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ECONOMETRIC MODEL OF THE IMPACT OF GOVERNMENT INVESTMENT SPENDING ON SELECTED VARIABLES IN THE PUBLIC HEALTH SERVICES SECTOR IN IRAQ FOR THE PERIOD 2012-2021

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ABSTRACT

The research aims to show the impact of government health investment spending on some indicators of the effectiveness of the health sector during the period 2012-2021, and the problem of the study was summarized in the low investment spending in the health sector and its inability to promote this vital sector, but the goal was to highlight the importance and role of government investment spending in the health sector, and accordingly, the basic hypothesis was based on the weak impact of the aforementioned spending in the health sector, and for the purpose of taking note of the subject of the research , the most important concepts were addressed The theory of government health investment spending and the importance and components of government investment health spending in Iraq, as for the applied side, the ARDL model has been adopted and through which the hypothesis was proven and it was found that the impact of government health investment spending was weak due to the lack of investment allocations for the health sector, and finally the research has adopted a number of recommendations, the most important of which is to deliberately The government to increase government health investment, raise the level of health spending, promote the development of the health industry, and promote sustainable economic growth in Iraq.

INTRODUCTION

Spending on the health sector is a basic requirement for the provision of health services in order to sustain life and then increase the possibilities that increase the productivity of individuals, and in particular, health spending is one of the most important pillars of economic development according to the perspective of the United Nations, as confirmed by the World Commission on Environment and Development in the 1989 report, and therefore the pursuit of countries - regardless of the degree of development to meet the health needs of individuals would achieve a high level of well-being for their peoples and achieve At the same time, an increase in its GDP, spending on health leads to maintaining the physical strength of the individual and increasing his ability to work, and thus the more public expenditures that provide individuals

with free or low prices, they can obtain those services easily on the one hand and increase the amount of their real income by the amount of amounts that were prepared to spend on those goods and services on the other hand.

Research problem

The weakness of investment financial allocations in the health sector, which led to a decrease in the efficiency of the health sector, especially the government, in addition to the decline in the role of government investment health spending and its inability to provide the necessary requirements for the advancement of the health sector

The importance of research: - The importance of the research stems from the fact that it deals with a basic phenomenon in human development, which is the phenomenon of investment in the health sector in Iraq and its effects on the multiple joints of the health sector

Study hypothec:

The research proceeds from the premise that investment health spending did not play an active role in developing and improving the effectiveness of the health sector.

Research Objective

The research aims to identify the extent to which investment health spending contributes to raising and improving the level of government health services, and to identify the reality of spending in the health sector in general in Iraq.

Research Structure

In order to cover the research topic, it has been divided into three axes as follows:

The first topic is the conceptual framework for government health investment spending, and the second is the importance of government health investment spending in Iraq, while the third is a standard model to show the impact of government health investment spending on some indicators of the effectiveness of the government health sector Nigeria.

METHODOLOGY AND PROCEDURES

The Spatial and temporal boundaries

The research dealt with the health sector in Iraq for the period 2012-2021

The first topic: - The conceptual framework of government health investment expenditures

First: The concept of government health spending

Health spending is an essential element to promote and maintain the health of individuals in society, and expresses the total expenditures allocated to the investment and management processes, which contribute to the implementation of the state's health policy, where we find that the large part of these expenses are borne by the state and social security, and the other part is borne by local groups and institutions.(Snoni, 2010,) 155Government health spending is also a key element that helps achieve the third sustainable development goal of good health and well-being (Ministry of Planning, 2018, 15), and we can define government health spending as spending on health care from public funds represented by government bodies. Regional, Local and Social Security (ESCWA, Dictionary of Statistical Terms, www.unescwa, org) Therefore, spending on health is not only an economic necessity, but also a moral

imperative, as such spending helps in preparing a healthy generation free of diseases, and a high capacity of productivity through physical, mental and mental abilities and the productive life of the human element. (Al-Hiti et al., 2009,07-06)

Second: Components of Government Health Spending

It is possible to distinguish between three main components of public expenditure in the health services sector, where the first and second are operational expenses and the third of investment expenditures: (Al-Rubaie, 2011, 38)

1- Public expenditure on human resources: represented in salaries, wages and incentives paid for the preparation, training and operation of human resources in the health sector, whether workers in the medical or nursing field... Other.

2- Public expenditure on intermediate products in the medical services provided: that is, it includes the items of expenditure on solutions and medicines and the needs of laboratories and laboratories of chemicals.

3- Public expenditure on the capital component: which includes spending on the purchase of equipment, machinery, specialized devices, buildings, etc.

Third: Factors affecting investment health spending

Health spending has many factors affecting it, which are expressed in a set of indicators that can be summarized as follows: (Bouziani and Tahtan, 2021, 549)

1- Productive indicators: We mean indicators related to the final product of health services, which is to raise and improve the level of health of members of society, which is a product of a non-material nature, and one of its most important indicators

A Life expectancy index: It means the expected age at birth or the number of years that the newborn child is expected to live, and based on this indicator it is possible to know the level of health services, and then estimate the productivity of public spending on the health sector, but in fact, life expectancy for the individual is not only due to the level of health services only, but is largely due to other factors such as nutrition, housing and the environment (Abdawi and Amal, 2020, 26-25).

B- Mortality Index: Mortality indicators are indirect measures of the productivity of public health spending, because the mortality rate depends on factors other than the level and volume of public health expenditure, such as wars. However, it cannot be overlooked or denied that the decline or lack of quality of health services leads to deaths, so this indicator can be taken as a partial and relative indication. (Ministry of Health, Annual Statistical Report, 2021, 28-25).

2- Health services indicators

Health services indicators are direct measures through which the productivity of spending on the health sector is estimated, and they are used to determine the extent to which members of society can access health services, (former Abdawi and Amal, 2020-2021, 26-25), and this indicator includes three sub-indicators: Ministry of Health, Annual Statistical Reports, for the year 2005-2021)

Primary health care indicators: represented by the number of primary health centers, the number of visits to patients, and the number of doctors

B Secondary and tertiary health care indicators: represented by the number of government and

private hospitals, the number of beds prepared for sleeping, the number of ambulances, the number of outpatients, the number of patients and the number of surgeries, and the number of hospital beds per 1000population

C - Human resources indicators: represented by the number of medical staff (the number of specialized and non-specialized doctors, the number of dentists, the number of pharmacists), the number of nursing staff (the number of nurses - the number of health professionals) and the number of supporting staff (administrators, engineers and technicians..Other)

The second topic: the importance and components of government investment health spending in Iraq

First: The importance of government investment health spending in GDP

The data of Table (1) indicate that the operational health expenditure has increased rapidly, reaching its lowest in 2012 to reach (6,013,962) million dinars and reached its maximum of (7358261) million dinars in 2021. However, it witnessed volatility and decline during the years 2014 (2017) due to the double crisis that the Iraqi economy was exposed to. The percentage of operating health expenditure constituted the highest in 2012, reaching 2.37% of GDP, and then this percentage fluctuated after this year between decline and rise until it reached its maximum in 2020 and reached (2.62%). Operating health expenditure amounted to (5,651,582) million dinars in 2020. It should be noted that the growth rate of operational health expenditure has reached (14.3%) annually, which is a very high percentage compared to investment health expenditure, which reached during the research period (7%), and this means that operational health spending is mostly wages and salaries that do not contribute to the development of the health sector. While the investment health expenditure reached its lowest in 2017, reaching (13,344) million dinars, and reaching a maximum of 733,495 in 2013. However, the percentage of this expenditure of GDP did not reach 1%, as it remained below this level during the research period (20122021). In general, the growth rate of the percentage of investment health expenditure from GDP was negative, reaching (-1.7%) during the research period. It is a serious indicator that indicates that there has been no investment change in this sector, but on the contrary, it has led to the erosion of the technical infrastructure in this sector.

Table (1) Percentage of Operational and Investment Health Expenditure of GDP in Iraq for the Period (2005-2021) Million JD

Years	Operating Health Expenditure (1)	Health Investment Spending (2)	Government Health Spending (3)	Gross Domestic Product (4)	Percentage of Operating Health Expenditure as a Percentage of GDP (5)	Percentage of investment health expenditure as a percentage of GDP (6)
2012	6,013,962	224,429	6,238,391	254225490.7	2.37	0.09
2013	6,181,598	733,495	6,915,093	273587529.2	2.26	0.27
2014	4,542,122	449,752	4,991,874	266,332,655.1	1.71	0.17
2015	4,081,028	107,217	4,188,245	194,680,971.8	2.10	0.06
2016	4,108,054	26,725	4,134,779	196,924,141.7	2.09	0.01
2017	4,034,370	13,344	4,047,714	221,665,709.5	1.82	0.01
2018	4,632,269	29,558	4,661,827	268,918,874	1.72	0.01
2019	5,834,304	31,830	5,866,134	276,157,867.6	2.11	0.01
2020	5,651,582	61,709	5,713,291	215,561,516.5	2.62	0.03
2021	7,358,261	85,587	7,443,848	301,152,818.8	2.44	0.03
Annual growth rate	%14.3	%7	%14.2	%8.6	%5.3	%-1.7

Source: Column (2-1) Ministry of Health Department of Planning and Human Resources

Development, Department of Health Statistics, Annual Statistical Report (for Miscellaneous Years) Ministry of Planning Department of Government Investment Projects Miscellaneous years, column (356) prepared by the researcher, column (4) Ministry of Planning Statistical Center

Table (2) Investment Expenditure Percentage of Total Public Expenditure and Percentage of Investment Expenditure for the Period (20052021) (Million Dinars)

Years	Health Investment Expenditure (1)	General Total State Expenditure (2)	Total Investment Expenditure of the State (3)	Percentage of investment health expenditure as a percentage of total public expenditure ½	Percentage of investment health expenditure of total investment expenditure 1/3
2012	516,834	105,139,575	29,350,952	0.2	0.8
2013	733,495	119,127,556	40,380,750	0.6	1.8
2014	449,752	112,192,125	35,450,453	0.4	1.3
2015	107,217	82,813,611	27,431,819	0.1	0.4
2016	26,725	73,570,822	18,408,055	0.0	0.1
2017	13,344	75,490,115	16,464,461	0.0	0.1
2018	29,558	80,873,188	13,820,332	0.0	0.2
2019	31,830	111,723,523	24,422,590	0.0	0.1
2020	61,709	76,082,442	3,208,905	0.1	1.9
2021	85,587	102,849,660	13,322,973	0.1	0.6
Annual growth rate**[1]		8.6%	-1.1%		

Source: Column (1) Ministry of Health Department of Planning and Human Resources Development, Department of Health Statistics, Annual Statistical Report (for Miscellaneous Years) Ministry of Planning Department of Government Investment Projects Miscellaneous Years Column (2-3) Ministry of Planning Statistical Center (National Accounts) Column (4-5) Prepared by the researcher

Table (3) Per capita Share of Total Health Expenditures in Obstacles for the Period (2005-2021)

Years	Total expenditure on the Ministry of Health (million dinars) (1))	Population (2)) (million inhabitants)	Per capita share (one thousand dinars) 2÷1 = (3))
2012	6,238,391	29459	211.765
2013	6,915,093	30218	228.840
2014	4,991,874	30994	161.059
2015	4,188,245	31787	131.760
2016	4,134,779	32598	126.841
2017	4,047,714	31967	126.622
2018	4,661,827	32814	142.068
2019	5,866,134	33678	174.183
2020	5,713,291	34558	165.325
2021	7,443,848	35454	209.958

Source: Ministry of Health Department of Planning and Human Resources Development, Department of Health Statistics, Annual Statistical Report (for Miscellaneous Years) Ministry of Planning Department of Government Investment Projects

Table (4) Growth rate of total health expenditure, operational health expenditure and investment health expenditure

Years	Total health expenditure	Its growth rate	Operational Health Expenditure	Its growth rate	Health Investment Spending	Its growth rate
2012	10,755,528	76.9	6,013,962	50.9	224,429	-56.6
2013	11,428,501	6.3	6,181,598	2.8	733,495	226.8
2014	9,808,951	-14.2	4,542,122	-26.5	449,752	-38.7
2015	8,928,677	-9.0	4,081,028	-10.2	107,217	-76.2
2016	9,217,827	3.2	4,108,054	0.7	26,725	-75.1
2017	9,310,997	1.0	4,034,370	-1.8	13,344	-50.1
2018	11,502,182	23.5	4,632,269	14.8	29,558	121.5
2019	13,127,655	14.1	5,834,304	25.9	31,830	7.7
2020	14,953,369	13.9	5,651,582	-3.1	61,709	93.9
2021	18,035,422.	20.6	7,358,261	30.2	85,587	38.7

Source: Ministry of Health, Department of Planning and Human Resources Development, Department of Health Statistics, Annual Statistical Report (for Miscellaneous Years), Ministry of Planning, Government Investment Projects Department Miscellaneous Years, and Column (246) prepared by the researcher

Second: The importance of government health investment spending in the general budget

Table (2) indicates that the health investment expenditure, which reached a maximum in 2013 (733,495) million Iraqi dinars and reached the lowest in 2017 to (13,344) million dinars, and this expenditure fluctuated during the rest of the research years. For the reasons we have mentioned in the preceding paragraphs. As for the total public government spending, it reached its maximum in 2013, as it reached (119,127,556) million Iraqi dinars and reached its lowest in 2016, as it reached (73,570,822) million Iraqi dinars, and this spending fluctuated between increase and decrease in the first years of research according to security, economic and international conditions. The arithmetic average of this expenditure was (78,169,683) million dinars during the research period (20122021). While the annual growth rate during the research period was (8.6%). Table (2) also shows that the total government investment expenditure reached its maximum in 2013, reaching (40,380,750) million dinars, and it was below in 2020, as it reached (3,208,905) million Iraqi dinars, and this expenditure fluctuated during other research years. We also note that the annual growth rate of this expenditure was negative during the research period, as it was (-1.1%), which means a slowdown in total government investment spending and an increase in non-productive operating spending during the research period. And by following up the percentage of investment health spending of the total public expenditure. We find that this percentage did not exceed (0.5%) and was equal to zero during the years (20162019). This is a negative indicator of the performance of this spending. Advances in the field of medicine require the introduction of new technology and medicines in order to respond to the needs of the population. This requires an increase in the proportion of investment health

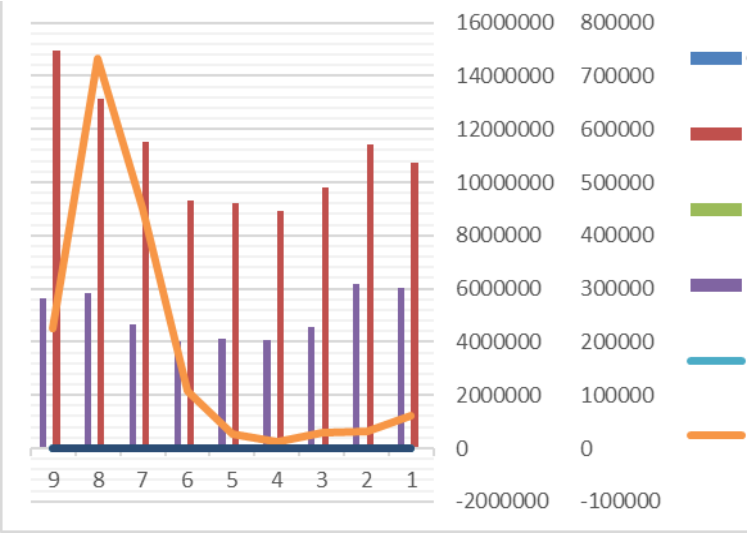
spending to keep pace with such development. In addition, most government medical institutions suffer from a shortage of medicines, and the high rate of damage to medical equipment in them. As for the percentage of investment health spending in the total investment spending, we find that it is very low, as it reached the highest in 2020 by (1.9%). The lowest during the years (2016 20172019), reaching (0.1%), respectively.

It is worth noting that the World Health Organization indicates that at least 5% of GDP should be allocated to the health sector. (Human Development Report, Public Health Expenditure, 2019). This percentage has not reached the health sector in Iraq, which reflects the deterioration in meeting its requirements and what Iraqi families bear when requesting treatment services, especially in light of the weakness or absence of levels of health insurance. In summary, operational health expenditure reached an annual growth rate of (14.3%) during the research period, and this came as a result of the expansion policy in employment, especially in the health sector. This is equivalent to double investment health spending (7%). This reflects the extent of the deterioration of the health system in Iraq.

There is a decrease in per capita total health expenditures, which means a high expenditure borne by the patient, which leads to the lack of families and lack of access to health services. In addition, the prices of treatment in the private sector exceed the capabilities of individuals to pay, and these capabilities depend or depend mainly on the methods of compensation from health insurance institutions and the number of individuals covered by compulsory insurance. Table (3) indicates that the highest share per capita has reached a maximum of (228.8) thousand dinars in 2013 and reached the lowest in 2017, as it amounted to (126.6) thousand dinars, and this share confirms the low per capita of the total expenses of the Ministry of Health, and thus incurring high costs that strain the Iraqi citizen in review, treatment and laboratory tests.

As for the annual rate of change of total health expenditures, it witnessed a strong fluctuation reaching a maximum of (76.9%) in 2012 and a negative low of (-14.2%) in 2014. This fluctuation in the rate of change of this indicator is due to the security and economic conditions witnessed by Iraq during this period. This negatively affected the life of the Iraqi citizen in terms of health care and reduced the suffering of individuals under difficult conditions in terms of the costs of obtaining medicine and medical examinations (see Table 4), while the annual rate of change of operational expenditures also witnessed fluctuations during the research period. It reached a maximum of (50.9%) in 2012 and the lowest (-26.5%) in 2014. This volatility reflects increased spending on wages and salaries, which was impacted by increased employment in non-medical and non-productive areas. (See Table 4). While the annual rate of change of investment expenditures also witnessed a strong fluctuation, reaching a maximum of (226%) in 2013. and below (-76.2%) in 2015. The rate of change of this indicator has been linked to economic and political conditions. Iraq was subjected to a double crisis represented by low oil prices on the one hand, and the occupation of three provinces by the terrorist organization ISIS (see Table 4).

sure 1 Growth rate of total health expenditure, operating health expenditure and investment health expenditure for the period (20052021)



source: Prepared by researchers based on Table (4) data

Third topic: An econometric model to show the impact of government health investment spending on some indicators of the effectiveness of the government health sector

First: Describe the model variables that reflect the effectiveness of the health sector

1- GDP in the health sector: It means what the health sector produces of medical goods and services during a specific period, often one year, and Table (5) shows the gross domestic product in the health sector and its annual rates of change in Iraq for the years 2012-2021, and its values have witnessed a clear fluctuation throughout the research period

2- Investment spending on health care: Investment spending on health care occupies a wide area of importance because of its prominent role in human life, and the following table shows the importance of that spending and the relative annual rate of change for the period 2012-2021, and the share of spending referred to was the largest, as it exceeded eighty percent throughout the research period, but the relative annual change was characterized by instability for the same period

3- Spending on medical devices and equipment: Through Table (7), we notice the annual rate of change of expenditures on devices, which was also characterized by clear fluctuation, sometimes rising and sometimes falling, and this is the result of fluctuating investment spending in the health sector, which depends almost entirely on oil revenues of an unstable nature.

Second: Description of the standard model: The model adopted in this chapter takes the following description:

(1) GDPt=β o + β 1 HCEt+ β 2 EDME + Ut.....

Whereas:

GDP: Expresses the GDP in the health sector. (billion Iraqi dinars)

HCE: Investment spending on healthcare. Iraqi Billion)

EDME: Investment expenditure on medical equipment and devices. Iraqi Billion)

β 1,β 2: Expresses long-term coefficients.

β o: intersection border

U: random term, whose median is equal to zero and its variance is constant.

ARDL model: The ARDL model in the short and long term takes the following formula:

DGDP= Bo + ∑β

$$DGDPt = Bo + \sum_{i=1}^{a} \beta 1\ DGDPt - 1 + \sum_{i=2}^{b} \beta 2\ DHCPEt - 1 + \sum_{i=3}^{c} \beta 3\ DEDMEt - 1 + \S i1\ GDPt - 1 + \S 2\ DHCEt - 1 + \S 3\ EDMEt - 1 + ult \dots \dots (2)$$

Long-term equation:

GDPt = aI + S1 GDPt-1 + S2 DHCEt-1 +S3 EDMEt-1 + ult....(3)

Short-term equation:

DGDPt = aI + $\sum_{i=1}^{a} B1\ DGDPt - i$ + $\sum_{i=2}^{b} B2\ DHCPEt - i$ + $\sum_{i=3}^{c} B3\ DEDMEt - i$ + u2t….(4)

Whereas: B3, B2, B1short-term parameters

S3, S2, S1

long-term parameters

hird: Research Methodology: The methodologies presented by (Granger, Engle) (AWAN, et, al, 2018, 823) have been placed on preconditions, which are that all the variables studied must be static at the first difference One of the disadvantages of the methodologies referred to is that cointegration tests are poor in small-scale samples, so in order to overcome this defect of methodologies, we resorted to using the self-regressive model of distributed deceleration (ARDL) presented by Pesaran, 1998,371-413)) to any of the explanatory variables (EDME, HCE). This means that if the standard theory indicates a bidirectional causal relationship from the dependent variable and any of the explanatory variables, it is better to choose another methodology because the feedback requirement is one of the basic conditions in the ARDL methodology. If there is an impact of healthcare investment spending (HCE) on GDP, it is very likely that GDP can lead to increased investment spending on healthcare, so the ARDL model is not a good test in this case and once the absence of feedback is achieved, the ARDL methodology is started by applying unit root tests.

Unit root test: Dicki-Fuller AD F Test

Time series data are often non-static, and the stillness of these series is very important in economic studies. If the results of time series are non-static, they give false (misleading) results, i.e. meaningless results. Therefore, it is necessary to obtain correct results and avoid false results, as the data must be static (Gujarati, Porter, 2010, 380).).

ARDl-Bounds model

The ARDL model was introduced by Pesaran and was developed by Pesaran, Shin et al. (2001).

1 that this model does not require that all variables be jointly integrated of the same degree, meaning.

2 The ARDL model can be applied if all variables are jointly integrated from different degrees of Or Or even a combination of both, i.e. and. Which was not acceptable in the traditional model and methodologies.

3 The ARDL model of cointegration provides robust and reliable results and a consistent estimate of long-term coefficients in the case of small samples compared to other traditional cointegration methodologies. (Hang, 2002, 399-412).

Bound Test: This research was conducted using the bound test to find out the long-term relationship as specified in equation (2) below, and using F-statistic and with the help of two limits., i.e. the minimum and upper limits to verify the interintegration of variables, and in this regard the null hypothesis includes:

Ho: Lack of co-integration. vs. alternative hypothesis

H1: Having co-integration

If the statistical values of F are greater than the upper limit, then the null hypothesis is rejected, but if the statistical values of F are less than the minimum, we conclude that there is no common integration.

Fifth: Analysis and presentation of the results of the standard model:

This research includes three variables, representing (GDP) in the dependent health sector, investment spending on health care (HCE) and investment spending on devices and equipment (EDME) and the results respectively are: Unit Root Test ARDL Model Estimation, ARDL Boundary Test The ARDL approach, the ECM error correction model and finally diagnostic tests.

1- Unit Root Test: Table (4) Unit Root Test (ADF) for Lookup Variables

Statistical Appendix)) EviEw12 Source: From the work of the researcher based on the data of the program

Table (4) reflects the results of the unit root tests for all the time series approved in the research. Unit root tests were applied to check whether the data is static or not, so the time series is very important, because if the trend is found in the data, we will get false results and do not serve the research, so unit root tests were adopted to avoid such results. The table above shows the tests at the level, at the first difference, and at the significance level 5%. Therefore, the null hypothesis is rejected due to the lack of direction in the surveyed data, and the alternative hypothesis is accepted because the data is static. Therefore, we can move to discover the relationship between the explanatory variables and the dependent variable by applying the ARDL model.

2-Estimate the ARDL model: based on unit root tests. All variables are static at the first difference or it does not have the root of the unit at the first difference.

Sixth: Interpreting the results of the ARDL model in the short term

We note from the results of the ARDL estimate in Table (4) that the variable LGDP when slowing down for one period has a positive effect on the current period and was significant in its impact in economic terms, as the value of 0.05 P. value> and this positive effect of this

variable moved to a negative impact in the duration of the slowdown (2) was not significant in economic terms, as the value of P. value exceeded the value of the level of 5%. Similarly, the effect of this variable was negative and non-significant in the duration of the slowdown (3).

Table (5) Estimating the ARDL Mode

Dependent Variable: LGDP				
Method: ARDL				
Date: 04/27/23 Time: 17:35				
Sample (adjusted): 2013Q1 2021Q1				
Included observations: 33 after adjustments				
Maximum dependent lags: 4 (Automatic selection)				
Model selection method: Akaike info criterion (AIC)				
Dynamic regressors (4 lags, automatic): LHCE LEDME				
Fixed regressors: C				
Number of models evaluated: 100				
Selected Model: ARDL (3, 1, 4)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LGDP(-1)	0.902777	0.172797	5.224501	0.0000
LGDP(-2)	-0.241635	0.238563	-1.012880	0.3221
LGDP(-3)	-0.212609	0.144610	-1.470227	0.1557
LHCE	0.231202	0.039340	5.877031	0.0000
LHCE(-1)	-0.105827	0.032236	-3.282845	0.0034
LEDME	-0.208880	0.037903	-5.510835	0.0000
LEDME(-1)	0.126753	0.066141	1.916417	0.0684
LEDME(-2)	-0.030686	0.070486	-0.435344	0.6676
LEDME(-3)	-0.030702	0.064406	-0.476695	0.6383
LEDME(-4)	-0.115332	0.044380	-2.598771	0.0164
C	9.679460	1.647649	5.874711	0.0000
R-squared	0.994749	Mean dependent var		15.82718
Adjusted R-squared	0.992362	S.D. dependent var		0.231677
S.E. of regression	0.020248	Akaike info criterion		-4.700302
Sum squared resid	0.009020	Schwarz criterion		-4.201467
Log likelihood	88.55499	Hannan-Quinn criter.		-4.532459
F-statistic	416.7317	Durbin-Watson stat		1.856181
Prob(F-statistic)	0.000000			
*Note: p-values and any subsequent tests do not account for model				
selection.				

Source: Researcher's work based on EviEw12 data.

When taking the combined effect of these slowdowns through the Wald Test, we find that the F-statisticvalue was 29.9994 and the corresponding probability value was 0.00, which is less than the level of (0.05) On the other hand, Chi-square has a value of 89.99821 and a corresponding peak probability of 0.00, which is below 0.05). Therefore, we conclude that the combined effect of the decelerations of the LGDP variable has a significant effect. As for the LHCE variable, its effect was positive in LGDP at the current period and statistically significant, as the value of P.value was (0.00) It is below the level of 0.05)).

At the first slowdown, this effect shifted from positive to negative in its impact on LGDP, but it is still statistically significant. P.value (0.0034) is less than 0.05). When studying the combined effect on LGDP of the variable of investment expenditure on health care during the current period and the duration of the first lag1 slowdown on LGDP through the Wald Test.

19.929) and the corresponding probability value is (0.00) which is less than the level of (0.05). The Chi-square value of (39.8597) and its corresponding probability value () are below the level of (0.05). Therefore, the effect of this variable is considered a positive effect on LGDP in the short term. As for the LEDME variable, it was negative in its effect on LGDP in the current period and statistically significant, but this effect turned into a negative effect in the duration of the slowdown (1,2,3,4) was not statistically significant, but the slowdown (4) as the value of P.value (0.010), which is less than the level of (0.05). From the study of the combined effect of these decelerations through the Wald Test, we find that the F-statistic value of (9.648) and the corresponding (probability value (0.00) are less than the level of (0.05). The Chi-square value is (48.244) and the corresponding probability value is (0.00), which is less than the level of (0.05, the impact of these slowdowns is significant in terms of Statistical.

Table (6) Wald test of the combined effect of slowdowns for the LGDP variable (GDP in the health sector)

Wald Test:			[]
Equation: Untitled			
Test Statistic	Value	Df	Probability
F-statistic	29.99940	(3, 22)	0.0000
Chi-square	89.99821	3	0.0000
Null Hypothesis: C (1) =C (2) =C (3) =0			
Null Hypothesis Summary:			
Normalized Restriction (= 0)		Value	Std. Err.
C(1)		0.902777	0.172797
C(2)		-0.241635	0.238563
C(3)		-0.212609	0.144610

Table (7)
Test of the father of slowdowns for the variable L HCE (Investment spending on health care

Wald Test:			
Equation: Untitled			
Test Statistic	Value	Df	Probability
F-statistic	19.92985	(2, 22)	0.0000
Chi-square	39.85970	2	0.0000
Null Hypothesis: C(4)=C(5)=0			
Null Hypothesis Summary:			
Normalized Restriction (= 0)		Value	Std. Err.
C(4)		0.231202	0.039340
C(5)		-0.105827	0.032236
Restrictions are linear in coefficients.			

Source: Researcher's work based on EviEw12 data.

Table (8) Test of the father of slowdowns for the LEDME variable) investment spending on medical equipment and devices

Wald Test:			
Equation: Untitled			
Test Statistic	Value	Df	Probability
F-statistic	9.648913	(5, 22)	0.0001
Chi-square	48.24457	5	0.0000
Null Hypothesis: C(6)=C(7)=C(8)=C(9)=C(10)=0			
Null Hypothesis Summary:			

Normalized Restriction (= 0)	Value	Std. Err.
C(6)	-0.208880	0.037903
C(7)	0.126753	0.066141
C(8)	-0.030686	0.070486
C(9)	-0.030702	0.064406
C(10)	-0.115332	0.044380
Restrictions are linear in coefficients.		

Limit test in ARDL (Long-Term Relationship) Estimation

The previous paragraph dealt with the short-term relationship, and because we test which is the long-term relationship and estimate it through the bounds test (Bounds Test)).

Table (9) Boundary Test for ARDL Model

Test Statistic	Value	Sign if	I(0)	I(1)
F-statistic	10.63240	10%	2.63	3.35
K	2	5%	3.1	3.87
		2.5%	3.55	4.38
		1%	4.13	5

Source: From the work of the researcher based on the data of the Eviews12 program (see statistical appendix ccountries (14)).

Table (9) shows the results of the boundary test, if the value of F-statistic is greater than the critical value of the limits, this indicates a long-term relationship between the variables and as long as the F-statistic value of (10.63) is greater than the level of 5% of (3.87). Therefore, there is a long-term relationship between the variables studied and these variables are complementary and go together in the long term.

Seventh: Interpreting long-term results

Table (10) Long-term Coefficients of ARDL Model (3,1,4) and LGDP Variable

Variable	Coefficient	Std. Error	t-statistic	Prob
Constant	17.55217	0.101507	172.9155	0.0000
LHCE	0.227348	0.014988	15.16865	0.0000
LEDME	0.469377	0.022471	20.88794	0.0000

Source: From the work of the researcher based on the data of the Eviews12 program (see statistical appendix c (15)).

The results of Table (10) reflect that investment spending on health care (HCE) is significant in its impact on GDP, as the value of P.value (0.000) is less than the level of (0.05). This means that the effect of HCE is positive and statistically significant, i.e. investment spending on health care explains the dependent variable and this is evidence of the rejection of the null hypothesis. The value of the variable parameter (HCE) indicates that an increase in investment spending on health care by 1% will lead to an increase in GDP.) by approximately 0.22% in the long run. Assuming the stability of other variables, the variable of investment expenditure on medical devices and equipment (EDME) is also significant in its impact on (GDP) in the health sector, as indicated by the P.valueof (0.000) which is below the level of (0.05). However, the sign of this parameter is negative, which confirms the inverse or negative relationship. An increase of 1% EDME will lead to a decrease. (GDP) in the health sector by approximately (0.47%) in the long term, assuming that other factors are constant. is noted from the results of estimating the error correction model as follow

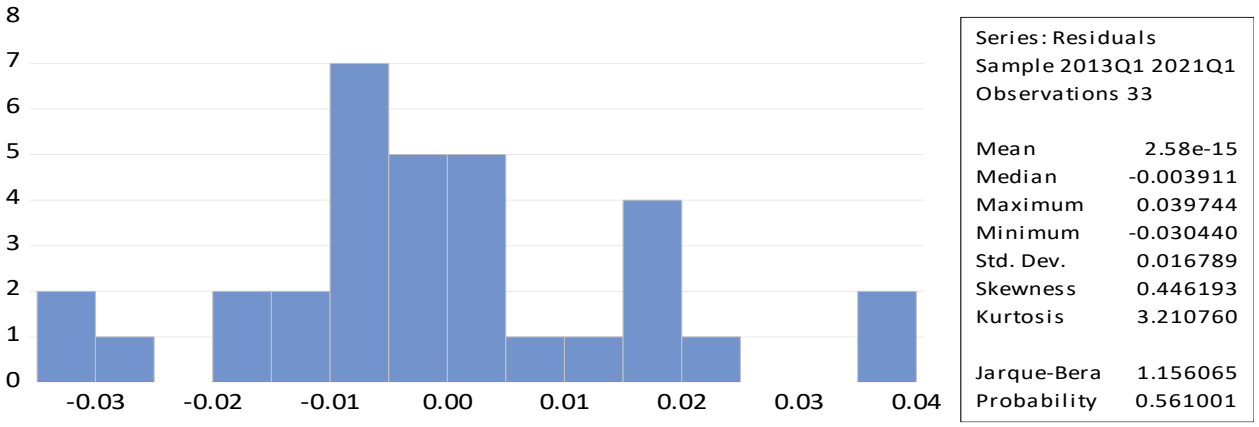
Table (11) Estimation of the error correction modelt

Variable	Coefficient	Std. Error	t-statistic	Prob
Coint-Eq(-1)	-0.551	0.079330	-6.951587	0.0000

Eighth: Diagnostic tests for residues

1: Jarque - Bera test: The table shows the Jarque-Berra test the normal distribution of residues and the news results are:

Table (12) Normal Distribution Test for Residues (Jarque – Bera)



it is noted from the test results that the value of the Jarque-Berra test was (1.15606) and the corresponding probability value was (0.561001), which is greater than the level of (0.05). Therefore, the null hypothesis that the residues are distributed is accepted. Normal distribution.

2- **Breusch Godfrey, Serial Correlation-LM test**.

This test is used to show if residues have an autologous problem. The following table shows the results of this test.

Table (13) Test of the autocorrelation problem between residues

Breusch-Godfrey Serial Correlation LM Test:			
Null hypothesis: No serial correlation at up to 2 lags			
F-statistic	0.083074	Prob. F(2,20)	0.9206
Obs*R-squared	0.271884	Prob. Chi-Square (2)	0.8729

Source: From the work of the researcher based on the data of the Eviews12 program (see the statistical appendix Table (17)).

The results of Table (13) reflect that the test proves that the residues obtained from the ARDL model are free of self-correlation. It turns out that the value of Obs*R-Squared is equal to (0.271884) and the corresponding probability value P.value is equal to 87.29% which is greater than the significance level of 5%. Therefore, the null hypothesis that there is no autocorrelation between residuals or that the model is free of self-correlation between residuals is accepted.

3- Heteroskedasticity test)
:This test is used to confirm that the residues obtained from the ARDL model are free of variance variation (variance homogeneity instability) and the results of Table (14) below show the result of this test.

Table (14) Variance Difference Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
Null hypothesis: Homoskedasticity			
F-statistic	0.691295	Prob. F(10,22)	0.7219
Obs*R-squared	7.890143	Prob. Chi-Square (10)	0.6396
Scaled explained SS	3.876270	Prob. Chi-Square (10)	0.9528

Source: From the work of the researcher based on the data of the Eviews12 program (see statistical appendix Table (18)).

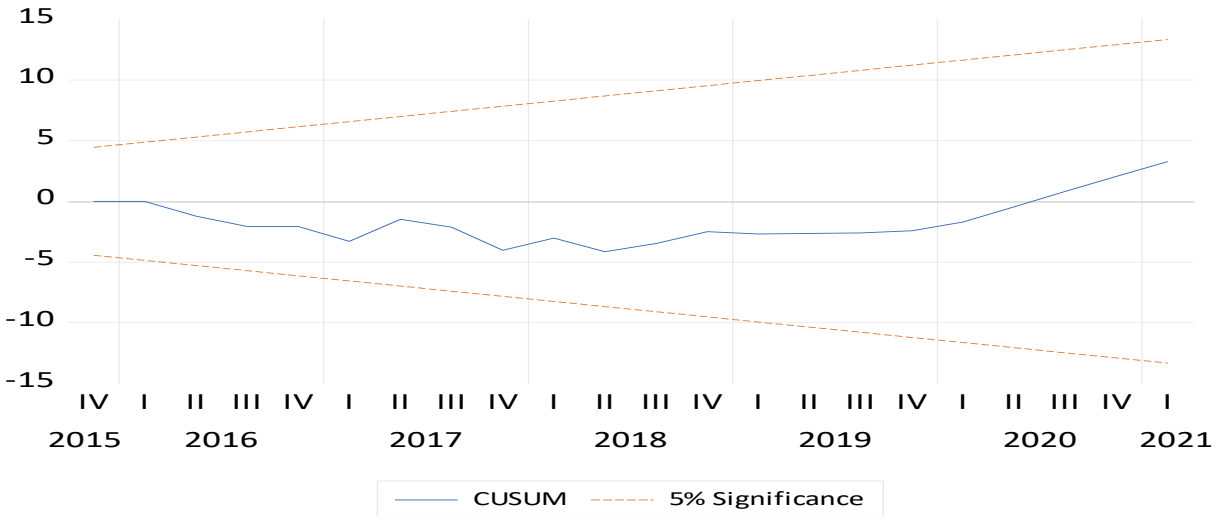
The results of the above table reflect that the value of R-Squared Obs is equal to (7.890143) and the corresponding probability value is (0.6396), which is greater than the significance level (0.05).). It is therefore accepted that the null hypothesis that there is no variance difference in the remainder is accepted.

Ninth : Diagnostic tests for the stability of the parameters of the model

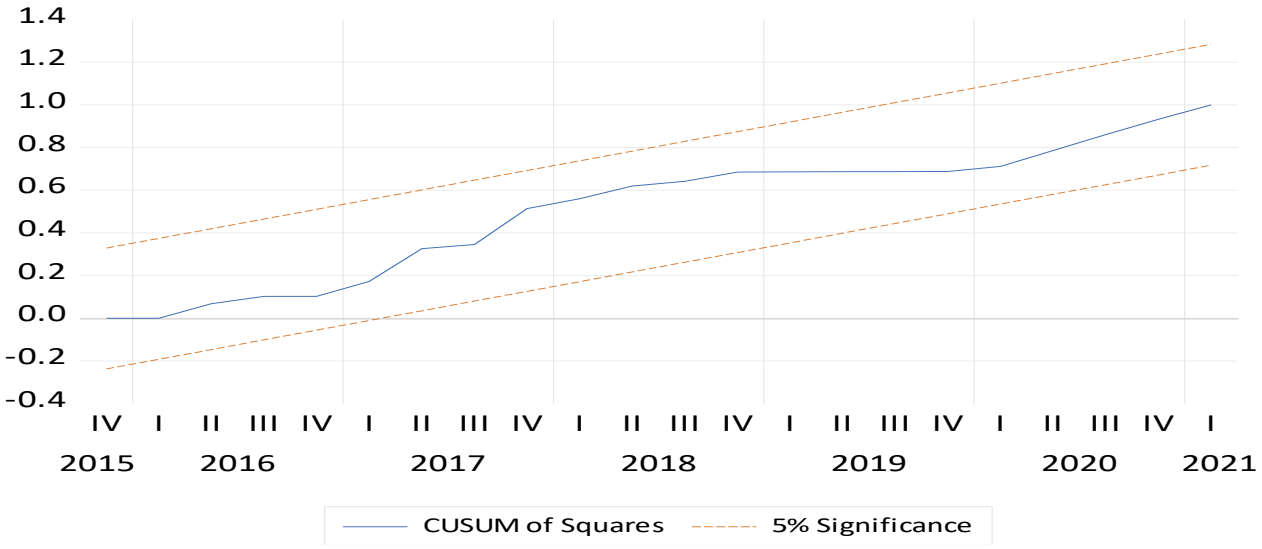
In this regard, the graph of the CUSUM-SQ and Cusum test is used, and the following two diagrams illustrate this:

1- Cusum – Test

Sure (2)



2-CUSUM-SQ Test Sure (3)



Source: From the researcher's work based on Eviews12 data

both diagrams are between the tabular boundaries 15%. Which proves that the features are stable. The ARDL model is structurally stable, but if CUSUMSQ and CUSUM exceed the critical limits of 5%, we can confirm that it is unstable. In summary, the results of the ARDL model have shown that there is a positive and significant impact of the variable of investment spending on health care in the short and long term on health GDP, while investment spending on medical devices and equipment was a negative, but significant, impact in the short and long term. Just as there is a long-term equilibrium relationship, the model corrects itself in the long term by 55%, and it takes one year, eight months and 15 days to achieve this equilibrium.

CONCLUSION AND SUGGESTION

1-Double the impact of government health investment spending on the total indicators of the health sector, especially structural and technical, aspects related to these indicators, and this is due to the misguidance of this spending to the extent that it does not meet the need of the health sector of the necessary requirements necessary for its advancement and development and enable it to provide health services close to the level of those services provided in neighboring countries at least, in addition to the spread of administrative and economic corruption in this sector.

2- Health investment spending in Iraq witnessed a clear fluctuation towards decline during the research period, in harmony with the security, economic and international conditions. Iraq witnessed a double crisis (the occupation of three provinces by the terrorist organization ISIS and the drop in oil prices). On the other hand, operating spending in this sector has increased. In light of this situation, we conclude that most government health institutions suffer from a shortage of medicines and a high rate of damage and malfunction of medical equipment.

3 Standard results using the ARDL-Bounds model proved that there is a common positive effect of slowdowns for both LGDP variables and investment spending variables...

4-The ARDL-Bounds model has passed all diagnostic tests for residues (normal distribution, autocorrelation, and variance variation). In addition, diagnostic tests for the stability of the parameters of the model confirm the stability of these parameters. Which reassures the reliance on the estimated model.

5- The error correction coefficient was negative with a coefficient of (-0.551). In addition, this parameter was statistically significant. This parameter indicates that the speed of adjustment

(correction) towards long-term equilibrium is (55.1%), i.e. the imbalance correction system for the previous period quickly reached (55.1%) within one year, eight months and 15 days.

Second: Recommendations

1- It is necessary for the government to direct more funding to the health sector, as the current funding is lower than the World Health Organization's set of 5% of GDP.

2- It is necessary to encourage the private health sector to increase its investments in the health sector in Iraq.

3- Activating the partnership between the Ministry of Health, the government and international NGOs and reaching a framework to ensure increased funding by international NGOs for health sector units or activities that suffer from financial deficits.

4 It is essential that international NGOs have a governance framework to ensure that funding is used by international NGOs effectively.

5- It requires the Iraqi government to increase government health investment, raise the level of health spending, promote the development of the health industry, and promote sustainable economic growth in Iraq.

6- This research provides evidence for policymakers that can guide them in drawing the features of a health policy that works to achieve human well-being and exceeds the economic and health fluctuations experienced by the world.

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