SciencePG
Science Publishing Group

Review Article

Critique of Phillips Curve: A Case Study of Zimbabwe Economy

Shame Mukoka

Faculty of Commerce, Zimbabwe Open University, Harare, Zimbabwe

Email address:
smukoka49@gmail.com

Abstract: This study sought to determine the relationship between Inflation and Unemployment in Zimbabwe. The time series yearly data for Inflation and Unemployment from 1990 to 2017 were used for the study. Ordinary Least Squares (OLS) was used to determine the relationship between inflation on Unemployment. Some Stationarity and Cointegration tests were carried out. Data became stationarity after first differencing using Augmented Dickey Fuller Test. There was also evidence of cointegration between the two variables using the Johansen Cointegration Test. The results of the study established a stable and permanent inverse relationship between Inflation and Unemployment in Zimbabwe, conforming to the Phillips Curve. The Zimbabwean government should, therefore, work towards growing its economy through adopting a policy mix that embraces macro-economic indicators that have a direct impact on both inflation and unemployment.

Keywords: Inflation, Unemployment, Stationarity and Ordinary Least Squares

1. Introduction

Myth is stubborn, and in the case of the Phillips Curve, it has taken a considerable time frame of obvious contrary evidence to convince many economists that there is no fixed inverse relationship between unemployment and price inflation. Resurreccion [1], argued that the relationship between inflation and unemployment never existed, not even at the purely empirical level. Zimbabwe is one of the countries whose economic development is measured in terms of variables such as unemployment and inflation. Inflation and Unemployment are considered as important economic indicators in Zimbabwe, with unemployment rate considered as one of the macroeconomic factors that are used to measure the state of the economy. High inflation is coupled with increased price variability and at times can work against investors. The reduction of country's international competitiveness may be a result of inflation as the country's exports become expensive. This study, therefore, seeks to evaluate the relevance of the Phillips Curve in the Zimbabwe economy so that informed polices premised on inflation and unemployment may be recommended.

2. Background to the Problem of the Study

The Phillips curve shows the relationship between unemployment and inflation in an economy. Since its discovery by British economist AW Phillips, it has become an essential tool to analyse macro-economic policy world over, impliedly suggesting that it also applies in Zimbabwe. After 1945, fiscal demand management became the general tool for managing the trade cycle. The consensus was that policy makers should stimulate aggregate demand (AD) when faced with recession and unemployment, and constrain it when experiencing inflation. It was also generally believed that economies faced either inflation or unemployment, but not together - and whichever existed would dictate which macro-economic policy objective to pursue at any given time. In addition, the accepted wisdom was that it was possible to target one objective, without having a negative effect on the other. However, following publication of Phillips' research in 1958, both of these assumptions were called into question.

Phillips analysed annual wage inflation and

unemploymentrates in the United Kingdom for the period 1860-1957, and then plotted them on a scatter diagram. The data appeared to demonstrate an inverse and stable relationship between wage inflation and unemployment. Later, economists such as Friedman [2], Akerlof et al, [3], substituted price inflation for wage inflation and the Phillips

curve was born. When economists from other countries, with the exception of Zimbabwe, undertook similar research, they also found very similar curves for their own economies. In fact, Phillips [5], analysed annual wage inflation and unemployment rate.
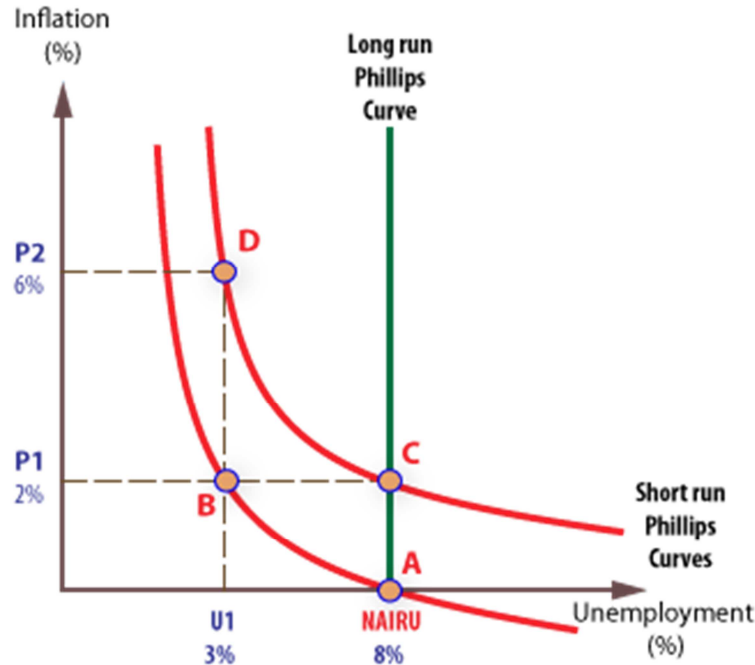

Figure 1. Phillips Curve: (Adapted from Advanced Macro-Economics: Sanjay Rode, 2012).

The curve suggested that changes in the level of unemployment have a direct and predictable effect on the level of price inflation in the short-run. In fact, a fiscal stimulus, and increase in aggregated demand (AD), would trigger an increase in the demand for labour as government spending generates growth. This also would lead in the declining in the fall of unemployment. The rightward shift of the AD would result in firms competing for fewer workers thereby raising nominal wages. This results in workers having greater bargaining power to seek out increases in nominal wages, thus wage costs surges. Faced with rising wage costs, firms pass on these cost increases in higher prices. It can, therefore, be concluded from this graph that whatever happens to inflation in the long-run, no changes are experienced on the unemployment rate. This study, therefore, determine whether or not, this rule of thumb holds in the Zimbabwe economy.

3. Statement of the Problem

Unemployment and Inflation is among the major problems not only in less developed and developing countries but also in developed countries [1]. The two economic indicators have received much attention among economic analysts, governments, and scholars in pursuit of better understanding of their occurrence as well as their relationship. Zimbabwe had a record high of both inflation and unemployment rates [4], with policies introduced to manage the two macro-economic

indicators with little success. Phillip's [5] conducted a study to determine the nature of relationship between the two macro-economic variables and an inverse relationship was found. This study is an evaluation of the Phillips curve, to determine whether the theory holds in Zimbabwe economy.

4. Research Objectives and Hypothesis

The objective of this study is to evaluate the Phillips Curve in the Zimbabwe economy, so that informed polices premised on inflation and unemployment may be recommended. The hypothesis that pinned this study is that unemployment is negatively related to inflation.

5. Review of Related Literature

The concept of inflation has been defined as a persistence in the general price level of broad spectrum of goods and services in a country over a long period of time. Inflation has been intrinsically linked to money, as captured by the often said maxim '…inflation is too much money chasing too few goods'. Inflation was described by Oliver [6] as an economic situation when the increase in money supply is faster than the new production of goods and services in the same economy.

Forder [7], distinguish inflation from an economic phenomenon as a onetime increase in prices, or when there are price increases in a narrow group of economic goods or

services. Balami [8] also sees inflation as a situation of rising a general price of broad spectrum of goods and services over a long period of time. It is, measured as the rate of increase in the general price level over a specific period of time. On the other hand, the International Labour Organisation (ILO) defines unemployment as numbers of the economically active population who are without work, but available for and seeking work, including people who have lost their jobs and those who have voluntarily left work [9]. In Zimbabwe, unemployment measures the number of people actively looking for a job as a percentage of the labour force and is calculated by dividing the number of unemployed persons aged 15 years and above by the economically active population in that age range [4].

Although there seems to be convergence on the inflation-unemployment concept, its applications have been bedevilled with series of problems across countries. First, most published unemployment rates are recorded open unemployment. People's attitude on this varies from country to country. While this may be high in developed countries and where government is committed to resolving unemployment problems, it is likely to be very low in countries with the opposite attributes. Okafor [10], pointed out the problem arising from the concept of labour force. In Nigeria, people below the age of 15 years and those above the age of 55, who are actively engaged in economic activities, are excluded from labour statistics surveys. Contrary to the Zimbabwe economy, where people with at least 15 years are included in labour statistics surveys [11]. These factors have the result in underestimation or overestimation of unemployment thereby making international comparison very difficult. Furthermore, factors such as the preponderance of full housewives (but who are willing to be engaged in paid job) and unpaid family workers also contribute significantly to the underestimation of unemployment.

Frictional unemployment may be regarded as subset of structural unemployment, mainly reflecting temporary unemployment spells as a result of job search and matching difficulties in connection with quits, new entries to the labour market, and job separation because of employers' dissatisfaction with the individuals' workers [12]. Ordinarily, this kind of unemployment does not usually pose much threat to individuals' welfare, as it is temporary in nature. However, the situation in Zimbabwe is that frictional unemployment grows into long-term unemployment and thereby resulting into a stable state of unemployment.

Similarly, Abachi [13] studied the trade-off between unemployment and inflation in Nigeria using a trade-off model. His studies revealed that there is no trade-off between inflation and unemployment. Rather, the estimates established a non-linear curve that slopes upwards. Also, his findings showed that causality existed between inflation and unemployment, which implies that any attempt to control inflation results to the aggravation of unemployment and vice-versa.

In another study, Sanda [14] used a sample of 360 firms in Kano and its environs to examine whether or not, in comparison to large firms, small firms are relatively better at creation of employment opportunities. The results were positive in that small firms were found to be relatively better, and the conclusion they derived was that a policy that gives special preference to small firms is justified. Even though unemployment is painful to those who have no source of income, reducing unemployment is not costless. In the short-run, a reduction in unemployment may come at the expense of a higher rate of inflation, especially if the economy is close to full capacity, where resources are almost fully employed [15].

In Zimbabwe, economic development is measured in terms of factors such as unemployment and inflation. These two variables are considered as important economic indicators, with unemployment rate considered as one of the macroeconomic factors that are used to measure the state of the economy. High inflation is coupled with increased price variability and at times can lead to the departures of investors. The reduction of country's international competitiveness may be due to inflation which directly make country's exports relatively expensive.

This study, therefore, evaluates the Phillips Curve in its applicability in the Zimbabwe context, with the theory stating that in the short-run there is an inverse relationship between inflation and unemployment rate, whilst in the long-run, the concepts of unemployment and inflation are not related.

6. Materials and Method

This section explores the econometric methodology applied in the study to determine the relationship between inflation and unemployment in Zimbabwe. The study uses secondary yearly data for only four variables, namely, inflation, unemployment, current account balance and gross domestic product. Twenty-eight observations were considered since the period under study covers from 1990 to 2017. The data was collected from International Monetary Fund (IMF) Data Base. In analysing the data Ordinary least squares (OLS) were used in which inflation was regressed against unemployment rate, current account balance, real GDP. The method is useful in developing quantitative relationship between variables, which can be used for prediction. This is the most appropriate technique in view of the test for fitness and simplicity in understanding. To estimate the parameters in the model, we assumed that the assumptions of the OLS hold. This analysis helps us to determine the extent to which the exogenous or policy variables explain the endogenous variable. The test of the explanatory parameters was carried out using the student T-test which determines the strength of the relationship between the independent variables in the model. It ascertains if each estimated parameters is individually significantly different from zero. The co-efficient of determination (R-squared) was computed. R-squared is used to measure the goodness of fit. It is used to reinforce F-statistic. It takes into account, the degree of freedom and tests the significance of

the explained variation in the regressend by the regressor. The Durbin-Watson (DW) value was also computed and used to determine the presence or absence of auto-correlation in the data collected.

Based on the theoretical framework, the model used on this study could be represented mathematically as:

$$INFL = f\ (UNEMP,\ CAB,\ GDP) \qquad (1)$$

Where:

INFL = Inflation Rate, UNEMP = Unemployment Rate, CAB = Current Account Balance, GDP = Real Gross Domestic Product. The linear relationship of equation (1) could be stated as:

$$INFL = a_0 + a_1 UNEMP + a_2\ CAB + a_3 GDP + U \qquad (2)$$

Where a_1, a_2 and a_3 are the relevant elasticity, a_0 is the regression constant and U is the error term subject to the usual stochastic consumptions.

7. Data Analysis and Interpretation of Results

This section focuses on the empirical estimation, presentation and economic interpretation of the regression results carried out using the methodology highlighted in the previous section.

Preliminary Tests

Table 1 shows descriptive statistics of the dependant and explanatory variables used in the study for the period 1990 to 2017. Maximum and minimum statistics rule out the possibility of outliers in the data used as the data were transformed logarithms to reduce its variability and enable direct estimation of the parameters. Classical linear regression requires that the residuals be normally distributed and judging by the probability values of the Jarque-Bera, three variables except for GDP residuals follows a normal distributed therefore, unit root tests can be conducted.

Table 1. Descriptive Statistics.

	INFL	UNEMP	GDP	CAB
Mean	11.57143	22.76327	1.628571	-8.607143
Median	1.900000	16.02832	2.500000	-6.250000
Maximum	156.9000	87.80344	11.90000	4.100000
Minimum	-37.40000	-4.63257	-16.50000	-43.60000
Std. Dev	40.95992	21.17633	7.462144	9.255546
Skewness	2.229836	1.448543	-0.882641	-1.992995
Kurtosis	7.931191	4.778605	3.306033	8.384451
Jarque-Bera	51.57286	13.48263	3.744854	52.36051
Probability	0.000000	0.001181	0.153750	0.00000
Observations	28	28	28	28

Stationarity Test Results

The stationarity and unit root tests of the data used in this study were conducted using Augmented Dickey-Fuller test and the results are shown below:

Table 2. Unit Root Test.

Variable	t-ADF Statistic	Critical1%	Critical5%	Critical10%	Conclusion
INFL	-4.568668	-3.699871	-2.976263	-2.627420**	1(1)
UNEMP	-4.305603	-3.711457	-2.981038	-2.629906**	1(1)
GDP	-5.894354	-3.711457	-2.981038	-2.629906**	1(1)
CAB	-7.666563	-3.711457	-2.981038	-2.629906**	1(1)

*, ** indicate significance at 1% and 10% respectively

The results from the ADF test became stationary after differencing. The next stage involves testing the existence of the cointegration relationship among the variable using Johansen Cointegration Test. Table 3 below presents the cointegration test results.

Table 3. Cointegration Test Results.

Hypothesised No. of CE (s)	Eigen Value	5% Critical Value	Prob.**
None*	0.753482	27.58434	0.0029
At most 1	0.395652	21.13162	0.4436
At most 2	0.246490	14.26460	0.4477
At Most 3*	0.218606	3.841466	0.0113

*Denotes rejection of the hypothesis at the 5% (1%) significance level.

The hypothesis of no cointegration is rejected suggesting that there exists a long-run relationship amongst inflation and its determinants. This is because the statistical values of those tests were greater than their critical values. When the cointegration exists, it means INFL, UNEMP, GDP and CAB share a common trend and long-run equilibrium as suggested. However, the statement of cointegration of 'At most 3', was

rejected. There being evidence of cointegration amongst the variables, the following Table 4 exhibits results for estimated Ordinary Least Squares (OLS).

Table 4. Ordinary Least Squares.

Dependent Variable: (INFL)

Variable	Coefficient	Std. Error	t-Statistic
Unemp	-9.603003	13.46993	-0.712921
GDP	2.329862	1.138528	2.046381
CAB	-0.230333	0.926617	0.248574
C	58.23383	71.29286	0.816825

R Squared=0.16542
Adjusted R Squared=0.061099
F. Statistic=1.585676
Log Likelihood=-140,6422
Durbin Watson Stat= 1.779852

The result shows that unemployment rate in Zimbabwe has negative and significant relationship with the Inflation rate. Also, Current Account Balance (CAB) has a negative relationship with the Inflation rate. However, Gross Domestic Product (GDP) has a positive relationship with the Inflation

rate. Now, given that this study is premised on the evaluation of the Phillips Curve in the Zimbabwe Economy context, discussion of the results has been centred on Inflation rate and Unemployment rate. The results on Table 4 shows that a unit increase in unemployment will result in a decrease of inflation by 9.603 units. Therefore, Ordinary Least Squares (OLS) results shows that unemployment and inflation have a permanent (fixed) stable inverse relationship. These results, therefore, strongly supports the Phillips Curve. This, therefore, suggests that the Phillips Curve, will remain the primary framework in Zimbabwe for understanding and forecasting inflation.

8. Conclusion and Policy Recommendations

The trade-off relationship between unemployment and inflation poses a dilemma for policy makers, since in order to reduce unemployment, the inflation rate in the economy tends to rise. Therefore, basing on the findings of this study, there is great need for constructive and well-specified policy recommendations that will help to ameliorate the situation of unemployment and inflation in Zimbabwe. The following policy recommendations have potential of alleviating the current problems of unemployment and inflation in Zimbabwe.

   (i) Government of Zimbabwe should strive to develop the agricultural sector, which has great potentials to increase the supply of farm products and other basic necessities of life. The increased supply will reduce prices and increase in employment generation. To achieve this, various specific agricultural policy measures should be promoted and pursued vigorously. Thumbs up for the Command Agricultural model which the country is currently undertaking.

   (ii) Massive investments should be carried out in the real sector of the economy, through establishment of job-creating industries. This would help reduce the level of unemployment in the country, increase output, reduce prices of goods and services, and thus, reducing the level of inflation in the economy.

  (iii) The free flow of information between employers and employees should be enhanced, through the reduction in the cost of job or employee search by means of job data banks, thus resulting to increased efficiency in the labour market. Similarly, training and educational programmes should be increased and geared towards innovations and productivity, thereby, reducing the rate of unemployment in the economy.

  (iv) It is, also recommended strongly that special attention be given to policy implementation. In this regard, the government of Zimbabwe should set up a policy implementation body or committee in the office of the president for the purpose of monitoring government policies and ensuring that they are implemented according to prescriptions.

   (v) A well thought model should be designed for the mining sector, especially in the Diamond mining. The model should clearly spell the procedures to be followed, from the extraction to the selling of the mineral, with the government taking a leading role from both the extraction and the selling, rather than leaving private industries to manage the most sought resource. This would enhance in the accountability of the mineral and the ultimate proceeds.

Zimbabwe government should, therefore, work towards growing its economy through adopting a policy mix that embraces macro-economic indicators.

References

[1] Resurreccion P, F. (2014). 'Linking unemployment to inflation and economic growth in the Philippines': Asian Journal of Economic Modelling 2(4): 156-168.

[2] Friedman, M. (1968), 'The Role of Monetary Policy', 58(1) American Economic Review.

[3] Akerlof, George A.; Dickens, William T.; Perry, George L. (2000). 'Near-Rational Wage and Price Setting and the Long-Run Phillips Curve'. Brookings Papers on Economic Activity. 2000 (1): 1–60.

[4] Zivanomoyo, J and Mukoka S. (2015). 'An empirical Analysis of the Impact of Unemployment on Economic Growth in Zimbabwe'. Society for Science and Education, United Kingdom.

[5] Phillips A, W. (1958). 'The Relation between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom 1861–1957', referring to unemployment and the 'change of money wage rates'.

[6] Oliver, H. (2010) 'US Money Demand, Monetary Overhang, and Inflation Prediction' International Network for Economic Research working paper no. 2010.4.

[7] Forder, J. (2014). 'Macroeconomics and the Phillips Curve Myth'. Oxford University Press. ISBN 978-0-19-968365-9.

[8] Balami, G. (2006). 'Innovation and Growth in Developing Countries', Journal of Development Economics, July. Growth in Developing Countries, Journal of Economic Literature, 33(3), September Growth in the Global Economy (Cambridge, Mass: MIT Press).

[9] World Bank (1998). 'World Development Indicators', Washington, D. C. The World Bank.

[10] Okafor, E. E (2011). 'Youth Unemployment and Implications for Stability of Democracy in Nigeria. JSDA, 13(1)'. http://www.jsdafrica.com/Jsda/V13No1

[11] ILO (1998). 'The new institutional economic, approach world development'. International LabourOrganisation. World Labour Report, Geneva, ILO Office.

[12] Lindbeck, 1999. Unemployment-Structural Paper. Institute of International Economics Studies: S-10691 Sweden.

[13] Abachi (1998). Unemployment and inflation in Nigeria. www.coursehero.com BahauddinZakariyauniversity.

[14] Sanda, R. (2006). Nigeria: 'Youth Unemployment, Poverty - a Time Bomb for Country'. Leadership, Wednesday, 27 August.

[15] Hargreaves-Heap S. P. (1980). 'Choosing the Wrong Natural Rate: Accelerating Inflation or Decelerating Employment and Growth', Economic Journal, 90, 611-620.