International Journal of Psychosocial Rehabilitation, Vol. 24, Issue 02, 2020
ISSN: 1475-7192

Factors affecting the gross domestic product in Iraq for the period 1990-2018

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Abstract:

"The study aimed to measure and analyze the effect of some factors such as (government spending G_O, consumption C_O, population P_O, investment I_O, exchange rate E_X, money supply Ms, and inflation Inf) in the gross domestic product, however, the research adopted the descriptive and standard approach in the formation of the model based on Economic theory and statistical program (Eviews) during the period (1990-2018), and the importance of the study comes from that the gross domestic product is a basic indicator for identifying the performance of the economy, the research also relied on the tests of Augmented Dickey-Fuller and Philips-Byron to recognize the stationarity of the variables, and the results showed the significance of the variables through the value of the calculated F factor of 85.334 at the level of significance of 5% As for the 1.76 test (D.W), it proves that there is no autocorrelation problem, and the value of the adjusted determination coefficient R2 showed that about 95% of the changes in the GDP were explained by the independent variables. while the 5% which remaining of these changes can be attributed to other factors that are not included in the model. However, government and investment expenditures were excluded from the model because they were not significant, and the study recommended setting targeted policies to improve and develop the investment climate".

Keywords: *GDP, economic growth, Unit root test, Cointegration test.*

I. Introduction:

"The gross domestic product is one of the determinants of the economic growth of the country." Thus, the "GDP" is one of the pillars of economic growth in developing and developed countries alike, because the GDP build and increase of the country's productive capacities in addition to maintaining the existing capacities already", It is also an effective means to change the structure of the national economy and correct structural imbalances in it, and it is an important factor that reflects the growth and technological progress of the same country, becuse the greater the capacity of (GDP) it can overcome all the problems of underdevelopment and accelerate the process of economic and social development, where the (GDP) recorded decreased by (-1%) Compared to 2017, was it record (199.1) trillion Iraqi dinars for 2018 compared to (201.1) trillion in 2017, while the value of gross domestic product excluding oil decreased by (4%) to 71.2 trillion dinars in 2018 compared to 71.5 trillion dinars in 2017,Therefore, diversification of sources of income and development of contribution ratios of economic indicators is inevitable, through developing productive sectors and increasing the

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competitiveness of local products, as the factors leading to GDP growth are relatively important to prevent economic, social and political instability from occurring.

The research problem: "The decrease in the gross domestic product compared to the diversity of the Iraqi economy in the productive sectors during the study" period (1990-2019) "clearly affected the development and growth of the economy, therefore the question lies about what are the factors affecting the gross domestic product in Iraq, and what is the relationship between GDP and" (government spending GO, consumption CO, population PO, investment IO, exchange rate EX, money supply Ms, inflation Inf).

The importance of research:"The importance of research lies in the gross domestic product, as it is the most important indicator for estimating the performance and development of the economy of any country, by recognizing the most important factors affecting the gross domestic product, and applying the standard analysis in a way of multiple regression".

Research objectives:"This research aims to clarify and estimate the most important factors affecting the gross domestic product during the study period, in order to enhance and provide accurate economic and statistical indicators that help the Iraqi plan to clarify the most important variables at the level of economic sectors".

The research hypothesis:"The research is based on a basic hypothesis: there is a positive correlation between the gross domestic product and the factors affecting it such as" (government spending GO, consumption CO, population PO, investment IO, exchange rate EX, money supply Ms, inflation Inf).

Research methodology:"To achieve the goals that the research seeks to achieve, it is based on two approaches, the first one: The mixture between the two approaches" (descriptive and analytical)" depends on the logic of economic theory that connects the gross domestic product and the factors affecting it, and the second is: the quantitative approach which based on economic measurement methods and its methods of estimating, in addition to interpreting the results and analyzing them to reach specific conclusions that are drawn to be placed within the reach of the economic plan and to serve the Iraqi economy as a whole, using the standard analysis program" (Eviews 10).

II. Literature review:

A study (Rana, 2018) titled “Factors Affecting India’s GDP” "The current paper highlights factors affecting India’s GDP, by assessing economic growth using GDP, however, the gross domestic product is measured by the total market value of all final goods and services produced in the year, and the paper concluded that the imbalance between poverty and the economy affects the rate of GDP, and it is also noted that the balance between supply and demand must be at the same level, or it can be said that the level of demand must be higher in order to raise the level of GDP".

A study (Aziz & Azmi, 2017) entitled: “Factors Affecting GDP in Malaysia” "This paper examines the correlation between GDP growth and factors affecting it, such as inflation, foreign direct investment, and female participation in the workforce in Malaysia, and the annual time series data were used for the 1982 to 2013 periods, the OLS method, and the Augmented Dickey–Fuller test" (ADF) for analysis, howrver, "the results

indicate that among the factors of foreign direct investment and the female workforce have a positive impact on GDP growth, However, foreign direct investment" (FDI) is "the only variable that contributes significantly to Malaysia's GDP growth, moreover, inflation was associated negatively with the growth of the GDP, but it is not an important factor towards the growth of the GDP in Malaysia, and that the gross domestic product, inflation, foreign direct investment, and the female workforce are stationary in the levels, and based on the result, the study recommends maintaining inflation stability, and the Malaysian government can increase taxes and reduce government spending in order to reduce inflationary pressure, in addition to identifying solutions to current economic obstacles".

A study (Al-Athari and Al-Hashemi, 2017) entitled: "The effect of some economic indicators on the Iranian gross domestic product". "The standard analysis process showed milestone indications that were compatible with the economic logic except for the indication of the foreign trade sector, which showed its inverse correlation with the gross domestic product. The R2 coefficient also showed its explanatory power to demonstrate changes to GDP changes that were caused by the sectors examined, and that 1% was due to other variables not included in the model".

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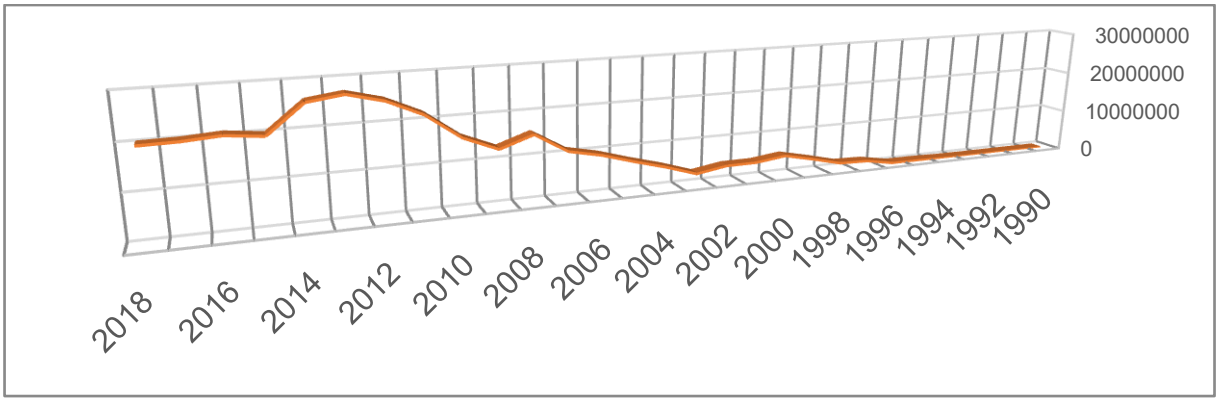
A study (Kira, 2013) entitled "Factors affecting the GDP of developing countries - the case of Tanzania", this "study aims to analyze the factors that affect the GDP of developing countries, and the Keynes model was adopted to test it in the GDP for a period" of (1970-2009), "and the result shows that GDP is at the same level year after year without major changes due to some dormant factors, and Tanzania's GDP as a developing country is affected by consumption (the government final spending and final household spending) and exports, however, the study recommended encouraging the investment sector due to its impact on the GDP, including stimulating industrialization at the country levelTheoretical framework".

First:" the concept of gross domestic product: It means the total number of goods and services that the economy produces during a specific period and is estimated at a year, it represents the sum of the value of goods and services at market prices, knowing that the intermediate goods and services, that is, that were used in the production of other goods are not counted to avoid arithmetic frequency" (Erekat, 2006: 60), "and it is possible to differentiate between the nominal GDP and the real GDP, whereby the nominal GDP is calculated according to the current prices in the relevant time period, whereas the real GDP is calculated by adjusting the nominal GDP, through mathematical equations that neutralize the effect of variable prices" (inflation), "In order to ensure a more accurate view of the volume of production, the following figure shows the gross domestic product in Iraq for the period" (1990-2018).

Figure (1): "Gross Domestic Product in Iraq for the period" (1990-2018) Iraqi dinars



Source: The work of the researcher based on Table No.1.

Second: Methods for calculating GDP:

GDP can be measured from three different approaches (Erekat, 2006: 33):

Production (added value): It is by adding the added values of all productive activities that are to be included, and the added value is defined as the difference between the total sales and the value of the intermediate inputs in the production process.

GDP at market price GDP = output + taxes - product subsidies - intermediate consumption

Expenditure: It is by collecting the final consumption expenditures of families, companies, and the government sector in addition to the investment expenditures and the balance of exchanges with the outside (the difference between exports and imports).

GDP at market price GDP = final/actual consumption expenditure + change in inventory + gross fixed capital formation + net acquisition of valuables + commodity and service exports - commodity and service imports.

Income: It is by collecting all the revenues generated by production, such as employee wages, company profits, and taxes.

Gross domestic income at market price GDP = employee compensation + taxes on production and imports - subsidies + operating surplus / mixed income

Third: Factors affecting GDP:

In this paragraph, we will address some of the main factors that affect the gross domestic product (government spending GO, consumption CO, population PO, investment IO, exchange rate EX, money supply Ms, inflation Inf).

1- Government spending: "This spending consists of purchases made by various government units, and these purchases include obtaining military equipment for the defense of the homeland, and salaries of government employees, however, it must confirm that not all government expenditures are included in the calculation of gross national product, A key exception is government transfer payments and includes social insurance benefits and unemployment benefits" (Abidjman, 1998: 44).

2- Consumption:"This is the portion of disposable income spent on the purchase of current goods and services that are used during a short period of time, and it may be greater than disposable income, In this case, you will be facing a negative saving" (Omar, 2005: 20).

3- Population:"It is a statistical or numerical study of population, concerned with analyzing the digital dimensions and focusing on the importance of growth and fertility, however, the results of the census are used as a basic reference in ensuring the fair distribution of wealth and government services" (United Nations, 2009: 5).

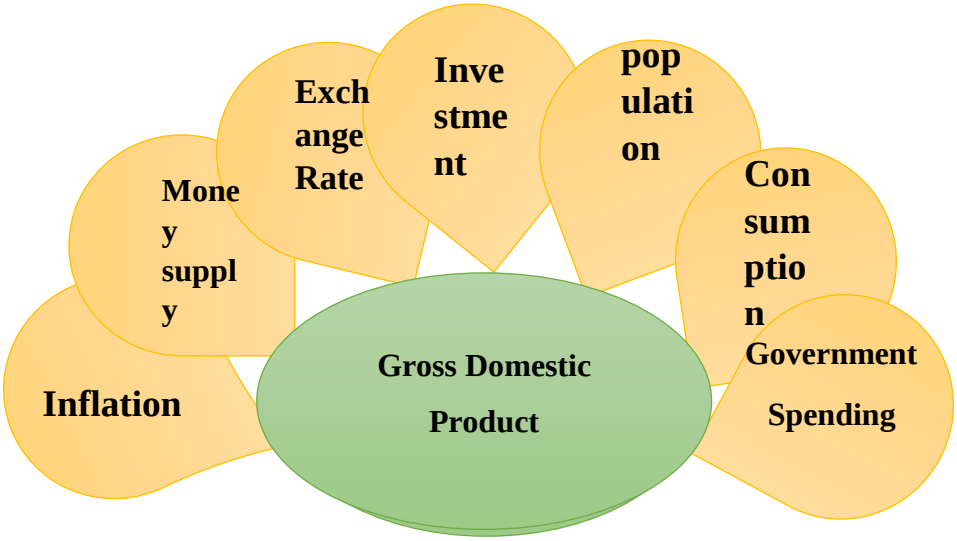
4- Investment: "It is the type or nature of economic activity in which an investor utilizes his money in order to obtain a return. Examples include real estate, agriculture, industry, tourism, etc". (Ramadan, 2007: 33).

5- Exchange rate:"It is a major tool with a direct impact between domestic and external prices, and is often more effective when required to encourage exports and provide imports" (Al-Atrash, 2005: 96).

6- Money supply:"The set of payment methods available to society during a specific time period, which is held by various individuals, enterprises, and institutions" (Ali, 1986: 120).

7- Inflation:"It is the continuous rise in the general level of prices, that is, a continuous movement towards an upward trend, whether this increase is caused by an increase in the amount of cash that makes the cash flow greater than the commodity current, or it is caused by a rise in production costs or from the presence of a surplus of total demand, as well as The role of feeding inflationary expectations"(Abdullah and Al-Ajarmah, 2009: 17).

Figure (2): Factors affecting the GDP



Source: Prepared by the researcher.

In the table below, the data of some factors affecting the gross domestic product in Iraq.

Table (1): Data of some indicators of the Iraqi economy for the period (1990-2018) Iraqi dinars

Sectors	GDP at current	Consumption CO	GO Government	Population PO	IO investment	EX exchange rate	Money supply Ms	INF Inflation

Years	prices		Spending					
1990	22848.3	11375	14179	17.419	-6810000	2	21269	53.65
1991	21313.3	15653	17497	17.889	7686000	10	31722	180.95
1992	59348	25876	32883	18.955	93000	21	56829	83.61
1993	122997.2	50060	68954	19.539	803000	74	113666	207.69
1994	630006.1	171742	199442	20.149	-30000	454	276857	448.5
1995	2252263.8	605840	690783	20783	-463400	1674	773337	387.31
1996	2556307	506102	542541	21.439	-1994000	1170	1084172	-16.17
1997	15093144	534092	605802	22.046	1153000	1471	1242569	23.06
1998	17125847	824705	920501	22.702	7388000	1620	1646240	14.76
1999	34464016	831592	1164384	23.382	-32000	1972	1857406	12.57
2000	50213699	1151663	1498700	24.086	-6656000	1930	2114072	4.97
2001	41314568	1490866	2069727	24.813	-326000	1929	2645155	16.37
2002	41022927	1762683	2518285	25.565	10000000	1957	3632860	19.31
2003	29585788.6	36311594	235504336	26.340	-6848830	1936	4555282	33.61
2004	53235358.7	13608947	421534917	27.139	9005770	1453	11480873	26.96
2005	73533598.6	14683390	585681936	27.963	16291600	1472	13228369	36.95
2006	95587954.8	14984454	685937398	28.810	18082900	1467	17649646	53.2
2007	111455813	50510794	742463863	29.682	10411900	1255	24829268	30.8
2008	155982258	638344973	9.90766635	31.895	23843000	1193	26075000	2.7
2009	130643200	752305220	1105350780	31.664	14757300	1170	467912	2.8
2010	162064566	957739530	1284080773	32.490	25716200	1170	613931	2.5

2011	217327107	102687068	1480126420	33.338	33710200	1199	740983	5.6
2012	251907662	114412157	177348209	34.208	39016000	1234	771875	6.1
2013	271091778	143158634	263750400	35.096	49335000	1233	895121	1.9
2014	260610438	190152000	261561500	36.005	47500986	1218	929889	2.2
2015	199715643	191246400	219413200	35.213	44566562	1251	845273	1.4
2016	207997224	168246400	2228691866	36.169	31911859	1281	904664	0.5
2017	202808495	179928833	2254464074	37.140	42653219	1256	928570	0.2
2018	201667198	186777267	2437789471	38.124	45327326	1206	953907	0.4

Source: World Bank, Data Bank, https://www.albankaldawli.org/.

Standard Aspect

First: the description of the standard model

"It is intended to formulate economic relations between the variables under discussion in a mathematical form in order to estimate their coefficients and recognize the direction of the correlation utilizing standard methods. This stage includes two steps":

Defining model variables:"The research variables and standard formulation of factors affecting GDP may be defined as follows":

The dependent variable:"the gross domestic product which is the value of national goods and services during the year at current prices, that is, at the market price, and also represents the size of the market and the economic structure of the country" (Al-Rashid, 2010: 177).

The independent variable:"Some independent variables were identified in the GDP such as" (government spending GO, consumption CO, population PO, investment IO, exchange rate EX, money supply Ms, inflation INF).

The default standard model:

GDP= BO+B1G0+B2C0+B3P0+B4I0+B5EX+B6MS+B7INF+Ui

"Applying traditional standard methods to statistically unstable data will lead to showing inaccurate or false results, so the current study will apply unit root tests such as Dickey-Fuller and Phillips Peron, to indicate whether this data is for the studied variables is stable or unstable".

Second: Results of time series stationary tests for GDP variables

"In order to test the stationary of time series of the study variables, both the Augmented Dicky-Fuller and Phelps Byron tests were utilized to ensure the stationary of time series, As the instability of time series

converges into false regression results, if the regression coefficient of the proposed standard formula is equal to one, then the model leads to the presence of The unit root problem which means time series instability (Al-Rasheed, 2010: 45), and thus the test for study variables was conducted at the level as shown in the table below".

Table (2): The results of the Augmented Dicky-Fuller test

Variable	**level**	**ADF**	**Significance**
Gross Domestic Product (GDP)	**The first difference**	**-4.068**	**0.0041**
Government Spending G_O	**The first difference**	**-5.818**	**0.0001**
Consumption C_O	**The first difference**	**-5.340**	**0.0002**
Population P_O	**At the level**	**-5.295**	**0.0002**
Investment I_O	**The first difference**	**-7.546**	**0.0000**
Exchange Rate EX	**The first difference**	**-5.521**	**0.0001**
Money supply *Ms*	**The first difference**	**-4.791**	**0.0007**
Inflation *INF*	**The first difference**	**-5.354**	**0.0002**

Source: Prepared by the researcher based on (10 EV.) program outputs.

"Through the results in Table" (2), "it was found that all variables are unstable at the level, except for the population variable was at the level, and therefore it is necessary to take the first difference of the study variables and then re-test, However, after taking the first difference it was found that the time series of the study variables appeared Stationary, and in turn, shows that the effect of all temporary shocks will fade over time in the long run".

Third: Co-Integration Test results:

"The Co-Integration demonstrates the possibility of a long-term balance between unstable time series in their levels", and (Angel-Granger) "indicated that if time-series data are integrated from one rank, then time-series data have the estimated regression not false".

Table (3): Co-Integration Test

"Critical Value" 5%	**"Likelihood Ratio"**	**Number of Co-integration vectors**
122.25	**201.494**	None**
93.16	**110.212**	At Most 1**

69.53	**97.169**	At Most 2**
48.22	**43.151**	At Most 3*

Source: Prepared by the researcher based on (10 EV.) program outputs.

The results of Table (3) "show that there is a Co-integration correlation between the study variables with a vector and with a significant" (5%). "However, the results of the data stability and Co-integration test indicate a long-term balance correlation between study variables, and that data instability in its levels does not lead to any false estimation, that is, it shows similar behavior in the long term".

Fourth: Linear correlation test for error limit

"We notice from Table No". (4) That the residues (no correlation) are" free from autocorrelation, as the probability of Chi2 is greater than" (0.05).

Table (4): autocorrelation test

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	**0.46308**	Prob. F	**0.7151**
Obs*R-squared	**1.947302**	Prob. Chi-Square	**0.5778**

Source: Prepared by the researcher based on (10 EV.) program outputs.

Fifth: Test for heterogeneity

"We notice from Table No". (5) "That there is no difference between the error limit, meaning that it is homogeneous since" Chi2 is greater than (0.05).

Table (5): Examination of difference or heterogeneity

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	**0.860048**	Prob. F	**0.5055**
Obs R-squared	**3.67932**	Prob. Chi-Square	**0.4511**
Scaled explained SS	**5.544521**	Prob. Chi-Square	**0.2358**

Source: Prepared by the researcher based on (10 EV.) program outputs.

Sixth: Estimating the standard model

"Table (5): Estimating the Standard Model Function"

Variable	value of the coefficient	Standard error	t-Statistic	(p-value)
B_0	8.904368	2.0238	6.8220	0.000
Government Spending GO	3.850008	1.80001	0.18411	0.815
Consumption CO	2.080006	3.610002	5.1776	0.000
Population PO	- 1.000479	4.940005	- 2.1064	0.005
Investment IO	1.69008	2.620007	2.9191	0.228
Exchange Rate EX	2.856894	1.47404	9.1836	0.000
Money supply Ms	3.800006	2.450007	6.2788	0.000
Inflation INF	1.049785	1.00423	8.2355	0.000

Source: Prepared by the researcher based on (10 EV.) program outputs.

It is clear from Table No. (5) that all coefficients of variables have a statistically significant effect, except for two variables that did not have a significant effect on the model, namely government spending G0 and investment I0, meaning that this standard model suffers from several problems, and thus the standard model becomes as follows:

GDP = 8.904 + 2.85C0-1.0004P0 + 2.856EX + 3.8MS + 1.049INF

R^2 = 0.9543 F = 85.3348 D.W = 1.765

However, after conducting statistical and standard tests, the significance of the variables appeared through the value of the calculated F factor of 85.334 at the level of significance of 5%. As for the test (D.W) which reached 1.76, it proved that there was no autocorrelation problem because the more the value of (D.W) exceeds 1.5, this indicates that there is no autocorrelation, as the value of the modified determination coefficient

showed that about 95% of the changes in the GDP are explained by the independent variables,whilethe remaining 5% of these changes can be due to other factors not included in the modelConclusions:

1- The gross domestic product does not indicate the level of wealth or prosperity of the state or its individuals, so the GDP may be huge in the presence of a very large population, and therefore the average income of individuals is low, in contrast, the level of production in a specific country may be high, while Factories, workshops, and mode of transportation cause dangerous environmental pollution.

2- GDP measures the total quality of goods and services produced and sold in the economy, but it does not transmit any information about who uses these goods and services.

3- There is a statistically significant positive correlation between (consumption, exchange rate, money supply, and inflation) with the gross domestic product, and also the existence of a statistical significance inverse correlation between the population and the gross domestic product.

4- There is no significant correlation between government spending and GDP with a probability ratio (0.815), and there is no significant correlation between investment and GDP with a probability ratio (0.228).

5- That the interpretation of the standard model was (95%) and the rest (5%) could be due to other factors not included in the model.

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