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Economic shocks and their impact on Egypt's agricultural sector for 2004-2023

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A B S T R A C T

The study aims to measure the impact of macro-shocks on the Egyptian economy in general and on the agricultural sector in particular by measuring the impact of some macro-variables on GDP and then agricultural output through the use of two-stage micro-squares(2SLS), the results of the long-term relationship assessment show that all economic variables covered by this research have moral implications for GDP through the mechanism of joint integration, The most influential of these variables is when the results of the response pulse analysis show that these variables appear clearly in their longitudes and when there is a shock, GDP will be significantly affected primarily by the first position of oil prices (ARDL) , and then inflation rates come (second place), while any shock to other variables may not be significantly affected by GDP and the reason for the rise is the value of the standard error as it contains an impact of uncertain forecasting of domestic production in past years, The study recommends attention to international economic transformations affecting the agricultural sector through appropriate agricultural policies and the use of scientific and technical achievements for the domestic use of modern agricultural technologies, as well as their transfer and localization

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Introduction

Developed and developing countries alike are often exposed to external shocks Such shocks may have positive or negative effects or may be temporary or permanent, Macroeconomic policy responds in an anti-cyclical manner in developed countries s economic cycle ", while developing countries, particularly petroleum, respond in line with the trend of the economic cycle, Expanding booms and shrinking recessions and thus the impact of external shocks will be reflected in the irregularity of fiscal policies in those States, often resulting in an increase in the frequency and instability of shocks caused by fiscal policy volatility and hence the instability of economic activity, The problem of the study is that Egypt's economy has experienced many circumstances and crises that have made it easy to experience any economic shock, whether of internal or external origin. s economic situation ", leading to sudden changes affecting fiscal and monetary policies that will reflect the internal situation of the Egyptian economy, The importance of the study shows that economic policies in developing countries, including Egypt, have a significant impact on economic activities. Any shock to the instruments of these policies is transmitted to macroeconomic variables because of their interrelationships with the rest of the policies of the economy, based on the premise that the macroeconomic shocks to Egypt's economy are due to imbalances and vibrations that may occur in global oil markets and macroeconomic policies. that have overlapped with external oil shocks in certain years economic policies ", which have had an impact on macro-policies and work to build economic policies that raise economic affairs and reduce shocks, The study relied on a methodology based on the first two methods, the descriptive approach based on previous studies and the quantitative analytical approach to data and using the common integration method, which is a modern method of standard analysis through the use of the statistical program (Eviews10) As well as some other statistical programmes, previous studies and research provide information in the field of scientific research as well as of great importance. This study comes to the foregoing in this area. It is necessary to take a quick look at a number of previous studies and indicate their findings. [1] In his study, measuring and analysing the impact of public expenditure shocks on some of Iraq's macroeconomic variables between (2004-2019) The study focused on analysing shocks and their impact on public expenditures and some variables of Iraq's economy The study found that there was a positive correlation between shocks to public expenditures and GDP. Increased public expenditures would, of course, increase domestic output. This was consistent with economic theory. The researcher recommended that investment expenditures be increased to current expenditures, because investment expenditures had the objective of creating a capital, leading to the expansion of economic activity and the directing of public expenditures to support private sectors. In their study, [2] analysis and measurement of the impact of the economic shock to Iraq's labour markets from 2004-2017. The objective of the study was to measure the impact of shocks on oil prices in Iraq. It concluded that the oil price shock led to lower prices and affected Iraq's economy as well as public expenditure Recommended that a strategy be developed to save surplus to take advantage of it in the event of economic shocks, reduce oil dependence and revitalize the agricultural sector. The study aimed to measure and analyse the effects of the economic shock on the agricultural sector from 2004 to 2020, focused on oil price shocks, used a time series to clarify the relationship with the future of the agricultural sector, and found that economic shocks were generated by low oil price shocks and used a time series to reduce the impact of corruption on the future of the agricultural sector. In its study of macroeconomic policies and its role in neutralizing the impact of the oil shock on some of Iraq's macroeconomic variables, [3] also presented a standard study between. (2019-1990) The Khazrji study aimed at measuring the realities of economic policies and their role in the impact of oil shocks on some macroeconomic variables based on the premise of oil shocks has negative effects on the macroeconomic, forcing macroeconomic policies to take actions and measures that have arisen directly and indirectly in order to identify such shocks, particularly by analysing some variables of each individual policy, on which the fiscal approach has been used in order to expose the oil shocks to Iraq to the economy Important in increasing the economy's productive capacity.The

Materials and methods of work

Description of the model used

The model's characterization phase is one of the most important and difficult to estimate stages in the standard economy and often the most difficult points of application of the standard economy are to formulate the model correctly.

As a model of our research, the main model is as follows:

Where

Y=F(X1,X2,X3,X4,X5)

Y1=B0+B1X1+B2X2+B3X3+B4X4+B5X5 +UI…(1)

Y1 = GDP (US $ Million)

X1 = Oil prices (USD).

X2 = taxes (million dollars).

X3 = Exchange rates (JD/USD).

X4 = Inflation rates (%).

X5 = Terms of trade (%).

B0 = absolute limit.

B1,B5 = Variable transactions.

UI = random variable.

The second phase of the estimate is worded as follows:

Y2= F (X1,)

Y2=B0+B1X1 + …UI…(2)

Y2 = Value of agricultural output (US $1 million).
X1 = the estimated function of the first GDP function.

Test results for stabilization of study variables using unit root test:
Granger and Newbold's work emphasized in 1974 that the existence of self-correlation in time chain data can make the R2 determination coefficient unreliable and lead to spurious regression. To overcome this problem, unit root tests were used as a precondition for the combined movement of time chains in the model [4]The non-existent hypothesis in the Dickie-Fuller expanded ADF test provides for the unit root in the variable's time series, meaning that it is unstable or unstable. This hypothesis is accepted if the probability value of the test is greater than the level of morale (5%), in which case we resort to taking the first difference and re-testing. They are otherwise rejected, in the sense that they are free of the unit's root, i.e. they are static or stable. The y2 variables are static at the level while the rest of the [5] . while the variables are all static and stable at the first difference and the ARDL model requirement is achieved.
In the second phase, the joint integration test, as shown in the boundary test shown in table (3), shows that the value of the F test(15.37758) is greater than all I (1) threshold values, at [1%, 2.5%, 5%, 10%], so there is a correlation between the variables in the modules of a level of morale below (1%), which means that we reject the notion of nowhere (H0: b = 0) We accept the alternative hypothesis (H1:b≠0) indicating a long-term balance between the study variables, which is shown in the following table:
The standard model used was found to be free of any standard problems of ARCH's test of contrast persistence and LM's self-correlation and stable model structure through Ramsey's test of abnormal distribution of Jarque-Bera errors, illustrated in table (3).
The results also demonstrated that there was no multiple linear interference problem, as described above, as all VIF magnification values were found to be less than 10, thus acceptable to the non-existence hypothesis of the linear correlation problem between each of the explanatory variables of the model.
Model Quality:
Based on the morale of high modules and the value of the high determination coefficient, and without standard problems, the modules largely reflect the relationship between the dependent variable and the autonomous variables, as shown in the figure below by the significant convergence of real values in the adopted variable represented by the red-colored curve and the values predicted for the dependent variable through the modularization. (Green Line), in addition to more (95%) of the retention (errors) (Blue Curve) occurring between the limit of confidence, as in figure (1) below:

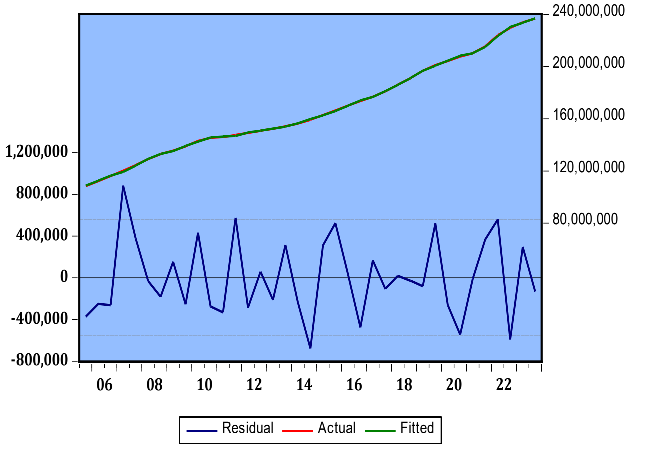

Figure 1. shows the quality of the model

To confirm that there is a common complementarity among model variables, there are values of CointEq's common integration factor. (-1) Negative and moral (-0.935301), indicating that the adjustment or conditioning speed is 1/0.934 = 1.069, through which the third phase can be moved to apply error correction methodology) (ECM) and as shown in Table (5) which will prepare us to move to the causation test of Granger) Based on probable test values, there is one causal link from the Y1 variant to the X5 autonomous variant, which means that the GDP causes the trade rate variable, in the long term, and this can be explained as follows, when a State's GDP falls, it may have an increased impact on its export
Assessment of short-term relationship:
Table 4 shows the results of the quantitative analysis of the short-term relationship according to the model (ARDL) (2.3.3.3.3.0 of the impact of its economic parameters on the domestic production of (2004-2023), showing that all variables of the economic model affect the short-term approved variable Ma 'x5, whose morale has not been shown in the short and long term because Egypt is consulted in large quantities for population need and a significant increase in population growth rates that barely compares to the size of its export restricted to exports of glass grain, It is noted that there is a congruence in the impact of all model variables on domestic production for both generations except the impact of the oil price on GDP is reverse, as Egypt is an oil importer (unlike Iraq) When the price of oil on the global market increases, GDP will decline.
There was a long-term balance between GDP and macroshock variables. referring to the amount of change in GDP as a result of the deviation of both oil prices, Taxes, exchange rate, short-term inflation and trade rate at their long-term balanced values for one unit each s long-term equilibrium after the effects of total shocks because 1/(-0.935301) = 1.069 ≅1 year.

Estimate the long-term relationship:
After confirmation of a common complementarity between the study variables, the long-term

relationship showing the impact of the economic model variables on domestic production in the long term was estimated, with the Eviews-10 programme estimating a number (3072) of models, based on the lowest value of (Akaike criterion) AIC (29.32381) showing that the best model of GDP (GDP) is 3.3l. The results were as in the table below. All variables except x5 show a moral impact on local and long-term production, X1, X2 and X3 reverse affect (oil prices, taxes and exchange rates), while X4 inflation rates affect exponentially as shown in table (5) below.

Oil price: GDP is adversely affected when oil prices increase and is inconsistent with economic logic. Increasing oil prices by one unit results in a decline in GDP by its apparent flexibility in the above function. This is no longer consistent with economic logic and is due to the composition of Egypt's economy, which is mainly dependent on its oil import. Higher oil prices lead to higher inflation, driving Egyptian banks to raise interest rates, which in turn depress investment and economic activity, causing their GDP to decline.

Taxes: GDP is also adversely affected when taxes increase and this is not in line with the economic theory because the higher the tax rates (1%) GDP falls by a function's flexibility, due to the fact that the Government provides significant support to energy prices related to the previous point (Oil prices), which in turn put pressure on the state's general budget, which causes weak public spending capacity and which causes a decrease in domestic output.[6]

Exchange rate: While in exchange rate variables the parameter signal showed a negative relationship (Reverse) With the variable adopted, when exchange rates increase by only one, the GDP rate will decrease by its flexibility, owing to the fact that the exchange rate of dinars vis-à-vis foreign currencies, especially the dollar. Egyptian exports, especially oil exports, are less competitive in global markets because their dollar prices are higher and imports are cheaper, leading companies and consumers to prefer imported goods to domestic goods, which adversely affect domestic product.

Inflation rate: The consequences of the inverse relationship between domestic production and inflation rates are shown, as inflation rates increase. (1%) Aesthetic GDP rates by a degree of flexibility, this is consistent with the concept of economic theory due to the high cost of production and an increase in interest rates that operate due to higher prices, reduced purchasing power of consumers and an increase in economic recession.[7]

Trade Rate: The results of the analysis also showed the immorality of the rate of trade on domestic production, and the reason for this is that there is no balance in trade, which barely mentions the amount of exports by Egypt's imports of goods and services for the vast population.

Dynamic analysis of GDP:

Disparity Segmentation:Variance Decomposition

The fragmentation or dismantling of the variability of error of the dependent variable into its component, is the way in which motor behavior is described (Dynamic) of the model, especially in the long term, as the variability of the dependent variable prediction line is dismantled (Approved) No multiple penalties. The amount of variability in the certified variable's forecast line is due to a forecast line for the variable itself, as well as errors in the interpretative variables. This analysis gives us information of relative importance rather than the impact of sudden changes (Shock) In the parameters of the interpretative model variables on the parameter of the dependent model variable, to avoid the problem of simultaneous effects in the errors of the model variables, the cholsky fragmentation is used (Choleski Decomposition) It is influenced by the order of model variables and significantly [8] In the fragmentation of the variance of a line to predict the use of the Cholsky fragmentation, the results of table (6) showing the ratio of error to predict domestic production are obtained.

Where the results of table (7) note that the standard error (Stander error) forecasting domestic production for the first half of the year is equal to (98.66888), and declines with time to reach (34.36116) In the last half of the tenth year, the study data were used as biannual data to obtain better results in terms of economic, statistical and statistical theory in the short and long term, and when the X3 exchange rate shock occurs, the GDP Y1 will be significantly affected primarily. Inflation rates (second place) come, while any shock in other variables may not be significantly affected by GDP and the reason for the rise in the value of the index error is due to the fact that it contains an impact of uncertainty in forecasting domestic production in past years, noting from the previous table that, over the medium term, (future year V) Van (19.56%) of variance on the forecast error of domestic production is due to its exchange rate shock by (1.32%) And then the trade rate (6.7%) and the oil prices contribute a percentage. (4.42%), the tax delinquency contributes 0.03% to the variable interpretation of the forecast error of domestic production.

It is noted from the previous table that in the medium term of the future tenth year, 41.2% of the error in forecasting domestic production is due to its exchange rate shock of 3. 9%), then the trade rate (6.2%) and oil prices contribute (4.5%), and the last taxes contribute (4.2%) of the variance explanations for domestic production forecasting lines as shown in figure (2).

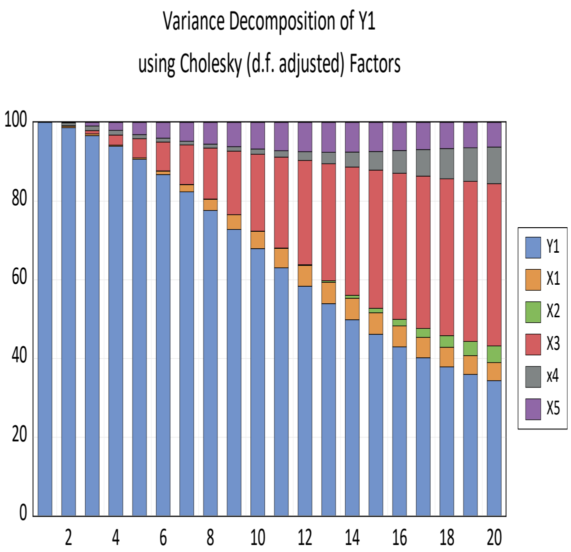

Figure 2. GDP error variance components for 10 years

Analysis of the response pulse function:

The response pulse function is to study the interaction of variables among them in the self-regression model [9], these functions reflect the reaction of variables to any shocks to this system, and this function can measure the impact of any shock to the amount of one standard deviation to one of the model variables in the current or future values of the rest of the model variables calculated based on modules. (VAR), table 8 shows the results of gross domestic product (GDP) [10], by a single standard deviation, where the schedule and format below show that the exchange rate, inflation rates, are more influential in domestic production (GDP), followed by oil prices and trade rates along the forecast period of (10) years, which is roughly similar to those previously reached in Fragmentation IDP . Table (7) shows the analysis of response pulses and impact of shocks as shown in the following table.

Table 8 shows a positive slight rise in the price of oil (x1) In the first year to the third year and then it begins to decline until the fourth year, it begins to rise until the end of the tenth year by forecasting, which affects shocks and its response to Egyptian GDP throughout the forecast period, because the Egyptian economy is mainly dependent on oil companies that increase their investments and are affected by the real value of the Egyptian pound, which leads to higher oil prices and higher demand for the Egyppound, thereby increasing GDP. [4]

Note from the table that taxes (x2) were in a positive rise in GDP the length of the forecast period of shocks and the extent of response until the ninth year and then began decreasing in the tenth year, which is due to the increase in taxes that increase government revenues and that increase expenditure on investment projects that raise GDP. [11]Exchange rates (x3) have been on a positive rise in gross domestic product (GDP) throughout the forecast period of shocks and response to the ninth year and then appear to decrease in the tenth year, resulting in a decline in GDP as the exchange rate increases investments and increases the cost of imports to increase demand for domestic commodities, thus increasing GDP [12]. It is further noted from the above table that inflation rates (x4) decrease in their negative impact from the first year of impact and response to the ninth year, as in exchange rates, until the tenth year began to rise, thereby improving GDP. This is because the impact of inflation rates leads to an increase in the cost of prices for goods and services, which lower investment rates, thereby increasing interest on loans, which in turn works on GDP[13] The above table notes that the trade rate (x5) appears to decline by negative impact from the first year to the fifth year and then begins to decline, impact shocks and response to GDP. This is due to global economic developments such as a decline in oil prices and increased trade tensions that lower terms of trade and then rise due to economic improvement and improved global developments.

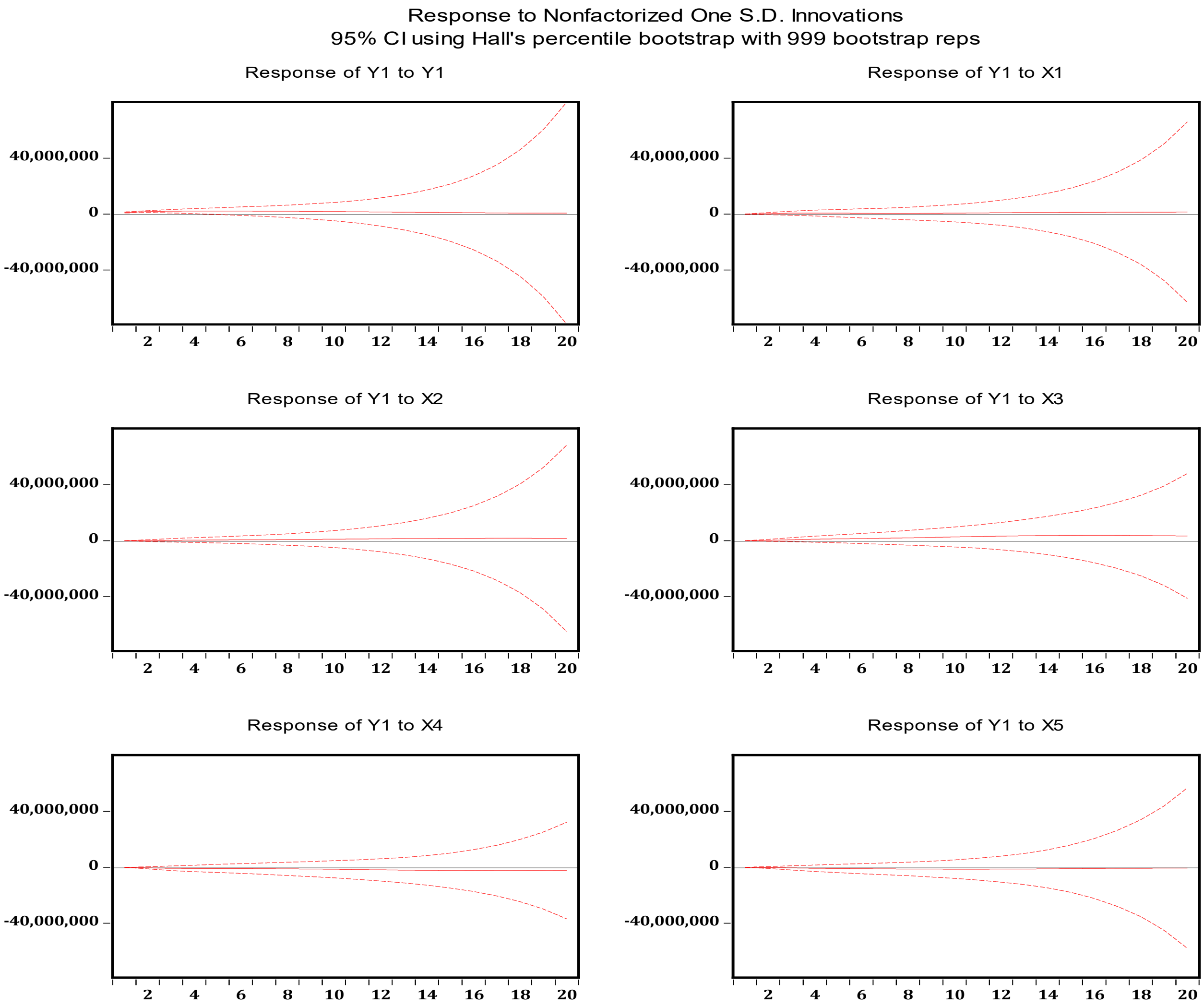

Figure 3. Analysis of the pulse function in response to Egypt's economic shocks

Estimation and analysis of the second model:
Table 8 shows that there is a correlation with a positive meaning effect of the GDP estimated from the first model in the value of the agricultural product at morale levels (5%). by increasing GDP, this results in an increase in the value of agricultural output. This result illustrates the correlation between gross domestic product (GDP) and the value of agricultural output, which corresponds to economic logic, as the rise in domestic production increases the fiscal competencies of the agricultural sector resulting in an increase in the value of the agricultural product, as shown in the following table:

Conclusions:

1- There is a fluctuation in agricultural output during the duration of the research and its decline during the duration of the study. This is noted by the decrease in its contribution to GDP
2- .ARDL and ARDL models have been shown to be the self-correlating models of distributed slowdown based on its stability of variations between the first original level of data and that the models are free of any standard problems, making them the body for future GDP forecasting.
3- Variables were changed on a long-term basis as representing the direct and indirect impact of variables that demonstrated the morale of all variables in all sample countries
4- .The results of the state of long-term integration of the variables also showed that when the variable deviates from its predictive value of one unit, the variables deviate by approximately 47% in this ratio and need approximately two years to return to their first balance.
5- The result of the analysis of the dynamic GDP analysis showed that there was a state of stability and stability in GDP.
6- The results of the analysis of the response pulses also showed that these changes are evident in their longitudinal terms. Egypt's level rate appears in the third year of oil prices, whereas in taxes in the second year, the exchange rate in the third year, inflation in the second year and the tax rate in the fourth year.
7- The impact of shocks on GDP and the impulses of responding to macroeconomic variables on the positive moral impact of GDP on the value of GDP has also been demonstrated.

Recommendations:

1- To pursue exchange policies based on domestic economic policies away from external international changes, particularly those of the Monetary Fund and the World Bank, which have emerged evidently through the floating of exchange rates that have led to substantial price increases.
2- To reduce inflation rates to low and economically acceptable levels by improving the performance of agricultural institutions, undermining their capital and assisting them in making sound financial decisions by adopting rational policies based on the principles and principles of macroeconomic policies and working on the need for sustained inflation policies
3- Attention to international economic transformations affecting the agricultural sector, through appropriate agricultural policies, and the use of scientific and technical achievements for the domestic use of modern agricultural technologies, as well as their transfer and localization.
4- The need to increase government support to the agricultural sector by increasing the proportion of allocations made to the agricultural sector in the State's general budget for the establishment and establishment of agricultural infrastructure projects
5- Intensify scientific studies and research on the agricultural sector to deepen the sector's problems and find appropriate solutions.

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Conflict of Interest
The authors declare that there are no conflicts of interest regarding the publishing of this article.

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Table 1. Stable Unit Root for Study Variables in Egypt For 2004-2023

UNIT ROOT TEST TABLE (ADF)									
At Level									
		Y1	X1	X2	X3	X4	X5	Y2	Y^1
With Constant	t-Statistic	1.6879	-2.4404	-1.5485	-0.5341	-0.4955	-1.4740	-0.7864	-1.7425
	Prob.	*0.9991*	*0.1447*	*0.4882*	*0.8637*	*0.8719*	*0.5245*	*0.8001*	*0. 099*
		n0	n0	n0	n0	n0	n0	n0	*
With Constant & Trend	t-Statistic	-0.3334	-2.3543	-1.8524	-1.8719	-2.1055	-2.0168	-2.5361	-0.3334
	Prob.	*0.9825*	*0.3885*	*0.6388*	*0.6292*	*0.5104*	*0.5558*	*0.3092*	*0.9825*
		n0	n0	n0	n0	n0	n0	n0	n0
Without Constant & Trend	t-Statistic	10.2830	0.0189	1.5213	0.7706	0.6827	-0.8223	2.5294	0.8199
	Prob.	*1.0000*	*0.6764*	*0.9630*	*0.8716*	*0.8545*	*0.3464*	*0.9952*	*0.5169*
		n0	n0	n0	n0	n0	n0	n0	n0
At First Difference									
		d(Y1)	d(X1)	d(X2)	d(X3)	d(X4)	d(X5)	d(Y2)	D(Y^1)
With Constant	t-Statistic	-2.5323	-3.9207	-4.3876	-3.0961	-4.3246	-3.9701	-5.2486	-2.6498
	Prob.	*0.1248*	*0.0088*	*0.0034*	*0.0450*	*0.0039*	*0.0080*	*0.0006*	0.0372
		n0	***	***	**	***	***	***	**
With Constant & Trend	t-Statistic	-2.7639	-3.7686	-6.4722	-2.9787	-4.2112	-3.8786	-5.0487	-2.9352
	Prob.	*0. 1261*	*0.0436*	*0.0003*	*0.1641*	*0.0195*	*0.0358*	*0.0041*	0.0367
		n0	**	***	n0	**	**	***	**
Without Constant & Trend	t-Statistic	-1.7601	-4.0855	-3.6326	-3.0304	-4.0662	-4.0214	-4.1804	1.9127
	Prob.	*0.0235*	*0.0004*	*0.0011*	*0.0046*	*0.0004*	*0.0004*	*0.0003*	*0.0015*
		**	***	***	***	***	***	***	***

Source: From the researcher's preparation based on the data of the statistical programme (Eviews 10)

Table 2. Joint Integration Test Results Using Border Test

K	Value	Test Statistic
5	**15.37758**	F- Statistic
	Critical Value Bounds	
I_1 Bound	I_0 Bound	Significance
3.79	**2.75**	**10 %**
4.25	**3.12**	**5 %**
4.67	**3.49**	**2.5 %**
5.23	**3.93**	**1 %**

Source: From the researcher's preparation based on the data of the statistical programme (Eviews 10)

Table 3. Diagnostic Tests for Total Economic Shocks in Egypt

The problem	Test	Statistics	value	p- value
Non-normal distribution of errors	Jarque-Bera	Jarque-Bera	1.185376^{ns}	0.552839
Autocorrelation	Breusch-Godfrey	F	5959^{ns}6.80	0.3668
variance difference	ARCH	χ^2	0.065208^{ns}	0.8000
structural instability of the model	Rasmsey	F	0.052054^{ns}	0.9592
Multicollinearity	**Variance inflation factor**	VIF		
	Variable	**Coefficient Variance**	**Uncentered VIF**	**Centered VIF**
	X1	**6.89E+09**	**16.88313**	**1.566829**
	X2	**110907.3**	**21.52173**	**2.231968**
	X3	**1.22E+12**	**65.58040**	**8.954325**
	X4	**2.58E+11**	**45.38482**	**9.814421**
	X5	**1.87E+10**	**67.16230**	**2.199031**

Source: From the researcher's preparation based on the data of the statistical programme (Eviews 10)

Table 4. shows the short-term estimate of economic variables of total shocks in Egypt for the period 2023-2004

ARDL Error Correction Regression
Dependent Variable: D(Y1)
Selected Model: ARDL(2, 3, 3, 3, 3, 0)
Case 2: Unrestricted Co
stant and No Trend
Sample: 2004S1 2023S2
Included observations: 37
ECM Regression
Case 2: Rest
icted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.12E+08	9945629.	0.000000	0.0000
@TREND	4497120.	407880.6	11.02558	0.0000
D(Y1(-1))	0.713283	0.084075	8.483860	0.0000
D(X1)	-65864.16	13017.63	-5.059612	0.0001
D(X1(-1))	1806.681	14082.25	0.128295	0.8995
D(X1(-2))	89197.71	13286.05	6.713638	0.0000
D(X2)	-905.7074	122.6465	-7.384696	0.0000
D(X3(-1))	846.9060	114.6069	7.389658	0.0000
D(X3(-2))	221.8473	132.5042	1.674266	0.1135
D(X3)	-2253881.	252245.4	-8.935270	0.0000
D(X3(-1))	419420.3	208236.5	2.014153	0.0611
D(X3(-2))	944767.7	187063.2	5.050528	0.0001
D(X4)	457797.3	70988.40	6.448903	0.0000
D(X4(-1))	-192575.9	76940.87	-2.502908	0.0235
D(X4(-2))	-490304.3	75181.32	-6.521624	0.0000
CointEq(-1)*	-0.935301	0.084993	-11.00447	0.0000
R-squared	0.938157	Mean dependent var		3553983.
Adjusted R-squared	0.893984	S.D. dependent var		1492278.
S.E. of regression	485886.7	Akaike info criterion		29.32381
Sum squared resid	4.96E+12	Schwarz criterion		30.02042
Log likelihood	-526.4904	Hannan-Quinn criter.		29.56940
F-statistic	21.23813			

* p-value incompatible with t-Bounds distribution.

Source: From the researcher's preparation based on the data of the statistical programme (Eviews 10)

Table 5. shows long-term estimate of total shock variables in Egypt (2004-2023)

ARDL Long Run Form and Bounds Test
Dependent Variable: D(Y1)
Selected Model: ARDL(2, 3, 3, 3, 3, 0)
Case 2: Restricted Constant and No Trend
Sample: 2004S1 2023S2
Included observations: 37

Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.12E+08	16450720	0.000000	0.0000
@TREND	4497120.	754994.9	5.956490	0.0000
Y1(-1)*	-0.935301	0.140446	-6.659488	0.0000
X1(-1)	-72173.70	13766.80	-5.242589	0.0001
X2(-1)	-1684.898	378.8219	-4.447731	0.0004
X3(-1)	-2434391.	339471.9	-7.171110	0.0000
X4(-1)	641756.5	83996.01	7.640321	0.0000
X5**	11432.49	18128.78	0.630627	0.5372
D(Y1(-1))	0.713283	0.113042	6.309895	0.0000
D(X1)	-65864.16	23848.24	-2.761804	0.0139
D(X1(-1))	1806.681	19812.21	0.091190	0.9285
D(X1(-2))	89197.71	17125.49	5.208476	0.0001
D(X2)	-905.7074	222.4296	-4.071883	0.0009
D(X2(-1))	846.9060	201.2176	4.208907	0.0007
D(X2(-2))	221.8473	214.0269	1.036539	0.3154
D(X4)	-2253881.	397971.4	-5.663425	0.0000
D(X4(-1))	419420.3	267263.1	1.569316	0.1361
D(X4(-2))	944767.7	266290.0	3.547890	0.0027
D(X5)	457797.3	112983.4	4.051900	0.0009
D(X5(-1))	-192575.9	102115.2	-1.885870	0.0776
D(X5(-2))	-490304.3	94730.66	-5.175772	0.0001

* p-value incompatible with t-Bounds distribution.

Levels Equation
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
X1	-77166.26	12550.22	-6.148599	0.0000
X2	-1801.449	178.4627	-10.09426	0.0000
X3	-2602788.	146004.1	-17.82681	0.0000
X4	686149.5	87181.49	7.870357	0.0000
X5	12223.32	18436.38	0.663000	0.5168

EC = Y1 - (-77166.2604*X1 -1801.4492*X2 -2602787.5122*X3 + 686149.4672*X4 + 12223.3235*X5)

Source: From the researcher's preparation based on the data of the statistical programme (Eviews 10)

Table 6. Egypt's gross domestic product variability in 2004-202

Period	S.E.	Y1	X1	X2	X3	X4	X5
1	1152806.	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
2	2123425.	98.66888	0.383385	2.48E-05	0.080547	0.744099	0.123069
3	3002463.	96.61316	0.448182	0.000103	0.858547	1.173692	0.906316
4	3776757.	93.91739	0.291642	0.000277	2.563703	1.176908	2.050078
5	4461056.	90.61418	0.360138	0.004298	4.840762	1.071875	3.108746
6	5081676.	86.72712	0.905738	0.015071	7.359913	0.998752	3.993403
7	5662775.	82.34050	1.828482	0.025093	10.04319	0.983080	4.779659
8	6217022.	77.63209	2.846502	0.025086	12.95552	1.022272	5.518528
9	6747087.	72.77386	3.738167	0.021917	16.14544	1.124214	6.196394
10	7252270.	67.88239	4.424029	0.036540	19.56550	1.321134	6.770406
11	7733011.	63.04636	4.913957	0.090415	23.08278	1.661782	7.204708
12	8191377.	58.35814	5.240159	0.202724	26.53119	2.187499	7.480283
13	8629281.	53.91888	5.428035	0.395694	29.75809	2.905764	7.593542
14	9047029.	49.82426	5.495552	0.694080	32.64650	3.781573	7.558037
15	9443179.	46.14743	5.460544	1.114139	35.11974	4.752265	7.405887
16	9815081.	42.92930	5.344930	1.650320	37.14199	5.751928	7.181531
17	10159596	40.17630	5.174026	2.272440	38.71813	6.729889	6.929216
18	10474124	37.86352	4.973209	2.936817	39.88706	7.657213	6.682180
19	10757721	35.94386	4.764558	3.602188	40.70747	8.523129	6.458798
20	11011633	34.36116	4.564854	4.239571	41.24293	9.326707	6.264768

Cholesky Ordering: Y1 X1 X2 X3 X4 X5

Source: From the researcher's preparation based on the data of the statistical programme (Eviews 10)

Table 7. Analysis of Egypt's GDP Response Function for the Period (2004-2023)

Period	Y1	X1	X2	X3	X4	X5
1	1152806.	0.000000	0.000000	0.000000	0.000000	0.000000
	(158411.)	(0.00000)	(0.00000)	(0.00000)	(0.00000)	(0.00000)
2	1776992.	346052.3	71711.48	320879.2	-364370.8	-112227.0
	(359949.)	(342332.)	(316111.)	(343048.)	(388069.)	(329434.)
3	2052669.	662670.6	274231.8	731282.3	-665100.7	-415748.7
	(637523.)	(703037.)	(600642.)	(734291.)	(795871.)	(679248.)
4	2138918.	755351.6	460437.1	1059937.	-775478.0	-691573.0
	(917892.)	(1022535)	(860475.)	(1116541)	(1149769)	(1023846)
5	2146088.	668130.6	572268.4	1308535.	-803123.2	-860523.0
	(1181205)	(1299345)	(1090921)	(1499130)	(1434482)	(1339023)
6	2123727.	535036.3	641716.4	1539249.	-855452.1	-967677.9
	(1439014)	(1554316)	(1309247)	(1907607)	(1669450)	(1612300)
7	2080666.	456409.9	722011.7	1790420.	-954182.6	-1066854.
	(1722072)	(1794510)	(1541879)	(2359830)	(1895898)	(1847192)
8	2010851.	462909.1	838190.3	2067810.	-1078492.	-1167261.
	(2068219)	(2035433)	(1809328)	(2893399)	(2140707)	(2066890)
9	1910416.	538976.3	980751.3	2365836.	-1219642.	-1249455.
	(2503244)	(2320719)	(2115939)	(3578460)	(2411270)	(2308520)
10	1783433.	656357.6	1126360.	2678222.	-1388126.	-1296104.
	(3052754)	(2668629)	(2467314)	(4505724)	(2731145)	(2610193)
11	1639445.	791133.2	1258545.	2993802.	-1590010.	-1302502.
	(3764297)	(3067886)	(2894373)	(5779967)	(3138039)	(2979773)
12	1488140.	925540.0	1373667.	3291703.	-1810187.	-1270159.
	(4708270)	(3540078)	(3448657)	(7516397)	(3627860)	(3419724)
13	1336029.	1046089.	1474711.	3544902.	-2017732.	-1200836.
	(5968050)	(4107205)	(4164421)	(9857291)	(4200868)	(3962343)
14	1186978.	1144326.	1563128.	3729497.	-2183235.	-1098514.
	(7638537)	(4779958)	(5065395)	(1.3E+07)	(4945718)	(4645128)
15	1045078.	1218855.	1635782.	3832547.	-2292058.	-973967.6
	(9837636)	(5589539)	(6213455)	(1.7E+07)	(5972598)	(5510559)
16	916854.5	1275068.	1687199.	3854411.	-2346427.	-844599.1
	(1.3E+07)	(6565190)	(7710445)	(2.3E+07)	(7349316)	(6623745)
17	810911.0	1321602.	1713440.	3806183.	-2359225.	-728416.1
	(1.7E+07)	(7750578)	(9692355)	(3.1E+07)	(9194270)	(8044407)
18	735363.4	1365569.	1714322.	3704914.	-2345805.	-636836.4
	(2.2E+07)	(9241205)	(1.2E+07)	(4.1E+07)	(1.2E+07)	(9846644)
19	694902.2	1409248.	1693142.	3568822.	-2318082.	-571372.5
	(2.8E+07)	(1.1E+07)	(1.6E+07)	(5.5E+07)	(1.5E+07)	(1.2E+07)
20	689288.1	1449577.	1654926.	3413608.	-2282095.	-525652.7
	(3.7E+07)	(1.4E+07)	(2.1E+07)	(7.3E+07)	(2.0E+07)	(1.5E+07)

Nonfactorized One Std.Dev.
Standard Errors: Bootstrap (999 repetitions)

Source: From the researcher's preparation based on the data of the statistical programme (Eviews 10)

Table 8. Results of the agricultural output model estimate

variable	**Std. Error**	**Coefficient**	**t Test**	**p- value**
C	7201.993	2060.166	$3.495831^{n.s}$	0.0020
$G\hat{D}P$	2.67E-05	3.31E-06	8.075451**	0.0000
R^2	%.95			
$\bar{R}^2$	%93			
F Test	**50.25627			
p- value	0.000000			

Non-significant n.s %1 significant at 1% **

Source: From the researcher's preparation based on the data of the statistical programme (Eviews 10)