

NEXUS BETWEEN UNEMPLOYMENT AND INFLATION IN SRI LANKA

A.L.MohamedAslam

Sri Lanka Planning Service

Ministry of Public Administration and Management

Sri Lanka

mohamedaslamalm@gmail.com

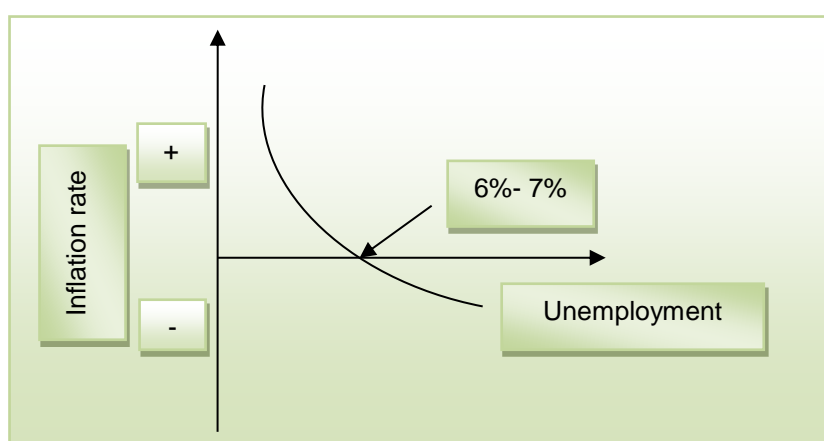
ABSTRACT: Phillips in his study confirmed that there was inverse relationship between inflation and unemployment rates but in Sri Lankan context, this relationship was not statistically proofed which is the gap of this study. The objective of this study was to test the nexus between the unemployment and the inflation rates. To test this objective, the annual time series data from 1959 to 2015 were considered and the multiple regressions model by OLS estimators were employed to test the nexus between the inflation and unemployment rates. In this study, the inflation rate was considered as dependent variable and the unemployment rate was employed as key independent variable. Furthermore, the interest rate and money supply in this study were used as controlled variables. Based on the multiple regression results, this study confirmed that the Phillips concept of the relationship between the inflation and the unemployment rates. It means that there was inverse relationship among the unemployment and the inflation rates in Sri Lanka during the sample periods.

Keywords: Inflation Rate, Interest Rate, Unemployment, Money Supply and Phillips Curve.

INTRODUCTION

In macroeconomics aspect, unemployment and Inflation are very sensitive factors in countries' economies (Alisa, 2015). Unemployment means that a person who is actively searching for employment is unable to find work. The most frequently measure of unemployment is the unemployment rate which is the number of unemployment people divided by the number of people in the labour force (Derek, 2009). Inflation means the percentage changes in the value of the whole price index on a year – on year basis.

Figure – 1: Short run Phillips curve



(Source: Macroeconomics: theory and policy by H.L. Ahuja)

It measures the change in the price of a basket of goods and services in a year (Lipsey, 1960). Historically, the connection between the unemployment and inflation rates soundly was conducted by London school of economics professor A. W. Phillips in 1958. In his

study, he concluded that in short run period they (the unemployment and inflation rates) maintain the inverse relationship. This relationship is publicized as follows diagram.

In the figure -1, the vertical line shows rate of inflation and horizontal line demonstrates the unemployment rate which visualizes the inverse relationship among the unemployment and inflation rates. Further, this figure explains that a country might accept from 6% to 7% rate of unemployment. If this percentage exceeds, the unemployment issues will be arisen in countries.

In Sri Lanka, the connection between the unemployment and the inflation rates econometrically was not studied. Therefore, it is time to conduct the relationship between the unemployment and the inflation rates in Sri Lankan context. For this purpose, this study is separated the following sub sections: introduction, objective, review of literatures, research methods, results and conclusion.

OBJECTIVE

The main objective of this study is to test the nexus between unemployment and inflation rates in Sri Lanka. Furthermore, this study has following sub – objectives:

- To explore the trend of the inflation and the unemployment rates in Sri Lanka
- To test the correlation between the unemployment and inflation rates in Sri Lanka during the sample periods.

REVIEW OF LITERATURES

Empirically number of studies had been conducted regarding the relationship between the inflation and the unemployment rates. However, in this study the following selected studies are considered as the literatures.

Umair and Ullah (2103) studied the impact of GDP and Inflation on Unemployment rate in Pakistan. In this study, the time series data from the years of 2000 to 2010 were employed and the multiple regressions model was considered to test the objective. Based on the regression outcome, the unemployment positively impacted on the inflation of Pakistan. In this circumstance, Okafor et.al (2016) explored the Responsiveness of Unemployment to Inflation using Nigerian time series data from 1989 to 2014. In this study, the error correction model and Johansen cointegration technique were used to test the responsiveness of unemployment on the inflation rate. Finally, this study found that there was the negative relationship between unemployment and inflation rates. In the meantime, Dapontas(2016) studied the relationship between unemployment and inflations rates using time series data of East African countries from1990 to 2015. To test this relationship the Ordinary Least Square (OLS) method was used. At last, this study explored that the positive relationship between the unemployment and inflation rates. Fei and Qianyi (2013) studied the correlation between the unemployment and inflation rate. In this study they used the time series data from 1978 to 2011 and found that there was an inverse relation between the unemployment and inflation rates.

But in Sri Lankan context, the relationship between the inflation and unemployment rates was not clearly studied. Therefore, presently it is formulating a research gap regarding this

relationship. So, this study thinks, it is a suitable time to fulfill this gap using the following research method.

RESEARCH METHODS

This section clearly describes the research methods of this study which includes the variables and data collection, regression technique and its' confirmation features.

In this study inflation rate, interest rate, unemployment rate and money supply were considered as variables. Meanwhile, the inflation rate was employed as dependent variable and the unemployment rate was used as key independent variable and other variables: the interest rate and the money supply were considered as controlled variables. Furthermore, the annual time series data during the periods of 1959 to 2015 were considered, which were gathered from statistical reports of the Central Bank of Sri Lanka. In the meantime, to test the stationarity of the variables (unit root), the Augmented Dickey Fuller test was employed.

As mentioned in the literatures, most of the studies used the multiple regression techniques to test the connection between the unemployment and the inflation rates with support of Cobb- Douglas production function. This study also used the Cobb - Douglas production function with natural logarithm format. The following mathematical functional form and regression equations completely show the linkage between the dependent and independent variables.

$$INF = f(IR, UR, MS) \dots \dots \dots (1)$$

Mathematical functional form (1) shows the connection between the dependent and independents variables.

$$INF_t = \beta_1 IR_t^{\beta_2} UR_t^{\beta_3} MS_t^{\beta_4} \dots \dots \dots (2)$$

The mathematical functional form (1) is written as Cobb – Douglas format which sows in the equation (2):

$$\log(INF_t) = \beta_1 + \beta_2 \log(IR_t) + \beta_3 \log(UR_t) + \beta_4 \log(MS_t) + u_t \dots \dots \dots (3)$$

When the Cobb – Douglas format (2) is transformed as logarithm equation, which shows in the above equation (3)

Where: *INF*: Inflation rate in the period t, *IR*: the percentage of interest rate in the period t, *UR*: Unemployment rate in the period t, *MS*: Money supply in the period in t

In addition, to test the serial correlation effect of the fitted model, the Brush Good fry Serial Correlation LM test was applied and to test the stability of the fitted model the CUSUM plots had been employed. Furthermore, to see the trend of the variables, XY diagram was considered.

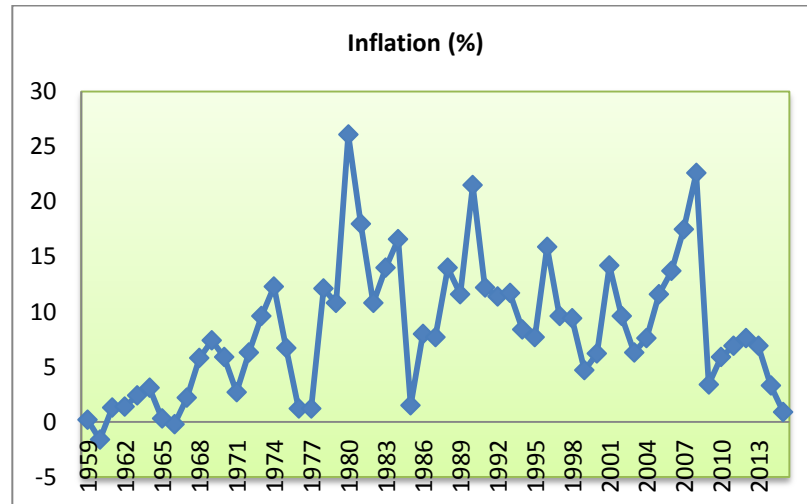
RESULTS AND DISCUSSION

In this study, this section confers the following items such as the trend of variables with time, the relationship between the key independent variable and dependent variable using XY diagram, regression results and validity of the fitted model.

Trends of variables

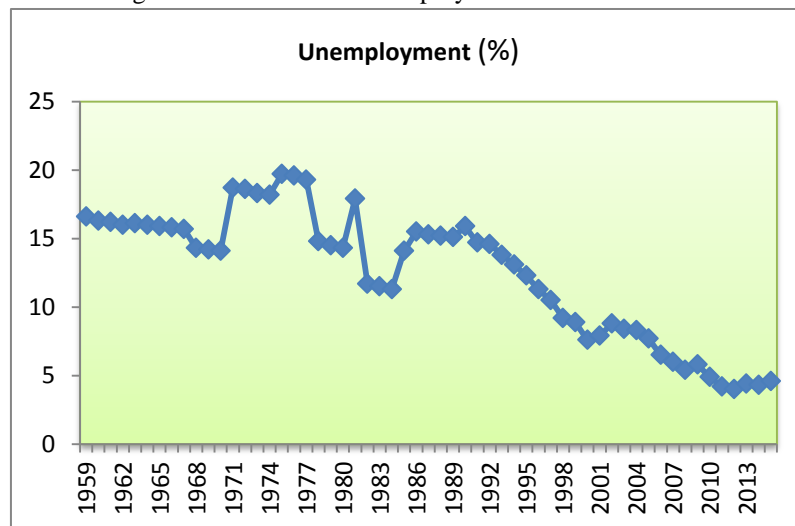
In this study, the following diagrams show the trend of both inflation and unemployment rates. In figure -1, the inflation rate is shown, in the figure -2, the unemployment rate is illustrated. In the figure – 3 it shows the relationship between the inflation and unemployment rates by the XY diagram.

Figure -1: The trend of inflation rate in Sri Lanka



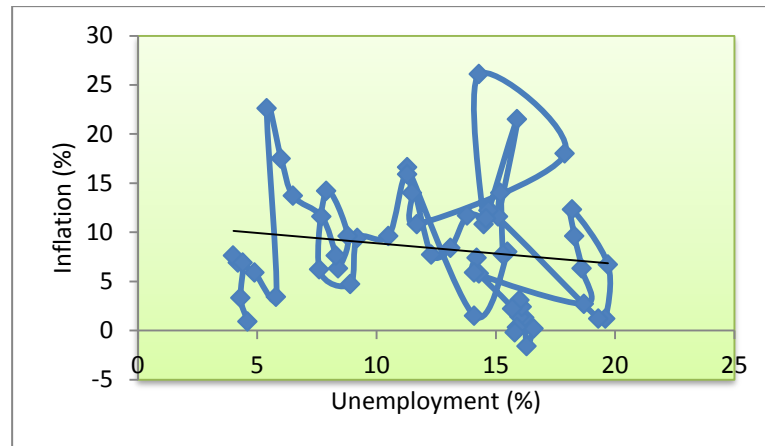
(Source: Diagrammed from secondary date: 1959 – 2015)

Figure -2: The trend of unemployment rate in Sri Lanka



(Source: Diagram from secondary date: 1959 – 2015)

Figure -1: The relationship between unemployment and inflation rates in Sri Lanka



(Source: Diagram from secondary date: 1959 – 2015)

Based on the above figures, the inflation rate keeps the fluctuation relationship with time (see figure -1). In the meantime, the unemployment rate continuously maintains the inverse relationship with the time (see figure – 2). Likewise the unemployment and inflation rates maintain the negative correlation which shows XY diagram (see figure – 3).

Results of egression:

To test the main objective in this study, the multiple regression function is considered. For this purpose, this study has to be confirmed the stationarity of the variables. Therefore, to confirm the stationarity of the variables of this study, the Augmented Dickey Fuller (ADF) test is employed at 5% significant level using the intercept equation which shows in the following table.

Table -1: Unit root test results of variables

Variables	Level form		1 st difference form	
	Test statistics	Critical value	Test statistics	Critical value
Inflation rate	-4.0264	-2.9145	-9.6852	-2.9155
Interest rate	-1.5705	-2.9155	-10.409	-2.9155
Unemployment rate	-0.7148	-2.9145	-8.2088	-2.9155
Money supply	3.8824	-3.5063	4.32793	-2.9266

Source: Estimated by secondary data from (1959 – 2015)

In the table – 1 it shows the unit root results / stationarity results of the variables of this study. In which, it delivers that all the variables are stationary at 1st difference form. Because the absolute values of test statistics of the variables are greater than critical values of the variables. In the meantime, the inflation rate and the money supply are stationary at both level and 1st difference forms. But, in this study stationarity positions of them consider at 1st difference form.

After testing the stationarity of the variables in this study, the independents variables are regressed on the dependent variable. The following table shows the regression results among those the variables.

Table- 2: Output of the regressions

Variables	Coefficients	p- values	t- statistics
Constant	0.56	0.8334	0.211
Interest rate	2.29	0.6451	4.244
Unemployment rate	- 0.29	0.0001*	-0.463
Money supply	0.31	0.1079	1.636
$\log(INF_t) = 0.56 + 2.29 \log (IR_t) - 0.29 \log(UR_t) + 0.31\log(MS_t)$			
$R^2 = 0.54$			

(Source: Estimated by secondary data from 1959 – 2015)

* Significant at 1% level

In the table -2, there are three independent variables such as interest rate, unemployment rate and money supply. In these variables, the key independent variable is unemployment, which significantly impacts on the dependent variable and others are not significant (see table -2). According to the table -2, when others (interest rate and money supply) are constant, the coefficient of unemployment rate (- 0.29) says that, if the unemployment rate increases by one percent the inflation rate is expected to decrease by 0.29 percent and on the other hand if the unemployment rate decreases by one percent the inflation rate is expected to increase by 0.29 percent.

To test the serial correlation effect of the fitted model, the Brush Good fry Serial Correlation LM test is applied. The following table shows the serial correlation effect of the fitted model.

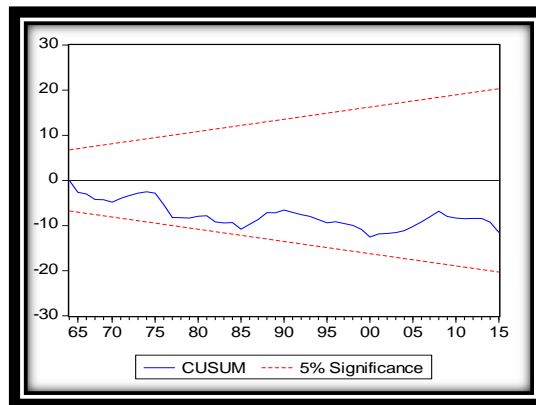
Table – 3: the results of serial correlation LM test

F- statistics	1.91269	Probability	0.15854
Observed R ²	3.98286	Probability	0.13649

(Source: Estimated by secondary data from 1959 – 2015)

In the table -3, the corresponding probability values of the F- statistics and observed R² are greater than at 5% significant level. Therefore, the fitted model is not suffering from the serial correlation which means that there is no correlation among the disturbances / error terms. After testing the serial correlation of the fitted model, this study tests the stability of the fitted model using the CUSUM plot technique. The CUSUM plot shows as follows:

Figure – 4: The CUSUM plot of the fitted model



In the figure -4, the CUSUM line is situated between the grid lines at 5% significant level. The guide line of the CUSUM technique says that, if the CUSUM line of the fitted model is situated between the grid lines, the fitted model is stable otherwise not. According to the figure - 4, the CUSUM line situates among the grid line. Therefore, the fitted model in this study is stable and this study may use this fitted model for interpreting the variables in future.

CONCLUSION

In this study, the main objective was to test the nexus between unemployment and inflation rates in Sri Lanka. To test this objective, this study used the following variables: inflation rate, interest rate, unemployment rate, and money supply. These variables were tested using the multiple regressions model. Furthermore, to test the serial correlation effect of the fitted model, the Brush Good fry Serial Correlation LM test was applied and the CUSUM plot was used to test the stability of the fitted model. Based on the regression outcomes, it was confirmed that there was short run Phillips' concept in Sri Lanka too. Finally, this study recommends that the development policy makers in Sri Lanka have to consider the Phillips concept when they design the development policy to uplift the Sri Lankan economy.

REFERENCES

- Ahuja, H.L. (2002). *Macroeconomics: Theory and Policy*, S.Chand & Company LTD, New Delhi.
- Alisa, M (2015). The Relationship between Inflation and Unemployment: A Theoretical Discussion about the Philips Curve, *Journal of International Business and Economics*, 3(2). pp. 89-97.
- Derek S. (2009). An examination of U.S. Phillips curve nonlinearity and its relationship to the business cycle. *Economics Bulletin*, 29(2), pp.736-748
- Dapontas, D. (2016). Explaining Unemployment in Eastern African Community using Robust Least Squares, *International Journal of Emerging Research in Management &Technology*, 5(6) pp 117-121.
- Fei, Q and Qianyi, W. (2013) The Research on Inflation Rate And Unemployment Rate In China, *Proceeding of the International Conference on Social Science Research* pp 202 – 220.

Lipsey R.G. (1960). The Relationship between Unemployment and the Rate of Change of Money Wage Rates in the U. K. 1862-1957: A Further Analysis, *Economica*, 27 pp. 1-31.

Okafor, G., Chijindu, E.H. and Ugochukwu, U.S (2016). Responsiveness of Unemployment to Inflation: Empirical Evidence from Nigeria, *IJSRST*, 4(2) pp.173-179

Phillips, A. W. (1958). The Relationship between Unemployment and the Rate of Change of Money Wages in the United Kingdom 1861-1957, *Economica*, 25(100) pp. 283–299.

Umair, M and Ullah, R. (2013), impact of GDP and inflation on Unemployment Rate, *International Review of Management and Business Research* 2(2). pp. 388 - 400.