Research Article

Measuring And Analyzing the Impact of Oil Shocks on The Gross Domestic Product in The Kingdom of Saudi Arabia Duration (1970-2020)

Researcher Ghada Saleh Abboud[1], Prof. Dr. Nabil Mahdi Al-Janabi[2]

[1]College of Administration and Economics, University of Al- Qadisiyah
eco.post28@qu.edu.iq
[2]College of Administration and Economics, University of Al- Qadisiyah
nabeel.aljanabi@qu.edu.iq
* Professor of Economics in the Department of Economics / Al-Qadisiyah University
** MA student in Economics

Article History: Received: 10 January 2021; Revised: 12 February 2021; Accepted: 27 March 2021; Published online: 16 May 2021

Abstract:
The research aims to measure and analyze the impact of oil shocks on the gross domestic product of the largest oil economy in OPEC, in the short and long terms. The period 1970-2020 covered all the positive and negative oil shocks to the global economy. And by describing a standard model for the oil shock and measuring its impact on the Saudi GDP, and by using the methodology of testing the limits and the slow gaps model ARDEL, after testing the absence of time series from the unit root, as well as analyzing oil shocks through the Impulse Responsible Function. The results support the hypothesis of a positive relationship to oil shocks on GDP in the long term, and thus the two do not move away from each other. And the existence of a short-term positive correlation through the error correction model (ECM). And that the results support the success of the Kingdom of Saudi Arabia and that Saudi Arabia in its efforts to diversify the Saudi economy through the "Saudi Vision 2030" and in reducing the heavy dependence of the oil sector in generating gross domestic product.

Keywords: oil shocks, gross domestic product, boundary test, impulse response function.

Introduction:

Fluctuations in global oil prices and oil shocks greatly affect business and macroeconomic performance indicators in both oil-exporting and importing countries as a result of globalization of the global economy and the increasing integration of global financial markets. The occurrence of positive or negative oil shocks has implications for the macroeconomic policies and economic activity of oil producing and exporting countries. The research deals with analyzing the impact of oil shocks and global oil price fluctuations on the economic performance of the largest oil exporter in OPEC, namely: Saudi Arabia, which depends heavily on oil revenues. It should be noted that the mechanisms of transmission of shocks in oil-exporting countries differ from those of importing countries. The importance of the research stems from the fact that it presents an important and sensitive topic, which is an analysis of oil shocks on the size of the GDP of the largest producer and exporter of oil in OPEC, i.e. their impact on the level of economic activity in the Kingdom of Saudi Arabia and the effect of the degree of economic diversification thereof and its importance in absorbing the effects of the shock, whether positive or negative. The problem faced by the research. The research starts from the hypothesis that "since the Saudi economy depends heavily on the revenue source, what is the impact of oil shocks on Saudi GDP for the period (1970-2020). The period includes all the oil shocks to which the global economy was exposed from the seventies of the last century to the last double shock?" 2020.

First. Theoretical framework and applied studies

Conceptual and epistemological framework for trauma: Shock can be defined as a sudden and uncontrollable event that has a major impact on the economy, and it is an expression of unwanted disturbances in the economy that affect the behavior of projects and returns 1, as in the oil price boom and the collapse of financial markets and shocks that affect the movement of international capital and are reflected in disturbances Short-term financing that leads to the final result of an impact on the gross domestic product. Both Bastianin and Manera defined the oil shock as a cutback in crude oil production due to political turmoil in the Middle East. While Nyangarika mentioned that it is a sharp change in oil prices, which greatly affects the level of production and the standard of living of the population, and these changes could be caused by a change in oil market conditions, followed by a sharp decline in production. Nordhaus sees the oil shock as an internal shift in the supply curve of crude oil resulting from political events outside the oil market and the overall economy.

The first challenge is to understand why oil price shocks reduce from real production in the first place. As there are two basic sets of reasons. Oil shocks can be classified according to the type of impact into two shocks: the positive oil shock, which is a sudden increase in oil export prices, and the total impact of that shock varies according to the relative weight of oil exports in the national income, and this type of shock has a role through the economy entering the expansion phase The recovery) from the economic cycle, the positive effect on government consumption, which increases public spending, especially if the state relies on the export sector as a main source of financing its public spending, and this is naturally reflected in some macroeconomic variables such as domestic production and aggregate demand, so the increase in government total consumption will increase It leads to higher output, incomes increase, and the level of use of production factors increases, provided that the economy does not reach the level of full[6] employment. The final effects of the (positive) oil shock were expansionary, and this shock was positively witnessed by many developing oil-exporting countries in the seventies, when they witnessed Oil prices have increased in the balance of payments of these countries and increase their revenues, but the development programs of these countries and the productive capacities It was not prepared to expand the volume of investments, and there was a gap between financial assets and real investments.[7] **The negative oil shock**: which is a sudden drop in the prices of oil exports, and that this decline in the global market price for exported oil commodities, and that this has an impact on the volume of export revenues, will subsequently affect the reduction of investment opportunities on the state's spending plans, so public spending will decrease, accompanied by a decrease in aggregate demand. And production decreases, and with it usage levels decrease.

2- The relationship between oil shocks and GDP

The most common theoretical explanation for this relationship is the so-called Dutch disease theory, which aims to explain the effects of high oil prices on GDP growth. In oil-exporting countries, some economists argue that the asymmetric effects of oil price shocks on economic growth in oil-exporting countries are the result of changing revenues from the oil industry. As the decrease in revenues leads to a deficit in the budget as a result of changes in oil prices. Thus, a higher oil price leads to GDP growth and lower oil prices lead to lower GDP and fiscal deficits. There are a large number of studies that have examined the excessive effects of fluctuations in world oil prices. These studies usually focus on examining the effects of the oil shock on oil exporting and importing countries. Meanwhile, some researchers argue that the oil price shock has a fundamental effect on the economy, some argue that this effect of oil prices depends on factors various including economic development, economic weakness, economic openness, and structural characteristics. There is no common vision for the effect of oil prices on macroeconomic variables. However, most economists agree that oil prices affect the economy through the supply and demand sides. As for opinions about the impact of global oil price shocks on the economic growth of oil exporting countries[9]. The mechanism by which oil price movements affect production in oil-producing countries has sparked widespread controversy over the years. This is based on the rate of decline or rise as well as the periods during which oil prices change. Stauffer (1984), Vahid and Jabber (1997), Majid (2006) and Amuzegar (2001) have argued that the effect of positive oil price shocks on the

[3] Bastianin , A & Manera, M. ,(2015) How does stock market volatility react to oil shocks ?
[4] Nyangarika, A. M. (2018) Correlation of oil price and gross domestic product in oil countries, p 42.

[1] Nordhaus, W. D. (2007) , Who's afraid of a big bad oil shock? Brookings papers on Economic Activity , p 219-238

production performance of oil-producing economies usually leads to currency appreciation stimulated by the accumulation of foreign currencies. Exchange profits and, consequently, an expansion of production. The three studies also showed that the opposite tends to be the case when there is a negative oil price shock10. Some studies argue that the situation described above may not be available to an oil-producing country because there are some factors that can prevent reaction chains from occurring (see Engelmann, Owyang, & Wall, 2012; Kilian, 2008). Some of these factors are the availability of domestic refining capacity, the nature of the change in oil prices and the level of economic diversification, among others (see Hamilton, 1983, 1996, 2003, 2008; Kilian, 2009; Kim & Roubini, 2000). These studies confirm that the oil-producing country with a narrow economic base and lack of domestic refining capacity may not enjoy an increase in production after the positive oil price shock, and the exchange rate may not increase due to the country's massive import of refined petroleum products. And other commodities. Hamilton (1983, 1996, 2003, 2008), Killian (2009) and Kim and Robini (2000) further indicate that production may not necessarily decline in the event of a negative oil price shock if the oil-producing country is widely diversified and has sufficient capacity. Domestic refining which will ease pressure on imports, which could prevent the currency from depreciating.

It has also been argued that the indication of the adverse response to a positive shock such as a negative shock may not be correct in most cases due to macroeconomic uncertainties and external cyclical changes that can cause distortions in the reactions of macroeconomic variables to external shocks. According to this school of thought, it affects Sharp drops in oil prices for oil-producing countries are more than unexpected increases in oil prices. The former causes a depreciation of the currency, and a subsequent decrease in production. It is evident from the previous discussion that there are arguments back and forth indicating a lack of consensus about the nature of the effects of oil price shocks on production performance in oil-producing countries[11].

Second: Estimation methodology: To demonstrate the impact of oil shocks on Saudi gross domestic product, we use the ARDEL model through the following equation:

$$\Delta gdps_t = a_0 + \sum_{i=0}^{r} a_{1i}\,\Delta gdps_{t-1} + \sum_{i=0}^{r} a_{2i}\,\Delta oshock_{t-i} + \sum_{i=0}^{r} a_{3i}\,\Delta infs_{t-i} + \sum_{i=0}^{r} a_{4i}\,\Delta tts_{t-i} + \beta_1 gdps_{t-1} + \beta_2 oshock_{t-1} + \beta_3 infs_{t-1} + \beta_4 tts_{t-1} + \varepsilon t \quad \ldots\ldots (1)$$

Gdpi = Saudi GDP. Oshock = oil shock. Infs, tts = total trade and inflation rate in Saudi Arabia, which are two explanatory variables that support the model[12.]

$=\Delta$ The first difference for the values of the variable .$=a_0$ Fixed limit. $=r$ The number of optimal temporal slowdown time .a_{3i}،a_{2i}،a_{1i} =Short-term transactions of a dynamic relationship. β3 ،β2، β1 =Long-term transactions through which to know the possibility of co-complementarity t *.time* .$=\varepsilon t$ *Random error limit*.

According to the above equation, if the possibility of co-integration between the variables under study according to the boundary test, the short-term relationship will be estimated using the error correction model as follows:

$$\Delta gdps_t = a_0 + \sum_{i=0}^{r} a_{1i}\,\Delta gdps_{t-1} + \sum_{i=0}^{r} a_{2i}\,\Delta oilshock_{t-i} + \sum_{i=0}^{r} a_{3i}\,\Delta infs_{t-i} + \sum_{i=0}^{r} a_{4i}\,\Delta tts_{t-i} + yECT_{t-1} + \varepsilon t \ldots\ldots (2)$$

[2] Daniel Rees,(2013) Terms of Trade Shocks and Incomplete Information, Research Discussion Paper, 9-2013, Economic Research Department, reserve Bank of Australia, July.

Mohsen Fardmanesh, (1991) , Dutch disease economics and oil syndrome: An empirical study, journal of World Development , Volume 19, Issue 6, June, P: 711-717

The description of changes in oil prices was based on the 1983 Hamilton study as follows:

- (Positive shock)O_t > 0 *if* O_t
  Other than 0

- (Negative shock)O_t < 0 O_t *if*
  Other than 0

The oil shock was estimated by: the random variable (residual) (resident) and by using the self-correlation function of the global oil price variable: after estimating and extracting the residual values, a regression is made between the residuals with their slowing values, and the resulting residues represent the oil shock. As follows:

Annual data were prepared (Table 1), which were collected from international sources (the World Bank, International Trade Statistics, and the International Monetary Fund). Figure 1 shows the time trend of the model variables for the period (1970-2020), annual data. It is noted that the time course of some variables is not stable in its general direction.

1- Unit root test

A stability test for the time series of variables Gdps, oshock, infs, tts with respect to the existence of the unit root is done by applying the tests of Dickie Fuller developed - extender - (ADF), and Phillips - Perron (PP), at level (level) and at difference. The first (Differences1) and under assumptions without categorical .The results were stability of the variables of the model at the level and the first difference, as shown in Table 2.

2- Cointegration test using the boundary method:

Since the variables of the model: gdps tts are first-class integral and infs, oshock is zero-degree integral, i.e. not integrated with the same rank, so the joint integration test cannot be applied by the Johansen method, and therefore we use the (ARDL) model. It can be seen from Table (3) that the value of the calculated F statistic was greater than the value of the upper limit of the limits (Bounds test) as defined by Pesaran in the case of a fixed limit for the function, and therefore we reject the null hypothesis and accept the alternative hypothesis that the variables are complementary together and achieve a long-term equilibrium relationship at The level of significance is 1%, 2.5%, 5% and 10%.

And since there is a correlation of complementarity between the variables, 'the long-term relationship is estimated, then the long-run coefficients represent elasticities. In light of this, the ideal model that gives the lowest value to the AIC standard is the ARDL (2,6,4,5) model for estimating the long-term equilibrium relationship, as shown in Figure 2. We conduct a number of tests on the model used to measure long-term elasticities, namely:

A- Test for heterogeneity of variance: Table (4) indicates that the model is free from the problem of heterogeneity of variance, and the calculated F value is not significant with a probability greater than 5%, and that the Chi-square parameter is not significant with a probability of (0,994) and (0.978).

B- B. LM self-correlation test: Table (5) indicates that the model is devoid of serial correlation if the calculated F value is not significant, with a probability greater than 5%, amounting to (0.92).

[9] Eltony, M. N. and M. Al-Awadi (2001): Oil price fluctuations and their impact on the macroeconomic variables of Kuwait: a case study using a VAR model, Olomola, P. A. and A. V. Adejumo (2006): Oil Price Shock and Macroeconomic Activities in Nigeria, International Research Journal of Finance and Economics 3, p: 28-34.
International Journal of Energy Research 25(11), p: 939-959.

[10] Olomola, P. A. and A. V. Adejumo (2006): Oil Price Shock and Macroeconomic Activities in Nigeria, International Research Journal of Finance and Economics 3, p: 28-34.
[11] Hamilton, J. D.(1966) (2002) , opcit
[1] Cunado, J., (2003). 'Do oil price shocks matter? ….Op cit , pp. 137–154.

C- The random errors distribution test: Figure 3 shows from the statistic not to reject the null hypothesis that random errors are distributed in a normal distribution.

3- Estimating the long and short-term parameters and the error correction parameter: The long-term relationship can be extracted from the error correction model. The relationship of variables in the level reflects this relationship and as shown in the table below, and the equation below Table 6 is the equation of the error correction parameter indicating the long-term relationship between the variables of the model and on as follows:

$$Gdps = 5.726 + 0.0178\ Oshock - 0.836\ \text{Infi} + 1.033\text{TTi}\ \ldots\ldots(6)$$

Equation 6 indicates the existence of a long-term relationship between the variables of the model. As the Saudi GDP is related to a positive relationship with the oil shock, increasing it by one unit leads to an increase in GDP by 0.0178 units, and this is consistent with economic theory, knowing that its impact is small, close to the correct zero. While an increase in the rate of inflation by 1% leads to a decrease in output by 0.836% and an increase in total foreign trade by one unit, which leads to an increase in output by 1,033 units, and this is consistent with economic logic. The final step in the ARDL model is to estimate the ECM model, which represents the relationship between the three variables in the short term, using the ARDL (3,0,2,5) model. Table 7 shows the speed of modifying the model to the equilibrium state or the error correction parameter is significant and with zero probability and takes a negative signal as expected, amounting to (-0.0946), that is, during a season of the year the imbalance is corrected in the short term and this increases the accuracy and validity of the equilibrium relationship in the long term. The oil shock is related to a positive short-term relationship with the gross domestic product, meaning that an increase in the oil shock by a dollar leads to an increase in output by (0.017) billion dollars. The existence of a short-term inverse relationship between GDP and the rate of inflation and positive with the total foreign trade in the Saudi economy for the period (1970-2020).

4-Structural stability test for the estimated ARDL model: This test reflects the short and long term coefficients that the data used do not have any structural changes in them over time. Two tests are used for this purpose: the CUSUM test and the cumulative sum test of consecutive residual squares CUSUMSQ. The two figures below show that the estimated coefficients of the ARDL model used for the variables of the Saudi economy are stable and in harmony in the results of correcting the error in the short and long terms.

5-Impulse response function: The figure below shows the pulse response function to shocks, which is derived from the vector error correction model (VECM), that the response of the Saudi GDP to an unexpected positive oil shock is initially large from the second period and its positive effect continues for the rest of the time periods, and it turns out that oil shocks have an important role in explaining Predicting error of the Saudi GDP. As for the response of the output to an unexpected shock in the rate of inflation by one standard deviation, it is negative and insignificant and approaches zero at the beginning of the first period and in the middle of the second period, but it gradually increases with a negative effect and slowly reaches its maximum in the sixth period, and then the decrease returns, achieving a negative effect over the length of the period. Searched. The resulting response to unexpected shocks that occurred in the first period, then fades in the second and third period and becomes non-existent and equal to zero, and then the improvement begins, achieving a positive effect for the rest of the period.

Conclusion:

This research paper reached a number of conclusions based on the analysis of data and standard results, and the study found that oil shocks have a positive effect on the GDP in the Kingdom of Saudi Arabia in the long term, as well as a positive relationship between total trade and an inverse relationship with the rate of inflation through the results of the border test. In the sense that these two variables remain close to most and do not move away, and the error correction parameter was negative and significant at the 5% level, reflecting the time needed for the imbalance in this relationship to return to the state of equilibrium. And a positive effect of the oil shock on the output in the short term from the results of the vector analysis that corrects the error. However, the impact of the oil shock in general is very small and approaches zero in the short and long terms. This gives an important conclusion that Saudi Arabia has made its efforts to diversify the Saudi economy through the "Saudi Vision 2030" in reducing the heavy dependence of the oil sector in generating gross domestic product.

Reference:

[1] Pans vargugis, and others,(2004) Exogenous shock in law income countries ,economic policy issues and there roll of international community , World Bank, p6

Salem Muhammad Aboud (2011), The Financial Crisis and the Future of Life Economics, Dar Al-Uloom, Baghdad, p *27*

[3] Bastianin , A & Manera, M. ,(2015) How does stock market volatility react to oil shocks ?

[4] Nyangarika, A. M. (2018) Correlation of oil price and gross domestic product in oil countries, p 42.

[1] Nordhaus, W. D. (2007) , Who's afraid of a big bad oil shock? Brookings papers on Economic Activity , p 219-238

[2] Daniel Rees,(2013) Terms of Trade Shocks and Incomplete Information, Research Discussion Paper, 9-2013, Economic Research Department, reserve Bank of Australia, July. Mohsen Fardmanesh, (1991) , Dutch disease economics and oil syndrome: An empirical study, journal of World Development , Volume 19, Issue 6, June, P: 711-717

Eltony, M. N. and M. Al-Awadi (2001): Oil price fluctuations and their impact on the macroeconomic variables of Kuwait: a case study using a VAR model, Olomola, P. A. and A. V. Adejumo (2006): Oil Price Shock and Macroeconomic Activities in Nigeria, International Research Journal of Finance and Economics 3, p: 28-34.

International Journal of Energy Research 25(11), p: 939-959.

Olomola, P. A. and A. V. Adejumo (2006): Oil Price Shock and Macroeconomic Activities in Nigeria, International Research Journal of Finance and Economics 3, p: 28-34.

Hamilton, J. D.(1966) (2002) , opcit

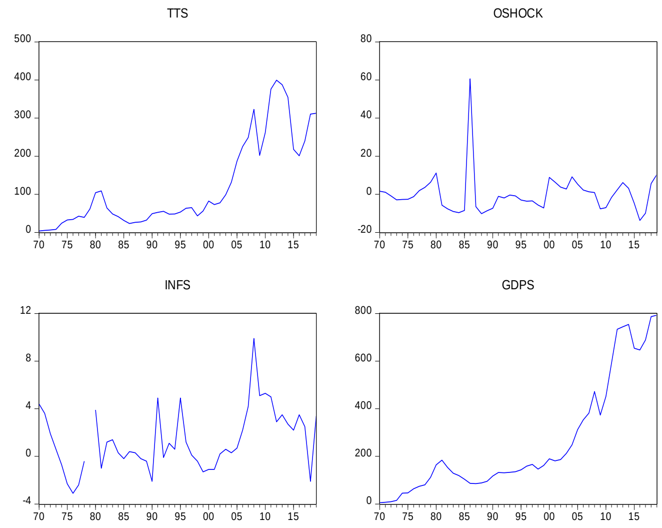
[1] Cunado, J., (2003). ‘Do oil price shocks matter? ….Op cit , pp. 137–154.

جدول 1

GDPS	INFS	OILP	SHOCK	TTS	
5.37	4.4	1.8	1.6	3.81	1970
7.18	3.6	6.9	1.11	5.22	1971
9.66	1.9	11.7	-0.82	6.48	1972
14.95	0.6	18.2	-2.93	8.09	1973
45.41	-0.7	28.6	-2.66	24.13	1974
46.77	-2.3	32.5	-2.6	32.53	1975
64.01	-3.1	27.3	-1.21	34.07	1976
74.19	-2.4	24.2	1.95	42.591	1977
80.27	-0.4	20.8	3.62	39.58	1978
111.9		31.7	6.36	61.36	1979

164.5	3.9	33.8	11.2	104.41	1980
184.3	-1	32.6	-5.68	108.91	1981
153.2	1.2	31.8	-7.66	64.01	1982
129.2	1.4	33.5	-9.05	48.38	1983
119.6	0.3	34.6	-9.6	41.29	1984
103.9	-0.2	32.7	-8.48	31.24	1985
86.95	0.4	20.5	60.58	23.21	1986
85.7	0.3	18.7	-6.48	26.44	1987
88.26	-0.2	22.2	-10.2	27.52	1988
95.34	-0.4	20.4	-8.6	32.11	1989
117.6	-2.1	22.5	-7.34	48.97	1990
132.2	4.9	21.8	-1.11	52.62	1991
131.1	-0.1	20.5	-1.93	55.5	1992
133	1.1	21.6	-0.37	47.9	1993
135.2	0.6	22.2	-0.82	48.56	1994
143.3	4.9	21.2	-2.98	53.52	1995
158.7	1.2	23.3	-3.61	63.5	1996
166	0.1	22.3	-3.44	64.98	1997
146.8	-0.4	23.3	-5.65	43.55	1998
161.7	-1.3	21.5	-7.15	56.06	1999
189.5	-1.1	27.6	8.89	82.25	2000
181.11	-1.1	28.5	6.4	72.98	2001
186.56	0.2	24.3	3.78	77.64	2002
212.41	0.6	32.2	2.82	98.95	2003
247.98	0.3	36.1	9.16	131.84	2004
312.64	0.7	50.6	5.32	187.24	2005
353.21	2.2	61	2.26	225.2	2006
381.53	4.2	69.1	1.34	249.15	2007
472.32	9.9	97.2	0.95	322.85	2008
373.25	5.1	71.6	-7.6	202.05	2009
452.01	5.3	77.4	-7.02	261.83	2010
592.24	5	105.4	-1.64	376.22	2011
733.95	2.9	103.8	2.32	399.44	2012
744.33	3.5	59.5	6.14	387.64	2013
753.83	2.7	55.5	3.16	354.54	2014
654.26	2.2	35.3	-4.67	218.01	2015
646.43	3.5	32.5	-13.72	200.86	2016
688.6	2.5	55.8	-9.96	239.99	2017
786.5	-2.1	63.8	5.6	310.38	2018
793	3.4	65.6	10.44	312.88	2019
706.2	2.1	61.4	7.54	301.24	2020

شكل 1



جدول 2

Variable	Level		1st Difference	Critical value			
	ADF test	Prob.	ADF test	Prob.	1%	5%	10%
gdps	0.4046	0.9812	-4.5518*	0.006	-3.5777	-2.9251	-2.6006
oshock	-5.5643*	0.000			-3.5713	-2.9224	-2.5992
infs	-2.8475	0.0593	-5.9945*	0.000	-3.5777	-2.9251	-2.6006
tts	-1.0721	0.7194	-5.4105*	0.000	-3.5777	-2.9251	-2.6006

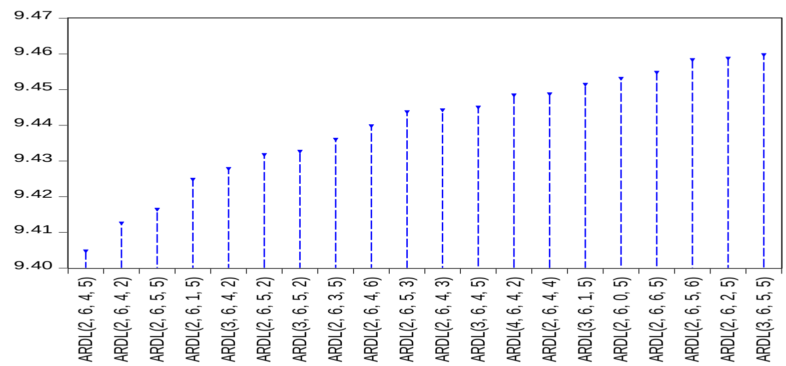
Variable	Level		1st Difference	Critical value			
	P-P test	Prob.	P-P test	Prob.	1%	5%	10%
gdps	0.7814	0.9927	-5.3616*	0.000	-3.5744	-2.9237	-2.5906
oshock	-6.6131*	0.000			-3.5713	-2.9224	-2.5922
infs	-3.7786*	0.005			-3.5713	-2.9224	-2.5906
tts	-0.8097	0.8074	-5.8762*	0.000	-3.5744	-2.9237	-2.5906

جدول 3

Null Hypothesis: No levels relationshipF-Bounds Test

I(1)	*I(0)*	*Signif.*	*Value*	*Test Statistic*
	Asymptotic: n=1000			
3.2	*2.37*	*10%*	*5.66573*	*F-statistic*
3.67	*2.79*	*5%*	*3*	*K*
4.08	*3.15*	*2.5%*		
4.66	*3.65*	*1%*		

شكل 2



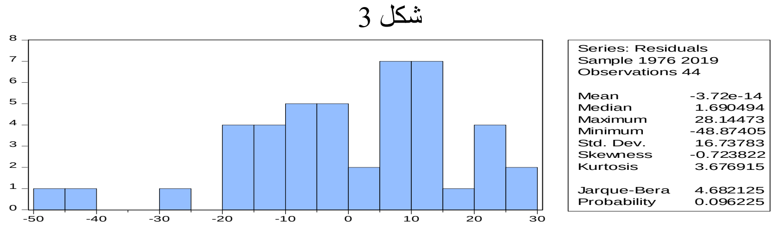
جدول 4

Heteroskedasticity Test: Breusch-Pagan-Godfrey		
0.9948	Prob. F(20,23)	0.310264F-statistic
0.9785	Prob. Chi-Square(20)	9.348741Obs*R-squared
1.0000	Prob. Chi-Square(20)	3.419070Scaled explained SS

جدول 5

Breusch-Godfrey Serial Correlation LM Test:		
0.9202	Prob. F(2,21)	0.083521F-statistic
0.8406	Prob. Chi-Square(2)	0.347232Obs*R-squared

شكل 3



جدول 6

Levels Equation
Case 2: Restricted Constant and No Trend

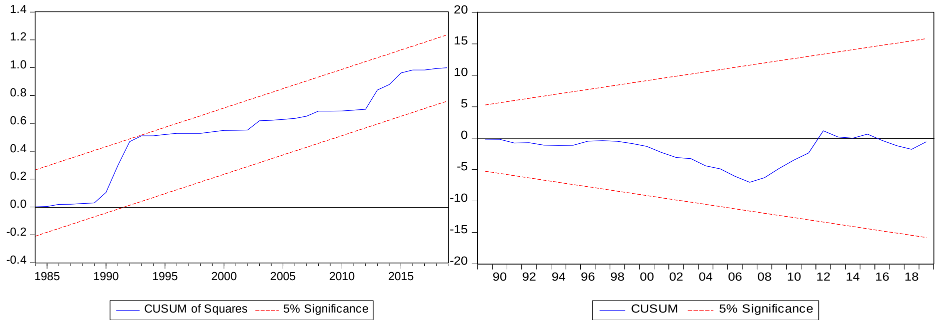
Prob.	t-Statistic	Std. Error	Coefficient	Variable
0.0077	0.129622	1.333210	0.01728	OSHOCK
0.0292	-0.296033	12.95991	-3.836561	INFS
0.0000	7.503219	0.299884	2.250097	TTS
0.8017	0.253294	22.60851	5.726606	C

*EC = GDPS +(0.0172*OSHOCK - 3.8366*INFS + 1.033*TTS + 5.7266)*

جدول 7

ECM Regression Case 2: Restricted Constant and No Trend				
Prob.	t-Statistic	Std. Error	Coefficient	Variable
0.0020	3.369434	0.080737	0.272036	D(GDPS(-1))
0.0000	5.946898	0.072943	0.433787	D(GDPS(-2))
0.2059	1.292145	0.561362	0.725362	D(INFS)
0.0392	-2.153334	0.577397	-1.243329	D(INFS(-1))+
0.0000	31.71305	0.032601	1.033881	D(TTS)
0.0333	-2.227485	0.078271	-0.174348	D(TTS(-1))
0.0000	-4.939566	0.086785	-0.428682	D(TTS(-2))
0.0000	-6.884673	0.046220	-0.318209	D(TTS(-3))
0.0036	3.148843	0.056677	0.017846	D(OSHOCK)
0.0062	-2.935525	0.032241	-0.094644	CointEq(-1)*
16.61311	Mean dependent var		0.977119	R-squared
45.50024	S.D. dependent var		0.971236	Adjusted R-squared
7.117827	Akaike info criterion		7.716880	S.E. of regression
7.519308	Schwarz criterion		2084.258	Sum squared resid
7.267495	Hannan-Quinn criter.		-150.1511	Log likelihood
			1.917707	Durbin-Watson stat

شكل 5



شكل 6

Response to Nonfactorized One Unit Innovations ± 2 S.E.