inflation rate and GDP, which is consistent with the Phillips curve, may be due to real exchange rate movements, tax, government spending, money growth and oil price etc. It also tells us that Inflation is not always driven by money flows or the increase of money flows in the economy. Maybe because of the greed of the entrepreneurs and lack of governmental controls in controlling the commodities prices.

The inflation of the ASEAN 5 countries is significantly different from 1990-2016. It shows that each country has its own trend history of inflation differs from others ASEAN countries. It does not affect the inflation of the whole ASEAN region.

However, Inflation and Unemployment can predict the Gross Domestic Product of the Philippines. The importance of these two variables is significantly high in determining and explaining the Gross domestic product of the Philippines. It only explains the 76.1% of the GDP of the Philippines. The 23.9% is explained by other variables, maybe the wage rate, currency, foreign, exchange rate, etc.

The findings show the Gross domestic product of the 5 ASEAN countries will continuously rise in the next seven years (from 2019-2025) in a linear upward trend. It also explains that the ASEAN 5 countries can be the next Tiger cub of the economy of the ASEAN region.

In the light of the findings and conclusions, the following recommendations. It is time for the government to prioritize the utilization of farmlands into more productive and useful ways rather transforming it into a commercial land. The government should provide concrete plans on how to encourage more people to engage in agriculture. In that way, we can minimize the population of unemployed individuals. It is very important the support of the government in our farmers, helping and opportunities to develop their own land.

Each country should implement the policy tools in such a way that GDP positively influence the unemployment rate and inflation rate of the Philippines, the government of Philippines should focus on the

salient issues like, leadership styles applied in Philippines' business sector, extroversion and internationalization of local SMEs in export marketable goods, bilateral agreements among local companies of public or private interest, as well as among multi-national parties and businesses' along with governmental strategic plans undertaken to support the prosperity of local business and family income. This paper might contribute to resolve the problem of stagflation experienced from a high level of inflation and unemployment in the economy not only in the Philippines but also in the rest of the world. In the long run, there might not be any offset between inflation and unemployment rate.

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