

Estimating the impact of Economic Growth on Unemployment in Emerging Economies: Turkey as A model

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Abstract

The current study aimed to measure and analyze the impact of economic growth on unemployment in a comparative context between Egypt and Turkey during the period (1990-2018). And after showing the stability of the study variables and the validity of using the ARDL model.

Key words: Growth, Unemployment, Okun's law Emerging Economies, Turkey.

Introduction:

Economic growth and unemployment are two of the major macroeconomic factors and vital components of any flourishing economy's strategic economic and monetary strategies. One of the most pressing macroeconomic concerns confronting industrialized, developing, and impoverished countries today is increasing economic growth and lowering unemployment. Every powerful country's strength is judged by its economic growth, and unemployment is an unavoidable macroeconomic indicator that reveals the country's ability to fully utilize its labor resources¹.

¹ Hobijn, M. D. (2010). Okun's Law and the Unemployment Surprise of 2009. FRBSF Economic Letter, 1-4.

The overall goal of the study is to quantify and analyse the influence of economic growth on unemployment in Turkey. More than that, the study aims to do the following:

- 1- An examination of Turkey's economic development and unemployment trends.
- 2- An investigation into the long-term co-integration of unemployment and economic growth in Turkey.

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The significance of the research: The Middle East is still suffering as a result of the unstable economic and political environment, and while it no longer faces complex and intertwined development challenges, its peoples, more than ever, are looking for a new generation of economists and development practitioners with knowledge training to provide an accurate understanding of economic development issues and to suggest effective solutions. Essentially, the study will help governments and other stakeholders improve their political decision-making processes regarding citizens' living standards in Turkey. It will also assist in determining the type of link that exists between economic growth and the unemployment rate in the short and long term, as well as its particular influence on Turkey's economy.

Hypotheses to be tested: The following hypotheses will be tested in this study: In Turkey, there is no long-term equilibrium relationship between the rate of economic growth and the rate of unemployment. Study Methodology: The study uses the usual approach of the ARDL model to test its hypotheses and attain its objectives. Data on Turkey's economic growth and unemployment characteristics were gathered via the World Bank database. Initially, Arthur Okun (1962) proposed a discrepancy between economic growth and unemployment rate, which was expressed as a linear regression model. As a result, the equation symbol is:

$Un_t = \beta_0 + \beta_1 Y_t + \epsilon_t$ Parameters

Un_t : "unemployment rate".

Y_t : Economic growth rate .

ϵ_t : a random effect.

Sections:

- 1- Literature review
- 2- Measuring the impact of economic growth in Turkey
- 3- Results

1- Literature review:

Economic growth is considered one of the most used tools in reducing poverty, reducing unemployment, as well as improving the quality of life. Adam Smith described economic growth as not accumulation of gold but rather of trade activities, where the parties in the exchange of goods are satisfied with his interest, and this market is generally regulated without any restrictions leading to a natural equilibrium. The Gross Domestic Product (GDP) is one of the important elements in calculating economic progress with other elements such as employment rates, public spending, inflation, domestic and foreign investment and the balance of trade, which in one way or another have its own contribution to the economic growth of developed, developing and underdeveloped countries².

Unemployment is one of the most important variables to consider when analyzing the micro and macro dynamics of most economies and formulating strategic strategies to stabilize economies in order to promote economic growth and development. The unemployment rate is also one of the most essential macroeconomic indicators for formulating and implementing economic policies, as well as assessing their efficacy. According to Ramzi Zaki, unemployment is defined as "anyone who is able and ready to work, who looks for it and accepts it at the prevailing salary level, but to no success"³.

² Jhingan, M. L. (2003). *Advanced Macroeconomics Theory* (11th Ed.). Delhi: Vrinda Publication Ltd.

³ Ramzy Zaki. *The political economy of unemployment: an analysis of the most serious problems of contemporary capitalism.. The Arab future. Mg. 21, p. 231 (May 1998).*

Unemployment is regarded as one of the most serious problems that any human community can face, since it has ramifications in multiple dimensions and orientations (Al Habees & Rumman, 2012)⁴. According to Akutson, Messiah, and Dalhatu (2018)⁵, unemployment is a major problem in most developed and emerging countries, resulting in economic and social problems. Unemployment is one of the most pressing issues confronting many economic systems, and its impact on living standards, productivity, and social cohesion is well known. Source: World Bank, 2012)⁶.

Economic issues associated with unemployment include depriving governments of tax money through income tax, waste of production hours, and other means, while social issues associated with unemployment include depression, a lack of self-respect, and other vices such as theft and prostitution⁷.

There are numerous studies in the economic literature that examine the relationship between unemployment and economic growth.

The research undertaken by the so-called Okun's Law (1962), which has served as the foundation for studies of this economic phenomenon for decades, is one of the most well-known.

⁴ Al-Habees, M. A., & Rumman, M. A. (2012). The Relationship Between Unemployment and Economic Growth in Jordan and Some Arab Countries. *World Applied Sciences Journal*, 673-680.

⁵ Seth, A., John, M. A., & Dalhatu, A. Y. (2018). The Impact of Unemployment on Economic Growth in Nigeria: An Application of Autoregressive Distributed Lag (ARDL) Bound Testing. *Sumerianz Journal of Business Management and Marketing*, 37-46.

⁶ Banda, H., Ngirande, H., & Hogwe, F. (2016). The impact of economic growth on unemployment in South Africa: 1994-2012. *Investment Management and Financial Innovations*, 246-255.

⁷ Karikari-Apau, Ellen and Abeti, Wilson, (2019), The Impact of Unemployment on Economic Growth in China, Munich Personal RePEc Archive, MPRA Paper No. 96228, posted 08 Oct.

Output and employment are linked, and according to Okun's Law (1962)⁸, if the unemployment rate decreases to 1%, output will grow by 3%. As a result, the economy must continue to expand in order to minimise job losses. Okun's law has a crucial implication: actual GDP must rise faster than prospective GDP.

Arthur Okun discovered in 1962 that unemployment in the United States tends to reduce by 1 percentage point for every 3 percentage point increase in GNP (production); later observers dubbed this empirical regularity "Okun's Law" of 1 - hence, the United States had an Okun coefficient. To put it another way, unemployment rates in most developed countries tend to fluctuate with GDP. Product volatility (GDP) in comparison to volatility in the US. The usual explanation for this is that the US, Canada and the UK have less regulated labor markets in which companies can easily lay off people during a slowdown. Most countries have a combination of strong implicit social protections (eg Japan), stronger unions, or greater formal restrictions on the release of workers.

The Tenzin study (2019)⁹ looked at the relationship between economic growth, inflation, and unemployment in Bhutan from 1998 to 2016 in order to better understand the country's unemployment patterns at a macro level. The ARDL (auto regressive distributed lag) model was used.

⁸ Okun, A. M. (1962). Potential GNP: Its measurement and significance. American Statistical Association, Proceedings of the Business and Economics Section, 98-103.

⁹ Ugyen Tenzin, (2019), The Nexus Among Economic Growth, Inflation and Unemployment in Bhutan South Asia Economic Journal, Vol 20, Issue 1, April.

2- Measuring the impact of economic growth on unemployment in Turkey :

ARDL models are one of the most advanced approaches for estimating time series econometric models, and they are used to investigate co-integration between two non-integrated or integrated time series of the same degree (integration level $I(0)$ or $I(1)$).

The Bound Test method established by (Pesaran et al. 2001) is used to test co-integration utilising ARDL, which combines the Autoregressive Model, AR (p), and Distributed Lag Model. The time series is a function in this methodology. Slowing down its values, as well as the values of the present explanatory variables, for one or more periods. (Edryush, 2013) The ARDL technique differs from typical co-integration testing methodologies in a number of ways, the most important of which are as follows:

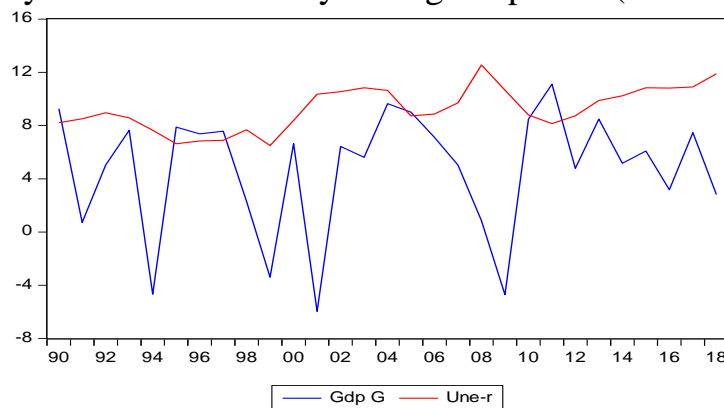
(1) It can be used regardless of whether the variables under investigation are integrated of order $I(0)$, integral of class $I(1)$, or integrated to varying degrees; however, it must be ensured that they are not integrated of order $I(2)$; that is, it can be used when the degree of integration is not uniform for all variables under investigation.

(2) In contrast to most standard co-integration tests, which require a large sample size in order for the results to be more efficient, the ARDL approach is characterised by extremely efficient practical results, especially in the case of a small sample size (number of observations).

First: Time series graph: Figure (1) indicates a sharp fluctuation in the unemployment rate. The unemployment rate of the Turkish economy witnessed, despite its decline from 8.2 in 1990 to 6.49 in 1999, it rose again, reaching a higher level, which is 10.84% in 2004. Despite its decline again, it rose to a higher rate in conjunction with the global financial crisis in 2008, to record 12.55%. Despite its decline during the following five years, it quickly returned to rise for a third time, recording 11.9% in 2018.

The economic growth rate was not far off. From a growth rate of 9.3% in 1990, it fell to a negative growth rate of -4.6% in 1994. Despite this negative rate, economic growth in Turkey returned to record a high rate of 7.6% in the following three years. However, this did not last long and tomorrow recorded a negative growth rate of -3.4% again. In 2004, the economic growth rate was 9.6%, which is the highest growth rate during the period (1990-2009). In 2009, it registered a third negative rate of -4.7. In 2011, the Turkish economic growth rate reached 11.11%, which is the highest growth rate during the entire study period (1990-2018). Despite this, economic growth continued to fluctuate between ups and downs, until it fell to 2.8% in 2018.

Figure No. (1) Evolution of the economic growth rate and unemployment rate in Turkey during the period (1990-2018).



Source: Prepared by the researcher based on the World Bank database.

Second, unit root tests: Table No. (1) displays the results of the static (stability) test, which reveal that the economic growth rate variable appears to be stable at a probability value (0.0001) less than the significance level of 5%. The unemployment rate variable, on the other hand, was not stable at the level with a probability value of (0.4681), which is higher than the morale level of 5%. The unemployment time series in the first difference has been retested at a probability value less than the 5% level of significance, which is significant (0.0023) Because the model is devoid of second-order integral variables, the ARDL model can be used in this situation.

Table No. (2) Dormancy tests for time series Output growth rate and unemployment rate

Comment	P-value	Static ADF	Lag Period	Index
String gdp g is static in level	0.0001	-5.618605	0	gdp g
The initial difference of the series is not stationary in the level so the test will be repeated	0.4681	-1.602475	0	Une-r
The series is stationary in the initial difference	0.0023	-4.313578	0	Une-r إعادة

Source: Prepared by the researcher based on Eviews10.

Third, the OLS test results: Table No. (2) Demonstrates that the study variables are negligible in the least squares test, and that the level of R is insignificant, which explains the changes induced by the independent variable in the dependent variable (0.012362).

Table No. (3) The results of the least squares test for model variables

Dependent Variable: UNE_R
Method: Least Squares
Date: 01/30/20 Time: 19:47
Sample: 1990 2018
Included observations: 29

Prob.	t-Statistic	Std. Error	Coefficient	Variable
0.5658	-0.581335	0.067056	-0.038982	GDP_G
0.0000	21.52279	0.437848	9.423710	C
9.239517	Mean dependent var		0.012362	R-squared
1.608001	S.D. dependent var		-0.024217	Adjusted R-squared
3.878262	Akaike info criterion		1.627356	S.E. of regression
3.972558	Schwarz criterion		71.50373	Sum squared resid
3.907794	Hannan-Quinn criter.		-54.23480	Log likelihood
0.477328	Durbin-Watson stat		0.337950	F-statistic
			0.565837	Prob(F-statistic)

Source: Prepared by the researcher based on Eviews 10.

Fourth, the results of using the Bound test, as shown in Table No. (3), reveal that the value of F-static is 1.458828, which is less than all levels of significance at 10, 5, 2.5, and 1%. This means accepting the null hypothesis, which states that there is no co-integration between the rate of economic growth and the rate of unemployment, and rejecting the alternative hypothesis, which states that the rate of economic growth and the rate of unemployment do have a co-integration relationship.

Table No. (3) Results of the Bounds Test

ARDL Long Run Form and Bounds Test
Dependent Variable: D(UNE_R)
Selected Model: ARDL(2, 0)
Case 2: Restricted Constant and No Trend
Date: 01/30/20 Time: 19:48
Sample: 1990 2018
Included observations: 27

Conditional Error Correction Regression				
Prob.	t-Statistic	Std. Error	Coefficient	Variable
0.0507	2.061865	1.402290	2.891333	C
0.0548	-2.023283	0.155850	-0.315329	UNE_R(-1)*
0.7385	0.337946	0.059042	0.019953	GDP_G**
0.1899	1.350942	0.258218	0.348838	D(UNE_R(-1))

* p-value incompatible with t-Bounds distribution.

** Variable interpreted as $Z = Z(-1) + D(Z)$.

Levels Equation				
Case 2: Restricted Constant and No Trend				
Prob.	t-Statistic	Std. Error	Coefficient	Variable
0.7322	0.346367	0.182688	0.063277	GDP_G
0.0000	7.942296	1.154484	9.169255	C

$$EC = UNE_R - (0.0633 * GDP_G + 9.1693)$$

Null Hypothesis: No levels relationship F-Bounds Test

I(1)	I(0)	Signif.	Value	Test Statistic
Asymptotic: n=1000				
3.51	3.02	10%	1.458828	F-statistic
4.16	3.62	5%	1	k
4.79	4.18	2.5%		
5.58	4.94	1%		

Finite Sample: n=35			27	Actual Sample Size
3.757	3.223	10%		
4.53	3.957	5%		
6.48	5.763	1%		
Finite Sample: n=30				
3.797	3.303	10%		
4.663	4.09	5%		
6.76	6.027	1%		

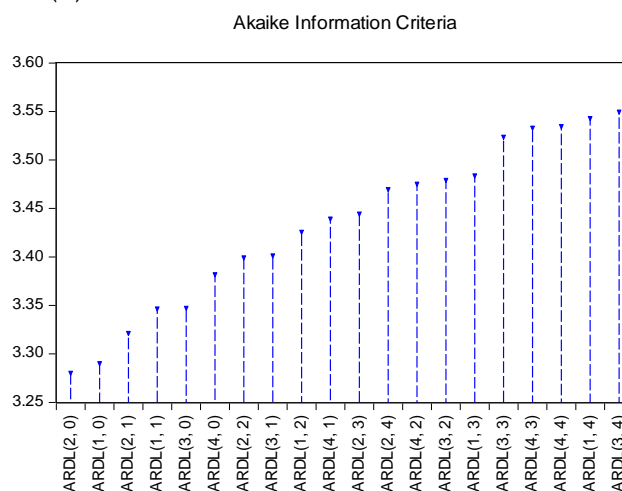
Source: Prepared by the researcher based on Eviews 10.

Thus, the equation of the model is as follows:

$$EC = UNE_R - (0.0633 * GDP_G + 9.1693)$$

Fifth, model integrity checks: According to data standards (SIC, HQ, and AIC), four lag periods were chosen to determine co-integration through the Bound test, with a maximum of four lag periods for all variables. (ARDL 2.0) is free of the problem of heterogeneity of variance, which occurs when the tabular value is more than the computed value for both tests and the level of significance is greater than 5%.

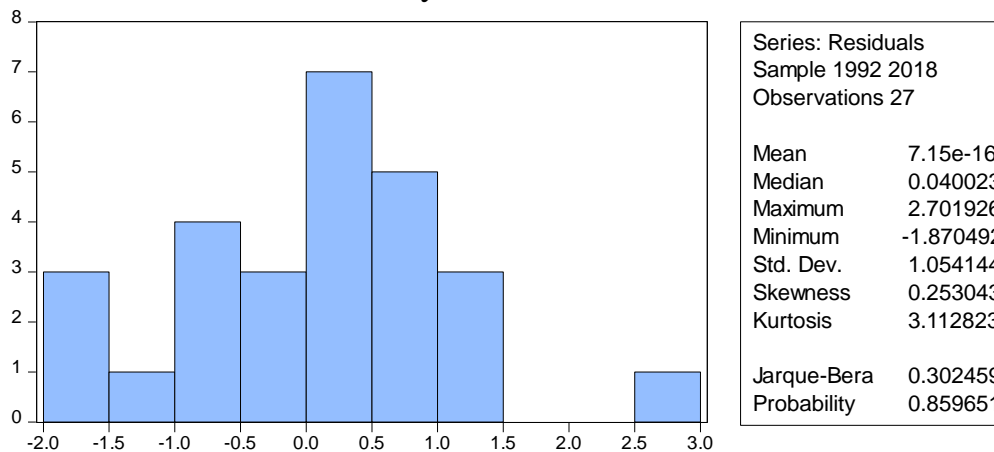
Figure No. (2) The comparison test between deceleration periods



Source: Prepared by the researcher based on Eviews 10.

5-1 Normal distribution: Chart No. (3) demonstrates that the estimated model has a normal distribution, as well as the results of the Jarque-Bera test, which has a probability value greater than the 5% threshold, and the hypothesis that the residuals can be accepted, which is derived from it. It is widely dispersed.

Figure No. (3) The normal distribution of the variables of the Standard Model for Turkey



Source: Prepared by the researcher based on Eviews 10.

The transmission variance test: Table (3) shows the test of the null hypothesis of the error term using the Autoregressive Conditional Heteroscedasticity test with autoregression ARCH (Test), which demonstrates the possibility of accepting the null hypothesis that the variance of the random error term is stable in the estimated model, because the value of (F -static) is positive (0.292491 is significant and greater than 5 percent). How many tests are there to find a problem of variance in this study, where the researcher employed the (Breusch-Pagan-Godfrey) and (White) tests and discussed the results.

Table No. (4) also shows that the (ARDL 3,4) model is free of the problem of heterogeneity of variance, as the tabular value for both tests was greater than the calculated value, and the level of morale was higher than the significance threshold of 5%.

Using the (Breusch-Godfrey) test at the first degree with probabilistic values at (0.1946) that came greater than the 0.05 level of significance, the results showed that the estimated model was devoid of serial correlation of the residuals of the highest ranks, and thus the hypothesis of a serial correlation in the residual series was rejected, as the calculated values of the Lagrangian multiplier (LM) were less than the critical values of the critical values of the critical values of the critical values (1.701217).

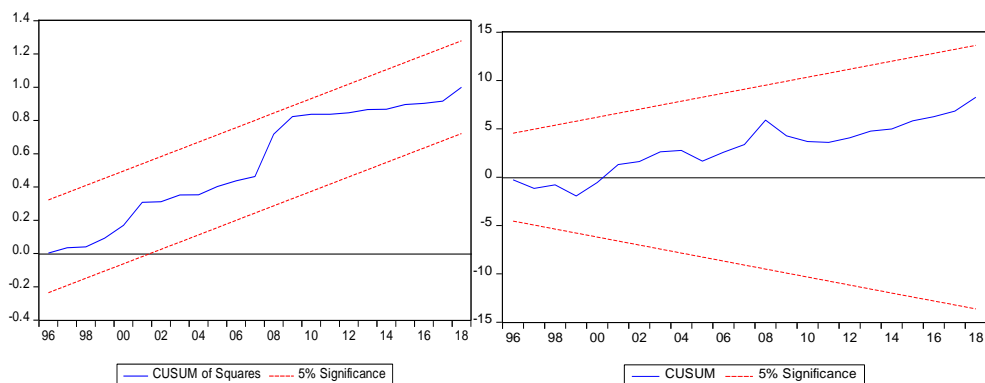
Table No. (3) Results of the residual autocorrelation test

Breusch-Godfrey Serial Correlation LM Test:		
0.7494	Prob. F(2,21)	0.292491 F-statistic
0.6936	Prob. Chi-Square(2)	0.731737 Obs*R-squared
Heteroskedasticity Test: Breusch-Pagan-Godfrey		
0.1946	Prob. F(3,23)	1.701217 F-statistic
0.1790	Prob. Chi-Square(3)	4.903226 Obs*R-squared
0.2887	Prob. Chi-Square(3)	3.758747 Scaled explained SS

Source: Prepared by the researcher based on Eviews 10.

6-1 Structural stability test of the model: It is clear from Figure (5) that the estimated coefficients of the ARDL model used are structurally stable across the period under study, which confirms the existence of stability between the study variables and consistency in the model, as the graph of the statistics of the two mentioned tests for this model fell within the limits criticality at the 5% significance level.

Figure No. (5) Structural stability test of the model



Source: Prepared by the researcher based on Eviews 10.

Sixth: Toda Yamato's Causal Test:

The first of the two outcomes in Table No. (4) is under the probability Prob = (0.7097), which is greater than the 5% level of significance. As a result, we accept the null hypothesis that economic growth does not generate unemployment and reject the alternative hypothesis that unemployment is caused by economic growth. The second outcome was that, with a probability Prob of (0.0019), which is less than the 5% level of significance, the nihilistic hypothesis that unemployment does not cause economic growth was rejected, and the alternative hypothesis that unemployment does cause economic growth was accepted. That is, there is a single causal relationship between unemployment and economic growth, and vice versa.

Table No. (5) Results of the causality test of the model

VAR Granger Causality/Block Exogeneity Wald Tests

Date: 01/30/20 Time: 19:58

Sample: 1990 2018

Included observations: 27

Dependent variable: UNE_R			
Prob.	df	Chi-sq	Excluded
0.7097	2	0.685763	GDP_G
0.7097	2	0.685763	All

Dependent variable: GDP_G			
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Prob.	df	Chi-sq	Excluded
0.0019	2	12.56231	UNE_R
0.0019	2	12.56231	All

Source: Prepared by the researcher based on Eviews 10.

Conclusion

The current study aimed to measure and analyze the impact of economic growth on unemployment in a comparative context between Egypt and Turkey during the period (1990-2018). And after showing the stability of the study variables and the validity of using the ARDL model.

Table No. (5) of the study data during the period (1990-2018)

Years	Une –r	Gdp G	Une-r	Gdp G
1990	9.38	5.667029	8.21	9.266147
1991	8.92	1.125405	8.509	0.720279
1992	10.92	4.472859	8.962	5.035635
1993	10.93	2.900791	8.577	7.651265
1994	11.04	3.973172	7.644	-4.66815
1995	9	4.642459	6.629	7.878267
1996	8.37	4.988731	6.841	7.379664
1997	8.03	5.492355	6.888	7.577664
1998	7.95	5.575497	7.687	2.308213
1999	8.98	6.053439	6.495	-3.3893
2000	9.26	6.370004	8.381	6.640061
2001	10.01	3.535252	10.358	-5.96231
2002	11.01	2.390204	10.542	6.430279
2003	10.32	3.193455	10.838	5.608255
2004	11.2	4.092072	10.636	9.644323
2005	10.49	4.471744	8.718	9.009853
2006	8.8	6.843838	8.868	7.109703
2007	8.517	7.087827	9.71	5.030458
2008	9.087	7.156284	12.552	0.845251
2009	8.757	4.6736	10.66	-4.70447
2010	11.849	5.147235	8.796	8.487372
2011	12.597	1.764572	8.149	11.1135
2012	13.154	2.2262	8.732	4.78994
2013	13.105	2.185466	9.88	8.491309
2014	13.052	2.915912	10.236	5.166691
2015	12.407	4.372019	10.839	6.085887

2016	11.77	4.346643	10.819	3.183832
2017	11.436	4.181221	10.895	7.470867
2018	11.293	5.314121	11.895	2.826776

Source: Prepared by the researcher based on Eviews 10.

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- 1- Al-Habees, M. A., & Rumman, M. A. (2012). The Relationship Between Unemployment and Economic Growth in Jordan and Some Arab Countries. *World Applied Sciences Journal*, 673-680.
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