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INFLATION AND UNEMPLOYMENT RELATIONSHIP WITHIN PHILLIPS CURVE IN TUNISIA

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ABSTRACT: The current paper threats the relationship between inflation and unemployment in Tunisia in the context of the Phillips curve. To demonstrate this relationship we need the cointegration test using annual data from 1991 to 2019. Our variables are inflation and unemployment which is figuring by his gap taken by the Hodrick and Prescott filter with λ=100. In the case of Tunisia, variables are stationary at level meaning that the cointegration test is unavailable. That's why we can run for a VAR model to evaluate the relationship between variables over time.

1. INTRODUCTION

The relationship between inflation and unemployment had been widely discussed and examined for many years. This approach started in 1958 with A.W.Phillips on his paper:" The Relation between unemployment and the rate of change of money wage rate in the united kingdom, 1861-1957" (Nitzan and Jonathan; 1990).

The empirical study was formed by a reasonably smooth curve which is known as the "Phillips curve". The Phillips curve is an inverse relationship between inflation rates and unemployment. Various theories have been put forward to explaining the continuity of inflation and unemployment all over the world (BIS; 1997).

In developing countries like Tunisia, the subject of inflation and unemployment has been the central issue in most of macroeconomics studies and especially when these two countries are strongly concerned by the famous Arab spring.

In fact, the sources of inflation are various like monetary fluids, cost wages, importation, interest rate also inefficient economic structure, etc...

In otherwise, Unemployment in developing counties can be caused by:

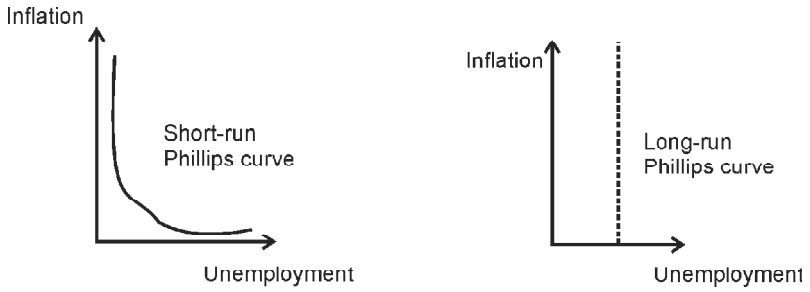
- Lack of the stock of physical capital in which the working force grows up faster than the stock of capital of a country.
- Use of capital intensive techniques.
- Inequitable distribution of land.
- Rigid protective labor registration which excessively protective labor legislation induces private entrepreneurs to prefer the maximum use of capital in places of labor.
- Lack of infrastructures such as roads, power, telecommunications, and highways presents a great obstacle for generation of opportunities for productive employment[1].

2. BRIEF OVERVIEW OF INFLATION AND UNEMPLOYMENT'S THEORIES

The relationship between inflation and unemployment rates is inverse. As the level of unemployment decreases, inflation increases. Phillips in 1958 published the inverse correlation between wages and unemployment. In 1960, Paul Samuelson and Robert Solow mentioned that the Phillips curve predicted rates of inflation and rates of unemployment.

In fact, the relationship between inflation and unemployment is not linear. In the short term, the Phillips curve traces an L – shape. However, the long-run Phillips curve is a vertical line at the natural rate of unemployment (NAIRU) and this means that inflation and unemployment are unrelated in the long run (Figure 1):

Figure 1: short-run and long-run Phillips Curve



Note: the picture is treating by the author

According to economists, there cannot be a tradeoff between inflation and unemployment in the long run but only in the short run. In the long-run inflation and unemployment are unrelated (Mankiw; 2011).

Moreover, according to the NAIRU theory [hypothesis developed by Milton Friedman and Edmund Phelps], expansionary economic policies will create only temporary decreases in unemployment and the economy will adjust to the natural rate (Dobrescu *et al.*; 2011).

In brief:

- When unemployment is below NAIRU ⇒ inflation will accelerate.
- When unemployment is above the NAIRU ⇒ inflation will decelerate.
- When the unemployment rate is equal to NAIRU ⇒ inflation is stable.

3. THEORETICAL MODEL

The "natural rate of structural unemployment" is an economic concept developed in the 1960s by Friedman (1968) and Phelps (1967). The aim of this mode is to argue the existence of the natural unemployment rate when the labor market is equilibrated and the rate of inflation is stable (Coleman; 2013).

In fact, the theory of the natural unemployment rate (NAIRU) has distinguished between the short and the long-run Phillips curve. Indeed, the short-term Phillips curve is figured in L-shape and it can change in the long run when the expectations change. But, in the long run, the NAIRU is compatible with the inflation rate (Fitzenberg *et al.;* 2007).

According to NAIRU's theory and Lucas's approach, the function of the short-term Phillips curve can be written as follows:

$$Y = Y^* + \alpha\,(P\text{-}P^*) \qquad (1)$$

With:

Y is the logarithmic value of current production.

Y* is the logarithmic value of average production.

α is a positive constant.

P is the logarithmic value of the current price.

P* is the logarithmic value of the estimated price.

The price equation then becomes:

$$P = (Y - Y^*) / a + P^* \quad \textbf{(1-1)}$$

With the addition of an exogenous shock (World Supply), the price in the equation must be increased and it is written as follows:

$$P = (Y - Y^*) / a + P^* + WS \quad (1\text{-}2)$$

To establish the rate of inflation, it is necessary to minimize the price at t-1 of the price at t in the other word the rate of inflation (INF) is equal to $P - P(-1)$ and the estimated rate of inflation (INF*) is equal to $P^* - P^*(-1)$

Okun's law provided that there is a negative relationship between production and unemployment shown in the next equation:

$$(Y - Y^*) / a = -\beta\ (\text{Un-Un}^*) \quad (1\text{-}3)$$

Where:

Un is the unemployment rate

Un* is the natural unemployment rate

β is a constant >0.

After solving equation we get:

$$INF = INF^* - \beta\ (Un - Un^*) + WS \quad (2)$$

This equation presents the short-term Phillips curve and it shows the negative relationship between inflation and unemployment meaning when inflation increases (decreases), unemployment decreases (increases).

Replacing the Un_t^* with $NAIRU_t$, the equation becomes:

$$INF_t = \alpha\ (L)\ INF_{t-1} - \beta\ (L)\ (Un_t - NAIRU_t) + \xi_t \quad (2\text{-}1)$$

Where α (L) and β (L) are two polynomials of the delay operations.

Here we can also write the Equation (2-1) as:

$$\text{INF}_t = \alpha\ (\text{L})\ \text{INF}_{t-1} - \beta\ (\text{L})\ (\text{UnGAP}_t) + \xi_t \quad (2\text{-}2)$$

With $\text{UnGAP}_t = \text{Un}_t - \text{NAIRU}_t$

4. DATA SOURCES AND METHODOLOGICAL FRAMEWORK

The current paper investigates the impact of unemployment on inflation in the case of Tunisia within the Phillips curve using:

- Time-series unit root tests.
- VAR model

All data used are taken from the WDI over the period 1991-2019. The preliminary step in the current paper is to define the degree of integration of each variable. In order to detect unit roots in the level and in the first difference of each variable, we use the ADF test.

5. EMPIRICAL RESULTS AND INTERPRETATION

In the first time, we must run for stationary test to verify that variables are stationary and haven't got a unit root.

Table 1: Stationary test

Variables	*P-value*	*Integrated*
Inflation	0.0476	At level
Ungap	0.0113	At level

Note: Test resulted by E-views 8

The P-value for both variables is below 5% at level meaning that inflation and Ungap have not unit root and they are stationary. Here, the cointegration test is unavailable because there is no cointegration. For this reason, we can run to the VAR model specifically unrestricted VAR.

Table 2: VAR model

Variables lagged		*inflation*	*ungap*
Inflation (-1)	Coefficient	0.686	-0.013
	t-stat	3.419	-0.063
Inflation (-2)	Coefficient	-0.019	0.004
	t-stat	-0.102	0.023
Ungap(-1)	Coefficient	0.184	0.370
	t-stat	0.887	1.742
Ungap(-2)	Coefficient	-0.374	-0.131
	t-stat	-1.805	-0.622
Constant	Coefficient	1.284	-0.148
	t-stat	1.757	-0.199

Note: Test resulted by E-views 8

In this present model, we have got 10 coefficients. These 10 coefficients are significant when the P<5%. To study the efficiency and the signification of variables we must estimate the P-value.

Table 3: P-value estimating

Coefficient	*P-value*
C(1)	0.001
C(2)	0.918
C(3)	0.379
C(4)	0.077
C(5)	0.0857
C(6)	0.949
C(7)	0.981
C(8)	0.081
C(9)	0.536
C(10)	0.842

Note: Test resulted by E-views 8

These coefficients are corresponding to 2 equations giving the VAR model.

Equation 1 Inflation=C(1)*inflation(-1)+C(2)*inflation(-2)+C(3)*ungap(-1) + C(4)*ungap(-2)+ C(5)

Equation 2 ungap=C(6)*inflation(-1)+C(7)*inflation(-2)+C(8)*ungap(-1) +C(9)*ungap(-2)+ C(10)

The result of the P-value mentioned that only C(1)is significant at 5% and all the rest coefficients meaning C(2), C(3), C(4), C(5), C(6), C(6), C(8), C(9) and C(10) are insignificant at 5%. This means that only the past of inflation for one-period influence inflation and the Ungap has not an effect on inflation at 5% but it can have an influence at 10% where C(4), C(5) and C(8) are significant. In other words, Ungap lagged two-period can affect inflation when P=10%. Even though, we can test if the Ungap(-1) and Ungap(-2) can influence inflation jointly by running for the Wald coefficient test which the null hypothesis is C(3)=C(4)=0 meaning that import lag 1 and import lag2 cannot influence jointly inflation rather the alternative hypothesis which C(3)=C(4)≠0.

Table 4: Wald coefficient test

T-stat	*Prob*
Chi-square	0.186

Note: Test resulted by E-views 8

We remark that the probability is more than 5% even 10% and in this case, we cannot reject H0 rather we accept it meaning C(3) = C(4) = 0. In other ways, the Ungap (-1) and Ungap (-2) cannot influence inflation.

6. CONCLUSION

To sum up, the present empirical results improve that the Phillips curve doesn't exist in Tunisia and there is no relationship between inflation and unemployment in the short run in this economy. These results can be referred to as the incoherence and the instability of the economy's country today.

In fact, the theory of Phillips seemed stable and predictable but it was unstable and not usable for policy purposes such as fiscal and monetary policy. These two policies could be used to archive full employment at the cost of higher price levels or lower inflation at the cost of lowered unemployment.

As a solution, we can recipe reducing corruption, improving investment and applying for the policy mix which can be a solution to coordinate economy policies and make it stronger and favors the recovery and avoids economic growth.

NOTE

1. Web site : *http://www.yourarticlelibrary.com/unemployment/the-nature-and-causes-of-unemployment-in-developing-countries/37830 visited on 05/04/20*

REFERENCES

Bank for International Settlements (BIS, 1997). "Monetary Policy and the Inflation Process"; conference papers vol. 4.

Coleman, Th.S (2013). "The natural rate of unemployment".

Dobrescu, M; Paicu, C.; Iacob, S. (2011). "Theorical and Applied Economics : N°2", pp. 181-194.

Fitzenberg, Bernd, Franz, Wolfgang, Bode, Olivier (2007). "The Phillips curve and NAIRU Revised: New Estimates for Germany", ZEW Discussion Paper N° 07-2007, Mannheim.

Mankiw, G. (2011). "Trade-off between inflation and unemployment: Business and Economics: Chapiter 35" pp. 788-799.

Nitzan, Jonathan (1990). " Macroeconomic perspectives on inflation and unemployment", discussion papers departments of economics, McGill University- Canada;

Site web: *http://www.yourarticlelibrary.com/unemployment/the-nature-and-causes-of-unemployment-in-developing-countries/37830*

https://courses.lumenlearning.com/boundless-economics/chapter/the-relationship-between-inflation-and-unemployment/

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