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Modeling the Nonlinear Dynamic Relationship between Unemployment and Economic Growth – study case Arab countries

تقدير العلاقة الديناميكية غير الخطية بين البطالة والنمو الاقتصادي-حالة الدول العربية

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Abstract :

Service learning is a teaching strategy which involves learning in meaningful and contextual situations. Its focus on real-life situations has made it a crucial element in twenty-first-century skills. Service learning and other forms of experiential pedagogy have left a great impact over the last two decades within the EFL context. The literature, however, appears to be not well established beyond Teaching English to Speakers of Other Languages (TESOL). This article initially explores teachers' awareness of service-learning while teaching English as a foreign language to non-native speakers. It also describes how students' engagement aligns with and supports differentiated learning. To reach our findings, we used both qualitative and quantitative research methods. A sample of 13 teachers was set to answer our questionnaire which consists of 23items. The purpose is to elicit the participants' perceptions regarding service learning in the EFL context. The results indicate that teachers believe that service learning positively influences a student's learning in the following ways: Academic achievement 15%, critical thinking13%, sense of belongingness to the community 19%, motivation 18%, and autonomy 30%.

Keywords:Engagement, EnglishLanguage Skills, Service Learning, Teaching, University

ملخص :

تهدف هذه الدراسة إلى قياس العلاقة الدينامكية عير الخطية بين البطالة، والنمو الاقتصادي في الدول العربية ، خلال الفترة 1976 –2018، وذلك باستخدام انحدار نماذج الانتقال في النظم الماركوفية وقد أوضحت نتائج هذه الدراسة وجود علاقة عكسية بين البطالة، يمكن أن نستنتج أن كلا من سلسلتي البطالة والنمو متكاملتان من نفس الدرجة الأولى (الاستقرار بعد إجراء الفرق الأول لهما)، و ,انطلاقا من مصفوفة الانتقال فان متغير معدل البطالة يسلك سلوكا غير خطي باحتمال 89% لنظام الرواج في الفترة t ويرتفع هذا الاحتمال إلى أكثر من 91 % في الفترة t+1

الكلمات المفتاحية: الدول العربية،البطالة النمو،نماذج الانتقال في النظم الماركوفية

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Introduction :

Unemployment has become a major development problem in many Third World countries and has become a threat to the stability of many countries' balance of state in light of the increasing rates of population growth in these countries and the widening gap between production and consumption. The unemployment of people in the developing as well as those in developed countries, is undoubtedly reflected in their behavior, and the social environment is being overshadowed by the emergence of socially and socially conservative societies. Hence, the Arab world is not immune to what is happening in many countries of the world. The research problem is to analyze the dialectic existing in the relationship of between unemployment rate and other socio-economic variables including economic growth and this requires the need to address several questions. Most especially to understand the clear disparities among Arab countries in controlling the unemployment rate since the latter is affected by the state of the economy and the economic cycle. That is, is there a significant relationship between the rate of unemployment and economic growth, and to what extent can this relationship be affected by the economic cycle? This study attempts to test the hypothesis that the relationship between unemployment and growth is a nonlinear relationship, subject to Okun's lawusing a one-way causal relationship from economic growth to unemployment.

This study is important in several ways. Firstly, it is an attempt to uncover the relationship between two macroeconomic variables: unemployment rate and economic growth by analyzing the extent of change in this relationship between them in the case of prosperity and depression (that is, engaging a non-linear approach). Secondly, it contributes to the empirical literature on the standardized empirical exploration of the non-linear relationship between unemployment and economic growth in Arab countries thirdly, the study comes up with explanation which can aid policy makers to re-shape developmental goals for the different Arab countriesFourthly, the study also addresses the dimensions of the relationship between the two variables from other angles not addressed in the current literature. Lastly, the study assesses the unemployment situation in Arab countries, as a wholeon the econometric approach, the study is based on the use of the descriptive and analytical methods to explain the relationship between the two economic variables. The econometric method is applied highlighting the regression models of the changing systems, the transition models and how to adapt these models in the estimation process in explaining either a linear or nonlinear relationship between the two variables (Muler J& all,2004 ,P71) .

Study parts :

The study is divided into five parts in addition to the introduction and the conclusion. The theoretical part was presented in the first part of unemployment, the law of Okun, and the relationship of unemployment to

growth. The second part dealt with the reality of unemployment in the Arab world t he fourth part, which explains nonlinear models and threshold models between variables, included the standard study, which represents a dynamic nonlinear relationship between the two variables

Literature Review:

This section reviews some of the earlier studies of unemployment and their relation to economic growth, while focusing on studies that examine the nonlinear relationship between unemployment and economic growth. A study by (Splight & Peel , 2010, pp705-715) on nonlinear time series Unemployment rate in Germany, Britain, Japan, and America has shown that there is a linear effect of growth on unemployment except for the Japanese model, which can be estimated using ARIMA models. The rest of the countries agreed to provide the unemployment model with. STAR models. A study by (Alssimo & Violante,1994 138) , and the study of the dynamic nonlinearity of the unemployment rate in the United States, concluded that the rate of unemployment is affected by reverse recession, and the recession has a positive effect on the unemployment rate in the long term. (Phiri 2014, p 207) study on the nonlinearity of the combined integration of unemployment and growth in South Africa also found that employment was causing Granger's causality of economic growth. Another study by (Brzezinski , 2017, p116) involved 19 OCDE countries for the period 1985-2013. The data used in the analysis of the effect of the nonlinear relationship of low wages on the youth unemployment rate, in particular, found that the negative effect of the weak wage is severe and a constant incentive for groups Pressure to demand higher wages.

Study by (Bardsenall,2011, p255) spoke about the dynamic asymmetry of Australia's unemployment rate. This study concluded that some macro variables such as aggregate demand, exchange rate, and interest rate are good assets of a non-relation Unemployment. Study by (Akdogan, 2016 p20) on the deceleration, unemployment and structural changes in Europe, concluded that the global economic crisis and the European economy's slowdown is a variable scenario, which has contributed to increased unemployment in Europe. A study of nine Arab countries by (Abdul-Khaliq , and all 2012, p 68) used the data for the period from 1994 to 2010 and concluded that economic growth has an inverse impact on the unemployment rate and a growth rate of 1% declines in the unemployment rate of 16%. study by dealt with the impact of low wages on the labor market and reduced unemployment among young people. the result was that the few wages are the most important and motivating groups to work to raise wages, Spread among young people.

3. EXPERIMENTAL :

Reducing the unemployment rate, or controlling it, is the greatest challenge to development in Arab countries in the foreseeable future. The average unemployment rate in the panel of countries is estimated at 14%, the highest

among the regions of the world. The number of people unemployed in Arab countries in 2007 is estimated at 17 million. Table 1 shows the unemployment rates in the sample countries.

Table 1. Unemployment Rates in Arab Countries

Country	Unemployment rate	Country	Unemployment rate
Jordan	13	Yemen	17.8(2010)
UAE	2.3	Tunisia	15.6
Bahrain	3.7	Algeria	11
KSA	5.6	Djibouti	50
Syria	15(2011)	Sudan	18.5
Iraq	12	Somalia	24.6
Oman	10	Libya	13.5(2010)
Palestine	25	Egypt	11.9
Qatar	0.2	Morocco	9.8
Kuwait	1.7	Mauritania	10.6
Lebanon	10	All Arab countries	14

Arab countries: Figures and Indicators 2017 League of Arab States, Secretariat, Statistics Department and databases
Arab Monetary Fund, Arab Consolidated Economic Report, May 2017

From Table 1, high unemployment rates are evident in low-income countries such as Mauritania, Sudan, Yemen and Djibouti, and in unstable countries such as Iraq, Palestine and Somalia. Qatar recorded the lowest rate of unemployment (0.2%), while Djibouti recorded the highest rate of 50%. The lowest unemployment rates have been recorded in the GCC countries, and it can be said that the Gulf countries do not suffer from real unemployment problem, especially if they complete their plans to replace the expatriate labor force - Arab and non-Arab - taking into account the level of productivity and performance Skills

1.1 Causes of unemployment in Arab countries:

Unemployment is one of the factors threatening the economic stability and cohesion of Arab societies. Unemployment in the Arab region is attributable to economic, social and political reasons, triggered by internal and external causes. The causes of unemployment may differ from country to country. According to the economic structure and population structure in each country, the main causes of unemployment in the Arab countries can be summarized as follows:

A -The high rate of population growth in the Arab countries: the population increased from 218.239 million in 1990 to about 392 million in 2017, with an average annual growth rate of 2.36%.

B- Economic development plans in most Arab countries have not been successful, leading to the failure of economic development plans, the

occurrence of most Arab countries under the burden of external indebtedness, and in return the flight of Arab capital abroad.

1. Absence of effective economic planning where there is no coordination between education programs and the labor market in most Arab countries
2. Implement the policies of opening up the economy in many Arab countries and the accompanying application of the privatization programs that led in some countries to abandon large numbers of workers in companies and institutions of the public sector after their allocation. This is according to the international monetary organizations donor
3. The failure of most economic reform programs implemented by the Arab countries in cooperation with the International Monetary Fund in the event of any real economic growth
4. Inadequate distribution of local resources: Most of the Arab resources during the period of oil price boom have been spent on spending for non-productive purposes with a geographically unbalanced distribution of these resources.

2- Methodology and data :

This section attempts to model the empirical relationship between the unemployment rate and economic growth using a non-linear approach. We show how the relationship between them is determined through the economic cycle, that is, the extent of change of relationship through systems evidenced in a nonlinear regression. Standard economic studies have assumed that linearity models based on linear relationships between variables such as the widely used autoregressive moving average (ARMA) models in most standard studies, which are based on the normal lower squares method, are a model of estimation. However, the expansion of economic studies and their comprehensiveness of many motives, such as the economic cycle, positive and negative impact of explanatory variables. Oil prices affect economic growth but there is no similarity between prices in case of rise and decline (Sichel, 1999 p224). This analysis has resonated widely in the field of financial markets, economic cycles (Abdul Khaliq& all 2014 p 58)

Nonlinear models have two categories:

Category 1: Nonlinear process through variance. An example of this is the autoregressive conditional heteroskedasticity (ARCH) which depends on the volatility of the random limit, such as Autoregressive conditional heteroskedasticity (arch) , Generals arch, thresholds arch (Tarch)

Category 2: Non-linear process through the mean, an extension of ARMA models Examples:

Linear double models: developed by Granger and Andersen in 1978; Models of nonlinear moving averages: developed by (Robinson 1977); Nonlinear auto-Regression Models: They are the most versatile of nonlinear models and are also called threshold models. It can be seen in several transition mechanisms, including:

2-1 TAR models: They model the immediate and direct transition threshold, for example if we take the first-order auto-regression model AR (1):

$Y_t = Ø_0 + Ø_1 Y_{t-1} + \xi_t$

Let's say that y is symmetrical throughout the analysis period, but if the unit of q1 changes Y behavior by Ø1, the latter does not become constant and the previous equation takes one of these formulas:

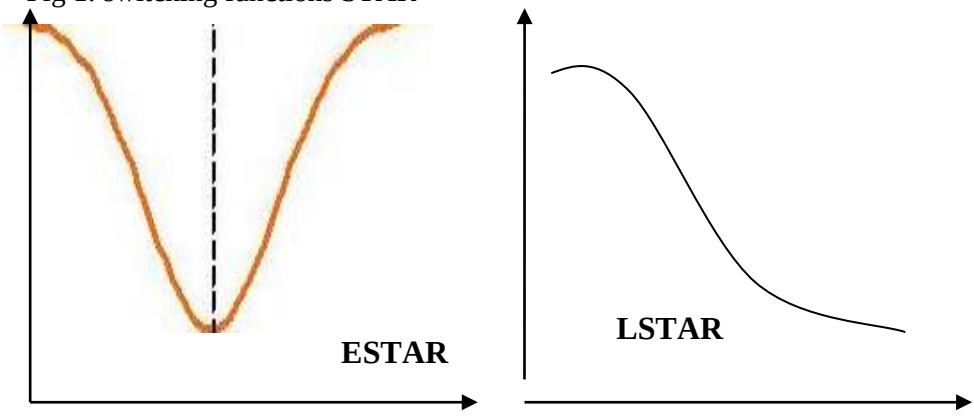
$$\begin{cases} Y = Ø_{01} + Ø_{11} Y_{t-1} + \xi_{1t} \text{ if } q_t = 1 \\ Y = Ø_{02} + Ø_{12} Y_{t-1} + \xi_{2t} \text{ if } q_t = 2 \end{cases}$$

And then called the threshold models because the variable q1 ensures that each equation behaves a certain behavior even though this equation alone is a linear basis, but the general behavior of the process Y becomes non-linear (Alssimo & Violante 1994 p. 99). Although TAR models allow for non-linear detection, it is possible to give an economic explanation through the observable variable. But it suffers from the problem that after the transition variable of the threshold does not change the coefficients of the explanatory variables of the single system, but only when the transition variable is greater or smaller than the threshold.

2-2 STAR models: They are auto regression models with a smooth or gradual transmission proposed by both (Tong 1990 p 433) and (Teräverta, 1994, p 208). The proponents of the idea of the flow of these models justify that the economy is composed of a group of agents, each of which changes his or her immediate behavior but at different times. These models are divided into two parts:

Logical STAR model, known as LSTAR and exponential STAR model, called ESTAR

Fig 1: switching functions STAR



UCtum, REMZI 2007 , p457)

2-3 Switching Regression Models:

These models, together with studies by (Goldfield and Quandt 1973 pp 3-16), differ from their predecessors in the threshold models. The explanatory variable is not observable and is frequently used in the analysis of economic cycles where separation between recovery and stagnation is also used in many data Finance affected by fiscal and monetary policy and exchange rate change. These models can be mathematically formulated in the following equation:

$$Yt= \mu^{S}_{t} + Ø^{ST} Y_{t-1} + \delta^{ST}\xi_{t}$$

S, is unobserved variable that in the state of the system to which this equation passes. The values S = 1, 2 ... are the number of possible cases and it is assumed that this variable follows the first-class Markov series (auto regression). It is characterized by the probability of change and transmission symbolized by the symbol P is positive and confined between zero and one, and take the following form: P (St = j | St-1 = i)

For example, if S = 2, the Y variable will have two systems:

$$Y = Ø_{01} + Ø_{11}Y_{t-1} + \xi_{t} \text{ if } S_t = 1$$

$$Y= Ø_{02} + Ø_{12}Y_{t-1} + \xi_{t} \text{ if } S_t = 2$$

Cases of switching from one case to another are:

P (St = 1 | St-1 = 1) = P11
P (St = 2 | St-1 = 1) = P12
P (St = 1 | St-1 = 2) = P21
P (St = 2 | St-1 = 2) = P22

Where P is the probability of moving from case i at t-1 to case j at period t, knowing that:

P11 + P12 = 1 / P21 + P 22 = 1

Based on the above, the switching matrix can be inferred:

$$\begin{bmatrix} P_{11} & 1-P_{22} \\ 1-P_{11} & P_{22} \end{bmatrix}$$

Our applied study of the relationship of unemployment to economic growth will depend on models of Markov switching systems. (P. Pastpipatkul and all 2016 p91)

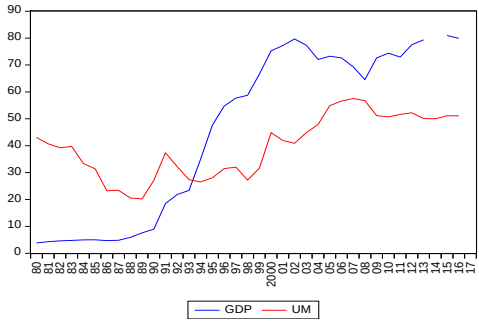
3. Data and Sources:

To illustrate the study, we examined the relationship between the two variables, the unemployment rate and gross domestic product (GDP) growth in the Arab world for a sample …22 countries and it is considered by aggregate economy from 1976 to 2016. Data is sourced from the World Bank (indicate the year), the Arab League (indicate the year), the Arab Monetary Fund (indicate the year). Analysis is carried using EViews9, OxMetrics6 and JMulTi4, taking into account that unemployment is

determined by the economic situation directly related to economic growth in Arab countries.

We can distinguish between or two systems, namely applying the estimate by means of transition models or switching regression models, End graphically represent the variables we have acquired the following

Figure 2. Unemployment and GDP growth rates



Source: Author. Using eviews 09

The direct observation of the previous two forms suggests that many of the refractions are in the path of the um and gdp curve. This can be explained by the general economic situation of many Arab countries, such as the transition between capitalist and socialist economic approaches, geopolitical changes, oil price fluctuations. This leads us to try to estimate the relationship between the two variables considered below

- There is a non-linear relationship between the two variables.
- The dependent variable unemployment is influenced by the general state of the economy (vogue, recession).

Therefore we will choose one of unit root tests taking into account the existence of structural breakouts or shifts in the course of each series.

4- Unit Root with Structural Breaks:

Since the relationship between the variables um and gdp is nonlinear, we conducted the stability tests for that relationship, and test the hypothesis of the extent of refraction or inflection point in the path of the series unemployment rate and GDP series, and there are many tests of stability in case of non-linear variables (Perron 1989) (Zivot-Andrews 1992) and others using (JMulTi 04). The results shown in Table 2.

Table(2). Unit Root Test Results

Critical value		T stat (1st dif)	Break date	Number of legs	variable
-3.55	%1	-5.35	1987	2	UM
-3.03	5%				
-2.76	10%				
-3.48	1%	-7.56	1991	3	GDP
-2.88	5%				
-2.58	%10				

Source: AuthorUsing JMulTi 04

From the previous table we note that the test statistic is less than the critical value of the distribution of the student at all levels of morale, and therefore accept the null hypothesis of the existence of root units with the inflection point in 1987, thus the time series are unstable at their levels, for both unemployment and GDP. We can judge the stability of the first team in the same way, and this to match the results, and through the results of testing of the unit root structural break, we make sure that the two series are complementary co integrated

5- Modeling Markov switching Regression :

We will estimate the relationship between the two variables unemployment and growth in this approach based on the realization of the hypothesis and not the linear relationship between them, according to two systems as mentioned above represents the boom, as the parameters of this system are estimated and the probability of transition from it, according to the matrix of probability, and the second represents the system of depression, Dealing with the same approach, after estimating the relationship in a regression model of changing systems, or switching models. Results are shown in Table 3.

Table 3. Results of Regression

Coefficient	value	Std error	t-value	Prob
Gdp	-0.526308	0.07723	-4.49	0.000
Constant(0)	-1.14694	33.37	-0.231	0.021
Constant(1)	8.08647	3.013	2.67	0.008
Sigma	57.4966	2.108	11.4	0.000
p{0l0}	0.890015	0.4267	7.99	0.000
p{0l1}	0. 0834364	0.006224	1.29	0.000
Aic T	4080.19053	AIC	10.9682541	
Mean(um)	7.76075	Var(um)	3719.78	
Linearity LR test x^2(3)	110.55			0.000

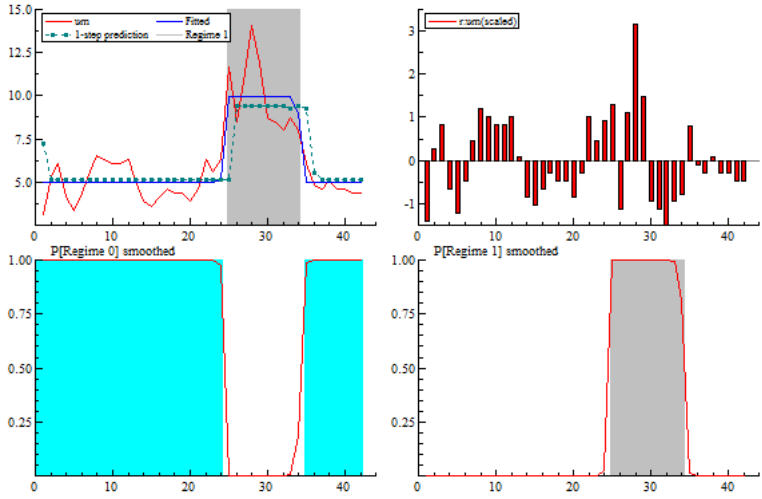
Source Author: Using OxMetrics6

The first thing that can be seen from Table 3 is the value of GDP with a negative sign (0.52) indicating the inverse relationship between the two variables. This corresponds to the economic theory. It reflects the unemployment law of Okun. Each increase in growth is 1% followed by a

decrease in the unemployment rate by 0.52%. Another conclusion is that the relationship between the two variables is not linearized by the LR test and its value is statistically significant in the distribution of x^2 the statistical significance of the probability of 0%, thus rejecting the null hypothesis of the relationship between the two variables and accepting the alternative hypothesis of non-linearity.

As for the transition matrix, it can be written as follows: The probability of the existence of the first system is 89%, which means that the relationship of unemployment to growth in most cases is determined according to this system with a probability of 91.66% in the coming period ie t + 1 for the system of always (stay in the same system) The probability of moving to the opposite system is the regression system that determines the relation between the two variables is 10.99% in period t with a probability of moving to t + 1 period of 8.34%. The different transitions in the relationship between the two variables can be represented in Figure 2.

Figure 2. Probability of Switching



Using ox metrics 06

In this figure we see that there are two shifts in the system. The blue color in the bottom left is the state of the depression system that prevailed in many Arab countries before their comprehensive development, which is mainly associated with agriculture, tourism and internal resources (especially hydrocarbons). In the first time (until the medium of 1990). It can be explained by the situation until the mid-1990s, then the boom system associated with higher oil prices for some countries, the boom in tourism and services for others, years 2010 and beyond, when the unemployment rate increased in the majority of Arab countries for several reasons, most notably

affected the economies of Arab countries fall in oil prices, and some political events.

CONCLUSION :

The nonlinear relationship between unemployment and GDP variables was estimated. The relationship was opposite. This corresponds to the economic theory and the Okun's law, because each increase from 100% growth is offset by a 52% reduction in the unemployment rate on all data available and the sample studied. On the basis of the transition matrix, the um variable exhibits a non-linear behavior with a probability of 89% for the propagation system in period t and increases this probability to more than 91% in t + 1. With regard to the standard approach of the unemployment variable and its standard relation to the growth variable in an economic situation ranging from boom and bust, we recorded the following results:

(1) nonlinear models are relatively modern models within the series of standard models, suitable for the estimation of many of the economic phenomena characterized by instability and non-silence
(2) , transformation models or system models (λ models) are a nonlinear model when the effect of the dependent variable is unobserved,
(3) the estimation process was based on annual data from 1976to 2018, that
(4) unemployment and GDP series in Arab countries are characterized by non-linearity, with several fractions recorded in their path
(5) the basic hypothesis (zero) stability of the first difference of the variables, with the presence of refractions and this according to the unit root test of the turning points designed in the software JMulTi,
(6) as a result of the same test we can conclude that both the um and gdp series are complementary to the first class self (stability after the first difference).

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