

Managing the Three Pillars of the Economy for Sustainable Growth

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Abstract

The highest unemployment rate in the United States (US), 24.9%, was reported during the great depression from August 1929 to June 1938, and it remained above 10% until 1941. The US unemployment rate reached another high of 9.8% in 2009. Some market watchers predict it will occur again in the next two years. The economy's slow growth causes higher rates of unemployment with declining gross domestic product (GDP). Fewer jobs mean less income for US citizens, and less money available to spend leads to less consumption. As a result, GDP begins to decline. As GDP declines, businesses have fewer funds leading to a reduction of payroll and reducing personnel to reduce cost generated by salaries and wages. This leads to the belief that any of these two items are correlated. That is to say, that they vary together as the economy grows, providing a linear model for the quantities. The distribution of the differences between unemployment (UNMP), inflation (INF), and GDP, considering the quantities, UNMP - INF is right skewed and that of INF - GDP exhibits symmetry, while they both are unimodal. Using the ARIMA (2, 1, 0) Model we forecast GDP growth for the year 2018 and a few more years after that. As of now, it appears that the GDP estimate obtained for the year 2018 fits just about right. Businesses find themselves in the apathy of hiring personnel or waiting until the company is on a stable footing concerning the economic situation. The government has observed the unemployment rates in the US since the stock market crash in 1929 as a way to prevent further damage to the US economy. It is often said, "When the unemployment rate reaches 6.0%, the government steps in" (Amadeo, 2018). If the unemployment rate is too high, the government opts to use a monetary fund to counteract the possible damages to the economy. If unemployment persists, the US Congress also uses fiscal policy, and it can even create employments and give out benefits to those in need. Thus, it is important to have a detailed understanding of these quantities.

Keywords: Inflation, GDP, Unemployment, Interest, Economic Growth, Global Crises, Phillips Curve

Introduction

This paper attempts to investigate the relationships between among GDP, unemployment, and inflation. The data has shown that the economic slowdown will reduce GDP, increase unemployment rate, and upsurge the conditions for possible inflation. A reasonable balance must be maintained between the three in order to keep the economy thriving and sustained. Catao and Terrones (2003) described the inflation as the continuous rise in the prices of goods and services with the passage of time and declination in the monetary value of currency.

In the eyes of today's economic outlook, it is shown that every country has contributed to global financial crises. Some countries have impacted more than others, thus enabling economic planners and forecasters to implement what has been learned from past financial crises.

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It is with a more watchful eye on the market features, while implementing the right strategies, that all economic turbulences in the face of possible economic downturns is sustainable. They are depending on remaining or increasing their GDP, unemployment rate or inflation. In the future, the market factors will naturally face financial misfortune again and again. Real GDP, real GDP per capita, unemployment rate and inflation rate can all play an important role in this progression to avoid a crisis whether it is big or small. In the study of Romania's economy during the period of disinflation from 2014 to 2016, it was discovered that their national GDP and the national rate of inflation is strongly correlated. This has an inverse influence on the latter (Anghel, Lilea, and Mirea, 2017).

Background and Related Economic Risks

The US suffered a recession in 2007 to 2009. Its consequences continued to raise problems in the economy for much longer in a larger scale. The recovery of the nation depended in a patchy way to overcome these scenarios. The US economy left with debts, loss of homes, and loss of retirement funds and appalling rates of approximately 13.9% Americans unemployed. Not only was the US left with a crisis, but also a desire to overcome and prevent further related perils. It is known as the most significant recession in over 40 years before the great depression. This recession made dreadful changes to the GDP, inflation, and unemployment rates of the country. A proper balance in this three elements will make the economy thrive and secure a sustainable growth of the US. A well-balanced economy will prevent the US from another recession and to succeed as a global economic powerhouse.

The GDP is one of the most important indications of the national economic growth. It is used by the government to know how the US economy is developing and to be able to take actions regarding budget planning and structures. Wall Street also bases themselves in the GDP; this one gives them an overview of how the economy is progressing. As such, the business community frequently uses the GDP as a way of forecasting, employment, productions, and investments (Konchitchki and Patatoukas, 2013). Additionally, as GDP declines, businesses have fewer funds available therefore leading to a deduction of payroll and reducing personnel to reduce cost generated by salaries and wages. Corporations find themselves hesitant about hiring personnel or waiting until the company is on a stable economy footing. When the unemployment rate is too high, the government opts to use a monetary fund to counteract the possible damages to the economy. If unemployment persists, the US Congress gets involved with the proper fiscal policies, and it can even create jobs, and give out benefits to those in need (Amadeo, 2018). Unemployment has fallen further in the US over the last six years than most economists predicted or otherwise. As the unemployment rate fell, Inflation increased. The main reason inflation has not been present in all goods and services is because they are continually improving the measurement of consumer price index. This tends eventually to eliminate the inflation. Although the economy in the US may be steady, stability cannot continue forever. Much of the US stability is because the US has a relatively low minimum wage, which allows higher employment by businesses, companies, and industries to remain. The percentage gap between the actual GDP and potential GDP is proportional to the difference between the current unemployment rate, and some believed, the "normal" unemployment rate (Solow, 2000).

Unemployment measured as a percentage. Statistically, unemployment is a residual phenomenon. It is a reflection of the number of persons who are misemployed and remain without work over a period. Service employment usually is the one that suffers the less struggle of higher rates of unemployment, because there is always a demand for services. Change in trade employment is another type of employment that is estimated secured. Other types of industries such as agricultural and manufacturing employment have shown no significant change over the past few years (Galenson and Zellner, 1957). Unemployment may be computed in two different ways; one is by the direct enumeration of the unemployed; or by deducting the total of those actually employed from the total available for work. Most commonly used is the direct enumeration in the US (Lebergott, Pearlman, Cooper, and Wool, 1948). Every time the US enters into recession, this is known by using GDP by the US Bureau of Economic Analysis (BEA). There have been several recessions in the US. Wars, oil prices, and unemployment were the primary causes that affected the GDP. Several steps have been taken when the economy is presented with a recession. The Federal government has also been involved in creating the same recessions. In 1981, a recession was created by raising interest rates to combat inflation. There have been times that the economy had to face a negative GDP. In 2007, with the great recession, the country had to face problems in the global banking sector with credit crisis. The BEA revises the new GDP in June of each year (Amadeo, 2018).

The GDP growth rate by year is the percent change in the gross domestic product from one year to the next one; the GDP is the best indicator of how the economy is progressing over time.

The GDP should also be compared to the unemployment rate by year and to that of inflation by year. This tells us where the economy of the country stands. Negative growth indicates a recession followed by high unemployment. Faster growth does not indicate a good economy and the growth must be sustainable. Economists indicate that an ideal GDP growth rate is the range of 2-3% to maintain a natural rate of unemployment (Amadeo, 2018).

Economic Factors and Uncertainties

Business and economic factors and uncertainties, and many other factors could cause risks primarily in the currency fluctuations and global economic climate. Unemployment is always one of the most economic priorities discussed due to the magnitude of the issue. This unemployment problem keeps changing over time. There has to be some sort of unemployment rate to maintain a healthy economy, but it has become another issue to decide what percentage of unemployment is “purely cyclical.” Today, the fixing of unemployment rate must take into consideration several factors. How long can we push the unemployment rate will depend on how well we can control inflation without resorting to market performances and how successfully we can cope with unemployment and reduce unemployment disparities among the different groups in the labor force (Perry, Hall, Holt, and Kaitz, 1972). Unmistakably, individual countries’ inability to control internal debt, weak currency market, and meager performance of market parameters all have contributed to the current financial crises around the world (Goonatilake, Bachnak, and Acosta, 2012). However, the impact of globalization on the US economy stays to be one of the dominant economic topics debated in favor and against the economic development in the past decade (Dwight, 2008). The extent of what has transpired on currency and stock markets effect the economy and vice versa, thus providing a higher volatility of stock transactions for stocks that are being sold and bought on a daily basis. Although the process of buying and selling stocks is direct, generating steady profits is a lofty challenge for active traders.

Unemployment occurs when a worker departs from a job and spends some time finding a new job. The reasons why this person is unemployed are irrelevant in this definition. Unemployment varies positively with the separation rate and negatively with the job finding rate. Unemployment during a recession is high because jobs are hard to find. More job seeker has been dumped into the labor market. During a recession, the economy suffers high unemployment for extended periods. The jobs that change less during recessions are the government, education and health services and finance. The labor market is the place to look for an understanding in depth and persistence of recessions. This view will help to understand the issue (Hall, 2005). High unemployment rates create problems that range from individual economic hardship to a strain on the social safety net. When the economic growth is low, unemployment increases in most of the states in the nation. Low-interest rates are likely to spur additional employments, but they also create the risk of inflation. Higher levels of unemployment hurt the working class more because the upper classes are more likely to find a job due to qualifications. Lower class individuals lack the qualifications to find employment easily and lack the financial resources to cushion themselves for unemployment. Government is willing to risk the creation of higher inflation to create additional employment. The creation of employment without having the sufficient funds to keep a stable economy will only increase the inflation rates (Kelly and Witko, 2014).

It is clear that although the unemployment rate may seem to only change so little in the past few years, the problem of unemployment in the United States is getting worse and worse. If unemployment fluctuates around the natural rate, we know that this fluctuation is critical. If this natural rate changes by increasing or decreasing it, is because there is some kind of structural change in the economy of the country. It is obvious that the natural rate itself has risen. To have a healthy economy, a number of individuals are going to suffer so that the economy as a whole can prosper. It is roughly estimated that two million people each year will suffer difficulty in finding a job, but this is to maintain a stable economy, so we don’t suffer further inflation problems (Baily, Burtless, Lovell, Lovell, and Semerad, 1983). An epidemic for the United States, unemployment is threatening the government and tearing societies apart. It is not only an unemployment crisis but rather a crisis of employment. Unemployment in the US is higher among the working class. The United States has a great wage flexibility, but the US is still losing low waged employments (Aaron, 1994). The GDP per capita can be broken down into two principal objectives: labor hours per capita and output per worker-hour. If labor hours per capita start to decline, output per worker hours must rise to keep the GDP from shrinking. The only way growth can occur is if the rise in labor productivity outpaces the fall in labor hours.

Since the year 2000, labor hours have been declining. If labor hours keep declining, we will reach eventually the point called “peak GDP.” When the income rises, people generally tend to invest in leisure; people want to buy more leisure as their wages rise. However, leisure goes up with rising wages as the opportunity cost of extra leisure is now higher than before (Lindsey, 2016).

Inflation is a highly complex phenomenon. Competition in the market will tend to rise the monetary value of wages in the outlook to increase labor productivity by about two percent in a year in the US. Because prices tend to rely closer to unit labor cost, there is a relation that links price inflation to the unemployment rate. Prices tend to remain stable even when wages are rising, but if the rate of increase in wages is bigger than the productivity, prices more than likely will move up. Whether a high level of inflation could be avoided, it is only at the cost of the higher level of unemployment (Smaistrla and Throop, 1980). The way inflation affects the labor market remains an open question. Usually, when inflation increases, a given amount of income at a specific periods makes it possible to consume lower amounts of goods during the period. Through this inflation-tax system, the returns on the economy are reduced relative to search cost. Therefore, industries have fewer jobs available as the unemployment increases. Berentsen, Rocheteau, and Shi (2007) showed that the trend in the unemployment rate is positively correlated with inflation or the interest rates (Lehmann, 2012 and Berentsen, Rocheteau, and Shi, 2007).

If the higher rates of price inflation can be tolerated, low levels of unemployment can be enjoyed. On the other hand, if the higher levels of unemployment can be tolerated, low rates of inflation can be enjoyed. It has been mathematically shown that by keeping a low inflation rate, a certain amount of higher employment must be maintained. A higher rate in increasing wages will quickly translate into a high rate of increasing prices. This higher rate of inflation will then become the new standard. The level of unemployment must govern the rate at which the inflation rate is either increasing or decreasing rather than the inflation rate itself (Treynor, 1975). The relationship known as the Phillips curve as provided in Figure 1, states that there is a functional relationship between the rate of inflation and the level of unemployment. The Phillips Curve and the natural unemployment rate are somewhat related. If the expected rate of inflation is well approximated by the last period inflation, then we finally have $\pi_t - \pi_{t-1} = -\alpha(u_t - u_n)$, where π_t is the inflation at time t and π_{t-1} is the inflation at the end of the last period prior to time t . This equation strictly states that the change in inflation depends on the difference between the actual and the natural rate of unemployment, $(u_t - u_n)$. When u_t is either higher (or lower) than u_n , inflation either decreases (or increases), respectively. And, in fact, u_n is the necessary unemployment needed in order to keep inflation constant. This constant unemployment rate is called nonaccelerating inflation rate of unemployment (NAIRU) (Meyler, 1999).

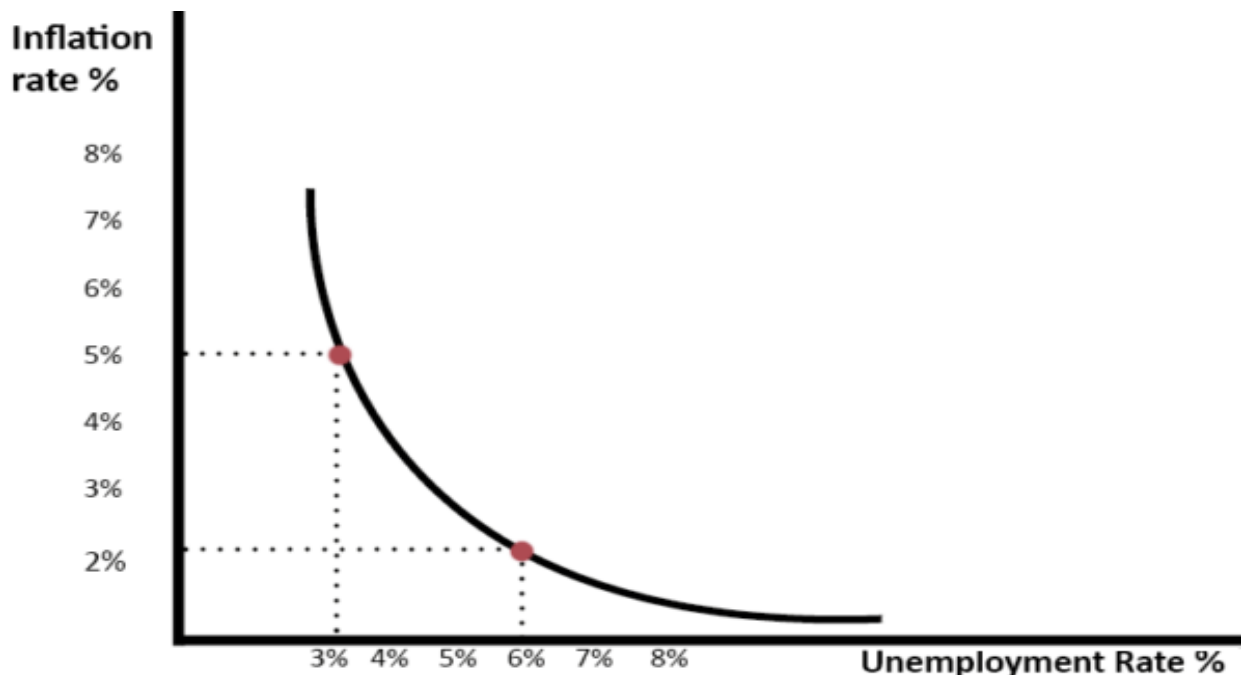


Figure 1. The Phillips Curve Estimates an Inverse Association between Inflation and Unemployment

Source: <https://www.economicshelp.org>

In the simplest terms, it implies that full employment causes inflation. Thus, it also arises a significant economic difficulty, price stability, and the low unemployment. These are stemming from the current predicaments of the US economic policy. The conventional view of the correlation between unemployment and inflation is based on the fact that the wage is set by supply and demand in a marketplace, whereas the inflation is generated when the demand exceeds the supply (Piore, 1978).

Mathematics of GDP

The GDP is calculated using the aggregate expenditure formula as described by the equation, $GDP = C + G + I + NX$, where C = all private consumptions, or consumer spending in the economy as a whole, G = the sum of all government spending, I = the sum of all the investment, including businesses capital expenditures and NX = the total net exports, calculated as $NX = \text{all values of exports} - \text{all values of imports}$. The GDP is calculated quarterly whereas the unemployment rates are calculated monthly and invariable, some corrections are expected for the previous monthly rates as we often see if more data become available (Rokicka, 2013). Inflation is affected by both unemployment and money growth. Inflation responds better to the monetary stimulus in order to reduce unemployment faster than the response implies by pure unemployment–inflation models, but it also reacts slower than the reaction implied by pure money growth-inflation models. Once money growth is considered, the level of unemployment does not affect the rate of inflation directly (Benderly and Zwick, 1985).

The current total GDP and the real major spending of exports are the only items taken into account. Let consumption (C) plus Investment (I), plus exports (X) minus imports (M) equals GDP: $(C + I) + (X - M) = GDP (E)$. This quantity is not a physical volume and known for the set of deflated export values at a certain base year price, in a form of “real value.” It is only an accurate measure of real value when there are no changes in terms of trade (Hall, 2011). Inflation and GDP growth are the two most frequently used variables to monitor macroeconomic indicators of how the economy performs. These are also the objects more investigated for modeling methods. The GDP gap was found to impact inflation (Qin, Cagas, Ducanes, Magtibay-Ramos, and Quising, 2008). There are reports of a negative correlation between inflation and GDP growth for average inflation rates that are greater than 10%. The available annual data on inflation and the rate at which GDP grows allow for testing of casual relations by using lagged values of theregressors in a dynamic panel data model. The impact of inflation and GDP is estimated using annual data collected. The results found with the data showed that the statistical relation between inflation and GDP is highly periodic-specific (Arai, Kinnwall, and Thoursie, 2006).

Economic growth is essentially an increase in real GDP visualizing an increase in the value of goods and services produced in an economy. The rate of economic growth is the annual percentage increase in real GDP. There are several factors affecting the economic development and growth that can be split into 1) Demand-side factors (the extent of consumer spending) and, 2) Supply-side factors (the strength of productive capacity). The data obtained (Amadeo, 2018) has been aggregated over a 10-year period from 1930 to 2010 to see whether there are patterns of ten-year aggregates of unemployment rates, GDP growth, and inflation as provided in Figure 2. Apparently, there is no pattern that we can visually point out to. However, additional statistical analysis is needed to conclude the relationships between unemployment rates, GDP growth, and inflation (Arai, Kinnwall, and Thoursie, 2006).

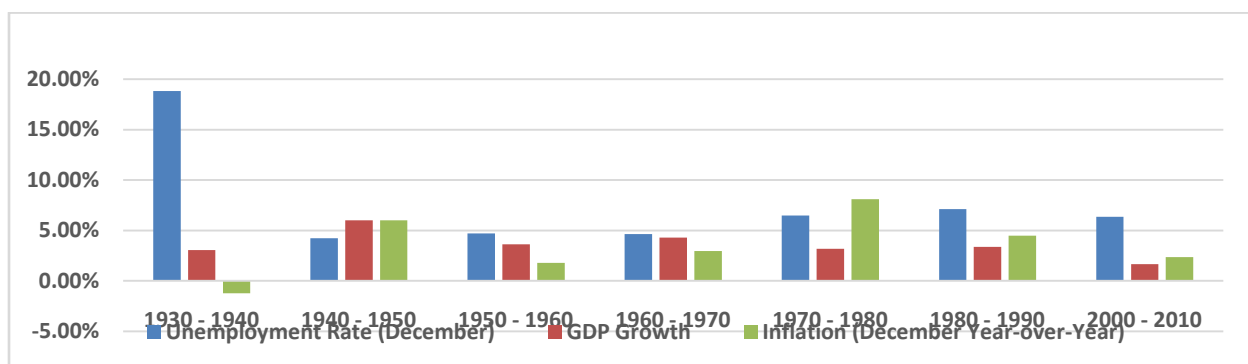


Figure 2. Ten-Year Aggregates of Unemployment Rates, GDP Growth, and Inflation from 1930 to 2010

Another study conducted in Pakistan from 2002 to 2014 showed that inflation has insignificant impact on unemployment and GDP. The correlation between inflation and GDP is negative, and the inflation and unemployment is insignificantly negative, thus concluding that with the increase of GDP, the inflation rate decreases and vice versa with unemployment (Rasheed and Ali, 2017). Furthermore, interest rates and stock prices are some economic factors that can be associated with GDP. For example, a study to ascertain the effect of interest rate, inflation rate, and GDP on real economic growth rate has been undertaken in terms of Jordan’s economic growth over the period from 2000 to 2010 (Saymeh and Orabi, 2013). Since the worldwide recovery from the last recession appears to have encountered additional delays, economic growth posture for Jordan is increasingly stimulating. Although an adverse external atmosphere continues to add to domestic doubts associated with the regional socio-political turbulences, this could enable analysts to assess the extent of Jordan’s aggregate demand that is unique to underlined economic growth scenarios.

Moreover, the level of economic growth is the key for economic sustainability. As many benefits of economic growth, more businesses will flourish, nations grow and enterprises result in profitability, more jobs, and resources. This will undoubtedly lead to a better quality of life. At this point in human history, technology has played a pivotal role to overcome lack of employment to make miraculous products, opportunity for global travel, rapid communication, bewildering efficiencies and unimagined freedom. Economic growth derived from all innovation and automation has indeed led to facilitate impossible tasks showing that limitless economic growth counters sustainability (Higgins, 2013). The Philips curve is utilized as an instrument to explain the trade-off between the two ideas. In fact, New Zealand-born economist, A.W. Philips first developed this theory in 1958 to analyze the data of unemployment and changes in wage levels in the UK from 1861 to 1957. The deflation, rather negative inflation, occurs when the prices of goods fall due to the supply of goods being higher than the demand for them. This is typical because a decline of values in money, credit, or consumer spending can be all-time low. An empirical analysis of quarterly data for seven of the Organization for Economic Cooperation and Development (OECD) countries covering the period from 1959 to 1999 concluded that some asset prices predict inflation or output growth in some countries and in some periods. However, a good predictor historically is largely unrelated to the subsequent performance of the economy. How interesting that these forecasts that combine these singly unstable forecasts appear to improve reliability of benchmarks (Stock, James, and Watson, 2003). The factors associated with inflation are ample and contribute to influence the inflation at any given time, and so briskly. This is quite evident from the turbulent rate patterns evident from 1915 to 2015. Figure 3 showed that the inflation rates can be significant and, also, at least thirteen times there has been negative inflation occurring during the period from 1915 to 2015 (Alioth Finance, 2018).

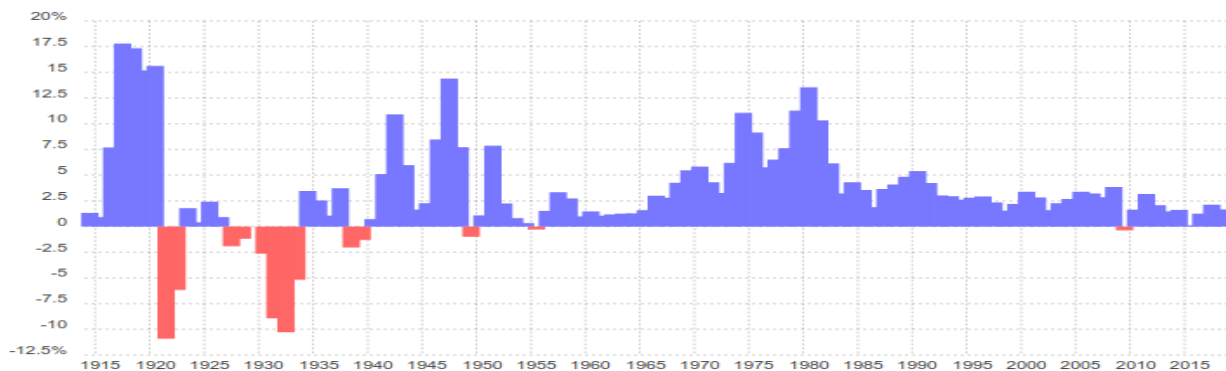


Figure 3. US Inflation Rates from 1913 to 2015

Source: US Inflation since 1913, Annual Rate, US Bureau of Labor Statistics CPI

It has been proposed by (Sarel, 1995) and (Ghosh and Phillips, 1998a and 1998b) that the logarithm equation in the form of $GDP = \hat{I}_0 \pm + \hat{I}_1 \ln(INF) + \hat{I}_2 \ln(EMP) + \hat{I}_\mu$, where, GDP = Gross Domestic Product, $\hat{I}_0 \pm =$ Constant, $\hat{I}_1 =$ Inflation, $\hat{I}_2 =$ Employment, and $\hat{I}_\mu =$ Error Term, expresses the GDP as a function of inflation (INF) and employment (EMP), but with some error terms. In addition, the unemployment reflects the number of people who are jobless, actively seeking work, and available to take an employment when offered. The official unemployment rate is essentially the number of unemployed as a percentage of the labor force (the sum of the employed and unemployed altogether). One would think that the employment vs. Unemployment are the inverse of each other.

This is not the case anymore since the U.S. Bureau of Labor Statistics (BLS) basically uses two entirely different surveys to calculate these rates. In fact, the employment and unemployment rates are the reflection of the same phenomenon as discussed differently (Shiskin, 1976).

Methodology and Analysis

The statistical methods in economics study offer a knowledge of the advanced quantitative tools and techniques used in this field and vast knowledge of current trends of economic variables and modelling for future forecasting. To this end, the analyses of the research would be carried out on the basis of correlation, regression analysis, t-test and ANOVA model using statistical programming SAS®. SAS® is a software suite developed by SAS Institute for advanced analytics, multivariate analyses, business intelligence, data management, and predictive analytics. The findings of the analyses provide statistical significance for examining three pillars of the economy that include GDP, unemployment, and inflation. Economic data for this study comes from unemployment rate tabulated year to year from 1929 to 2017 compared to that of inflation and GDP in the respective years (Amadeo, 2018). The linear regression model using GDP as the dependent variable in terms of UNMP and INF provided the estimates for the parameters as in Table 1.

Table 1. Parameters for the Linear Regression Model

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	3.00081	1.17121	2.56	0.0121
unmp	1	-0.06719	0.11639	-0.58	0.5652
inf	1	0.24815	0.13673	1.81	0.0730

This suggests that the GDP can be a linear function of unemployment and inflation. Further, Table 1 concludes that $GDP = 3.00081 - 0.06719 X UNMP + 0.24815 X INF$, where UNMP = unemployment rate and INF = inflation rate whilst the percentages of distribution of residuals for GDP remains normally distributed as required. The coefficients are not significant, thus suggesting this is somewhat a weaker regression model. Additionally, Alnaa and Ahiakpor (2011) have used the ARIMA (autoregressive integrated moving average) approach in predicting inflation rates in Ghana. As such, Autoregressive Integrated Moving Average (ARIMA) models are most commonly used for univariate forecasting techniques that predict the future values of series based completely on its own inertia. Regardless of which technique has been used, the first step in the time series analysis is to plot the actual values against time. Particularly, in a seasonal ARIMA model, the parameters, p, d, and q can be preliminarily identified from the autocorrelation function (ACF), partial autocorrelation function (PACF) and inverse autocorrelation function (IACF) of the stationary processing series as provided in Figure 4 using SAS® software.

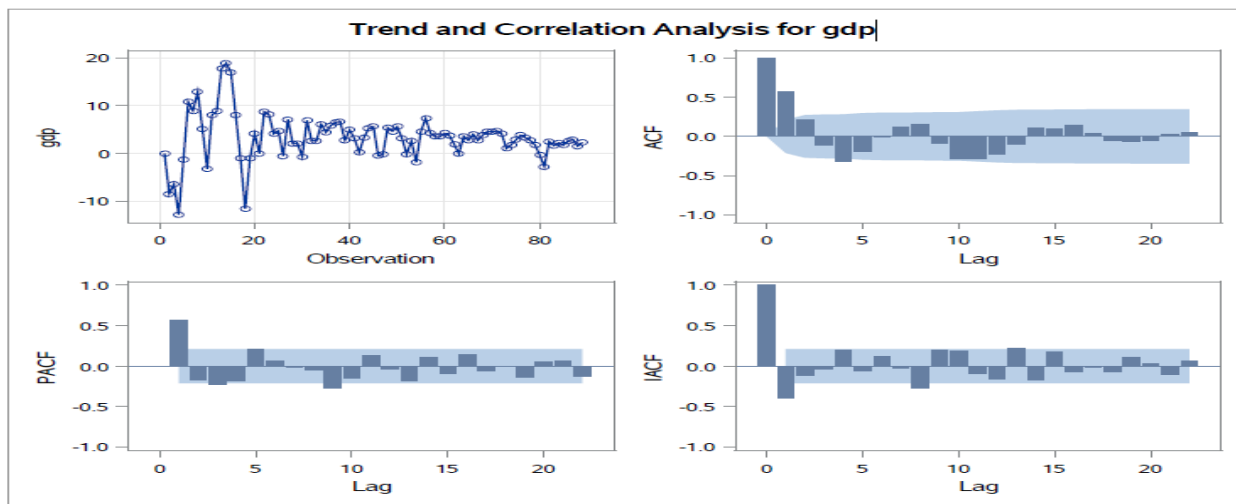


Figure 4. Trend and Correlation Analysis for GDP

However, the results obtained from ARIMA models can compete practically well with any emerging forecasting techniques in short-term requiring at least 40 past data points. The ARIMA (2, 1, 0) model proposed for this study is modeled by the equation: $\Delta y_t = \beta_0 + \beta_1 \Delta y_{t-1} + \beta_2 \Delta y_{t-2} + \varepsilon_t$ with familiar notations. This model has statistically significant coefficient estimates; the residuals up to lag 6 reject the null hypothesis of white noise, giving some validity to the model currently under consideration. Furthermore, some emphasis needs to be placed on the Chi-Square statistics for lags beyond 18.

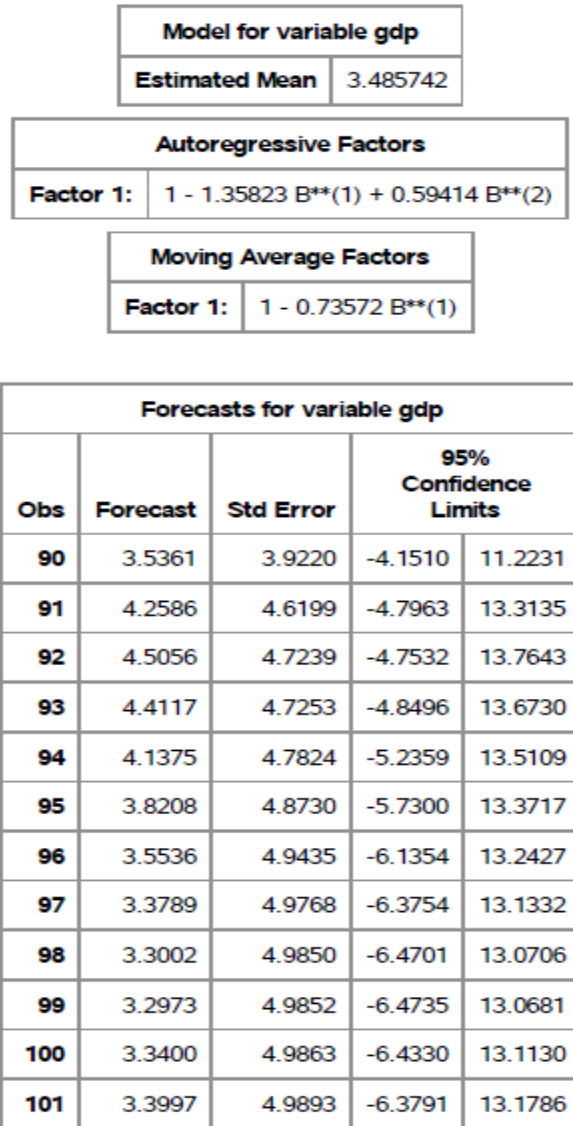


Figure 5. ARIMA (2, 1,0) Model Estimates for Forecasting GDP

Figure 5 provides an output of ARIMA (2, 1,0) Model estimates for forecasting GDP for future years. The observation (Obs) 90 listed therein corresponds to the year 2018, and the other observations for every year following 2018 are estimated as well. It appears that the GDP estimate for 2018 is about right where it has been anticipated.

The t-test procedures are applied to the differences between unemployment, inflation, and GDP considering the quantities, UNMP – INF and INF – GDP, respectively, provided the distribution of them with the 95% confidence interval for mean as given in Figures 6 and 7, respectively. The distribution of UNMP – INF is right skewed and unimodal.

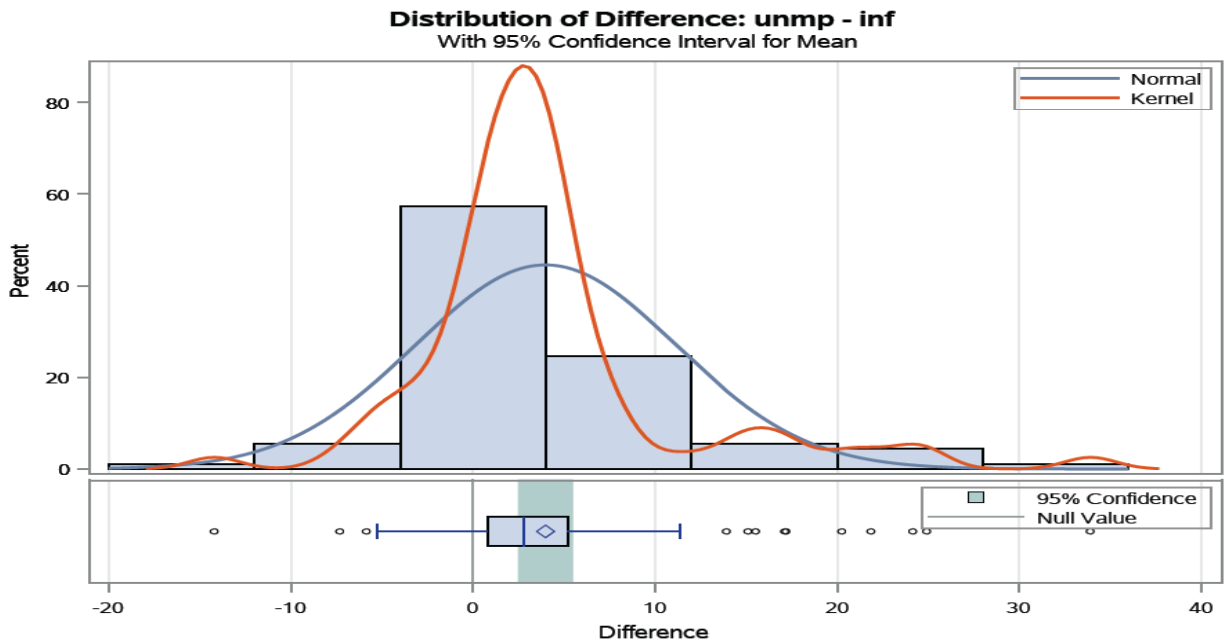


Figure 6. Distribution of Difference between Unemployment and Inflation (Unemployment – Inflation)

For the differences between inflation and GDP, the distribution of $INF - GDP$ is symmetric, or at least exhibiting symmetry. Figure 7 below provides the distribution of $INF - GDP$.

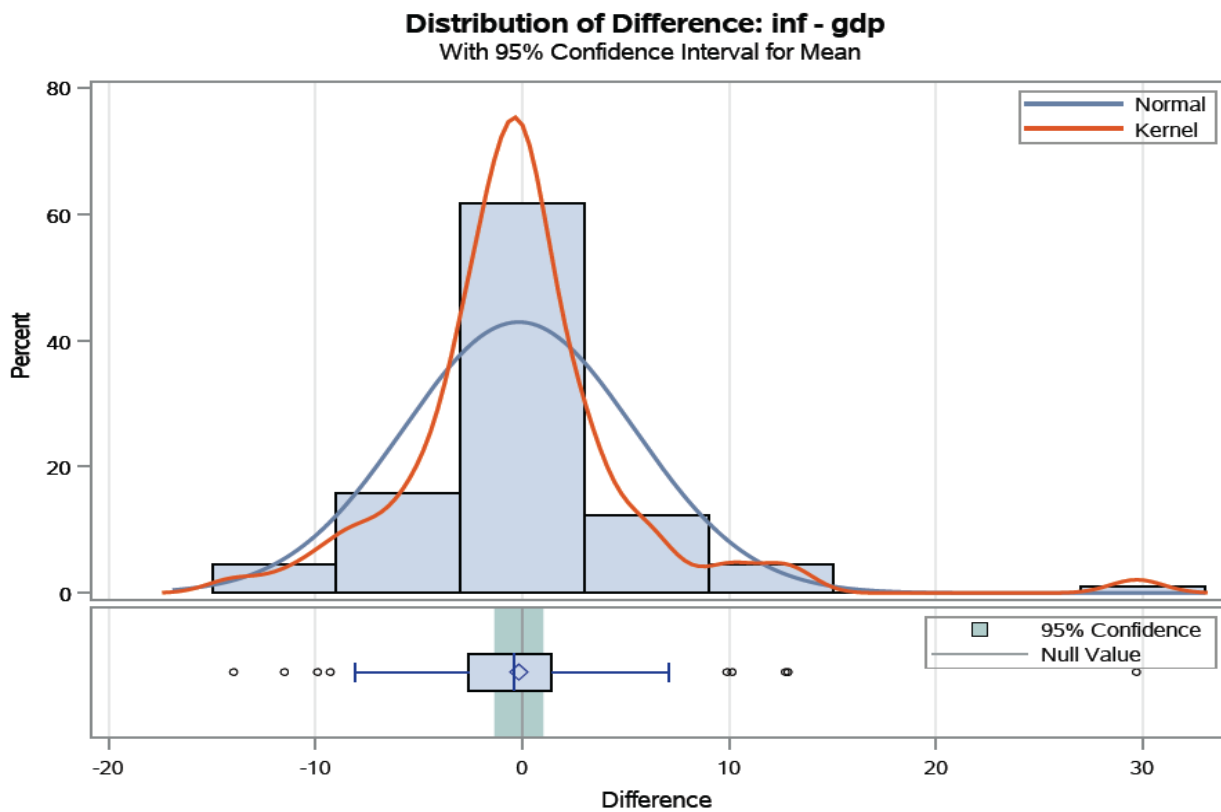


Figure 7. Distribution of Difference between Inflation and GDP (Inflation – GDP)

Moreover, an additional consideration using a three-dimensional VAR (2)-process model can make significant headway in the study (Anning, Tuama, and Darko, 2017). The model contains the logarithm values of yearly and seasonally adjusted variables for improved analytical method capabilities that may lead to additional findings (Cavaliere, Fanelli, and Gardini, 2008).

Conclusions

Evidently, GDP can be statistically expressed as a linear function of unemployment and inflation. The analysis of multiple regression has concluded that $GDP = 3.00081 - 0.06719 X UNMP + 0.24815 X INF$, where UNMP = unemployment rate and INF = inflationrate whilst the percentages of distribution of residuals for GDP remains normally distributed. Loosely speaking, inflation rates can be significant and fall into the negative territory rapidly, anytime soon. In fact, at least thirteen times there has been negative inflation (deflation) reported during the period from 1915 to 2015. Additionally, the distribution of the differences between unemployment, inflation, and GDP considering the quantities, UNMP – INF is right skewed and that of INF – GDP is exhibiting symmetry whilst they both are unimodal. The ARIMA (2, 1, 0) model applied to GDP rates provided the estimates beyond the year 2018. This time series forecasting method is valid only in short-term predictions requiring at least 40 past data points. The findings have shown that for the next five years the GDP remains in-between 3.5% and 4.5%. A similar application procedure can be used to forecast unemployment rates and inflations for the determination of estimates beyond 2018 for a few more years.

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