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Statistical tests to reveal the nature of the relationship between public Expenditures, spending on health, education, and investment Expenditures during the period (2005-2020)

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Abstract
Increasing government spending is an inherent characteristic of rentier economies to which the theory (curse of resources) applies. In times of financial abundance, public spending increases and the state is obligated to its citizens. When crude oil prices fall, public spending decreases and affects spending on health, education and investment spending, proportionately. Expenditure, so conducting statistical and standard tests to reveal the nature of the relationship between the expenditures provided by the state and the amount of flexibility in change and impact on people's lives, in addition to showing the nature of public spending, the research focused on the size, type and nature of the state's role in spending, the researchers used a set of tests To get to know the reality of government spending in Iraq and its impact on the Iraqi reality, and it was found that there is a strong correlation between public spending and spending on health, education and investment spending, and the correlation was positive and direct. between investment spending and public spending

Keywords: Public Spending, Spending on Health, Spending on Education, Investment spending, Cointegration

Introduction
The issue of public spending, whether spending on health, education or investment spending, is one of the topics that receives great attention, and is directly proportional to the role of the state. people's lives, as well as an explanation of the nature of public spending policies. The research shows the size, type, and nature of the state's role and its impact on the lives of societies. public spending and spending on health, education and investment spending, and the correlation was positive and direct, and the researcher concluded that public expenditures depend on external factors, including crude oil prices in global markets, and economic stability. Public spending increases, but investment expenditures decrease, as the increase in government investment spending is due to the development of the state's role and the growing responsibilities in economic

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and social life. Or from loans, subsidies, and fines, in addition to the new monetary issue, and the most important source of all is natural sources such as oil. The sources of public expenditures in their various forms determine the state's ability to expand public spending.

The problem:

Despite the significant increase in the volume of public expenditures in the Iraqi economy, it did not play a significant role in influencing the level of health, education and investment activity, and the volume of spending on health and education did not change in the same proportion in public spending.

The goal:

The research aims to find out the effect of public expenditures, which represent the independent variable on the level of health, education and the level of employment resulting from new investments.

Hypothesis: The researchers relied on the following hypotheses

1-There is a mutual influence relationship between public expenditures and the level of public health.

2-There is an impact relationship of public expenditures on the level of education.

3-There is an effect relationship of public expenditures on the volume of operation and investment

First: Analysis of public expenditures in Iraq for the period (2005-2020)

The study of Iraqi public expenditures, and the attempt to analyze it and reveal the relationship between its increase and the role of the state and the expansion of the volume of economic activity in Iraq, increases with the volume of public expenditures, and in rentier economies, including Iraq, depends on the oil sector to finance the volume of public expenditures, so it is a reflection of the volume of oil rentier revenues. **(Abd al-Razzaq: 2005, 271)**

1-Public expenditures in Iraq for the period (2005-2020):

The development of the volume of spending in the Iraqi economy, as evidenced by table (1), which shows the increase in public expenditures for the period (2005-2021) and through the analytical view of the table below, that public expenditures in the year (2005) began to increase gradually and continuously after it was (32,117,491) million in the year (2005), and increased to (38,806,679) million Iraqi dinars in the year (2007), and the rise continued to (59,403,375) million Iraqi dinars in the year (2009) with a total increase amount of (27,285,884) million dinars during the period (2005- 2009), as the aforementioned period witnessed a set of changes at the level of macro or partial policies that arose as a result of the structural transformation in the structure of the Iraqi state. This was accompanied by operations and looting that caused great damage to the institutions of the Iraqi state, which necessitated spending on their maintenance, in addition to spending on the military institution due to the spread of terrorist movements and control over large areas of the Iraqi state, and these economic and political changes affected the nature and direction of spending and its quality, and as a result wasted For opportunities that can achieve economic development, and hit the basic, structural and behavioral pillars of Iraqi society. **(Al-Hafez: 2011, 32)**

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Public spending witnessed a significant increase during the period (2010-2020) and the main reason was the rise in oil prices in global markets, which caused an increase in state revenues and increased state intervention in providing government support and subsidies to achieve economic stability, increased allocations for the Ministry of Defense and the Ministry of Interior, and the support provided by the state For basic commodities such as food and fuel, through the ration card at symbolic prices, providing support for oil derivatives, and adopting an agricultural policy based on granting loans to farmers, as the volume of spending increased from (70134201) million Iraqi dinars in the year (2010) to (119127556) million dinars in the year (2015) with an average growth rate of (13.2%) during the year (2013), and the growth rate of spending continued to increase (16%) during the period (2015-2021) as shown in Chart (1), as a large percentage of spending goes for security purposes It is not reflected in achieving the added value in the commodity sectors.
(Muhammad: 2016, 72)

Table (1) Total public expenditures and growth rate in Iraq for the period (2005-2020)

Year	Total Public Spending (1)	growth rate(2)
2005	263751756	-
2006	38806680	47.13
2007	39031233	0.57
2008	59403376	52.19
2009	52567026	-11.50
2010	70134202	33.41
2011	78757667	12.29
2012	105139577	33.49
2013	119127557	13.30
2014	115937763	-2.67
2015	70397516	-39.27
2016	75055866	6.617
2017	75490116	0.57
2018	80873190	7.13
2019	111723524	38.14
2020	132846352	2.17

Source:
1-Central Bank, Statistics and Research Center, Statistical Releases for the Years (2005-2021)
2-Column (2) from the work of the two researchers

2-Government spending on education and health

The interest in human capital and the free human being and diseases may achieve one goal, which is to achieve human and economic development and increase productivity, so I directed some theories called internal growth theories, which provided a reasonable justification for countries that achieved economic growth and development while they did not possess natural resources and

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mineral ores that help On the establishment of industry, and gave great importance to human capital, including the theory of (Theodore Schultz) as his idea of human capital as an internal variable led him to the idea of investing in education and knowledge in the sense of investment in education and health, as is the case with other scholars.**(Al-Arabi: 2007, 54)**

A- Government spending on education in Iraq

From table (2) and figure (1) represents spending on health and education, and figure (2) as we note that spending on education during the study period decreased significantly due to the state's interest in this sector in order to develop it, so expenditures increased from (1802611) million Iraqi dinars in a year. 2005) to (2051915) million Iraqi dinars in the year (2006) with a rate of (5.29%) of public expenditures, and a percentage of (2.2%) of the GDP, and it rose to (6617860.2) million Iraqi dinars in the year (2010) with a rate of (9.44%) of public spending, and (4.1%) of GDP, and it continued to rise to (10212502.3) million Iraqi dinars in the year (2014), with a rate of (8.9%) of public spending, and (3.4%) of GDP, and the rise continued to increase Spending reached its highest level by (12,430,856) million Iraqi dinars in the year (2019), and it represented (12.7%) of public spending, and (4.91%) of GDP, in addition to the loss and waste of a large percentage of the funds allocated for education due to slackness. career in the education sector, which requires restructuring spending priorities to be at a level that contributes to raising the scientific level and qualifying students in university education.**(Al-Helou: 2008, 187)**

Table (2): Spending on education, health, public expenditures, and percentages during the period (2005-2020)

Year	public expenditure EX (1)	spending on health EH(2)	spending on education EG(3)	The ratio of health spending to public spending	Ratio of education spending to public spending
2005	32117492	1788257.5	1802610.1	5.57	5.62
2006	26375176	1469086.3	1472788.3	5.57	5.59
2007	38806679	1637696.0	2051914.4	4.23	5.29
2008	39031233	1789216.1	2728653.2	4.59	6.91
2009	59403376	2708934.2	4943189.9	4.57	8.33
2010	52567026	2666786.3	5267519.7	5.08	10.03
2011	70134202	3823056.6	6617860.2	5.46	9.44
2012	78757667	3910804.7	7842843.5	4.97	9.96
2013	105139577	4364781.8	9194187.3	4.16	8.75
2014	119127557	5173071.1	10105925.4	4.35	8.49
2015	115937763	4516493.8	10212502.3	3.81	8.81
2016	70397516	484245.3	9874555.7	0.69	14.01
2017	75055866	4887463.1	10303119.1	6.52	13.73
2018	75490116	3834516.1	3907899.1	5.08	5.18

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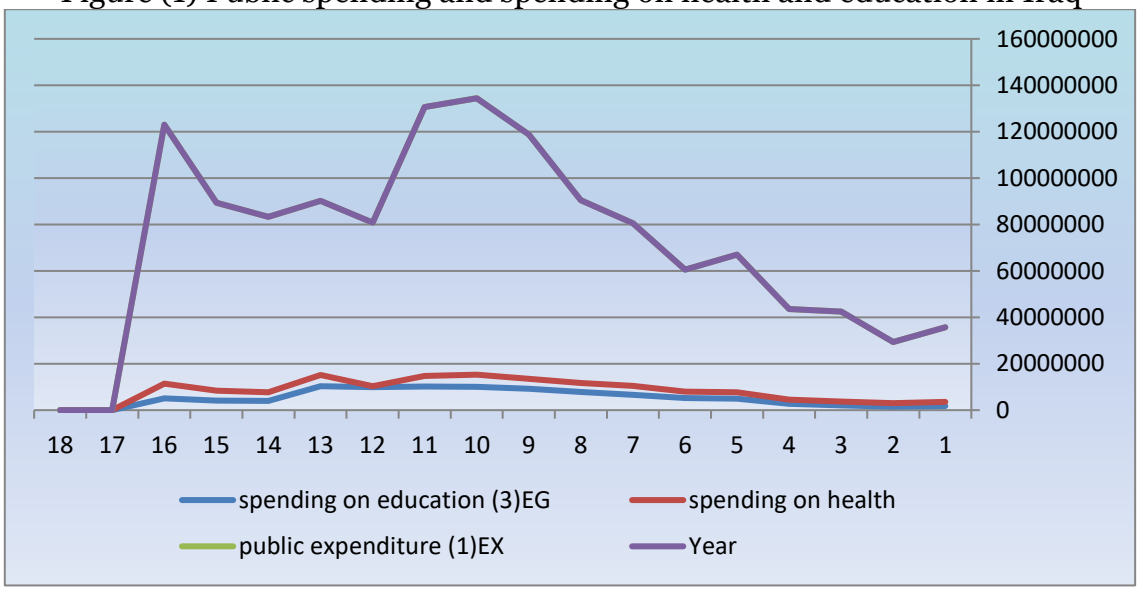
2019	80873189	4302671.1	4121195.1	5.33	5.01
2020	111723524	6306219.1	5053840.1	5.65	4.53

Sources:

1-The researcher calculated the percentage of education expenditures from the gross domestic product.
2-Ministry of Finance, annual reports, different years
3-The Central Bureau of Statistics, Department of National Accounts
4-Central Bank, Directorate General of Statistics and Research, Economic Report for the years (2005-2020).
5-The Ministry of Planning, the Central Statistical Organization, spending on health in Iraq, a statistical group for different years.

Figure (1) Public spending and spending on health and education in Iraq



The figure was prepared by the researcher based on the table (2) and the Excel program.

2-Spending on health:

Caring for health is considered a right of citizens over the state, because the human being is the source of production. A person who does not suffer from diseases and disabilities achieves high productivity, and life expectancy at birth is considered one of the indicators of human development, and the average age rises, which covers the great importance of health and spending on health programs. **(El-Gamal: 2007, 278)**

For the purpose of knowing the spending reality of the health sector in Iraq, and the volume of spending through table (2), which shows that health expenditures were (1788258) million Iraqi dinars in the year (2005) and rose to (2708935) million dinars in the year (2009) with an expenditure rate of (4.57). %) of public spending, with a rate of (2.1%) of GDP, and the increase in health spending continued to reach (5173071.1) million Iraqi dinars in the year (2014), with increasing spending rates, whether from public spending or GDP, where the percentage was (8.5%) for public spending, and (1.8%) for GDP, and the increase coincided with the increase in

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public spending on health and the rise in average per capita spending on health. Health expenditures achieved an annual growth rate of (9.9%) for the period (2005-2020).

Second: Results of analyzing the relationship between public spending, spending on education, health, and investment spending

In order to test the effect of public spending on health, education and investment spending, the annual data for the period (2005-2020) were used for the dependent variables represented by spending on health (EH), spending on education (EG), investment spending (EI) and current public spending (EX). Using the statistical program (Eviews10), the results were as follows: **(Blanchard: 2010, 93)**

1-Unit root test:

To test the stability of the time series of the dependent variables and the independent variable subject of research, and after estimating the three models, the fixed limit, the fixed limit, and the time trend, and without the fixed limit and the time trend at significant (5%), the results shown in the following table were reached. The results of the (ADF) test presented in Table (3) indicate that all the variables under study are not stable in the level, but rather they are stable in the first difference, as in the table below.**(Gujarat: 2003, 693)**

Table (3) The results of the (ADF) test for independent variables in Iraq for the period (2005-2020)

المتغير	The first model		The second form		Third form		Stationary
	test-critical	t-statistic	test-critical	t-statistic	test-critical	t-statistic	
EH	-3.0802	-0.8523	-3.7593	-2.8348	-1.9660	0.8978	Level
EH	-3.0996	-2.9701	-3.7912	-2.8390	-1.9680	-2.6709	1st dif
EG	-3.0802	-1.5384	-3.7593	-1.5729	-1.9660	0.1286	Level
EG	-3.0996	-2.5486	-3.7912	-2.3318	-1.9680	-2.4932	1st dif
EI	-3.0812	-3.0376	-3.7593	-3.1965	-1.9660	-1.4222	Level
EI	-3.0986	-5.8702	-3.7912	-5.70135	-1.9680	-6.1052	1st dif
EX	-3.0812	-2.3764	-3.7593	-2.9225	-1.9660	-2.0048	Level
EX	-3.0986	-4.5659	-3.7593	-4.3789	-1.9660	-1.3704	1st dif

Source: - the results of the statistical program

2-Results of cointegration analysis using (Engle - Granger) method

The results of the (ADF) test for government spending, spending on health, education, and investment spending showed that the time series variables are not stable at the level, and this means that they are stable in the first difference, so the cointegration test can be performed using

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(Engle - Granger) method with two steps, which estimates the relationship Long-term study variables, agencies.**(Pantula: 2011, 291)**

The first step: This stage includes estimating the regression of the simple linear relationship between variables using the (OLS) method, as follows:

-The relationship of public spending variables with spending on health:In this step, the relationship between spending on health, education and investment variables is estimated as dependent variables, and government spending is an independent variable in the three models, as in the following equations.

$$EH_t=\alpha + \beta_1 EX_t + \mu_t \quad .....(1)$$

$$EG_t=\alpha + \beta_1 EX_t + \mu_t \quad .....(2)$$

$$EI_t=\alpha + \beta_1 EX_t + \mu_t \quad .....(3)$$

After estimation, the equations for simple linear regression and the estimation results were as shown in the following table (4).

The equation	تقدير المعادلة			
	test-critical	t-statistic	B1	Bo
1	1.966271	2.310957	0.000084	33.1
2	1.966271	2.508399	0.017	29.9
3	-1.966271	-2.679706	-0.000070	13.5

Source: - The results of the statistical program

From the results of the above table, which includes estimating the simple regression between public spending and spending on health, the following is clear.**(Frederic: 2008, 401)**

A- The relationship between current spending (EX) was shown as an independent variable and spending on health (EH) as a dependent variable, as narcolepsy indicates that there is a direct but weak relationship through the value of the (B) coefficient, which means the change in agreement on affects health in Iraq But at a low rate, as the researchers believe that it is possible to raise the level of health in Iraq by increasing public spending, by the degree of flexibility coefficient of the independent variable in the estimated model, as in the following equation.**(Fred,& Lee: 2009, 203)**

$$EH_t=33.1 + 0.000084EX_t \quad .....(4)$$

The model showed statistical significance through the stability of the random error limit of the estimated equation, as the calculated value for the expanded ADF test was (-2.310957), which is greater than the tabular value of (-1.966271) at a significant level (5%), which indicates the possibility of a long-term relationship between the two variables.

B- As for the relationship of spending on education (EG) as a dependent variable for changes in the independent variable represented by public spending (EX), the results indicated the possibility of a long-term equilibrium relationship, if the model passes the required conditions, including where the random error is stable, as well On the indication of the coefficient (b), which indicated the existence of a direct but weak relationship between the two variables, meaning that every change of one time in government spending leads to a change in education by the amount of the elasticity

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coefficient of (0.017) as in the equation below. **(maddala & kajal: 2009, 381)**

$$EG_t=29.864 - 0.017Ext.....(5)$$

C- When estimating the third model represented by the relationship between spending on investment (EI) as not dependent on changes in the independent variable represented by public spending (EX), the results indicated the stability of the error limit with the possibility of a long-term relationship between them, and the estimate indicates the existence of an inverse relationship between The two variables, as each increase in public spending is measured once, leading to a decrease in investment spending by the variable coefficient of (0.0069), and inversely and with a weak relationship between the two variables**.(Harvey: 2006, 174)**

$$EI=13.414 - 0. 0069Ext.....(6)$$

The second step: The nature of the long-term relationship between the dependent variables and the independent variable in the model, and by estimating the error correction vector model, and after estimating and relying on the results of the statistical program (EVIEWS12) through which (tau) values are calculated directly to confirm the alternative hypothesis that states the existence of Joint integration between variables, which means the ability of variables to correct the time path, imbalances, and deviation from the time path that achieves balance. The results confirm the existence of joint integration between variables during the long term, as shown in the following table**.(Modigiliani: 2005, 495)**

Table (5) Results of the (Engle - Granger) test for the effect of the public spending variable on the variables.

Equation	dependent variable	tau - statistic	Prob% 5
1	EH	-4.835664	0.00154
2	EG	-2.998435	0.01665
3	EI	-4.994576	0.00076

Source: - The results of the statistical program

Conclusions and recommendations

First – conclusions:

1-The increase in public spending in Iraq leads to a direct impact on health, and this is in agreement with the logic of the economic statistical theory, which says that the nature of the relationship between spending and health is a direct relationship.

2-The increase in public spending leads to an increase in the level of education in Iraq, given that the education sector in Iraq depends on the state and that it is a non-productive sector and does not contribute to creating added value in economic activity.

3-The standard results reached by the two researchers emphasized the importance of public spending through the following:

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a - The existence of a long-term equilibrium relationship between public spending and spending on education in Iraq in Iraq, where public spending is able to correct the structural imbalances that education in Iraq is exposed to if it is properly exploited.
b - The existence of a long-term equilibrium relationship between public spending, spending on health and investment spending.
4-Public spending in Iraq varies from year to year, depending on changes in crude oil prices, which means that the determinants of public spending are limited and not multiple.
5-The trends in government public spending were characterized by an increase in average consumer spending at the expense of investment spending, and this is in contrast to the economic development process in Iraq that the development strategy seeks to achieve.
6-It is noticeable that the general government spending was not specified to develop the economic structure in Iraq and reduce dependence on the oil sector, but rather shares a large part of it to meet military expenditures and rebuild what was destroyed by terrorism.

Second - Recommendations

1-It is assumed that public spending is based on a scientific basis, as every increase in investment expenditures must be greater, equal, or slightly less than consumption expenditures, because this leads to activating the commodity sectors, and leads to increased production and realization of development.
2-Directing investment expenditures to diversify the Iraqi economy, develop industry and agriculture, which leads to multiple sources of income and reduce dependence on the extractive sector, and then ensure continued funding for health, education and investment spending in the event that the oil sector is exposed to external shocks.
3-Correcting structural imbalances in the Iraqi economy by directing spending properly and adopting a strategy of balanced growth in the economic structure by distributing public spending, trying to control the fiscal deficit and trying to achieve a surplus and maintain stability.
4-Work to encourage businessmen to invest in the country, provide job opportunities, reduce dependence on government spending for them, and contribute to creating an investment environment.
5-Establishing free trade zones in the south and north of Iraq, as they have great advantages that help them attract foreign investments. These zones need support from the Iraqi government.

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