

The Relation between Inflation and Unemployment in the Gambia: Analysis of the Philips Curve

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Abstract

Inflation and unemployment are two integral parts of the market economy. In an economy where these processes occur, negative socio economic consequences occur for the populace. The aim of this paper is to explore the relationship between inflation and unemployment in the Gambia. The study employs the new Keynesian curve model on annual time series data sampled from 1991-2015 to test for the existence of Philips Curve in the Gambia. The results show statistically significant variables that confirms the existence of an inverse relationship between inflation and unemployment in the Gambia. These results are broadly consistent with the vast majority of the existing literature on the Philips Curve hypothesis.

Keywords: Inflation; Unemployment; Philips curve and the Gambia

Introduction

The aim of this paper is to shed further light on the relation between inflation and unemployment in the Gambia. Inflation rate and unemployment rate are two of the major indicators in economy and they are seen to be major determinants of underdevelopment in any country including the Gambia. The question of whether it is possible to achieve the two main macroeconomic goals, low inflation and low unemployment in a particular economy at the same time, has remained a hot debate among economists; hence the emergence of the Philips Curve. As a result, there are numerous discussions among researchers to establish the connection between the two indicators. In this regard, the concept of Philips curve emerged.

The concept that provided a negative correlation between inflation and unemployment, which has been the core of policy discussion, was first introduced in 1958 and later became known as the Philips Curve. Philips observed that, one stable curve known as the Philips Curve can be used to represent inflation and unemployment trade-off. This model has been at the heart of many economists because it throws light on the effect of monetary policy in an economy. The Philips Curve has played a central role in macroeconomics by enhancing policy makers' understanding of an economy whenever they deem it fit to formulate monetary policy. It further emphasize the need for policy makers to act cautiously when managing monetary policy since it can push the two variables in opposing directions.

The inflation-unemployment trade-off has been confirmed by researchers using different econometric models ranging from Vector Autoregressive techniques, error correction model and the new Philips Curve model.

Liu observed that higher inflation rate provides incentives for workers to work which generates employment since firms are induced by the higher prices to produce more [1]. This ultimately implies a fall in unemployment when price increases.

Notwithstanding the empirical studies that confirms the inverse relationship between inflation and unemployment, the contribution of Phelps (1968), Friedman (1968), Lucas (1973) as well as the oil shocks of the 1970's have cast doubt on the validity of the Philips curve [2].

The implication of the oil shocks which took place during the 1970's and 1980's is that if OPEC should cut output and raise world

prices of oil today, then there is a possibility for some economies to simultaneously experience high inflation and unemployment, i.e. stagflation, which may contrast the general notion presented by The Philips Curve. In such a situation, relying on the Philips curve for inflation forecast and for policy purposes will pose serious consequences [3]. The fact being that policy makers would be forced to choose between fighting unemployment either by expending aggregate demand or reducing inflation by compressing aggregate demand. While this situation may put policymakers off in applying a Philip-based curve for inflation forecast, several studies have concluded that, the increased inflation experienced by U.S between 1970s and 1980s was as a result of productivity slowdown and also policy makers learning about the persistent trade-off in inflation and unemployment. Other studies have also shown that the simultaneous high inflation and unemployment was due to the fact that, monetary policy makers operated with misspecified Philips curve [3].

Given the rapid rural-urban migration in the Gambia, inability for people to search for work that requires their skills, job selectiveness by graduates, the economy cannot escape from high rate of unemployment. Within the context of Philips curve, does this high rate of unemployment imply low inflation in the Gambia? To answer this question, the quantitative dynamics relationships between inflation and unemployment should be known for certain. Without this certainty, actions of policy makers are likely to either undershoot or overshoot the targeted equilibrium level of inflation that would ensure higher employment.

In order to successfully embark on reducing or stabilizing price and raising employment in the Gambia, the trade-off between inflation and unemployment should empirically prove. Unfortunately for the Gambia, studies that look at this trade-off are limited. Policy makers

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should rely on empirical research that confirms Philips curve in the Gambia or within the sub Saharan region with a similar economic structure to make policies since most of the work done in the area were conducted in advanced countries. In a nutshell, the inverse relationship between inflation and unemployment are specific to each economy in question, hence to effectively capture their trade-offs, economy characteristics needs to be accounted for. In light of this, a thorough investigation into the quantitative relationship between inflation rate and unemployment rate using time series data on the Gambia would help policy makers understand the actual relationship between inflation rate and unemployment rate, and thus assist them in choosing the optimal policy mix between inflation rate and unemployment rate

A great contribution to the study about the connection between inflation and unemployment was made by a Professor of the London school of Economics- Alban Philips (1914-1975) in 1958. Philips analyzed information with statistics. He detected a negative relationship between the rate of money wage changes (wage inflation) and unemployment rate in the British economy over the period 1861-1957. The graph of inflation which he plotted against unemployment famously became known as the "Philips Curve".

The rest of the project paper proceeds as follows. Section 1 introduces the research project by discussing the objective, hypothesis and significance of the study. The scope and limitation of the study are also mentioned in introduction.

Literature review reviews the literature, whereas methodology outlines and discusses the methodology used in the study. Result and discussion presents and analyses the empirical results. Conclusion concludes the study, with some policy recommendations on how to stabilize the economy of the Gambia and insulate it from the twin adverse effects of high unemployment and high inflation.

Objective of the study

The primary objective of this study is to examine if there is any trade-off between inflation and unemployment in the Gambia.

The research hypothesis

The paper will be guided by the following hypothesis:

- Null hypothesis, H₀; there is no relationship between inflation and unemployment.
- Alternative, H₁; there is a relationship between inflation and unemployment.

Significance of the study

Unemployment and the general price level have been on the rise in the Gambia during the past two decades despite some improvement in the country's GDP. Inflation and unemployment are current issues that are affecting the Gambian economy. However, were the two variables neglected by the successive governments or have the twin problems defied all economic theories?

A study on the relationship between inflation and unemployment in the Gambian context will help economic decision-makers in the country greatly by helping them to acquire the knowledge and skills needed to face the issue of inflation and unemployment in the Gambia.

Scope and limitation of the study

The research work intends to study the inflation and unemployment situation in the Gambian economy between the period 1991-2015,

using the new Keynesian model version of the Philips Curve. Apart from the two main variables of interest, which is the inflation and unemployment, other variables that affect inflation such as the money supply, and the interest rates were also included. Due to lack of data on unemployment, output gap which is the difference between actual output and expected output was used as a proxy variable for unemployment.

Literature Review

Stability of domestic prices and full employment are undoubtedly parts of the macroeconomic goals which governments strive to achieve. Macroeconomic performance is judged by three broad measures- unemployment rate, inflation rate, and the growth rate of output.

Unemployment represents a significant waste of a country's manpower resources and hence it has been categorised as one of the most serious impediments to economic progress. It generates welfare loss in terms of lower output thereby leading to lower income and well-being.

Mankiw [4] defines rate of inflation as the percentage change in the overall level of prices. Inflation rate defers over time across countries, while other countries experience moderate inflation, others experience hyperinflation (inflation rate of more than 50% in a month), as was the case of Zimbabwe in 2008. Friedman famously asserted that "the growth in the quantity of money is the primary determinant of the inflation rate", to which many economists agree. Nevertheless, there are other factors which cause inflation including the interest rate and exchange rate.

According to author, 'Keynes for instance described inflation as the excess of expenditure over income at full-employment level. He contended that the greater the aggregate expenditure, the larger the inflationary gap and the more rapid the inflation. As for unemployment, the Keynesian economists hold that an increase in unemployment reduces income, which reduces consumption, and reduces aggregate output. As a result, employment can be increased by increasing consumption or investment'.

On the other hand, inflation was explained by the monetarist in terms of excessive growth of the money supply relative to real output. Their view of unemployment was framed around the context of Milton Friedman's permanent income hypothesis. Based on the Permanent Income Hypothesis (PIH), a reduction in employment and current receipts only affects output to the extent that the anticipated income declines.

Before the existence of what has become famously known as the Philips Curve in 1958 (unemployment and inflation trade-off) in economics, those two variables were treated as distinct subjects.

Prior to the emergence of Philips Curve, different policy solutions were offered by different schools of thoughts and there were however, no major attempts made to examine inflation and unemployment simultaneously.

Following the introduction of the Philips curve by A.W. Philips in 1958, it was only then inflation and unemployment were examined simultaneously by traditional economists, thus, establishing a trade-off between inflation and unemployment.

However, economists such as Milton Friedman and Edmund Phelps disapproved Phillips curve thesis, stating that the trade-off between unemployment and inflation only existed in the short-run

and that in the long-run, the Phillips curve is vertical. This led to the introduction of the Natural Rate Hypothesis.

Also, empirical analyses carried out by other economists over the years, have in one way or the other disproved the authenticity of the trade-off thesis as postulated by Phillips. Both high inflation rates and high unemployment rates were discovered to co-exist, giving rise to what has come to be known as stagflation. These twin problems are currently crucial elements of the economic crises in most Less Developed Countries (LDC).

According to the interpretation of the Philips curve by the monetarist (mostly Friedman and Phelps), hypothesis of adaptive expectation was used in which they explained that subjects adjust their expectations considering the activities of previous period. However, proponents of this concept believed that the entities do not have fully reliable information, therefore, will respond to changes with some delay [5].

Monetarist believed that every single action that is a stimulating policy can lead to growth in wages and national income, but then subjects need to adapt to the new conditions, and they will start to revise the terms of sale factors. This will lead to an increase in the level of aggregate supply. As a result we will get the initial value of employment, but with the higher inflation.

If the central bank which has the sole responsibility of printing money happens to print too much notes and pump it into the economy which does not correspond with at least the same magnitude of an increase in output (goods and services), it will lead to excess of demand because people will have a lot of money in hand. Inflation has been intrinsically linked to money, as captured by the often heard maxim; inflation is too much money following too few goods. Money supply is therefore a key determinant of the inflation rate.

Yelwa et al. [6] argue that the concept of inflation has been defined as a persistent rise in the general price level of broad spectrum of goods and services in a country over a long period of time.

Concept of unemployment

As cited in Yelwa et al. [6] “the international Labour Organisation (ILO) defines the unemployment as the number of economically active population who are without work but available for work and seeking work including those who have lost their jobs and those who left their jobs voluntarily [7]”. Those who have not looked for work within the past four weeks are no longer counted among the unemployed.

Employment is anyone 16 or older who worked any hours during the past week. That’s according to the Bureau of Labour Statistics (BLS). They can be paid employees or self-employed. They can be unpaid workers in a family-owned business, as long as they work at least 15 hours a week. The BLS also includes people who did not work during the week if they were temporarily absent (say, due to vacation or illness).

They cannot be residents of any institution. That includes prisons, mental facilities, and homes for the aged. The BLS also does not count

those on active military duty. In other words, they are members of the U.S. civilian non institutional population. These formulas describe how unemployment fits into the population. Population = Civilian no institutional population + Active duty military + Institutional population

Civilian no institutional population = Labor force + Not in labor force
 Labor force = Employed + Unemployed

Not in labor force = These following three groups:

People who would like to work, but have not looked for it in the last month. They include the “marginally attached,” who did look in the past year. They had school, ill health, or transportation problems that kept them from looking in the past month. Others are “discouraged workers.” They don’t believe there are any jobs. These people are included in the Real Unemployment Rate.

The other groups are not looking for work. They include students, homemakers and retired people.

Anyone under 16 is not included in the labour force, even if they are working.

Concept of inflation

The term inflation is such a generic term used in many contexts, hence there is no commonly accepted definition of inflation, nor is there a common agreement on what constitutes acceptable levels of inflation, bad inflation, or hyperinflation.

Historically, inflation destroyed economies and change the course of human history. Inflation rate is described as the annual growth rate in prices (most of the times measured by an index). During healthy economic times when the economy is experiencing neither inflation nor deflation, a term like price stability might describe the economic pricing environment at the time.

Different theories of inflation exist such as monetary theory of inflation. For Totonchi (2011, p459) monetarism refers to the followers of M. Friedman (1912-2006) who hold that “only money matters”, and as such monetary policy is a more potent instrument than fiscal policy in economic stabilization. According to the monetarists, the money supply is the “dominate, though not exclusive” determinant of both the level of output and prices in the short run, and of the level of prices in the long run. The long- run level of output is not influenced by the money.

Demand pull theory: John Maynard Keynes (1883-1946) and his followers emphasized the increase in aggregate demand as the source of demand-pull inflation. The aggregate demand comprises consumption, investment and government expenditure.

Structural Inflation Theory: Totonchi (2011, p469), about 40 years ago, from Table 1 the concept of structural inflation entered in economic discussion and research. It is related to the effect of structural factors on inflation. Structural analysis attempts to recognize how economic phenomena and finding the root of the permanent disease

Type	R (%)		
Creeping	<10	Beneficial to economic growth	Sets expectations that prices will continue to rise-> increase demand and drives economic expansion.
Galloping	10-100	Economy becomes unstable	Money loses value quickly, foreign investors avoid country
Hyper Inflation	>100	Out of control	Prices increases rapidly as currency loses it value, bater
Deflation	<0	Bad for economy	Why would you spend your crown today when the expectation is that it could buy effectively more stuff tomorrow? ->decreases demand [8]

Table 1: Types of inflation (Quantitative Perspective) by other writers.

and destruction such as inflation that evaluates lawful relationship between the phenomena [8].

Below is a description of inflation ranges (Table 2).

<0%	Deflation
0%-2.5%	Price Stability
2.5%-5%	Moderate Inflation
5%-8%	Serious Inflation
8%-12%	Self-Compounding Inflation
12%-20%	Hyper-Inflation
20%+	Explosive Inflation.
Federal Reserve Bank of Boston [9]	

Table 2: Inflation thresholds.

A good number of researchers have conducted research on the trade-off between inflation and unemployment, with different researchers in different countries reaching different conclusions. The work of some of those authors will be reviewed next [9].

A key study by Katria et al. [10] concluded that a negative Philips curve exists in the South Asian Association of Regional Cooperation (SAARC) member countries, meaning in that region of Asia, inflation and unemployment move in opposite direction. In their research, change in inflation is more with respect to unemployment. Berger [11] finds that an increase in cyclical unemployment will lead to a decrease in output which ultimately causes inflation to decrease.

In addition, Antonio [12] found that (when a country faces recession (downturns), inflation and unemployment go in conflicting directions. And when the economy is smooth and prospers it demonstrates the upbeat relations, both move in same direction, they do not go in a conflicting directions.

On the other hand, Hodge [13], as cited in Katria et al. [10], found that there is no short-run tradeoff between inflation and unemployment. In addition, another positive and significant relationship is identified that is between inflation and growth rate in the study conducted by Katria et al. [10].

Alisa [5] found that in Russia, the negative relationship between inflation and unemployment does exist. As observed earlier in this part of the paper, most of economists agree that in the short-run, there is an inverse relationship between unemployment and inflation. As for the long-term, such a relationship is absent. Therefore the government's efforts to estimate aggregate demand to increase the volume of GDP at full employment only lead to an increase in inflation.

Yelwa et al. [6] shows that the inflation and unemployment relationship in Nigeria corresponds to the priori expectation of a negative relationship.

It is evident from the foregoing that little or no research attention has thus far been devoted in the current literature in analysing the (inverse) relationship between inflation and unemployment using data from the Gambia. As a result, this study will build on the above-mentioned studies by shedding light on the relation between inflation and unemployment in the context of the Gambia.

Inflation and Unemployment in the Gambia inflation is another problem for the Gambian economy. Inflation is simply described as the rate at which the general level of prices for goods and services is rising. Inflation does not only decrease the growth of an economy but also puts a heavy burden on the poor populace than on the rich ones because the poor are more vulnerable to inflation consequences.

The major objective of the Central Bank of the Gambia is to achieve price stability to ensure economic growth as well as safeguard the financial stability of the economy.

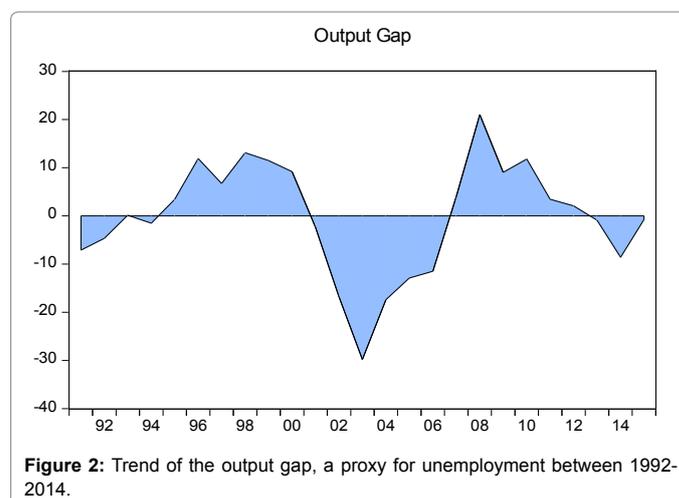
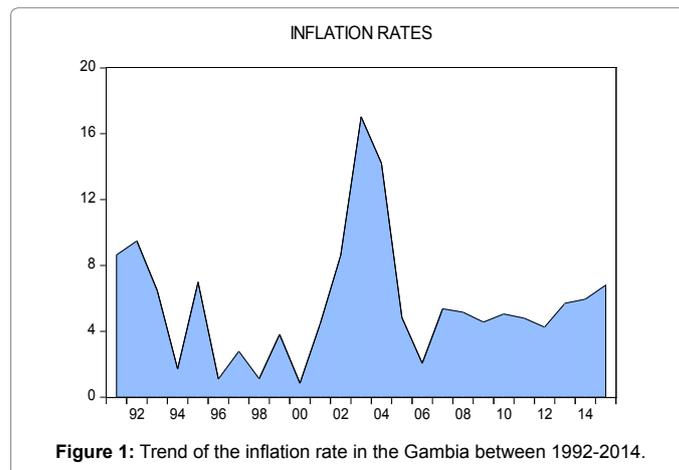
The inflation rate of the Gambia averaged to 4.22 percent in the 1990s; however, this average Figure 1 rose significantly to 16.532 percent between 2001 and 2010. The inflation was projected to be 9.11 in March 2017 (IMF). Figure 1 shows the trend of the inflation rate in the Gambia between 1991-2014.

In the Gambia, the unemployment rate measures the number of people actively looking for a job as a percentage of the labour force. Unemployment is one of the major problems that affect people. It lowers people's standard of living and puts lasting damage to the earning potentials of those who lose jobs. There happens to be a positive correlation between the longer it takes to fine the job and the damage it causes.

Unemployment rate in the Gambia increased to 29.80 percent in 2013 from 22 percent in 2010. Unemployment rate in Gambia average 15.95 percent from 1994 until 2013, reaching an all-time high of 29.80 percent in 013 and a record low of 6.00 percent in 2003.

Unemployment Rate in Gambia all-time average stands at 15.95. Below is the trend of the output gap which is the proxy used for unemployment in this study.

The trend of the output gap above Figure 2 shows that the output



gap of the economy in average recorded negative value from 1991-1995, after which there was a positive output gap for the subsequent five years, then the subsequent five years also recorded negative values. In a nutshell, the trend shows that the output gap fluctuation from positive values to negative values occur every years.

Methodology to empirically prove the relationship between inflation and unemployment in the Gambia, the study employs new Keynesian Philips curve model which has received most attention in recent years and is seen as the dynamic extension of the static new Keynesian model. Three basic relationships were used to derive the model Mankiw [4].

$$P\tau^* = P\tau - \alpha(Y\tau - Y) \quad (1)$$

The above equation explains that the firm's desired price $P\tau^*$ is a function of the general price level and the deviation of unemployment from its natural rate which is indicated by the cyclical gap $(Y\tau - Y)$ the model further states that a firm's desired relative price rises during economic boom and falls when an economy experience recession, i.e. when an economy is experiencing boom, unemployment is low since the increasing demand for a firm's product will result in higher employment. However, each firm is likely to raise its relative price there will be an increase in the marginal cost of a firm as a result of higher demand for labour.

According to new Keynesian model, to obtain the second relationships which were used to derive the model, since price adjustment is sporadic, firms do not change their relative price that easily In the light of this, a firm can only change its price at a point in time. Hence they adjust their price to be equal to the average desired prices. The adjustment equation I given below:

$$X\tau = \lambda \sum_{k=0}^{n=\text{infi}} (1 - \lambda) E\tau P^* \quad (2)$$

λ is the price adjustment rate and also tells the degree to which the weights decline. Equation (2) states that current adjustment price is an average of current general and next period's desired price.

The equation for the overall price level is the final equation in the model:

$$P\tau = \lambda \sum_{k=0}^{n=\text{infi}} (1 - \lambda) X\tau - J \quad (3)$$

Equation 3 explains that, the current price is determined by the firm's weighted average of current adjustment price and the past price level that occur.

The model is then specified solving equation 2 and 3 together which gives the Philips curve below according to the new Keynesian Philips curve.

$$\pi\tau = E\tau(\pi\tau + 1) - (\alpha\lambda/(1 - \lambda))(Y\tau - Y) + \mu\tau \quad (4)$$

Assuming individuals' expectation of future inflation is dependent on the current inflation, then current inflation level is individual's previous level of inflation. In the light of this, equation 4 can be rearranged as

$$\pi\tau = E\tau - 1\pi\tau + \varnothing(Y\tau - Y) + \mu\tau \quad (5)$$

Where $\varnothing = (\alpha\lambda/(1 - \lambda))$; $\pi\tau = P\tau - P\tau1$ indicate inflation rate; $E\tau - 1\pi\tau = \pi\tau - 1$; Y is the real growth rate and Ye represents the potential output growth.

Equation 4 shows that the present level of inflation is a function of expected inflation and deviation of employment from its long run equilibrium position. Due to lack of data on unemployment in the

Gambia, cyclical gap is used as a proxy for unemployment in the Gambia. Cyclical gap is the difference between the actual output and the potential output. Considering this, if the cyclical gap is greater than zero i.e. $(Y - Ye) > 0$, then it means actual output exceed the potential output which is a reflection of low unemployment. It also means that lower unemployment results to higher inflation holding other factors like expected inflation constant. On the other hand if the cyclical gap is less than 0 i.e. $(Y - Ye) < 0$ then it means the actual output is less than the potential level which is a signal of an increase in unemployment. In that case, high unemployment will lead to lower inflation. To effectively factor GDP into cyclical and trend component, the study makes use of the Hodrick-Prescott (H-P) filter procedure to estimate the output gap. Ravn and Uhlig [13] the H-P filter has become a standard method for removing trends in the business cycle.

The estimate for the coefficient of unemployment (\varnothing) will show the actual relationship between inflation and unemployment in the economy. If \varnothing is greater than zero, then a positive relationship between the two variables and if \varnothing is less than zero, then a negative relationship. If the negative relationship holds, then Philips curve hypothesis is confirm.

In the light of the above, the paper tests the hypothesis that there is a negative relationship between inflation and unemployment.

Results

Unit root tests

The Augmented Dickey Fuller test is principally concerned with whether to accept or reject the null hypothesis given at t and p values. From Table 3 if the null hypothesis is rejected, it means the series are stationary and integrated of order zero i.e. (0). If, in the other hand, the null hypothesis is not rejected, then the first difference is stationary and the variables are integrated of order one i.e. (1).

From Table 4 the unit root test for stationarity shows that both inflation and output gap were stationary at level form.

GDP against inflation: With negative coefficient of inflation as

Exogenous: Constant, Lag Length: 1 (Automatic - based on SIC, maxlag=5)			
		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.118850	0.0391
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

*MacKinnon (1996) one-sided p-values, Dependent Variable: D(INFLATION_RATES), Method: Least Squares, Date: 08/30/17, Time: 14:43, Sample (adjusted): 1993 2015, Included observations: 23 after adjustments

Table 3: Unit root tests (Null Hypothesis: INFLATION_RATES has a unit root).

Exogenous: Constant, Lag Length: 0 (Automatic - based on SIC, maxlag=5)			
		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.936211	0.3112
Test critical values:	1% level	-3.737853	
	5% level	-2.991878	
	10% level	-2.991878	

*MacKinnon (1996) one-sided p-values, Augmented Dickey-Fuller Test Equation, Dependent Variable: D(OUTPUT_GAP), Method: Least Squares, Date: 08/30/17, Time: 14:45, Sample (adjusted): 1992 2015, Included observations: 24 after adjustments

Table 4: Unit root tests (Null Hypothesis: OUTPUT_GAP has a unit root).

shown in Table 6, an increase in the level of inflation result to a decrease in the GDP.

We can say conclusively that inflation and unemployment have significant impact on the economic growth in the Gambia.

Durbin-Watson test measures the autocorrelation between variables. As a rule of thumb, if Durbin-Watson test is 2, it means the test is significant and free from autocorrelation; if Durbin-Watson test is less than 2, it means the test suffers from positive serial correlation and, if Durbin-Watson is greater than 2, it means the test suffers from negative serial correlation (Appendix 1).

Since the Durbin-Watson statistics for the paper is 2.167720 which is approximately 2, this means that the regression is free from autocorrelation.

The study tests for the existence of Philips Curve in the Gambia between the period 1991-2015 (Appendix 2).

The estimated coefficient of unemployment indicated by the output gap for the period is -0.198397 and is statistically significant at 1%

Variable	Coefficient Std.	Error	t-Statistic	Prob.
Interest_rtaes	-0.211351	0.131693	-1.604873	0.1259
Money_supply	4.92E-05	0.000105	0.466517	0.6464
Output_gap	-0.198397	0.052844	-3.754375	0.0015
C	9.620937	2.953100	3.257911	0.0044
R-squared	0.559718			
Adjusted R-squared	0.486337			
S.E. of regression	2.808758			
Sum squared resid	142.0042			
Log likelihood	-51.72960			
F-statistic	7.627619			
Prob(F-statistic)	0.001701			
Mean dependent var	5.312591			
S.D. dependent var	3.919000			
Akaike info criterion	5.066328			
Schwarz criterion	5.264699			
Hannan-Quinn criter.	5.113058			
Durbin-Watson stat	2.167720			

Dependent Variable: INFLATION_RATES, Method: Least Squares, Date: 08/30/17, Time: 14:55, Sample (adjusted): 1993 2014, Included observations: 22 after adjustments.

Table 5: Regression results (INFLATION_RATES).

Variable	Coefficient Std.	Error	t-Statistic	Prob.
Inflation_rates	-18610889	5854235.	-3.179047	0.0042
C	8.86E+08	39782948	22.27903	0.0000
R-squared	0.305269			
Adjusted R-squared	0.275063			
S.E. of regression	1.10E+08			
Sum squared resid	2.76E+17			
Log likelihood	-497.2237			
F-statistic	10.10634			
Prob(F-statistic)	0.004183			
Mean dependent var	7.81E+08			
S.D. dependent var	1.29E+08			
Akaike info criterion	39.93789			
Schwarz criterion	40.03540			
Hannan-Quinn criter.	39.96494			
Durbin-Watson stat	0.581967			

Table 6: GDP against inflation.

level, which confirms the negative relationship between inflation and unemployment in the Gambian context With the results confirming the Philips curve at that significant level, it could imply that an increase in unemployment could lead to a reduction in inflation in the Gambia economy.

The regression also includes additional potential determinants of the rate of inflation. The coefficient of real interest rate is negative which shows that higher real interest rate is associated with low inflation and is statistically significant at 1% level. Another major determinant of inflation which is the money supply has a positive coefficient which means that high money supply is associated high inflation but it is statistically insignificant as shown in Table 5.

Conclusion

The study tries to find the relationship between inflation and unemployment in the Gambia by testing for the existence of Philips Curve, using the new Keynesian Philips Curve model. Using output gap to measure unemployment, the results show that there is a negative relationship between inflation and unemployment in the Gambia. Furthermore the coefficient of output gap is significant at 1%, which in other words suggests that a change in unemployment may lead to inflation moving in an opposite direction.

The trade-off relationship between inflation and unemployment poses a dilemma for policy formulators, since a reduction in unemployment tends to lead to a rise the inflation rate in an economy. This in turn signifies the need for a well specified and constructive policy recommendation regarding the optimal policy mix between the level of inflation and unemployment in an economy.

Recommendations

Below are some of the policy recommendations which will help alleviate the current problems of inflation and unemployment in the Gambia.

The government should strive to have a well-developed agricultural sector which has a great potential to increase the supply of agricultural products and other necessities. Since agriculture is the mainstay of the Gambia, an increase in the supply from the agricultural sector will have a dual effect of reducing prices of agricultural products and create more employment and thus reduce unemployment within the economy. Various agricultural policy measures such as increasing the productivity of tradable products, which is an essential component of agricultural grow and most of the time the driving force behind agricultural growth and policies that will see to the adoption of improved technology, resources and institutions to deal with bottlenecks and constrains affecting various commodity system in order to respond to the problems of natural resource exhaustion and degradation Should be promoted as a way of increasing output in the agricultural sector in the Gambia.

Government needs to make huge investments in the real sector of the economy by establishing job creating industries such as policies that will ensure favourable conditions in which technical progress can contribute to job creation by helping to reduce the mismatch between demand and supply for skills and improve the framework for firms to adopt new organisational practices, which will help reduce the level of unemployment, increase output, reduce prices of goods and services as a result of the increase in output which will eventually reduce the level of inflation.

Government needs to increase efficiency in the labour market by

establishing a data bank which may lead to a reduction in the cost of employees searching for jobs.

Educational and other training programmes should be promoted and geared towards enhancing innovation and productivity, which in turn will help reduce the rate of unemployment in the Gambia.

Special attention needs to be given to policy implementation because a key impediment to economic development in the Gambia as elsewhere in other countries in sub-Saharan Africa is the lack of implementation of policies. Policies are drafted and kept in files and never implemented. As a result, the Government of the Gambia should set up a body or a committee charged with the responsibility of monitoring government policies and ensuring that they are implemented accordingly.

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References

1. Liu L (2008) Inflation and Unemployment: The Roles of Goods and Labor Markets Institutions. Job Market Paper, Queen's University, Canada.
2. Elliot (2015) The relationship between inflation and unemployment in Ghana. Afr J Econ Rev 3: 117-124.
3. Sargent T, Noah W, Tao Z (2006) Shocks and Government Beliefs: The Rise and fall of American Inflation. Am Econ Rev 96: 1193–1224.
4. Mankiw NG (2001) The inexorable and mysterious trade-off between inflation and unemployment. Econ J 111: 45-61.
5. Maximova A (2015) The Relationship between Inflation and Unemployment: A Theoretical Discussion about the Philips Curve. J Int Bus Econ 3: 89-97.
6. Mohammed Y, Okoroafor OKD, Awe, Emmanuel O (2005) Analysis of the relationship between inflation, unemployment and economic growth in Nigeria 1987-2012, Appl Econ Financ 2: 102-109.
7. World Bank (1998) World development indicators, Washinton DC.
8. Vikesh Gokal (2004) relationship between inflation and economic growth. Working Paper 2004/04, Suva, Fiji.
9. Jeffery FC, Giovanni PO, Geoffrey MBT (2009) Empirical estimates of changing inflation dynamics. Fed Reserve Bank Bo 9: 1-52.
10. Sagar K, Niaz AB, Falahuddin B, Azhar AD, Hyder AK, et al. Is There Any Tradeoff Between Inflation and Unemployment? The Case of SAARC Countries. Proceedings of 2nd International Conference on Business Management.
11. Berger T (2010) Labour taxes and unemployment evidence from a panel unobserved component model. University of Cologne, Germany 34: 354-364.
12. Antonio R (2006) Short-run and long-run interaction between inflation and unemployment in the USA. Appl Econ Lett 10: 373–376.
13. Ravn MO, Uhlig H (2002) On adjusting the Hodrick-Prescott filter for the frequency of observations. Rev Econ Stat 84: 371-376.