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A Standard Study Of Investigating The Impact Of Some Economic Variables In Iraqi Investment

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Abstract

Before proceeding to study the fluctuations of any economic phenomenon, it is necessary to first ascertain the existence of a trend in the time series, and according to the nature of the growth of the series, we can distinguish between stable time series and unstable time series. The stable time series can be defined as that series whose levels change with time without changing the average in it during a relatively long period of time, meaning that the series has no tendency towards increase or decrease. As for the unstable time series, the average level in it is constantly changing, whether towards increase or decrease.

The aim of this research is to show the extent of the impact of some economic variables represented by money supply, gross domestic product, national income, after reaching the state of stability for these variables, and it was concluded that most of these variables are unstable in the time series, but stable in the first difference. It was also concluded that the contribution of the independent variable (money supply) to investment is negative, and that the negative sign of the independent variable parameter (money supply) is consistent with the economic logic of the modern quantity theory (Chicago School) Friedman and his supporters that the growth of money supply should be proportional to the growth of money supply. Gross domestic product so as not to cause imbalances in the economy and thus its negative impact on investment. The growth of money supply in Iraq was not commensurate with the growth of the gross domestic product, because an increase in the money supply can affect some other economic factors, and some of these factors have an impact on the economy, leading to an increase in interest rates and consequently to a reduction in investment. The price level and the expected effect of inflation.

Keywords: Investment - National Income - Dickey Fuller Test

1-1Introduction

Some see that investment means “sacrificing a current benefit that can be achieved from the satisfaction of a current consumer in order to obtain a future benefit that can be obtained from a

greater future consumption." Others define investment as "giving up on the use of current funds and for a certain period of time in order to obtain more cash flows in the future as a compensation for the lost opportunity for the invested funds, as well as compensation for the expected decrease in the purchasing power of the invested funds due to inflation with the possibility of obtaining a return." On this basis, it can be said that investment differs from saving, which means "withholding part of the current consumption in order to obtain more consumption in the future," and saving differs from investment in that saving does not bear any degree of risk [Al-Mandalawi,2004, p.1]. On the other hand, the investment falls within the institutions sector, where the investment represents the funds allocated for the production of machinery, equipment, buildings and the like, and the funds allocated to increasing the stock. It is thus, according to Ketter's theory, that it changes according to the interest rate, because the demand for funds allocated for investment is from banks and banks that deal with the principle of interest, and therefore there is an inverse relationship in theory between investment and interest, the lower the interest rate, this encourages investors to invest. Both the classical theory and the Keynesian theory showed that an increase in investment leads to an increase in national product. The classic emphasized the necessity of capital accumulation, especially in the industrial sector, as the growth of national product is determined by the rate of capital formation in that sector. They also indicated that the investment demand represents an automatic process, as the demand for money is for the purposes of borrowing and converting it into investment spending, and with the convergence of investment and saving, the interest rate is determined. , then a decrease in the interest rate, and then an increase in investment, which increases the national product to a level sufficient to achieve full employment.

The Keynesian theory sees, as far as the relationship between investment and income is concerned, that the national product depends on the volume of investment and its extensions, thus emphasizing that investment is the determinant of the growth of national income in the short term, and an engine for increasing productivity and growth rate in the economy in the long term, and that this investment is determined by both the price of Marginal interest and adequacy of capital. [Ismail, 2005, p.10].

In line with that, it turns out that Marxist thought has given importance to investment in economic development, as it emphasized that the continuous increase in accumulation leads to an increase in production capacity, although this increase is not accompanied by a corresponding increase in purchasing power.

On the other hand, it is noted that the neoclassical school has gone further, as it emphasized the importance of investment lies in economic growth, especially investment in human capital, but it considered investment in physical capital a necessary condition for economic growth.

Based on the foregoing, it can be said that there is a direct direct relationship between the volume of investment and the national product, that is, the increase in investment leads to an increase in the national product, just as the increase in the national product leads to an increase in investment, and based on what was proposed by the Keynesian theory, Induced investment is a function of increasing levels of income and is generated as a result of the action of the acceleration principle. When income increases, consumer demand increases, which is a catalyst for increased investment.

As the net investment determined by the accelerator will be positive when the income increases, equal to zero if the income remains constant, and negative when it decreases.

1-2 Research objective:

The research aims to use the standard method represented by the expanded Dickey-Fuller test to test the stability of the variables of the investment function in Iraq and their impact on the estimation

1-3 Research Methodology

To achieve the objectives of this research, we will use the quantitative analytical method based on modern standard methods, according to the following steps:

1 -Using the developed Dickey-Fuller test to test each of the variables used in the estimate

2 -Using the difference method to address the instability of the time series of the variables used in the estimation

4-1The general framework of the research:

The time series of indicators of some economic variables related to the investment function in Iraq for the period (2001-1981) was relied upon.

5-1Research Problem:

The research problem is to test the stability of the time series and its impact on estimating the investment function in Iraq.

6-1Research Hypotheses:

The research includes testing the following null hypothesis:

H0: There is no unit root in the time series for the variables used in the search.

7-1search variables:

The variables of the investment function were used, including the following:

The dependent and included variable:

y: investment

Investment is defined as sacrificing a current benefit that can be achieved from satisfying current consumption with the intention of obtaining a greater future benefit that can be achieved from satisfying future consumption.

[Al-Hamoud, 2004,[p.10.].

X1: Cash offer

The concept of money supply refers to the net currency in circulation in addition to the current deposits (Demand deposits), which are deposits that banks are obligated to pay to the person on demand [Al-Mandalawi, 2004, chapter 2].

X2: Gross domestic product

The concept of domestic product is related to the productive economic activities that take place within the political boundaries of a particular society during a certain period of time, and the output is the sum of the added values that are realized locally [Muhammad, [p.5]

X3: Income . National Income

It is the value of this country's production of goods and services during a specific period that is taken as a basis for measuring this income. The economic norm may be based on estimating national income for a period of time of one year.

[Al-Mandalawi, 2004, chapter 2]

Table No. 1

Some variables of the investment function used in the research

The years	Gross fixed capital formation at constant prices	M1 cash offer	GDP at constant prices	National income at constant prices
1980	6974.00	2650.20	19046.90	37027.33
1981	9714.70	3645.50	18908.10	20291.38
1982	10294.10	4980.70	19557.40	19386.22
1983	8107.17	5527.40	17000.60	17317.32
1984	6066.06	5499.90	16748.10	18749.78
1985	5424.83	5777.00	16991.60	18219.89
1986	3269.36	6736.60	17781.30	1750.29
1987	3953.52	8316.70	19435.90	18581.67
1988	4396.60	9848.00	19432.20	16982.90
1989	5840.53	11868.20	18826.20	16808.00
1990	4700.03	15359.30	16373.40	12418.18
1991	597.64	24670.00	7134.80	4058.15
1992	568.45	43909.00	8964.00	5868.85
1993	728.42	86430.00	13318.40	4797.87
1994	448.12	23890.10	12703.40	40535.30
1995	309.66	705064.0	10376.80	2894.41
1996	139.83	960503.0	15527.80	3860.00
1997	235.86	1038097	18926.10	4033.87
1998	326.10	1351876	18640.30	4965.83
1999	464.02	1483836	21561.90	6255.33
2000	897.55	1728006	23180.60	7019.35
2001	1456.55	2159089	25533.30	7526.76

Application Part:

The advanced economic measurement program EVIEWS7.2 was used for the purpose of applying the expanded Dickey Fuller methodology in testing the stability of the time series with respect to the research variables, as follows:

3.1Extended Dickey-Fuller test for the money supply variable

For the purpose of applying the extended Dickey-Fuller test for the money supply chain, the following stages have been passed:

-1Estimation of the third model, which includes a fixed boundary and time trend:

$$\Delta Y_t = a + \beta t + \lambda Y_{t-1} + \sum_{j=1}^{k} P_j \Delta Y_{t-j} + U_t$$

So that:

α : constant limit parameter

β : time trend parameter

ΔY_t :The first difference to the money supply variable

Y_{t-1} :money supply is slow one time period

Where the results were as follows**:**

The Dickey-Fullier Extension Test of the Third Criticism Presentation (fixed, general direction)

	The null hypothesis: the time series contains a unit root (the series is unstable)			
	Exogenous: Constant, Linear Trend			
Prob.*	**Test value**			
0.9932	**0.008378**	**Dickey-Fuller Expanded Test of Statistics**		
	-4.498307		**1% level**	**Critical values for the test**
	-3.658446		**5% level**	
	-3.268973		**10% level**	
The probability value of the test	**Test T**	**standard error**	**parameter value**	**variable**
0.9934	**0.008378**	**0.104562**	**0.000876**	**Money supply slowed one time period**
0.2860	**-1.101625**	**88482.43**	**-97474.42**	**fixed limit**
0.0802	**1.860355**	**10490.42**	**19515.91**	**time direction**
107772.2	**The mean of the dependent variable**		**0.380535**	**The coefficient of determination**
187854.0	**The standard deviation of the dependent variable**		**0.307657**	**Modified determination factor**
26.89453	**Akaike info criterion**		**156308.0**	**standard error of the regression**

27.04389	**Schwarz criterion**		**4.15E+11**	**The sum of the squares of the remainders**
26.92368	**Hannan-Quinn criter.**		**-265.9453**	**Log likelihood**
2.179465	**Durbin-Watson stat**		**5.221513**	**Test F**
			0.017066	**Prob(F-statistic)**

According to Table (2) it is noted that:
1 -The calculated value of the expanded Dickey-Fuller test, which is (0.008378) is less than the critical values of the test under a significant level (1%,5%,10%) in absolute terms, which leads to the acceptance of the null hypothesis that there is a single root of the money supply chain, so We will move to the next step, which is to test the significance of the time trend, as follows:
2 -The calculated value of the t-test for the time trend parameter has reached (-1.101625), which is less than the tabular values under a significant level (1%,5%,10%) in absolute values, and this is a preliminary indication that the series is unstable, and therefore, we will move to the next step:
2 -Estimation of the second model, which includes a fixed limit:
This step includes estimating the second model, which is represented by the presence of a categorical, which can be written as follows:

$$\Delta Y_t = a + \lambda Y_{t-1} + \sum_{j=1}^{k} P_j \Delta Y_{t-j} + U_t$$

Where the results were as the results were shown in the following table:

Table (3)
The Dickey-Fullier Extended Test of the second model of criticism
(fixed limit)

	The null hypothesis: the time series contains a unit root (the series is unstable)			
	independent variables: categorical			
Lag Length: 0 (Automatic - based on SIC, maxlag=4)				
Prob.*	**Test value**			
0.9999	**2.478374**	**Extended Dickey-Fuller Test Statistics**		
	-3.808546		**1% level**	**Critical values for the test**
	-3.020686		**5% level**	
	-2.650413		**10% level**	
The probability value of the test	**Test T**	**standard error**	**parameter value**	**variable**

0.0233	**2.478374**	**0.064414**	**0.159642**	**Money supply slowed one time period**
0.2972	**1.073479**	**44450.13**	**47716.29**	**fixed limit C**
107772.2	**The mean of the dependent variable**		**0.254422**	**The coefficient of determination**
187854.0	**The standard deviation of the dependent variable**		**0.213001**	**Modified determination factor**
26.97983	**Akaike info criterion**		**166650.9**	**standard error of the regression**
27.07940	**Schwarz criterion**		**5.00E+11**	**The sum of the squares of the remainders**
26.99927	**Hannan-Quinn criter.**		**-267.7983**	**Log likelihood**
2.097607	**Durbin-Watson stat**		**6.142340**	**Test F**
			0.023332	**Prob(F-statistic)**

According to Table (3) it is noted that:
1 -The calculated value of the expanded Dickey-Fuller test, which is (2.478374), is less than the critical values of the test under a significant level (1%,5%,10%) in absolute terms, which leads to the acceptance of the null hypothesis that there is a single root of the money supply chain, so We will move to the next step, which is to test the significance of the fixed term, as follows:
2 -The calculated value of the t-test for the fixed term parameter has reached (1.073479) which is less than the tabular values under the significant level (1%,5%,10%) in absolute values.
3 -Estimation of the first model, which includes the absence of a fixed limit and time trend:
This step includes estimating the third model, which is represented by the absence of a categorical and general trend, which can be written as follows:

$$\Delta Y_t = \lambda Y_{t-1} + \sum_{j=1}^{k} P_j \Delta Y_{t-j} + U_t$$

Where the results were as follows:

Table (4)
The Dickey-Fuller Extended Test of the First Criticism Presentation
(no fixed, no general direction)

	The null hypothesis: The time series contains a unit root (the series is unstable)	
		Exogenous: None

Lag Length: 0 (Automatic - based on SIC, maxlag=4)				
Prob.*	**Test value**			
0.9996	**3.639783**	**Extended Dickey-Fuller Test Statistics**		
	-2.685718		**1% level**	**Critical values for the test:**
	-1.959071		**5% level**	
	-1.607456		**10% level**	
The probability value of the test	**Test t**	**standard error**	**parameter value**	**variable**
0.0017	**3.639783**	**0.054217**	**0.197337**	**Money supply slowed one time period**
107772.2	**The mean of the dependent variable**		**0.206690**	**The coefficient of determination**
187854.0	**The standard deviation of the dependent variable**		**0.206690**	**Corrected determination coefficient**
26.94188	**Akaike info criterion**		**167317.7**	**standard error of the regression**
26.99167	**Schwarz criterion**		**5.32E+11**	**The sum of the squares of the remainders**
26.95160	**Hannan-Quinn criter.**		**-268.4188**	**Log likelihood**
			2.041146	**Durbin-Watson stat**

According to Table (4) it is noted that the probabilistic value of the expanded Dickey-Fuller test for the slowed money supply parameter for one time period has reached (0.9996), which is greater than a significant level (1%,5%,10%), so the null hypothesis that there is a unit root is accepted. This is an indication of the instability of the time series, so the first differences of the money supply variable will be taken as follows:

Table (5)
Dickey-Fullier Expanded Test of the third model for the first difference in the presentation of criticism
(fixed, general direction)

	The null hypothesis: the time series contains a unit root (the series is unstable)			
	Exogenous: Constant, Linear Trend			
Lag Length: 0 (Automatic - based on SIC, maxlag=4)				
Prob.*	**t-Statistic**			

0.0104	**-4.480421**	**Augmented Dickey-Fuller test statistic**		
	-4.498307		**1% level**	**Test critical values:**
	-3.658446		**5% level**	
	-3.268973		**10% level**	
The probability value of the test	**Test t**	**standard error**	**parameter value**	**variable**
0.0003	**-4.480421**	**0.246554**	**-1.104667**	**The first difference is the money supply slowing down one time period**
0.1343	**-1.572366**	**81231.02**	**-127724.9**	**fixed limit**
0.0089	**2.950582**	**7206.435**	**21263.17**	**time direction**
21504.38	**Mean dependent var**		**0.545778**	**The coefficient of determination**
218225.6	**S.D. dependent var**		**0.492340**	**Modified determination factor**
26.88398	**Akaike info criterion**		**155486.4**	**standard error of the regression**
27.03334	**Schwarz criterion**		**4.11E+11**	**The sum of the squares of the remainders**
26.91314	**Hannan-Quinn criter.**		**-265.8398**	**Log likelihood**
2.014731	**Durbin-Watson stat**		**10.21331**	**Test F**
			0.001221	**Prob(F-statistic)**

It is noted from Table (5) that:
The calculated value of the expanded Dickey-Fuller test, which is (-4.480421), is greater than the critical values of the test under a significant level (1%,5%,10%) in absolute terms, which leads to the rejection of the null hypothesis that there is a unit root of the money supply chain, that is, that The series is stable in the first team

3 2Extended Dickey-Fullier test of the variable gross fixed capital formation

For the purpose of applying the extended Dickey-Fuller test for the money supply chain, the following stages have been passed:

1 -Estimation of the third model, which includes a fixed boundary and time trend:

$$\Delta Y_t = \alpha + \beta t + \lambda Y_{t-1} + \sum_{j=1}^{k} P_j \Delta Y_{t-j} + U_t$$

So that**:**

ΔY_t **:** The first difference for the variable gross fixed capital formation

Y_{t-1} :Gross fixed capital formation is decelerating one time period

Where the results were as follows:

Table (6)
The Extended Dickey-Fullier Test of the Third Series of Gross Fixed Capital Formation at Constant Prices
(fixed, general direction)

	The null hypothesis: the time series contains a unit root (the (series is unstable			
	Exogenous: Constant, Linear Trend			
Lag Length: 0 (Automatic - based on SIC, maxlag=4)				
Prob.*	**Test value**			
0.8269	**-1.406146**	**Extended Dickey-Fuller Test Statistics**		
	-4.498307		**1% level**	**Critical values for the test**
	-3.658446		**5% level**	
	-3.268973		**10% level**	
The probability value of the test	**Test t**	**standard error**	**parameter value**	**variable**
0.1777	**-1.406146**	**0.184342**	**-0.259212**	**Gross fixed capital formation (investment) decelerated for one period**
0.5436	**0.619768**	**1694.411**	**1050.142**	**fixed limit**
0.5926	**-0.545341**	**105.0271**	**-57.27562**	**time direction**
-412.9075	**The mean of the dependent variable**		**0.205168**	**The coefficient of determination**
1307.899	**The standard deviation of the dependent variable**		**0.111658**	**Corrected determination coefficient**
17.20931	**Akaike info criterion**		**1232.719**	**standard error of the regression**
17.35867	**Schwarz criterion**		**25833139**	**The sum of the squares of the remainders**
17.23847	**Hannan-Quinn criter.**		**-169.0931**	**Log likelihood**
1.619267	**Durbin-Watson stat**		**2.194084**	**Value F**
			0.142017	**Prob(F-statistic)**

It is noted from Table (6) that:
1 -The calculated value of the expanded Dickey-Fuller test of 1.406146 (-) is less than the critical values of the test below a significant level (1%,5%,10%) in absolute terms, which leads to the

acceptance of the null hypothesis that there is a unit root of the series total head formation Fixed money, so we will move to the next step, which is to test the morale of the time trend, as follows:
2 -The computed value of the t-test for the time trend parameter has reached (-0.545341) which is less than the tabular values below a significant level (1%,5%,10%) in absolute terms, and this is a preliminary indication that the series is unstable, and accordingly, we will move to the next step:
3 -Estimation of the second model, which includes a fixed limit:
This step involves estimating the second model, which is represented by the existence of a categorical, which can be written as follows

$$\Delta Y_t = a + \lambda Y_{t-1} + \sum_{j=1}^{k} P_j \Delta Y_{t-j} + U_t$$

Where the results were as the results were shown in the following table:

Table (7)
Extended Dickey-Fullier Test of the second model, total capital formation at constant prices (Constant)

	The null hypothesis: the time series contains a unit root (the series is unstable)			
		Exogenous: Constant		
Lag Length: 0 (Automatic - based on SIC, maxlag=4)				
Prob.*	**Test value**			
0.2600	**-2.063234**	**Extended Dickey-Fuller Test Statistics**		
	-3.808546		**1% level**	**Critical values for the test:**
	-3.020686		**5% level**	
	-2.650413		**10% level**	
The probability value of the test	**Test t**	**parameter value**	**parameter value**	**variable**
0.0538	**-2.063234**	**0.082249**	**-0.169699**	**Gross fixed capital formation (investment) decelerated for one period**
0.6987	**0.393323**	**384.4025**	**151.1945**	**fixed limit**
-412.9075	**The mean of the dependent variable**		**0.191263**	**The coefficient of determination**
1307.899	**The standard deviation of the dependent variable**		**0.146333**	**Corrected determination coefficient**

17.12666	**Akaike info criterion**	**1208.421**	**standard error of the regression**
17.22623	**Schwarz criterion**	**26285063**	**The sum of the squares of the remainders**
17.14609	**Hannan-Quinn criter.**	**-169.2666**	**Log likelihood**
1.729446	**Durbin-Watson stat**	**4.256935**	**Value f**
		0.053819	**Prob(F-statistic)**

According to Table (7) it is noted that:
1 -The calculated value of the expanded Dickey-Fuller test, which is (-2.063234), is less than the critical values of the test under a significant level (1%,5%,10%) in absolute terms, which leads to the acceptance of the null hypothesis that there is a single root of the investment chain, so We will move to the next step, which is to test the significance of the fixed term, as follows:
2 -The calculated value of the t-test for the fixed term parameter has reached (1.073479) which is less than the tabular values under the significant level (1%,5%,10%) in absolute values.
3 -Estimation of the first model, which includes the absence of a fixed limit and time trend:
This stage represents the assessment of the third model, which is represented by the absence of a categorical and general trend, which can be written as follows:

$$\Delta Y_t = \lambda Y_{t-1} + \sum_{j=1}^{k} P_j \Delta Y_{t-j} + U_t$$

Where the results were as follows:

Table (8)
Dickey-Fullier Extended Test of the first model, no aesthetic fixed capital (without fixed, and without general direction)

	The null hypothesis: the time series contains a unit root (the series is unstable)			
		Exogenous: None		
Lag Length: 0 (Automatic - based on SIC, maxlag=4)				
Prob.*	**Test value**			
0.0123	**-2.595577**	**Extended Dickey-Fuller Test Statistics**		
	-2.685718		**1% level**	**Critical values for the test:**
	-1.959071		**5% level**	
	-1.607456		**10% level**	
The probability value of the test	**Test t**	**standard error**	**parameter value**	**variable**
0.0178	**-2.595577**	**0.056515**	**-0.146690**	**S3(-1)**

-412.9075	**Mean dependent var**	**0.184313**	**The coefficient of determination**
1307.899	**S.D. dependent var**	**0.184313**	**Corrected determination coefficient**
17.03521	**Akaike info criterion**	**1181.234**	**standard error of the regression**
17.08500	**Schwarz criterion**	**26510973**	**The sum of the squares of the remainders**
17.04493	**Hannan-Quinn criter.**	**-169.3521**	**Log likelizhood**
		1.751404	**Durbin-Watson stat**

According to Table (8) it is noted that the calculated value of the expanded Dickey-Fuller test for the parameter slowing money supply for one period of time amounted to (-2.595577) greater than the tabular value under a significant level (1%,5%,10%), so we reject the null hypothesis that says The presence of a unit root, which is an indication of the stability of the time series

3.3Dickey-Fullier Expanded Test of National Income Variable

For the purpose of applying the expanded Dickey-Fuller test for the national income series, the following stages have been passed:

1 -Estimation of the third model, which includes a fixed boundary and time trend**:**

$$\Delta Y_t = a + \beta t + \lambda Y_{t-1} + \sum_{j=1}^{k} P_j \Delta Y_{t-j} + U_t$$

So that:

ΔY_t : The first difference for the variable gross national income

Y_{t-1}: National income is decelerating one time period

Where the results were as follows:

4.1Conclusions:

From the results found in the body of the search, the following points were reached:

1 -The money supply variable is stable at the first difference level of the time series, which means that the series is integrated of the first degree.

2 -The variable of gross fixed capital formation is stable at the level of the time series, and this means that the series is integrated of degree zero.

3 -The national income variable is stable at the level of the time series, and this means that the series is integrated of degree zero.

4 -The GDP variable is stable at the first difference level of the time series, and this means that the series is integrated of the first degree.
5 -The contribution of the independent variable (money supply) to investment is negative. The negative sign of the parameter of the independent variable (money supply) is consistent with the economic logic of the modern quantity theory (Chicago School) Friedman and his supporters that the growth of money supply should be proportional to the growth of GDP, and that So as not to cause imbalances in the economy, and consequently, its negative impact on investment. The growth of money supply in Iraq was not commensurate with the growth of GDP, because an increase in money supply could affect some other economic factors, and some of these factors have an impact on the economy, leading to an increase in interest rates and thus to a reduction in investment. The price level and the expected effect of inflation.
6 -The contribution of the independent variable (GDP) to investment is negative.

2-4 Recommendations:

Among the conclusions reached, the researchers recommend the following:
1 -It is necessary to test the stability of the time series before performing any regression in order to avoid the problem of falling into a false regression.
2- Using other tests for the stability of time series, including the Phelps-Peron test.

References

1 -Al-Bashir, Abdel-Karim “The profit rate as an alternative to the interest rate in the treatment of the financial and economic crisis, a theoretical study” 2007_ Faculty of Economics and Management Sciences, Hassiba Benbouali University, Algeria.
2 -Al-Jarrah, Muhammad bin Abdullah “Sources of Inflation in the Kingdom of Saudi Arabia during the Period (1970-2007)” 2011 Standard Study _ College of Business Administration, King Saud University
3 -Ben-Kana, Ismail, "A standard study of some Algerian macroeconomic variables (between 1970-2001) and their prediction (for the period between: 2002-2006) 2005 Master's thesis in Economic Sciences - Faculty of Law and Economic Sciences - Department of Economics.
4 -Al-Janabi, Nabil Mahdi, Karim Salem “The relationship between crude oil prices and the dollar exchange rate using joint integration and causality (Granger) during the period (2009-2010)” 2011, College of Administration and Economics - University of Qadisiyah, Iraq.
5 -Al-Kiswani, Dr. Mamdouh Al-Khatib, "Demand for Money in Syria - Using Error Correction and Co-Integration Model" 2001 College of Administrative Sciences - King Saud University.
6 -Al-Musbeh, Imad Al-Din, "Factors Affecting Unemployment in the Syrian Arab Republic, An Applied Study Using the Methodology of Joint Integration" 2008, Egypt.
7 -Al-Majali, Khaled Shalashel, “The impact of economic variables on the volume of foreign investment in the Amman Stock Exchange during the period (1994-2009)” 2011, an analytical study, Faculty of Economics, Damascus University, Syria.

8 -Al-Mandalawi, Abbas Yahya Khader. "The Possibilities of Monetary Policies in Encouraging Domestic Investment in Iraq" 2004, Master's Thesis in Economic Sciences, College of Administration and Economics - University of Baghdad
9 -Al-Hajhuj, d. Hassan bin Rafdan bin Hassan “Determinants of Inflation in the Countries of the Cooperation Council for the Arab States of the Gulf - The Method of Joint Integration” King Faisal University - Kingdom of Saudi Arabia.
10 -Dr. Ehab "Economic Feasibility Study and Project Evaluation"
11 -Shaarawy, Dr. Samir Mustafa, "Introduction to Modern Analysis of Time Series" 2005, College of Science - King Abdulaziz University, Saudi Arabia.
12 -Sheikhid. Muhammad, "Econometrics Methods - Lectures and Applications" 2012, Jordan, Dar Al-Hamid for Publishing and Distribution.
13 -Saleh, Ouyaba, “The impact of the change in the exchange rate on the economic balance - a case study of Algeria 1990-2009” 2011 People’s Democratic Republic of Algeria, Ministry of Higher Education and Scientific Research - University Center in Ghardaia.
14 -Abdel Qader Attia, Dr. Abdel Qader Mohammed. "Hadith in Econometrics between Theory and Practice" 2004, Makkah Al-Mukarramah
15- Ministry of Planning - Central Statistical Organization - Directorate of National Accounts, Central Bank of Iraq, General Directorate of Research and Statistics.