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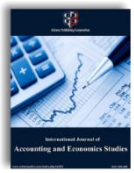

The Impact of Domestic Public Debt and Budget Deficit on Aggregate Supply in Iraq

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Abstract

public debt, the general budget deficit, and aggregate supply in the Iraqi economy—over the period 2004–2021, by employing the Vector Error Correction Model (VECM), which is suitable for non-stationary, cointegrated time series. The structural imbalance in aggregate supply, driven by the high relative contribution of the oil sector, has significantly influenced changes across all economic sectors that constitute the gross domestic product (GDP), as well as those linked through forward and backward linkages. Consequently, domestic public debt has increased, accompanied by a limited sustainability of the budget deficit.

Furthermore, negotiations with the International Monetary Fund, the World Bank, and the Paris Club, in cooperation with international financial and legal advisors and auditors, contributed to a substantial reduction in Iraq's external debt—achieving an 80% write-off of the total external public debt. This had a positive impact on the absolute values of GDP, the budget deficit, and the overall macroeconomic performance.

Econometric analysis confirms the existence of both long-run and short-run relationships among the study variables. These relationships appear more pronounced in the direction from the budget deficit and aggregate supply to domestic public debt, as well as from domestic public debt and aggregate supply toward the budget deficit within the Iraqi economy. Moreover, the temporal path of aggregate supply closely mirrored the trajectories of both domestic public debt and the budget deficit throughout the period 2004–2021.

Keywords: *Internal Public Debt; Budget Deficit; Aggregate Supply.*

1. Introduction

The Iraqi economy has suffered from rising planned budget deficits, largely due to the reliance on traditional methods of budget preparation that fail to accurately account for the country's economic resources. This has led to persistent deviations between planned and actual figures on both the revenue and expenditure sides of the budget, ultimately resulting in higher levels of public debt—both domestic and external—to bridge the expenditure–revenue gap and sustain growth and development. This challenge has been particularly acute due to the increasing need for public spending. Iraq faced complex economic and political conditions during the period 2004–2021.

In addition, the country's efforts to rebuild what was destroyed by the war after 2003 led to an expansion of public spending, particularly in infrastructure development and the establishment of productive capacity, both to broaden the structure of aggregate supply and to meet urgent humanitarian needs. As a result, budget planning frequently involved deficits that were either intentional or unrealistic once implementation began. Considering these dynamics, this study employs established scientific methodologies and econometric techniques, using the EViews 9 software, to estimate and analyze the relationships among the variables under investigation.

2. Research Methodology

The research is based on the problem that, despite the continuous increase in public spending year after year through deficit-based budgets and the expansion of both domestic and external debt in the Iraqi economy, such measures did not lead to an increase in aggregate supply, nor did they enhance the contribution of the non-oil productive sectors. From this problem, the study hypothesizes that the rise in domestic public debt and the preparation of deficit-based budgets reinforce the expansion of public spending in both its current and investment components, which in turn leads to higher aggregate demand and creates the need to expand the productive capacities of aggregate supply. The research, therefore, aims to analyze and measure the relationships among the budget deficit, domestic public debt, and aggregate supply. To achieve this, the study relied on both the inductive and deductive approaches, in addition to employing a quantitative method to estimate and analyze these relationships.

3. Theoretical Review

The International Monetary Fund (IMF) defines public debt as the total liabilities that require repayment of principal and interest on a specified date or dates. It comprises all obligations represented by debt instruments such as bonds, treasury bills, loans, Special Drawing Rights (SDRs), currency and deposits, insurance schemes, pensions, unified guarantees, and accounts payable. Financing public expenditures can be achieved through various methods, including taxation, external or domestic borrowing, and other mechanisms, which may be driven by political, economic, or other considerations.

During the 1970s, external indebtedness of various countries doubled, becoming a global phenomenon, which evolved into a worldwide debt crisis in the 1980s. The external debt of developing countries multiplied several times, reaching approximately $18 billion in 1960 with an annual debt service of $2.6 billion. By 1970, it had risen to $74 billion, primarily to finance budget deficits or provide external funding for economic development, and escalated further to $1,000 billion in 1980, with debt service estimated at $68 billion. In countries such as the United States, national debt originated at the federal level during the War of Independence, when wealthy individuals purchased treasury bonds at less than 10% of their face value. Issuing new debt to repay old obligations imposes additional burdens on taxpayers and further strains public budgets and individuals.

Classical economists opposed extensive government intervention and generally viewed public debt unfavorably, arguing that it ultimately leads to higher interest rates in financial markets and weakens competition. In contrast, the Keynesian school emphasized the importance of government intervention in economic activity. The state can direct public debt toward productive uses that enhance effective demand, which in turn determines aggregate supply.

However, increased government spending may crowd out private investment and raise interest rates (the "crowding-out effect"). Excessive demand for money generated by higher government expenditure compels households to reduce their spending to maintain liquidity and portfolio balance. Similarly, high debt-financed government spending can reduce private consumption, especially if future tax increases are necessary to repay public debt (the Ricardian equivalence proposition). Reduced private expenditure combined with higher government spending can also drive up domestic prices, potentially mitigating the impact of fiscal expansion on output. When the government spends more than it collects from taxes and other revenues, it borrows to cover the deficit. This borrowing is referred to as “net public sector borrowing” and is commonly indicated as the fiscal deficit.

Monetarists argue that economic problems stem from Keynesian policies, which led to increased government spending, rising budget deficits, and growing public debt. To address these issues, they advocate reducing the fiscal deficit and public debt. International institutions, aligning more with the neoclassical perspective, maintain that the capitalist system is capable of self-regulation, balance, and stability, provided there is freedom, competition, and minimal government intervention in economic activity.

4. Evolution of The Internal Public Debt for The Period 2004-2021

The government’s reliance on domestic borrowing to meet public expenditure requirements increases the money supply in the economy. An expanded money supply raises inflation rates, which in turn leads to higher taxes due to the increased liquidity, further enlarging public debt. This escalation contributes to higher interest rates, resulting in additional inflation and undermining the role of money in financing growth and development.

International experiences indicate that persistent fiscal deficits tend to increase public debt, as the budget bears additional burdens to cover debt interest, which in turn exacerbates future deficits. This pattern was evident in the Iraqi economy after 2003, due to the immense economic and political challenges confronting the reconstruction process.

Domestic public debt amounted to 6,390,347.8 million Iraqi dinars in 2004, influenced by the pre-2003 era, the economic sanctions, prevailing political conditions, and the monetary and financial realities of deficit financing. In 2005, domestic debt continued to rise to 6,566,526.5 million dinars, followed by a decrease in 2006 to 5,639,040.1 million dinars. The subsequent years, 2007 and 2008, saw further declines, with negative annual growth rates of -8.3% and -14.1%, respectively, as shown in Table 1. This reduction was partly attributed to higher oil revenues and rising oil prices during those years, which enabled the government to achieve a budget surplus, reduce reliance on borrowing, and partially repay both domestic and external debts.

Nevertheless, the Iraqi economy continues to face its core structural problem: the dominance of the oil sector and the resultant impact of its fluctuations on other economic sectors, including industrial, agricultural, commercial, and service sectors. Negotiations with the International Monetary Fund (IMF), the World Bank, and the Paris Club, in collaboration with international financial, legal, and auditing advisors, facilitated a reduction in Iraq’s external debt, achieving an 80% write-off of total public external debt.

Table 1: Internal Public Debt, 2003–2015 (Million IQD)

Annual rate of change	Internal public debt	Year	Annual rate of change	Internal public debt	Year
123.7	9520019	2014	---	6390347.8	2004
237.6	32142805	2015	2.76	6566526.5	2005
47.3	47362251	2016	-14.12	5639040.1	2006
0.66	47678796	2017	-8.36	5167884.4	2007
-12.3	41822918	2018	-14.15	4436849.5	2008
-8.3	38331548	2019	89.79	8420732.1	2009
0.67	64246559	2020	87.1-	1056052	2010
8.8	69912394	2021	605.1	7446859	2011
			12-	6547519	2012
			-35.0	4255549	2013

Source: Central Bank of Iraq, Directorate General of Statistics and Research, Annual Bulletins 2003-2021.

In 2009, public debt increased again, with an annual growth rate of 89.7%, the highest rate during the period 2004–2009. This rise was primarily due to the expansion of government operations, particularly in current and investment expenditures for salaries and wages, compounded by a sharp decline in global oil prices because of the 2007–2008 global financial crisis.

The increase in public debt continued during 2010 and 2011; however, in 2012, it declined, registering a negative growth rate of -12%.

The challenges faced by the country—including armed conflict with ISIS and the steep fall in oil prices, which led to a significant reduction in domestic liquidity—put pressure on the public budget. Consequently, the Ministry of Finance resorted to domestic borrowing to finance the budget deficit. Measures included issuing national bonds and forward-delivery bonds in U.S. dollars, discounting government transfers

at the Central Bank in the secondary market, and financing the state budget by utilizing 50% of commercial banks' reserves deposited at the Central Bank.

Public finance indicators for 2015 showed that the domestic debt balance reached 32.1 trillion Iraqi dinars, with an annual growth rate of 237.6%, representing 16.8% of the GDP at current prices.

The average domestic public debt amounted to approximately 51 trillion dinars during the period 2016–2021, as shown in Table 1. This increase was influenced by the continued occupation of parts of Iraq by terrorist groups, ongoing liberation operations, and the reconstruction of infrastructure destroyed by military operations. Additional contributing factors included the failure to approve the 2020 budget, continuation of expenditures at a 12:1 ratio relative to the previous fiscal year, and the negative impacts of the COVID-19 pandemic. These circumstances ultimately led to a rise in domestic public debt and were exacerbated by the fluctuations in oil supplies to global markets, which in turn reduced funding for various projects and subsequently affected the overall growth of Iraq's aggregate supply.

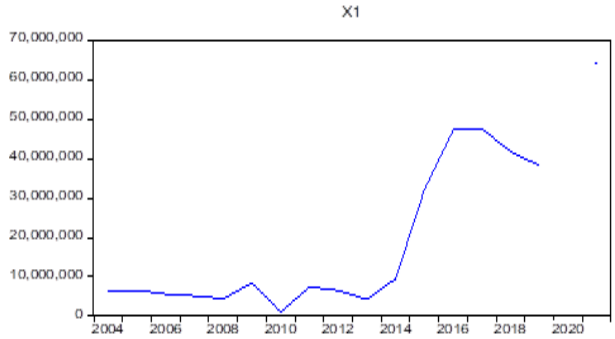

Fig. 1: Evolution of the Internal Public Debt for the Period 2003-21

Source: Prepared by researchers based on Table 1 data.

From the observation of the above figure, it is evident that the absolute values of domestic public debt remained relatively stable during the period 2004–2014. This stability is consistent with the increase in oil revenues and the lifting of economic sanctions on Iraq, which reduced the need for additional domestic borrowing. At the same time, local governments lacked the capacity to fully execute their budgeted expenditures.

However, after 2014, the public debt rate increased, reaching its peak in 2018. This rise reflects the growing need for financial resources to stimulate economic growth, particularly during the war against terrorist groups and the global decline in oil prices, while simultaneously maintaining pre-war expenditure levels. Consequently, these factors affected both the Iraqi general budget and the aggregate supply of the economy.

5. Evolution of The Public Budget Deficit/Surplus

The general budget in Iraq suffers from deep-rooted structural imbalances resulting from various factors, including the nature of budget preparation and the classification of expenditures and revenues. Expenditure priorities tend to favor consumption over investment, which ultimately weakens the capital formation of the national economy, thereby reducing future employment opportunities. This is particularly significant given Iraq's high population growth rate and its predominantly young population, implying a growing need for additional job opportunities. The actual state of Iraqi budgets reflects this trend, which is likely to lead to social pressures demanding immediate and future employment.

The period 2004–2012 was characterized by budget surpluses in Iraq despite the preparation of most budgets in deficit. On the revenue side, increases in crude oil prices, with the average oil price reaching $75.6 per barrel in 2010, led to a rise in oil revenues to 57.1 trillion dinars, registering a growth rate of 31.9%. In contrast, growth rates of tax revenues and changes in transfers were 54.1% and 81.2%, respectively. Meanwhile, public expenditures continued to increase but at a slower pace than overall revenue growth, which reinforced the surplus during the above period. This clearly indicates that the increase in public revenues was largely driven by higher oil exports, influenced by licensing rounds, the entry of foreign companies into the Iraqi oil market, and the post-2003 political transformation, in addition to the limited capacity of executive bodies and provincial councils to implement their budgets, given the novelty of the experience in Iraq.

The years 2013, 2014, and 2015 witnessed budget deficits, amounting to –5,287.5, –7,863.7, and –3,927.2 million dinars, respectively, as shown in Table 2. These deficits were driven by declines in oil prices, production increases in OPEC and non-OPEC countries, and a significant slowdown in labor demand for oil—particularly from Europe, Asia, and the Pacific. Forecasting agencies and markets were taken by surprise by the depth of the price decline. According to the World Economic Outlook report of October 2014, the average oil price was projected at $99.36 per barrel for 2015 based on futures markets, whereas the April 2015 report projected a range of $58.14–65.65.

These deficits coincided with Iraq's war against terrorist groups, necessitating increased military expenditures, compensation for those affected by military operations, and arbitrary government employment in security, defense, and certain low-productivity public sectors funded by the general budget without relying on the value added generated by these sectors to the national economy.

Table 2: General Budget, 2004-2021 (Million Dinars)

Surplus/deficit	Overhead	Public revenues	Year
871.4	32117.5	32988.9	2004
14060.3	26375.2	40435.5	2005
10248.8	38806.7	49055.5	2006
15933.7	39031.2	54964.9	2007
21237.6	59403.4	80641	2008
2676.5	52576	55243.5	2009
44	70134.2	70178.2	2010
30049.7	78757.7	108807.4	2011

14677.6	105139.6	119817.2	2012
5287.5-	119127.6	113840.1	2013
7863.7-	113473.5	105609.8	2014
10267266-	82813611	72546345	2015
20157557	73571003	53413446	2016
1845840	75490115	77335955	2017
2569645	80873189	106569834	2018
4156528-	111723523	107566965	2019
12882754-	76082434	63199689	2020
6231805	102894659	109081464	2021

Source: Republic of Iraq, Ministry of Planning, Central Organization for Statistics and Information Technology, annual statistical collection, miscellaneous years.

Republic of Iraq, Central Bank of Iraq, Directorate General of Statistics and Research, Annual Economic Report for the years (2004-2021).
The years 2016, 2017, and 2018 witnessed surpluses in Iraq's general budget, amounting to 20,157,557, 1,845,840, and 2,569,645 million dinars, respectively, as shown in Table 2. These surpluses resulted from public revenues exceeding public expenditures and Iraq's adoption of austerity measures, particularly regarding unjustified current expenditures, alongside support from donor countries to address the threat of terrorist groups. The surplus was also supported by the International Monetary Fund's (IMF) provision of technical assistance options from various IMF departments, based on practices offered to other oil-producing countries, especially in the areas of public finance management, enhancement of fiscal administration, and development of the financial sector.
The years 2019 and 2020 experienced significant budget deficits due to the COVID-19 pandemic, which led to the closure of most markets and disruption of economic activity, in addition to the absence of an approved budget for 2020, resulting in the observed deficits. Conversely, 2021 recorded a budget surplus, reflecting the end of the pandemic and the implementation of economic stimulus policies to address the recession caused by the pandemic. Consequently, most economic indicators improved, including the balance of the general budget.
Iraq's general budget suffers from structural imbalances in its public revenues. The economy's dependence on a single source for GDP generation and exports is among the primary reasons explaining these imbalances. Non-oil revenues, primarily tax revenues, also suffer from low collection efficiency and poor yield due to numerous challenges faced by the tax administration, leading to insufficient tax collection, a lack of revenue diversification, and inefficient tax management. Figure 2 illustrates the time path of Iraq's budget surplus or deficit, showing that deficit periods predominate over surplus periods. Notably, the time series of the budget for 2004–2021 does not indicate the absence of surplus or deficit; rather, the balance fluctuates between ±10, thereby showing a relatively stable trend.

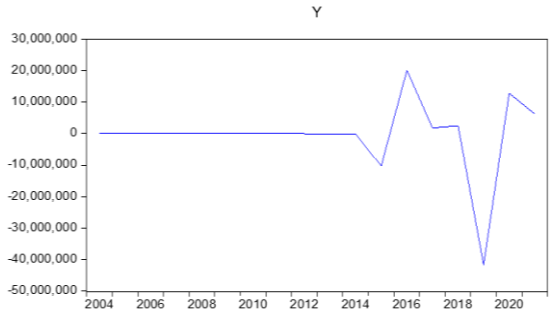

Fig. 2: Public Budget Deficit/Surplus.

Source: Prepared by researchers based on Table 2 data.

During the period, monetary policy attempted to raise and lower interest rates alternately to attract capital and encourage investment, or partially to finance the budget deficit. However, these efforts proved largely ineffective due to prevailing conditions, administrative bureaucracy, money laundering, and financial and administrative corruption, which hindered their success. Conversely, higher interest rates in any country would normally prompt individuals and foreign institutions to transfer funds to that country to benefit from the elevated returns, which implicitly increases the supply of foreign currencies and thus depreciates their value relative to the local currency. Had Iraq followed this approach effectively, it could have enhanced its competitive capacity, attracted more domestic and foreign funds, and thereby financed growth and development. Nevertheless, the ineffectiveness of monetary policy in significantly influencing interest rates prevented this outcome.

6. The Evolution of The Aggregate Supply

Following Iraq's political and economic transition after 2003, and despite the adoption of economic reform policies and the opening up to the international community, growth rates exhibited fluctuations and instability in key economic indicators. The Gross Domestic Product (GDP) reached 101,788.4, 103,568.4, and 109,368.4 billion Iraqi dinars in 2004, 2005, and 2007, respectively, with the oil sector maintaining a relatively high share of total aggregate supply at 30.3%, 41.1%, and 48.5% for the same years. The budget surplus relative to GDP stood at 0.86%, 13.58%, and 9.37%, respectively, as shown in Table 3. These increases reflect a phase of economic growth influenced by the lifting of economic sanctions on Iraq, combined with a significant expansion of imports in line with rising oil revenues, signaling a new political and economic stage in Iraq's history.
Growth in the Middle East remained robust, reaching 5.8% in 2007, despite limited increases in oil production. Rising oil prices facilitated higher government expenditure in oil-exporting countries, expansion of government credit to the private sector, and some countries' adoption of a managed exchange rate supported by foreign currency reserves derived from oil surpluses. Additionally, policies such as interest rate liberalization, fuel price adjustments, and competitiveness support—particularly in Gulf countries—contributed to stronger economic growth.
From Table 3, it is evident that the absolute GDP values increased during 2008–2010; however, the relative importance of oil in total aggregate supply declined after 2008, and the budget surplus-to-GDP ratio also fell until 2010. These fluctuations reflect intertwined

political and economic conditions, including terrorism, rising administrative and financial corruption, and wastage of productive capacity, indicating stagnation and lost development opportunities. After 2012, GDP values rose alongside higher budget deficits relative to GDP, despite the continued high contribution of the oil sector to aggregate supply. This outcome was primarily driven by the war on terrorism, increased military and civilian expenditures, and misguided employment policies not linked to productivity.

GDP reached 132,731; 142,700.2; 162,587.5; and 173,273 billion dinars for 2010, 2011, 2012, and 2013, respectively, with the oil sector maintaining a stable share of roughly 50% of total GDP during 2010–2013. This reflects economic policies aimed at structural adjustment in sectoral contributions, enhancing non-oil sector productivity to mitigate shocks arising from price or oil production imbalances.

To ensure sustainable growth in Iraq's aggregate supply, the International Monetary Fund (IMF) recommended improving energy pricing efficiency, given its regional low levels, to allow flexibility and responsiveness to domestic and global market changes. This would reinforce fiscal discipline and better budgetary planning, constituting part of structural adjustment efforts.

Aggregate supply continued to fluctuate between increases and decreases during 2017–2021, influenced by the persistently high contribution of the oil sector, which accounted for 61.5%, 89.7%, 59.1%, 61.4%, and 56.5% in 2017, 2018, 2019, 2020, and 2021, respectively, as shown in Table 3, alongside relatively modest budget deficits except in 2021. This period coincided with ongoing military operations against terrorist groups, the non-approval of the 2020 budget, and the COVID-19 pandemic, resulting in modest absolute GDP values and structural imbalance due to the dominance of the oil sector.

From a broader perspective, despite the year-on-year increase in domestic public debt, as shown in the previous section, these increases did not significantly enhance aggregate supply. In contrast, budget deficits and the oil sector's contributions had a more pronounced impact, clearly highlighting the critical role of oil in shaping aggregate supply compared to the influence of domestic public debt in financing growth and development. This underscores the need for sustainable development policies and the identification of alternative revenue sources beyond oil, recognizing the sector's finite nature. The limited effect of debt on GDP formation also indicates the nascent stage of Iraq's financial markets and their limited capacity to utilize public debt instruments to finance aggregate supply, given the small number of listed companies and market immaturity.

Table 3: Evolution of the Aggregate Supply (GDP) of the Iraqi Economy,2004-2021 2007 = 100 billion Iraqi Dinars

Budget Surplus/Deficit as % of GDP	Relative Importance of Oil in GDP (%)	Oil output	Gross Domestic Product (GDP)	Year
0.86	30.3	30855.9	101788.4	2004
13.58	41.1	42529.2	103568.4	2005
9.37	48.5	53030.9	109368.4	2006
14.30	53.2	59274.3	111455.8	2007
17.73	72.5	86867.1	119802	2008
2.15	54.4	67752.8	124659.5	2009
0.03	51.5	68401.9	132731	2010
21.06	52	74185.7	142700.2	2011
9.03	51.5	83805.7	162587.5	2012
3.05	49.9	86435.9	173273	2013
4.48	51.4	90195.8	175335.4	2014
2.16	55.4	100929.2	182051.4	2015
0.9	60.4	1197000	199500.0	2016
0.8	61.5	1287710	201110.0	2017
13	89.7	1771990	199100.0	2018
1.7	59.1	1398600	233100.0	2019
6.8	61.4	1152168	188800.0	2020
14.1	56.5	1134000	202500.0	2021

Source:

- Republic of Iraq, Ministry of Planning, Central Organization for Statistics and Information Technology, annual statistical collection, miscellaneous years.
- Republic of Iraq, Central Bank of Iraq, Directorate General of Statistics and Research, Annual Economic Report for the years (2004-2017).

The mismanagement rooted in an immature governmental philosophy for the Iraqi economy, coupled with unclear economic policies after 2003, led to structural imbalances in the composition of the Gross Domestic Product (GDP) and most macroeconomic variables. Expansionary fiscal policy, as observed in the budget deficits, primarily increased unproductive public spending (current expenditures) while reducing investment expenditures (growth-generating), which significantly contributed to the rise in domestic borrowing from banking institutions, individuals, and other sources. Consequently, this weakened savings directed toward investment, which is crucial for expanding the productive base, enhancing production techniques, improving productivity, and ultimately increasing the national economy's competitiveness.

The relationship between the research variables can be illustrated in Figure 3, which clearly demonstrates the nature and trajectory of the interactions among the studied variables.

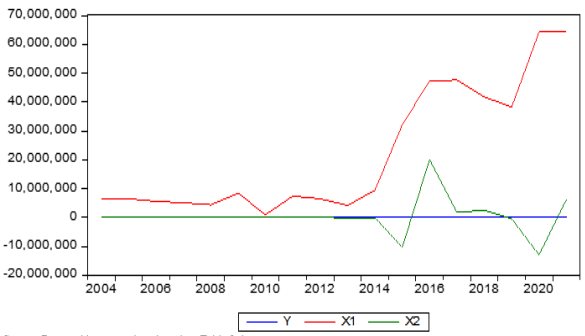

Fig. 3: Evolution of GDP.

Source: Prepared by researchers based on Table 3 data.

Using statistical software, the time series of one variable can reflect the changes occurring in another variable, a relationship supported by both economic theory and empirical evidence. The post-2003 transformation led to an increase in aggregate supply, as shown in Table 3, which contributed to heightened rural-to-urban migration, thereby placing pressure on urban services and generating social and psychological stresses manifested in the emergence of informal settlements, encroachments on public and private property, and displacement, which in turn became a source of terrorism. This transformation also facilitated the rise of influential political elites within state institutions, deepening administrative and financial corruption. Iraq was ranked third in corruption out of 167 countries according to the Transparency International report of 2007, resulting in increased money laundering activities and the smuggling of foreign currency, which removed a substantial portion of the GDP from the domestic income cycle.

To examine the nature of the relationships among the research variables more rigorously, the Vector Error Correction Model (VECM) is employed. This model is designed for non-stationary time series that are, however, integrated. Any two variables are considered cointegrated only if a long-term relationship exists between them, with values transformed into natural logarithms. Table 4 presents the results of the cointegration analysis among the research variables.

Table 4: Vector Error Correction Estimates

Date: 08/23/25 Time: 07:58			
Sample (adjusted): 2007 2021			
Included observations: 15 after adjustments			
Standard errors in ( ) & t-statistics in [ ]			
Cointegrating Eq:	CointEq1		
Y(-1)	1.000000		
X1(-1)	-0.001326		
	(5.7E-05)		
	[-23.3960]		
X2(-1)	-0.003367		
	(0.00046)		
	[-7.34670]		
C	-134811.1		
Error Correction:	D(Y)	D(X1)	D(X2)
CointEq1	-0.207445	608.3777	-204.7895
	(0.38464)	(93.9321)	(154.133)
	[-0.53932]	[6.47678]	[-1.32865]
D(Y(-1))	-0.196894	-1028.291	503.4448
	(1.07375)	(262.218)	(430.272)
	[-0.18337]	[-3.92152]	[1.17006]
D(Y(-2))	0.145751	-1547.366	345.9179
	(1.28531)	(313.884)	(515.052)
	[0.11340]	[-4.92973]	[0.67162]
D(X1(-1))	-0.000134	0.033865	0.744884
	(0.00063)	(0.15468)	(0.25382)
	[-0.21091]	[0.21893]	[2.93475]
D(X1(-2))	0.000763	-0.411851	0.327668
	(0.00083)	(0.20270)	(0.33262)
	[0.91932]	[-2.03178]	[0.98512]
D(X2(-1))	-0.001214	2.177956	-1.959787
	(0.00177)	(0.43310)	(0.71068)
	[-0.68451]	[5.02871]	[-2.75762]
D(X2(-2))	-0.001388	1.512809	-1.077195
	(0.00136)	(0.33252)	(0.54563)
	[-1.01910]	[4.54955]	[-1.97423]
C	3858.121	25957198	-10751040
	(19863.8)	(4850903)	(7959838)
	[0.19423]	[5.35100]	[-1.35066]
R-squared	0.478623	0.912902	0.829356
Adj. R-squared	-0.042754	0.825804	0.658712
Sum sq. resids	2.01E+09	1.20E+14	3.23E+14
S.E. equation	16956.37	4140885.	6794772.
F-statistic	0.917999	10.48133	4.860147
Log likelihood	-161.6440	-244.1143	-251.5430
Akaike AIC	22.61920	33.61524	34.60573
Schwarz SC	22.99683	33.99287	34.98336
Mean dependent	6208.773	3907168.	414770.4
S.D. dependent	16605.12	9921430.	11630922
Determinant resid covariance (dof adj.)		1.79E+34	
Determinant resid covariance		1.82E+33	
Log likelihood		-638.2420	
Akaike information criterion		88.69893	
Schwarz criterion		89.97342	

Source: Prepared by the researchers using EViews 9 software.

The results presented in the above table indicate the existence of cointegration and a long-term relationship among the variables, as the calculated t-values of −23.3960-23.3960−23.3960 and −7.34670-7.34670−7.34670 are significant. This demonstrates a mutual influence between public debt and budget deficit, on one hand, and aggregate supply, on the other. Changes in any of these variables are expected to affect the direction of change in the other variables over the long term.

For the purpose of determining the statistical significance of the estimated results, the tests will be extended as indicated in the following equations:

$$D(Y) = C(1)*(Y(-1) - 0.00132605110488*X1(-1) - 0.00336702294181*X2(-1) - 134811.108141) + C(2)*D(Y(-1)) + C(3)*D(Y(-2)) + C(4)*D(X1(-1)) + C(5)*D(X1(-2)) + C(6)*D(X2(-1)) + C(7)*D(X2(-2)) + C(8) \quad (1)$$

$$D(X1) = C(9)*(Y(-1) - 0.00132605110488*X1(-1) - 0.00336702294181*X2(-1) - 134811.108141) + C(10)*D(Y(-1)) + C(11)*D(Y(-2)) + C(12)*D(X1(-1)) + C(13)*D(X1(-2)) + C(14)*D(X2(-1)) + C(15)*D(X2(-2)) + C(16) \quad (2)$$

$$D(X2) = C(17)*(Y(-1) - 0.00132605110488*X1(-1) - 0.00336702294181*X2(-1) - 134811.108141) + C(18)*D(Y(-1)) + C(19)*D(Y(-2)) + C(20)*D(X1(-1)) + C(21)*D(X1(-2)) + C(22)*D(X2(-1)) + C(23)*D(X2(-2)) + C(24) \quad (3)$$

Here are three equations illustrating the relationship between the independent and dependent variables. Upon testing the first equation, the following results were obtained:

Table 5: Results of Testing Equation 1

Dependent Variable: D(Y)				
Method: Least Squares (Gauss-Newton / Marquardt steps)				
Date: 08/23/25 Time: 08:23				
Sample (adjusted): 2007 2021				
Included observations: 15 after adjustments				
D(Y) = C(1)*(Y(-1) - 0.00132605110488*X1(-1) - 0.00336702294181*X2(-1) - 134811.108141) + C(2)*D(Y(-1)) + C(3)*D(Y(-2)) + C(4)*D(X1(-1)) + C(5)*D(X1(-2)) + C(6)*D(X2(-1)) + C(7)*D(X2(-2)) + C(8)				
	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.207445	0.384639	-0.539323	0.6064
C(2)	-0.196894	1.073746	-0.183371	0.8597
C(3)	0.145751	1.285314	0.113397	0.9129
C(4)	-0.000134	0.000633	-0.210911	0.8390
C(5)	0.000763	0.000830	0.919322	0.3885
C(6)	-0.001214	0.001774	-0.684509	0.5157
C(7)	-0.001388	0.001362	-1.019103	0.3421
C(8)	3858.121	19863.80	0.194229	0.8515
R-squared	0.478623	Mean dependent var		6208.773
Adjusted R-squared	-0.042754	S.D. dependent var		16605.12
S.E. of regression	16956.37	Akaike info criterion		22.61920
Sum squared resid	2.01E+09	Schwarz criterion		22.99683
Log likelihood	-161.6440	Hannan-Quinn criterion.		22.61518
F-statistic	0.917999	Durbin-Watson stat		1.182970
Prob(F-statistic)	0.543482			

Source: Prepared by the researchers using E-Views 9 software.

Relationship between domestic public debt and budget deficit as independent variables, and the aggregate supply as the dependent variable, since the error correction coefficient is not statistically significant and the probability exceeds 0.10, as do the short-term coefficients. We then proceeded to test Equation 2, and the results are presented in Table 6.

Table 6: Results of Testing Equation 2

Dependent Variable: D(X1)				
Method: Least Squares (Gauss-Newton / Marquardt steps)				
Date: 08/23/25 Time: 08:32				
Sample (adjusted): 2007 2021				
Included observations: 15 after adjustments				
D(X1) = C(9)*(Y(-1) - 0.00132605110488*X1(-1) - 0.00336702294181*X2(-1) - 134811.108141) + C(10)*D(Y(-1)) + C(11)*D(Y(-2)) + C(12)*D(X1(-1)) + C(13)*D(X1(-2)) + C(14)*D(X2(-1)) + C(15)*D(X2(-2)) + C(16)				
	Coefficient	Std. Error	t-Statistic	Prob.
C(9)	608.3777	93.93212	6.476780	0.0003
C(10)	-1028.291	262.2176	-3.921518	0.0057
C(11)	-1547.366	313.8842	-4.929735	0.0017
C(12)	0.033865	0.154681	0.218935	0.8329
C(13)	-0.411851	0.202704	-2.031779	0.0817
C(14)	2.177956	0.433104	5.028713	0.0015
C(15)	1.512809	0.332518	4.549555	0.0026
C(16)	25957198	4850903.	5.351004	0.0011
R-squared	0.912902	Mean dependent var		3907168.
Adjusted R-squared	0.825804	S.D. dependent var		9921430.
S.E. of regression	4140885.	Akaike info criterion		33.61524
Sum squared resid	1.20E+14	Schwarz criterion		33.99287
Log likelihood	-244.1143	Hannan-Quinn criter.		33.61122
F-statistic	10.48133	Durbin-Watson stat		1.667562
Prob(F-statistic)	0.003049			

Source: Prepared by the researchers using EViews 9.

Table 6 indicates that the error correction coefficient is significant at the 0.05 level, implying that short-term deviations from the previous year are adjusted in the current year. Additionally, the short-term parameters C(10), C(11), C(13), C(14), C(15), and C(16) are statistically significant, as evidenced by the probability (Prob) values for each respective variable.
We proceed to test Equation 3, as presented in Table 7.

Table 7: Results of Testing Equation 3

Dependent Variable: D(X2)				
Method: Least Squares (Gauss-Newton / Marquardt steps)				
Date: 08/23/25 Time: 08:44				
Sample (adjusted): 2007 2021				
Included observations: 15 after adjustments				
D(X2) = C(17)*(Y(-1) - 0.00132605110488*X1(-1) - 0.00336702294181*X2(-1) - 134811.108141) + C(18)*D(Y(-1)) + C(19)*D(Y(-2)) + C(20)*D(X1(-1)) + C(21)*D(X1(-2)) + C(22)*D(X2(-1)) + C(23)*D(X2(-2)) + C(24)				
	Coefficient	Std. Error	t-Statistic	Prob.
C(17)	-204.7895	154.1331	-1.328654	0.2256
C(18)	503.4448	430.2725	1.170060	0.2803
C(19)	345.9179	515.0521	0.671617	0.5234
C(20)	0.744884	0.253815	2.934750	0.0219
C(21)	0.327668	0.332617	0.985120	0.3574
C(22)	-1.959787	0.710680	-2.757623	0.0282
C(23)	-1.077195	0.545628	-1.974229	0.0889
C(24)	-10751040	7959838.	-1.350661	0.2188
R-squared	0.829356	Mean dependent var		414770.4
Adjusted R-squared	0.658712	S.D. dependent var		11630922
S.E. of regression	6794772.	Akaike info criterion		34.60573
Sum squared resid	3.23E+14	Schwarz criterion		34.98336
Log likelihood	-251.5430	Hannan-Quinn criterion.		34.60171
F-statistic	4.860147	Durbin-Watson stat		1.590604
Prob(F-statistic)	0.026842			
Dependent Variable: D(X2)				
Method: Least Squares (Gauss-Newton / Marquardt steps)				
Date: 08/23/25 Time: 08:44				
Sample (adjusted): 2007 2021				
Included observations: 15 after adjustments				
D(X2) = C(17)*(Y(-1) - 0.00132605110488*X1(-1) - 0.00336702294181*X2(-1) - 134811.108141) + C(18)*D(Y(-1)) + C(19)*D(Y(-2)) + C(20)*D(X1(-1)) + C(21)*D(X1(-2)) + C(22)*D(X2(-1)) + C(23)*D(X2(-2)) + C(24)				
	Coefficient	Std. Error	t-Statistic	Prob.
C(17)	-204.7895	154.1331	-1.328654	0.2256
C(18)	503.4448	430.2725	1.170060	0.2803
C(19)	345.9179	515.0521	0.671617	0.5234
C(20)	0.744884	0.253815	2.934750	0.0219
C(21)	0.327668	0.332617	0.985120	0.3574
C(22)	-1.959787	0.710680	-2.757623	0.0282
C(23)	-1.077195	0.545628	-1.974229	0.0889
C(24)	-10751040	7959838.	-1.350661	0.2188
R-squared	0.829356	Mean dependent var		414770.4
Adjusted R-squared	0.658712	S.D. dependent var		11630922
S.E. of regression	6794772.	Akaike info criterion		34.60573
Sum squared resid	3.23E+14	Schwarz criterion		34.98336
Log likelihood	-251.5430	Hannan-Quinn criter.		34.60171
F-statistic	4.860147	Durbin-Watson stat		1.590604
Prob(F-statistic)	0.026842			

Source: Prepared by the researchers using EViews 9.

Table 7, according to Equation 3, illustrates the relationship between domestic public debt and aggregate supply as independent variables, and the budget deficit as the dependent variable. The results indicate that the long-term error correction coefficient is not statistically significant based on the probability values, whereas the short-term error correction parameters C(20), C(22), and C(23) are statistically significant.
Consequently, it can be concluded that there exist both long-term and short-term relationships among the study variables. This relationship is more pronounced and influential from the budget deficit and aggregate supply towards public debt, as well as from domestic public debt and aggregate supply towards the budget deficit in the Iraqi economy. This can be attributed to the rentier nature of the Iraqi economy, the method of financing public expenditures and budget deficits, the unproductive character of current expenditures, the weakness of the infrastructure, and the administrative practices of the government, which have not attempted to mitigate the influence of the budget on the behavior of certain macroeconomic variables.

7. Conclusions and Recommendations

7.1. Conclusions

7.1.1. There exists both a long-term and short-term relationship among the study variables, with this relationship being more pronounced and influential from the budget deficit and aggregate supply toward public debt, as well as from domestic public debt and aggregate supply toward the budget deficit in the Iraqi economy.

7.1.2. The temporal trend of aggregate supply followed a path almost identical to that of public debt and the budget deficit.

7.1.3. Most public budgets in the Iraqi economy were prepared with deficits to increase the financing of public expenditures; however, upon implementation, most expenditures were current, thereby weakening their developmental impact

7.1.4. Domestic public debt exhibited a fluctuating trend, with a clear effect on the budget deficit.

7.1.5. The rise in domestic public debt and the budget deficit led to a structural imbalance in aggregate supply, as the financing of both variables relied heavily on the oil sector, with a very high relative contribution

7.2. Recommendations

7.2.1. Expand aggregate supply in the Iraqi economy and increase the relative contribution of non-oil sectors to reduce the budget deficit and enhance the capacity to decrease both domestic and external public debt.

7.2.2. Reform the methodology for preparing public budgets in Iraq to cover periods longer than one year, ensuring the sustainability of public expenditures and emphasizing investment spending that generates economic growth.

7.2.3. Establish specific criteria for public expenditure productivity to ensure effective monitoring and implementation.

7.2.4. Align public debt directions with real investment trends in productive economic sectors to guarantee the recovery of capital and debt servicing.

7.2.5. Focus on modern methods and appropriate techniques to comprehensively account for economic resources, thereby supporting the economic structure and ensuring sustainable growth of aggregate supply.

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