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## Causal relationship between economic development and unemployment in Iraq: Using the ARDL method

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### Abstract

The role of the government in developing strategies to promote economic development to reduce unemployment is reflected in increasing foreign direct investment and modernizing the investment environment for private investment institutions. This study aims to analyze the impact of economic development variables on unemployment in Iraq during the period 2000-2023 by determining the impact of foreign direct investment, total government expenditure, total exports, and private investment. The inductive analysis method was used to examine the impact on unemployment. The results showed the importance of foreign direct investment on unemployment, while total government expenditure, total exports, and private investment had no significant impact on unemployment. There was a correlation between economic development variables and unemployment. This study provides an analytical perspective on the success of Iraq's economic development in addressing unemployment to help develop more effective economic reform strategies to address the challenges facing the Iraqi workforce.

**Keywords:** Economic development, unemployment rate, exports, private investment

### Introduction

The Great Recession of December 2007 has created a dangerous pressure on developing and developed countries to change their thinking. The literature on this subject has proposed various theories to explain the unemployment problem. Some blame the economic system; others blame external resources, the labor market, lack of innovation, and lack of job opportunities, especially for young people, as unemployment is a challenge for developing countries (Blanchard, 2007; Black, 1986) <sup>[9,8]</sup> and eliminating unemployment is an important and difficult necessity for every developing country (Obayori, 2014) <sup>[12]</sup> given the socio-economic deterioration and decline in living standards experienced by Iraq after 2003. Economic development is one of the most important factors in eliminating unemployment, as the implementation of effective economic policies, the promotion of investment, and the support of small and medium-sized enterprises contribute to economic growth, as they increase employment opportunities for Iraqi youth and also improve the business environment, develop infrastructure, promote non-oil exports and increase private investment, which helps to strengthen the labor market. Addressing the unemployment problem requires comprehensive reforms based on thorough economic reforms to promote the diversification of Iraq's economy and strengthen the productive sectors to achieve sustainable and comprehensive development.

### First: The problem of the study

Unemployment leads to severe poverty and social instability and hurts the country's economic growth. Iraq has the lowest unemployment rate among oil-rich countries. However, due to its heavy reliance on the oil industry and weak economic diversification, Iraq has one of the highest unemployment rates among university graduates and young people. In addition, the country's widespread economic deterioration has exacerbated the country's unemployment rate. However, increasing economic activities is a key factor in improving economic growth prospects, thereby creating new jobs and helping to reduce unemployment. Some challenges facing Iraq include rampant corruption and a poor business environment. Therefore, the research questions include considering the relationship between unemployment and economic development in Iraq.

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These reasons complicate the unemployment problem and formulate an effective strategic framework to achieve sustainable economic reforms based on high employment rates.

### Second: The importance of research

The importance of this study lies in determining the impact of economic development on the unemployment rate. The following points explain the importance of this study:

1. To determine the impact of economic development on the unemployment rate in Iraq and its effectiveness in combating unemployment.
2. To determine the impact of factors that affect the unemployment rate, such as B. Total foreign direct investment, total exports, total government expenditure, and private investment.
3. To make recommendations to promote economic development.

### Third: Research Objectives

The purpose of this study is to study the economic development during the period 2000-2023 by:

1. Identify the main factors that affect the economic development of Iraq.
2. Analyze the impact of economic development factors on the unemployment rate in Iraq during the period 2000-2023.
3. Contribute to the formulation of economic policies in Iraq.

### Research Form

The model uses the unemployment rate as the dependent variable and economic development variables as independent variables (total foreign direct investment, total exports, total government expenditure, private investment), as shown in equation (1):

$$UNE = FDI + EXPO\_G + EXP\_G + PINVEST \quad (1)$$

UNE=Unemployment Rate

FDI = Foreign Direct Investment

EXPO\_G=Total exports

EXP\_G = (oil and non-oil) total government expenditure

PINVEST=Private Equity

### Fourth: Research hypotheses

**Hypothesis I:** Foreign direct investment significantly impacts the unemployment rate of 0.05.

**Hypothesis II:** The total export volume significantly impacts the unemployment rate at the 0.05 level.

**Hypothesis III:** Total government expenditure significantly impacts the unemployment rate by 0.05.

**Fourth hypothesis:** The impact of private investment on the unemployment rate is significant at the 0.05 level.

### Fifth: Research Methodology

The inductive analysis method is used to collect and analyze the data by examining the literature, government reports, and existing economic indicators. In addition, the data is analyzed using the ARDL time gap model using the economic model to estimate the impact of economic

development variables on the unemployment rate in Iraq.

### The first topic: The theoretical side

#### The concept of economic development

Economists distinguish between the concepts of economic growth and development since economic growth implies a high proportion of public production at constant prices, i.e., h. the real growth of national income, since countries whose economies depend on the production and export of oil and gas, coal, coffee, and iron can achieve economic growth by increasing the production of these materials, provided that the prices of these materials do not fall on the world market. It is also defined as the commitment and attention of the country to the material aspects of its development since it is one of the main pillars of any development. Economic development is the transition process to a state of progress, which requires changes in the economy's structure to move from a state of waste to an increase in the productive capacity of economic resources.

#### Foreign Direct Investment (FDI)

They are long-term investments in productive capital goods that give their owner direct influence through full or partial ownership and ensure his control over the project management. The minimum limit of this attribute is determined by (10%). The upper limit varies according to the host country's policies. Since the concept of control and statistical symptoms are difficult to define, the International Monetary Fund defines foreign investment as the ownership of an institution by a foreign investor when the foreign investor directly holds 10% or more of the ordinary shares or voting rights of the shareholders. A single company is limited by shares or an equivalent institution (UNCTAD, 1997) <sup>[14]</sup>.

#### Total Government Expenditure (EXP\_G)

Public expenditure reflects the size of governments in different countries. The large differences in this indicator highlight the diversity of approaches to providing public goods and services and ensuring social protection, not necessarily differences in the resources spent (Ortiz, Rose, 2016) <sup>[13]</sup>.

#### Exports (EXPO\_G)

Exporting can be defined as the process of selling and sending domestic goods and services abroad and moving goods and other material commodities and property from the country of origin to another country for marketing in the international market.

#### Private Equity (PINVEST)

Although credit markets stagnated in 2008 and 2009, many private equity funds viewed distressed shares in several blue-chip companies as an excellent opportunity to raise cash. As a result, investment activity continued (albeit at a slower pace and in lower volumes), in many cases based on unsupervised acquisitions of common stock in public companies (David, 2018) <sup>[10]</sup>.

#### Unemployment rate

The unemployment problem is one of the most important and serious problems faced by most developing and developed countries in the world, as it has negative effects at all levels and governments around the world are working

hard to reduce unemployment and/or mitigate its effects as it has become a test of the economic system's ability to grow as quickly as possible to create jobs and rebuild the unemployed units in the shortest possible time (Khalifa, 2006) [4]. Unemployment is also a global phenomenon with economic, social, and political implications as both developed and developing countries are struggling to deal with unemployment, just as unemployment occurs in developing countries due to insufficient economic growth to track population growth and the inability of domestic savings to finance the investments required to create jobs (Al-Asraj, 2007) [1]. The definition of the unemployment

rate is the difference between the level of jobs available at the prevailing wage level in the labor market during a given period and the number of jobs required at that level (Namiq, 1965) [7].

**The second topic: Presentation and analysis of results: Analyze the relationships between study variables**

**First: Testing the stability of variables**

The stability of the studied variables was tested using the Eviews.12 program, and the Extended Dickey-Fuller Test (ADF) was performed to determine it. The results are shown in Table (1).

**Table 1:** Dickie-Fuller's Extended Root Test

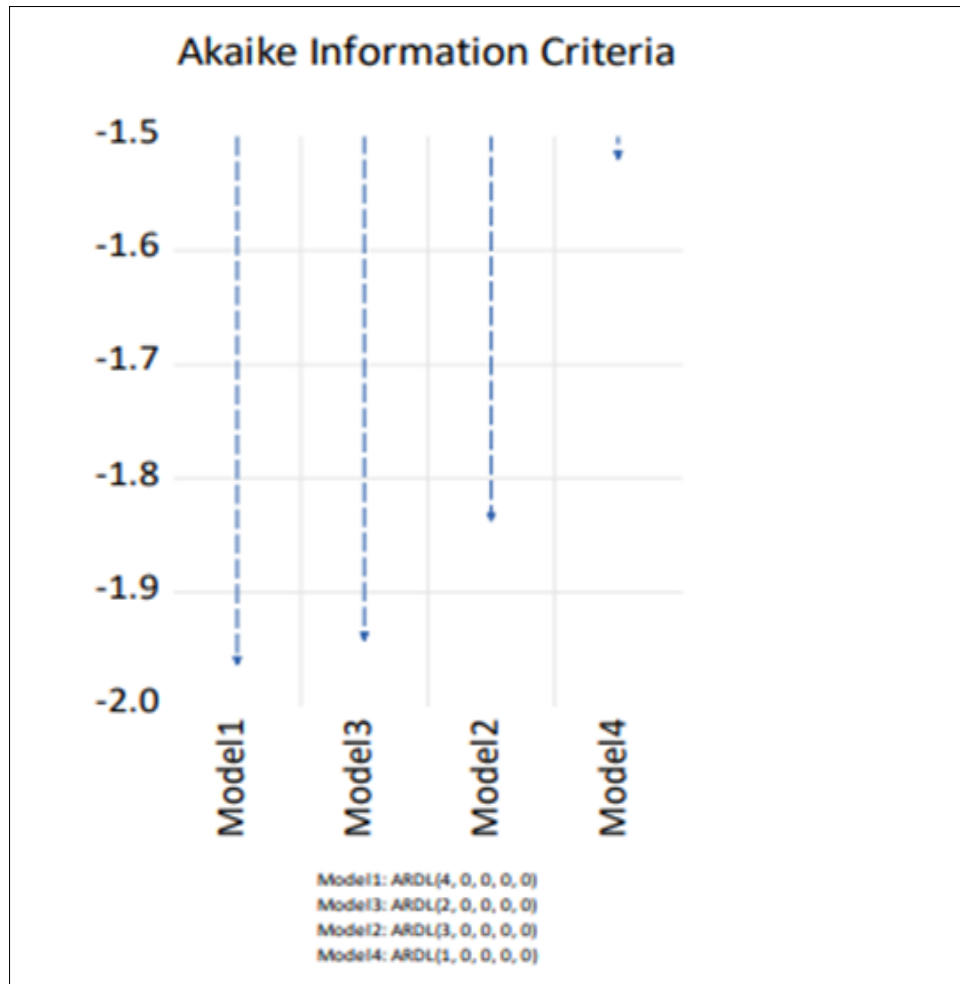
Variable	Level			The first difference		
	Non	A	B	Non	A	B
Unemployment rate (UNE)	2.261	0.387	-1.320	-3.141*	-3.567*	-3.681*
Foreign Direct Investment (FDI)	-1.165	-1.501	-2.846	-3.573*	-3.519*	-3.443
Total Government Spending (EXP_G)	0.879	-1.103	-0.680	-2.480*	-3.188*	-3.271*
Total Exports (EXPO_G)	-0.020	-1.301	0.904	-2.048*	-1.867	-2.452
Private Investments (PINVEST)	0.081	-1.404	-3.566	-4.096*	-4.188*	-4.069*

A: means the regression contains only one-second line  
 B: means the regression contains secants and general directions  
 Non: means the regression has no secants or general directions  
 \*: Indicates that morality is at the morality 5% level.

The results are in Table (1). All-time series is unstable in level, regardless of cuts or general trends, i.e., h. They contain a unity root at a 5% significance level. In contrast, all-time series in the model are stable at a 5% significance

level after taking the original series' first-order differences (first-order differences).

**Determination of rank**



**Fig 1:** Model Grade Selection Criteria

**Correlation Test (Co-integration)**

Results B in Table (2) show the results of the integral limit test to determine the long-term relationship between the variables. This is done by comparing the statistical values (F-statistics) if the test is performed using the limit test and different significance measures of 1%, 2.5%, and 10%. If

the F-statistic test value for the basic hypothesis is 4.756 (above the upper limit), the null hypothesis is rejected, and the alternative hypothesis is accepted. This means a long-term relationship exists between the variables included in the model.

**Table 2: F Bound Test**

Test Statistic	Value	Significant	I(1)	I(0)
F-statistic	4.756	10%	3.09	2.2
k	4	5%	3.49	2.56
		2.50%	3.87	2.88
		1%	4.37	3.29

**3. Long-term relationship coefficient estimation test:**

To do this, it is necessary to establish the existence of a long-term relationship between the independent and dependent variables according to the cointegration model (ARDL). See Tables (3) and (4), where the coefficients of the long-term relationship are shown. In addition, the commissioning model (ECM) takes the form of cointegration. Let us compare the coefficient values of the independent variable (economic development variable) with

the coefficient values of the dependent variable, which is represented by the unemployment rate and the corresponding statistical significance values. We will find that they all have a long-term relationship that is strong and moral in the relationship depicted. Obviously, logically, in the long run, changes in the independent variables will have an economic impact on the dependent variable (i.e., the permanent unemployment rate).

**Table 3: Long-term Relationship Equilibrium Model: ARDL (1,0,0,0) Dependent variable Unemployment rate**

Long run coefficients (ARDL)				
Prob.	t-Statistic	Std. Error	Coefficient	Variable
0.0312	-2.394164	0.000753	-0.001804	FDI
0.4167	0.836871	0.002163	0.001810	EXP_G
0.3764	-0.913576	0.275229	-0.251443	EXPO
0.5035	-0.686734	2.938667	-2.018083	PINVEST
0.4341	0.805292	3.760720	3.028479	C
UNE = - 0.00180369740157*FDI + 0.00180987199502*EXP_G - 0.251442562324*EXPO - 2.01808322503*PINVEST + 3.02847896107				

The results in Table (3) show that the long-run association estimates are integrated into the ARDL model (1,0,0,0) with unemployment as the dependent variable. For the variables in the model, there is a negative significant effect of foreign direct investment (FDI), with a coefficient of -0.0018, a statistical value of -2.394, and a value of (p = 0.0312), which is below the significance level (0.05). At the same time, total government expenditure has no significant effect on unemployment, with a t-value of 0.0018 and a p-

value of (p = 0.417), above the significance level (0.05). The table also shows that total exports do not affect unemployment, with a value coefficient of -0.251, a statistical value of (-0.687), and a p-value of (0.377), which is above the moral level (0.05). On the other hand, the coefficient of private investment is (-2.018), which indicates that there is no long-run effect, as the statistical significance level is equal to (0.434), which is greater than the significance level (0.05).

**Table 4: Identification of the Combined Debugging Model (ECM)**

Prob.	t-Statistic	Std. Error	Coefficient	Variable
0.0184	-2.667722	0.000503	-0.001343	D(FDI)
0.4074	0.854110	0.001578	0.001348	(EXP_G)
0.3773	-0.911753	0.205327	-0.187207	(EXPO)
0.5029	-0.687672	2.184951	-1.502530	(PINVEST)
0.0000	-6.223216	0.215825	-1.343123	CointEq(-1)*
EC = D(LLLUN_E) - (-0.0013*FDI + 0.0013*EXP_G -0.1872*EXPO -1.5025*PINVEST + 2.2548)				

**Co-integration equation**

$$D(UNE,2) = -1.343123021021*(D(UNE(-1))) - (-0.00134291*FDI + 0.00134751*EXP_G - 0.18720740*EXPO -1.50253044*PINVEST + 2.25480385)$$

Table (4) shows the short-term effects of the variables in the modified model. Foreign direct investment (FDI) has a negative significant effect, with a coefficient of -0.00134, a statistical value of -2.667, and a value (p = 0.0184) below the significance level (0.05). At the same time, total government expenditure has no significant effect on

unemployment, with a t-value of 0.854 and a p-value of (p = 0.407). This is a value above the moral level (0.05). The table also shows that total exports do not affect unemployment. The value coefficient is -0.187, with a statistical value (-0.911) and a p-value (0.377), which is above the moral level (0.05). On the other hand, the coefficient of private investment is (-1.503), indicating no effect in the long run. The statistical significance level is (0.503) above the moral level (0.05). The coefficient of CointEq (-1) is negative and universe-significant (p =

0.0000 < 0.05). This indicates the existence of long-term significant effects between the variables, thus strengthening

the presence of co-integration between the variables in the research model.

**Table 5:** Test of normal residual distribution

Audition	Standard	Value	Probability
Nature of the residues	Jarque-Bera	0.938	0.626

The results show that the residuals are normally distributed according to the Jarque-Bera test.

**Table 6:** Serial automatic correlation tests of residues using Broich's method

Test	Value
F-statistic	2.338
Obs*R-squared	5.607
Prob. F(2,12)	0.139
Prob. Chi-Square (2)	0.0606

The results in Table (6) show the auto-relay test using the Bruich method. This test detects whether there is a spontaneous sequence in the model. If we assume that the test probability value of Prob is 2.338 F, then according to

the statistical analysis, the coefficient value of F is 2.338 F. F (2, 5) is 0.139 and is greater than (5%), which means that there is no auto-sequence in the residues.

**Table 7:** Variance Variation Test Using Arch Method

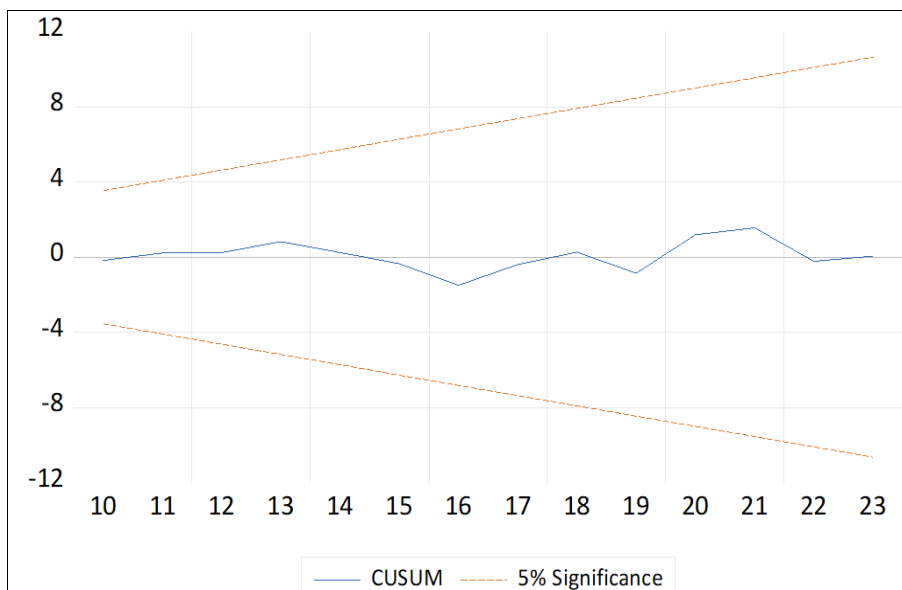
Test	Value
F-statistic	1.772
Obs*R-squared	1.794
Prob. F(1,17)	0.2007
Prob. Chi-Square(1)	0.1805

The results in Table (7) show the performance of the variance test using the ARCH method. This test is used to test the change in variance over time, where the value of F equals (1.772), the value of Prob. F is equal to (0.2007) and is greater than (5%), so there is no problem of variance homogeneity at the significance level (0.05). In addition, the results of the R square Obs coefficient and the probability coefficient are also provided in the table. Kai Square: Use these results to evaluate the quality of the model used in the

test. Since the p-value of the chi-square coefficient is (0.1805) and is greater than the significance level (5%), the model does not have a problem of variance instability.

**Model stability test**

Use CUMSUM to accumulate values to ensure that the dependent variables and the entire model do not change structurally.



**Fig 2:** CUMSUM test results

As Figure (2) shows, the residual cumulative sum test shows a linear mean within the critical region, indicating that the model is stable at the 5% significance level.

**Conclusions**

1. At the 5% level, foreign direct investment significantly affects unemployment.
2. At the 5% level, total government spending does not



- significantly affect unemployment.
3. At the 5% level, total exports do not significantly affect unemployment.
  4. At the 5% level, private investment does not significantly affect unemployment.

### Recommendations

The study made important recommendations, including:

1. Since FDI has an inverse relationship with unemployment, promoting FDI can reduce unemployment.
2. Reassessing government spending policies: since unemployment has no impact.
3. Diversifying domestic exports: since total exports have no significant impact on unemployment, emphasis should be placed on strengthening local industries that rely on local labor, which can help create new jobs.
4. Promoting private investment. Given the importance of private investment in reducing unemployment, work needs to be done to improve the investment climate, simplify administrative procedures, and ensure the stability of economic legislation to attract private investment.
5. Providing tax and investment incentives to private investment institutions, strengthening partnerships between the public and private sectors, and implementing joint projects to create new jobs.

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