



Public Debt Sustainability and its Impact on Reducing Unemployment Rates: The Iraqi Economy-A Case Study for the Period 2004-2023

Mahdi Khaleel Shadeed Al-Mamoori ^{1*}, Ruslan Abdul Zahra Safi Al-Janabi ², Abduljasim Abbas Alaallah ³

¹⁻³ University of Babylon, Babil, Iraq

* Corresponding Author: Mahdi Khaleel Shadeed Al-Mamoori

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Abstract

This research attempts to examine the relationship between the public debt-to-GDP ratio and unemployment rates to determine the possibility of reducing unemployment rates in the Iraqi economy. It also analyzes the nature of the relationship between these indicators to ensure the sustainability of national economic growth and its ability to withstand various shocks. The findings reveal that the Iraqi economy has attempted, through various economic policies, to increase public revenues to maintain the sustainability of public debt. However, this has been financed primarily through oil revenues, neglecting other sources such as taxes or other income-generating activities. This reinforced the imbalance in the budget structure in paying the installments of the public debt or the interest due on it, as the period of the study witnessed a decrease in the size of the public debt in absolute values and as indicators of output and a decrease in unemployment rates while they stabilized around 0.15. The decrease in unemployment rates was not a response to the decrease in debt, but rather came as a result of employment policies in the public sector far from the marginal productivity of labor. Economic measurement proved the existence of an integrated relationship between the variables of public revenues, public debt and unemployment rates, and that short-term changes can modify long-term changes. Providing financing enhances the sustainability of the economy by supporting economic policy reforms that reduce various risks to the national economy associated with various shocks, providing room for action through policies and increasing the financial safety margin to mitigate risks arising from long-term structural challenges, and providing greater scope to address debt resulting from financing to sustain growth in the output structure and public finances of the state and reduce unemployment.

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Introduction

The cyclical nature of contemporary economic activity remains an important focus of fiscal policy (in both developed and developing countries), as it aims to establish basic rules for the operation of various economic variables in order to sustain growth and achieve harmony between cash flows entering the general budget and cash flows leaving it. This in itself requires accurate calculations of the size of these flows and knowledge of their current and future values to ensure equal opportunities between current and future generations, thus ensuring that spending is consistent with available resources. However, the irregularity of economic fluctuations in various economic variables places a constraint on policymakers to avoid them and provide a suitable environment for growth and the rentier nature and monoculture of the Iraqi economy make the various economic policies restricted towards the sustainability of the relationship between the studied variables.

Consequently, the pressure of oil revenues on public spending does not provide sufficient flexibility for the various policy measures, and therefore the possibility of its sustainability in the medium and short term is characterized by difficulty in predicting and estimating. Increasing the rates of public debt, both internal and external, ultimately leads to a reduction in

unemployment rates and an increase in economic growth rates, provided that it is directed towards productive sectors with high added value to ensure the repayment of the public debt and the interest due on it, and thus achieve economic growth and reduce unemployment.

First: A Theoretical Review of Sustainability, Public Debt, and Unemployment

The state's activity in which it utilizes financial instruments, such as public expenditures, public revenues, taxes, fees, and public loans, to influence all aspects of economic and social life with the aim of achieving the public interest, according to prevailing economic, social, and political conditions, and in a way that satisfies public needs and achieves economic growth and stability, represents the task of public finance in sustaining the relationship between the aforementioned variables (Al-Batrik, 1986, 5) ^[7].

Thus, government procurement and taxation became the two key instruments of fiscal policy. Through them, the government can influence income and employment by increasing government purchases or reducing net taxes. Automatic changes in tax revenue due to a decrease in individual incomes expose the national economy to deflationary pressures, which consequently leads to a reduction in tax payments to the government. This implicitly means an increase in disposable income. Conversely, if the national economy is subjected to inflationary pressures and total expenditure increases rapidly, tax payments will automatically increase

individuals will pay an increasing percentage of their income in taxes, which will reduce overall spending and thus align spending with resources, thereby ensuring a sustainable relationship between the two (Karl *et al*, 613).

Providing long-term financing enhances the resilience, cohesion, and sustainability of the economy by supporting policy reforms that mitigate high macroeconomic risks associated with climate change, pandemic preparedness, and expanding policy space and financial buffers to reduce risks arising from long-term structural challenges (IMF Annual Report Arabic, 2021). This also provides greater financing capacity and addresses debt-related financing to ensure sustainable growth in the output structure and public finances.

Some businesses may choose not to distribute capital gains to shareholders in the short term for various reasons, including strengthening capital or capturing the opportunity cost of those funds later in future investments. This implicitly means not expanding overall spending, and the result may be a reduction in that spending. Here, the state's public finances play a compensatory role to increase overall spending or, at the very least, maintain its stable level, which implicitly means avoiding deflationary pressures the national economy is exposed to the effects of the business cycle, and the opposite is true when capital gains are distributed to individual shareholders. In this case, the state's public finances will resort to reducing total spending or increasing taxes to keep the level of spending stable and thus sustain the relationship between spending and output (Stanlik, 1992, p. 137). Increasing public debt without real financial sustainability leads to increased unemployment rates, meaning there is a direct relationship between public debt and unemployment levels, especially if interest rates on public debt are high. This is on the one hand, and on the other hand, it increases the tax gap, as it leads to a decrease in economic

growth (Abdul-Fahdawi, 2025, pp. 1233-1250) ^[12].

The concept of fiscal sustainability began to be used in numerous empirical studies in the 1980s as a synonym for public finance sustainability. This was in response to the challenges facing public finances due to increasing deficits or public debt in the general budget, or due to the mismatch between public revenues and public expenditures. It also stemmed from various governments' attempts to maintain aggregate demand or align it with population growth, rising welfare levels, and an increased role for state intervention (Taraf Hassanein, 2012, 105). The ability of governments to manage risks is crucial Financial sustainability is achieved by mitigating long-term shocks without requiring significant adjustments to public spending or revenue, and by ensuring that public institutions can cover all their expenses within the expected revenue ceiling while maintaining an acceptable growth rate without resorting to high borrowing or subsidies (Gavriiel Sene, 2010, p. 30) ^[16]. Linking debt service to repayment capacity helps increase policy flexibility.

During times of financial hardship, expanding the sovereign investment base and providing opportunities for risk diversification, and given the increased issuance of debt instruments to constitute a large percentage of the public debt itself, this will significantly raise the cost of sovereign debt crises (Al-Shammari, 2018, 389).

The concept of fiscal sustainability is linked to the time balance (or budgetary balance) of public finances, this means that any deficit in the public budget must be covered by future public revenues, taking into account the present value of expected cash flows Fiscal policy can allow for a certain ratio of public debt to GDP in the short term, but this cannot be sustained in the long term. To achieve sustainability, the government must generate a surplus to eliminate accumulated debt from the past and ensure a balance between the two sides of the budget.

The relationship between budgetary constraints and fiscal sustainability can be illustrated by the following mathematical formula:

$$G - T + iB_{t-1} + iEB_{t-1} = \Delta M + \Delta B + E\Delta A_{t-1} \quad (1)$$

G-T: Primary budget deficit, G: Government spending, T: Taxes, $iB_{t-1} + iEB_{t-1}$: Secondary budget deficit resulting from public debt service payments, ΔM : Borrowing from the central bank due to changes in the money supply, ΔB : Change in bonds, ΔA : External borrowing through foreign purchases of treasury bonds, E: Exchange rate

Primary deficit + Secondary deficit = Total deficit

$$D = (G - T) + (iB_{t-1} + iEB_{t-1}) \quad (2)$$

The left side of the equation (1) represents the budget deficit and is financed from the right side, which is financed by borrowing from the central bank through monetary issuance (deficit financing) or internal borrowing through the issuance of treasury bills. Therefore, public debt increases as long as there is a deficit.

Second: The Evolution of General Budget Variables for the Period 2004-2023

The general budget and its various variables are of great importance in Iraq because most economic activity takes place within the public sector. Furthermore, the rentier nature of the government necessitates its attention to the general

budget and its indicators. This has led to increased focus on public finances at the expense of other aspects of the economy, such as expanding the role of the private or mixed sectors, establishing economic partnerships with emerging or developed economies, or integrating into the international market to benefit from successful experiences therefore, integration, such as acquiring advanced technologies in the field of production or investment, or increasing the competitiveness of the Iraqi economy and expanding its infrastructure and production base, has, in contrast to the increased attention given to public finances, given rise to many structural imbalances.

In Iraq and the Iraqi economy in general, current spending increased at the expense of investment spending, weakening the productive capacity to create added value in various sectors. This undermined any opportunity to develop income-generating sectors that could replace imports, leading to higher unemployment rates and reduced productivity in the public sector.

According to Table (1), public expenditures reached 32,117,491, 26,375,175, 388,066,379, 39,031,232, and 59,403,375 million dinars for the years 2004, 2005, 2006,

2007, and 2008, respectively. The data above indicates steady year-on-year increases resulting from Iraq's exit from economic sanctions and its exit from the war with the international coalition after 2003, and the increase in wages and salaries, the number of employees in the government sector, and the reconstruction of what the war destroyed on the other hand. In contrast, public revenues also tended to increase, rising from 32,982,739 million dinars in 2004 to 80,252,182 million dinars in 2008 as a result of lifting the economic sanctions on Iraq that were imposed after 1990, in addition to the direction of macroeconomic policies in increasing crude oil exports to the outside world and economic reforms in the field of macroeconomic policies such as changing interest rates and targeting inflation through exchange through the foreign currency sale window by the Central Bank, liberalizing energy prices, and supporting vulnerable groups in society. The result was that the GDP increased from 53,235,359 million dinars in 2004 to 157,026,062 million dinars in 2008, while maintaining the budget deficit as an average of 13% of GDP for the period 2004-2008. This provides an important indication of the sustainability of public finances.

Table 1: General Budget in Iraq For the period 2004-2023 (million dinars).

Year	Public Revenues	Public Expenditures	Surplus or Deficit	Deficit or Surplus Ratio / GDP %	Current Spending / Public Spending	Investment Spending, / Public Spending g	Gross Domestic Product at Current Prices
2004	32982739	32117491	86524	16.3	90.5	9.5	53235359
2005	40502890	26375175	14127715	19.21	85.2	14.8	73533599
2006	49055545	388066379	10248866	10.72	84	16	95587955
2007	54599451	39031232	15568219	13.97	76.4	23.6	111455813
2008	80252182	59403375	20848807	13.28	65.8	34.2	157026062
2009	55209353	525670025	2642328	2.02	82.6	17.4	130634200
2010	70178223	70134201	44022	0.03	77.8	22.1	162064566
2011	108807390	78757668	30049722	13.83	77.4	22.6	217327107
2012	119817222	105139572	14677650	5.77	72.1	27.6	254255491
2013	113840076	119127555	-5287479	-1.93	66.1	33.9	273587529
2014	105364301	115937762	-10573461	-3.97	68.4	31.6	266332655
2015	725463345	82813611	-102672266	5.14	62.6	22.4	194680972
2016	53413446	73571003	-20157557	-9.89	74.9	25.1	196924142
2017	77335955	75490115	1845840	0.82	78.2	21.8	255722367
2018	106569834	80873189	25696645	10.24	82.9	17.1	251064479
2019	107566965	111723523	-4156528	-1.5	78.1	21.9	276157867
2020	63199689	76082434	-12882754	5.8-	95.7	4.3	219768798
2021	109081464	102894659	6231805	2.06	87.1	12.9	301439533
2022	161600025	95760017	65840008	17.2	82.1	24.9	383064152
2023	135516092	106770950	28745142	8.7	85.2	7.3	330046391

Source: Central Bank of Iraq, General Directorate of Statistics and Research, various publications. Ministry of Finance, Budget Department, Annual Report, various issues.

Economic growth and the achievement of some of the goals of the state's public financial sustainability, despite some reservations in this direction, given the enormous oil revenue in total public revenues, which reached approximately 98% in 2004 and then decreased to 88% in 2008 (Al-Sarhan, 2020, p. 85), which creates a structural imbalance in the output itself.

Public revenues decreased to 55,209,353 million dinars in 2009, compared to 5,256,700,250 million dinars in public expenditures for the same year, with a positive surplus of 2,642,328 million dinars, as a reflection of the 2008-2009 global financial crisis, which led to a loss of confidence in the

financial sector in the United States of America, and consequently the spread of the financial bubble in the global economy as a whole, including the Iraqi economy as well.

Public revenues continued to fluctuate between increases and decreases during the years 2011, 2012, 2013, and 2014, reaching approximately 108,807,390, 119,817,222, 113,840,076, and 105,364,301 million Iraqi dinars, respectively. This was accompanied by an increase in public expenditures during the same years, resulting in budget deficits, both in absolute terms and as a percentage of GDP. These deficits reached approximately 1% and 3% for the years 2013 and 2014, respectively. It should be noted that the

2014 budget was not approved for various reasons, including the overall political situation in the country and the incursion of terrorist groups. This was further compounded by the decline in oil prices to below \$50 per barrel since June 2014 and the rising costs of the war on terror this was accompanied by a drop in oil prices to below \$50 per barrel since June 2014, and an increase in the costs of the war on terror, support for displaced persons, reconstruction expenses, and the transfer of some self-funded salaries to central funding through the Ministry of Finance (Annual Economic Report, 2015, 68), which negatively affected the general budget.

In general, oil revenues are no longer sufficient as the sole source for financing foreign currency reserves and funding government spending, both investment and current. The longer Iraq delays developing its other productive sectors, the more severe its crises become and the greater the difficulties of recovery. It is not in Iraq's interest to adopt a development strategy based on increasing consumer demand to raise living standards and generate capital. Therefore, it is essential to adopt economic efficiency in managing available economic resources and to implement productivity standards for public spending (Al-Ali, <https://cbi.iq/static/uploads/up/file-15706129257589.pdf>), and to control unjustified consumption, and this contradiction in annual absorptive capacities between the highly flexible current consumption budget and the weakly flexible investment budget, places the burdens of monetary policy on the deviation of the restricted investment absorptive capacity and the conversion of its surpluses into consumer spending power added to highly flexible expenditures, which is essentially equivalent to the conditions of resource shortage that lead to price inflation, and is similar to the ability of foreign reserves for the intervention policy of the central bank, which is depleted by the high exchange rate flexibility in operating expenses and the high growth rates of them and what they add to the high

consumer demand power that the national economy is unable to face with a real immediate supply that avoids the problems of inflation (Saleh, <https://cbi.iq/static/uploads/up/file-15222299509583.pdf>).

Public revenues recorded an increase of 0.01 to reach 107.6 trillion dinars in 2019 compared to 106.5 trillion dinars in 2018 as a result of an increase in oil revenues by 3.8% due to an increase in the quantity of crude oil production by the same percentage, an increase in capital revenues by about 0.56 and other revenues by about 0.4. In contrast, expenditures for the period 2016-2019 increased as a response to the increase in public revenues on the one hand, and to increase spending to confront the security challenges that Iraq was exposed to after the entry of terrorist gangs into it, and to continue liberation operations and rebuild what the war destroyed, also with noting the increase in the ratio of current spending to public or investment spending by a very large difference, which implies undermining the sustainability of growth without the oil sector in the future.

By 2020, the effects of the COVID-19 crisis and the decline in oil prices on the financial variables of the general budget and the macroeconomic as a whole were becoming apparent. According to Table 2, oil revenues constituted a high percentage of total public revenues during the period 2004-2023. This indicates a structural imbalance in both public revenues and the general budget, implying that the sustainability of public finances is linked to the growth and development of oil revenues. Other revenues, including tax revenues, constitute only a small part of total public revenues, making the Iraqi economy and its financial sustainability more vulnerable to various shocks. Furthermore, the volatility of oil revenues implies that public finances and GDP in Iraq are susceptible to economic fluctuations from the business cycle

Table 2: Development of Oil Revenues Million Dinars

Year	Oil Revenues at Current Prices	General Revenues at Current Prices	Oil Revenues / General Revenues %
2004	32627203	32982739	98.9
2005	39480069	40502890	97.4
2006	46534310	49055545	94.8
2007	51701300	54599451	94.6
2008	75358291	80252182	93.9
2009	48871708	55209353	88.5
2010	66819670	70178223	95.2
2011	98090214	108807390	90.1
2012	116597076	119817222	97.3
2013	110677542	113840076	97.2
2014	97072410	105364301	92.1
2015	51312621	725463345	70.7
2016	44267060	53413446	82.8
2017	65155570	77335955	84.2
2018	95619121	106569834	89.7
2019	99216318	107566965	92.2
2020	54448514	63199689	86.1
2021	95270298	109081464	87.3
2022	153623277	161600025	95.1

Source: Ministry of Finance, General Budget Department, Budget, Annual Report, various issues.

Third: Development of some financial sustainability indicators and unemployment rates for the period 2004-2023

The sustainability of public debt and the sustainability of public finances are linked to the expected time course of the debt burden, expressed by the ratio of public debt to GDP and

the ratio of public debt to public revenues, taking into account how the public debt burden develops and the methods of repaying it under multiple scenarios. Accordingly, it can be said that the sustainability of the state's public finances is possible in light of a decrease or stability in the ratio of public debt to GDP with a moderate rate of unemployment in the use

of resources. The national economy must ensure the flow of economic surplus to the sectors that make up the economic structure at a rate greater than debt installments and debt service burdens in order to continue the sustainability of the state's public finances (Al-Aibi, 2018, 368)^[5].

Analysis of the Public Debt/GDP Ratio and Total Public Revenue/GDP Indicators

When public revenue does not cover public expenditures (current and investment), public authorities may resort to external or internal borrowing to cover these expenditures, taking into account the capacity of local productive capacity to bear the burden of the debt and its servicing. Public debt here represents the accumulated financial burdens on governments as a result of their ongoing activities to keep the cycle of spending going. The above indicator is internationally recognized and widely used in most international institutions. It is measured by comparing the growth rate of public debt with the growth rate of GDP to determine the government's ability to bear the costs and burdens of public debt. The value of the index should not exceed 100%, and most international standards, particularly those related to the Maastricht Treaty, stipulate that the debt-to-GDP ratio should not exceed 0.60 and the budget deficit-to-GDP ratio should not exceed 0.03.

Table (3) shows that public debt in Iraq began to decline from 2004 to 2008, both in absolute terms and as a percentage of GDP. However, the value of external debt increased compared to internal debt. This is explained by the fact that this debt was accumulated before 2003 as a result of economic sanctions and the nature of the economic conditions and low productivity in the sectors that generate foreign currency. Public debt exceeded GDP in 2004, 2005, and 2006, reaching 338.9%, 162.9%, and 125.2%, respectively, before declining in subsequent years. The above indicates the government's efforts, in cooperation with creditors and the international community, to reduce the size of the public debt to revive the Iraqi economy, with the ratio of public revenues to GDP reaching 0.53 for the period 2004-2008, which indicates that more than half of the GDP comes from the budget. This constitutes a constraint on economic policymakers to focus on diversifying the production base to meet aggregate demand in the event of a specific shock to the oil resource. In contrast, unemployment rates reached high rates of around 0.26 for the year 2004 as a reflection of the nature of the economic and political shocks of the period before 2004. In contrast, unemployment rates were characterized by decline and decrease for the period 2004-2008 with the decrease in the rates of public revenues and public debt to GDP, as in Table (3), this decline in unemployment rates indicates the stability policies pursued by macroeconomic policy, particularly monetary policy, in stabilizing the exchange rate, interest rates, and credit through the currency sale window. These policies also attempt to develop the private sector and increase employment opportunities within it, while noting the

expansion of employment in the public sector without taking into account the decline in marginal productivity of labor, along with the increase in unproductive employment opportunities in the service and administrative sectors of public authorities. The International Monetary Fund (IMF) prepared a program to reduce Iraq's debt and grant it relief of up to 0.95%. The Paris Club of creditors also submitted a proposal that included reducing the debt to 0.80% in three phases (Al-Tamimi, 2007, pp. 125-126)^[3]. This resulted in significant reductions in Iraq's total public debt, particularly its external debt. The result was evident, as both domestic and external public debt decreased as a percentage of GDP, reaching 87.9%, 51.4%, 64.1%, and 46.8% for the years 2007, 2008, 2009, and 2010, respectively. This percentage falls within the safe limits stipulated by international treaties and the IMF's recommendations for the sustainability of public finances and ensuring that the public debt is financed through output, along with a clear decline in unemployment rates. This indicates that the sustainability of public debt and the alignment of public revenues with public spending have yielded positive results in reducing unemployment rates in the Iraqi economy, benefiting from the prevailing optimistic outlook for growth.

By 2015, the events the country faced—namely, the incursion of terrorist groups, the decline in oil prices, and the decrease in domestic liquidity needed to finance public spending—posed challenges to the general budget. This led the government, through the Ministry of Finance, to resort to domestic borrowing to finance the deficit. It did so by issuing national bonds and discounting the remittances issued by these bonds at the Central Bank in the secondary market, and by working to finance the state budget through the utilization of 50% of the public sector.

This resulted in a significant increase in the domestic debt balance, as public finance indicators for 2015 showed that the domestic debt balance reached 32.1 trillion dinars, representing a growth rate of 237.6% compared to 2014. This constituted 16.8% of the GDP at current prices, compared to 9.5 trillion dinars in 2014 (Annual Economic Report, 2015, p. 76). In contrast, external debt remained relatively stable during the period 2010-2014 to avoid borrowing in foreign currencies and to prevent further burdening the national economy with external debt and debt servicing costs, in accordance with international agreements with the International Monetary Fund, the Paris Club, and the London Club.

The ratio of public revenues to GDP expressed at current prices remained high for the period 2010-2014 as shown in Table (3), despite the decrease in the volume and prices of oil revenues for the last year of the above period, clearly indicating that oil is an important source of public revenues and a major component in the structure of GDP, which creates high pressures on fiscal sustainability in the medium and short term, with difficulty in predicting the directions of the relationship in the long term.

Table 3: Some Financial Sustainability Indicators Million Dinars

Year	Total Public Debt	Domestic Public Debt	External Public Debt	GDP	GDP Public Debt / GDP%	Revenues / GDP%	Unemployment Rates %
2004	180421688	6061688	174360000	53235359	338.9	61.9	26.9
2005	119834763	6593960	113240803	73533599	162.9	55	17.5
2006	115220021	56453900	109574631	95587955	125.2	51.1	17.5
2007	98064705	5194705	92870000	111455813	87.9	47.6	11.7
2008	80763428	4455569	76307859	157026062	51.4	51.1	15.3
2009	83780757	8434049	75346708	130634200	64.1	42.2	15.1
2010	75901226	9180806	66720420	162064566	46.8	43.3	15.2
2011	79129249	7446859	71682390	217327107	36.4	50	12.2
2012	73832715	6549519	67285196	254255491	29	47.1	11.9
2013	72721903	4255549	68466354	273587529	26.5	41.6	15.1
2014	76386621	9520019	66866602	266332655	28.6	39.5	10.7
2015	100272103	32142805	68129298	194680972	51.5	36.8	14.9
2016	118286979	47362251	70924728	196924142	60	31.5	10.8
2017	125421420	47678769	77742624	255722367	49	30.2	10.9
2018	142986752	41822918	101163834	251064479	56.9	42.4	22.6
2019	154408148	38331548	101357878	276157867	55.9	55.9	12.8
2020	157693900	64246559	108355704	219768798	52.3	71.7	16.23
2021	105000000	69912394	30000000	301439533	34.8	34.8	16.17
2022	805974930	69495737	736179193	3830641523	21	42.1	16.5
2023	976611499	70557515	906053984	2873710922	33.9	41.1	15.2

Source: Central Bank of Iraq, General Directorate of Statistics and Research, various publications.\ Ministry of Finance, Budget Department, Annual Report, various issues.

Public debt continued to rise during the period 2004-2023 due to the increasing total internal and external public debt year after year, as shown in Table (3). This indicates the need to finance current and investment operations of the general budget, to meet the increasing military spending to combat terrorist groups and rebuild what these groups destroyed, and to ensure the continuation of the growth and development process of the Iraqi economy, while unemployment rates declined to their lowest level for the period 2004-2021, reaching their lowest point in 2016, The increase in debt in 2017 and its significant rise over the last four years of the above period is due to the repercussions of Covid-19 and the decline in economic activity at the international level, along with the repercussions of the oil market shock represented by the decrease in global demand for it and the decline in employment opportunities. The important observation here is that despite the increase in that debt, the value of the index continued to decline, indicating the efforts of the financial and monetary authorities in Iraq to sustain the public finances of the Iraqi state and increase the value of the gross domestic product on the other hand, and to clearly indicate that the value of the index remains within acceptable levels Low-income developing countries were affected by a range of external shocks, including a decline in the volume or prices of exports, a disruption in the structure of foreign trade, and a decrease in remittances and tourism revenues. This led to an increase in the volume of external debt, which greatly limited the ability of these countries to respond to these challenges and shocks, and thus affected the sustainability of public debt and public finances (<https://www.imf.org/external/pubs/ft/ar/2021/eng/download/imf-annual-report-2021-ar.pdf>). Iraq is one example of this.

As far as the total public revenues to GDP ratio for the period 2018-2021 is concerned, we find that the average value of the

index for the above period reached around 0.50, indicating once again the need to diversify the structure of public revenues and the structure of GDP away from oil sector revenues, so that this revenue is formed according to the data and conditions of the international market, away from financial sustainability policies and national economic policy procedures and directions.

Fourth: Estimating and Analyzing the Sustainability of Public Debt and the Unemployment Rate in the Iraqi Economy for the Period (2004-2022)

First: Model Description

Modern methods used in econometrics were employed. The Autoregressive Distributed Least Descent (ARDL) model was used to analyze the relationship between the research variables, relying on data and results from the Eviews program (13).

1. Description of Research Variables

The research includes a set of economic variables, which can be described as follows:

Y: Dependent variable, represented by the unemployment rate.

X1: Independent variable, represented by public debt.

X2 is the independent variable, representing public revenues.

The above variables were chosen to estimate the relationship between the research variables. Specific delay periods were adopted for the estimated model, and the time period was divided into quarterly periods. The logarithm was calculated using the statistical software (Eviews:13).

2. Time Series Stationability Test

A. Stationability Test for Model Variables using the ADF Test

Table 4: Stationability Test for Model Variables using the ADF Test

Variables	Dickey-Fuller Unit Root Test Statistics		
	Non-Intercept	Intercept	Intercept & Trend
Y1: Unemployment Rates	-3.9420(0.0002)	—	—
D(Y1)	—	—	—
X1: Public Debt Sustainability	-2.7796(0.0006)	—	—
D(X1)	—	—	—
X2: Average Public Revenues	-4.6776(0.0000)	—	—
D(X2)	—	—	—

Source: EViews13) Researchers' work based on program outputs

The extended Dickey-Fuller test (ADF) demonstrates the stationarity of the model variables. The results show that the unemployment rate series (Y1, according to Table 4) has a calculated τ value of -3.9420, which is greater than the tabulated τ value of -2.607686, with a significance level of 1% and a secant. Therefore, we reject the null hypothesis ($H_0: B = 0$) and accept the alternative hypothesis ($H_1: B = 1$). This indicates that the series does not contain a unit root because the series is stationary at the first difference and is integral of degree I.

Table (4) shows that the public debt rate series (X1) was stationary at its first difference and did not exhibit explosive movement. It remained stationary without a boundary or general trend, as the calculated value of (τ) was (-2.7796), which was greater than the tabulated value of (τ) of (-

2.605442) at a significance level of 1% without a boundary or general trend. This leads to the rejection of the null hypothesis and acceptance of the alternative hypothesis, which states that the series does not contain a unit root and is integral of degree (1) $\sim I$.

After conducting the Dickey-Fuller test for the (X2) general revenue rate series, it was found that the series is stationary in the first difference with the constant limit, as the calculated value of (τ) was (-4.6776) greater than the tabulated value of (τ), which amounted to (-2.610192) at a significance level of 1%. Therefore, we reject the null hypothesis and accept the alternative hypothesis, and that the series does not suffer from a unit root and is integral of degree (1) $\sim I$.

b) Phillips-Pyron (p-p) Test

Table 5: Stationhood test for model variables using the (p-p) test

Variables	Non-Intercept	Intercept	Intercept & Trend
Y1: Unemployment Rate	—	-3.5978(0.0080)	—
D(Y1)	—	—	-3.3438(0.0163)
X1: Public Debt Rate	—	—	—
D(X1)	—	—	—
X2: Public Revenue Rate	-3.3172(0.0175)	—	—
D(X2)	—	—	—

Source: Researchers' work based on the outputs of the program (EViews13)

Conducting the extended Phillips-Perron (p-p) test shows that the model variables are stationary. The results showed that the unemployment rate series (Y1, according to Table (5), has a calculated value of (τ) of (-3.5978) greater than the tabulated value of (τ), which was -2.768632, with a significance level of (1%) and a fixed term. Therefore, we reject the null hypothesis ($H_0: B = 0$) and accept the alternative hypothesis ($H_1: B = 1$). This indicates that the series does not contain the unit root because the series is stationary at the level and integral of degree (0)I. The results in Table (5) show that the public debt rate series (X1) was stationary at its first difference and did not exhibit explosive movement. It remained stationary without a boundary or general trend, as the calculated value of (τ) was (-3.3438), which was greater than the tabulated value of (τ) of (-2.605442) at a significance level of 1% without a boundary or general trend. This leads to the rejection of the null hypothesis and acceptance of the alternative hypothesis, which states that the series does not contain a unit root and is integral of degree (1) $\sim I$.

After conducting a p-p test for the public revenue rate series (X2), it was found that the series is stationary in the first difference without a limit and a general trend, as the calculated value of (τ) was (-3.3172) greater than the

tabulated value of (τ), which amounted to (-2.610192) at a significance level of 1%. Therefore, we reject the null hypothesis and accept the alternative hypothesis, and that the series does not suffer from a unit root and is integral of degree (1) $\sim I$.

Testing the ARDL Model in the Short Run for Some Research Variables:

Table (6) shows the preliminary estimation results of the ARDL model for the relationship between the public debt rate, the public revenue rate, and the unemployment rate. The estimated model results, with different lag periods (0, 2, and 4), are based on the Akaike criterion values. Akaike is among the top 20 model characterizations, as it provides the lowest value for this criterion, which is automatically determined by the software used (Eviews: 13). A value of (2) indicates two lag periods, and (1) indicates one lag period, and so on, according to the lag periods defined by the software for each model variable. The results demonstrate that the model possesses very high explanatory power due to the high value of the coefficient of determination (R^2), which is (0.99). This means that the model's independent variables explain approximately (99%).

Table 6: ARDL (Ardl) Model Test

Section	Variable / Statistic	Value
Model Information	Dependent Variable	IY
	Method	ARDL
	Date	06/02/26
	Time	16:38
	Sample	2005Q1–2023Q1
	Included Observations	73
	Dependent Lags	4 (Automatic)
	Automatic-Lag Linear Regressors	IX1, IX2
	Maximum Regressor Lags	4
	Deterministics	Restricted constant and no trend (Case 2)
	Model Selection Method	Akaike Information Criterion (AIC)
	Number of Models Evaluated	100
Coefficient Results	Variable	Coefficient
	IY(-1)	2.907832954
	IY(-2)	-3.558591282
	IY(-3)	2.116041836
	IY(-4)	-0.516787914
	IX1	0.096876309
	IX1(-1)	-0.211284216
	IX1(-2)	0.118461859
	IX2	0.001958821
	C	0.112839708
Standard Errors	IY(-1)	0.105697853
	IY(-2)	0.269404083
	IY(-3)	0.270218475
	IY(-4)	0.106849689
	IX1	0.058293328
	IX1(-1)	0.112388536
	IX1(-2)	0.058177696
	IX2	0.010711788
	C	0.040567588
t-Statistics	IY(-1)	27.510804220
	IY(-2)	-13.209121588
	IY(-3)	7.830855516
	IY(-4)	-4.836587927
	IX1	1.661876441
	IX1(-1)	-1.879944545
	IX1(-2)	2.036207451
	IX2	0.182865890
	C	2.781523681
Probability Values	IY(-1)	$3.594506226 \times 10^{-37}$
	IY(-2)	$6.051579620 \times 10^{-20}$
	IY(-3)	$6.406009434 \times 10^{-11}$
	IY(-4)	$8.658589518 \times 10^{-6}$
	IX1	0.101428587
	IX1(-1)	0.064668683
	IX1(-2)	0.045872387
	IX2	0.855481
	C	0.007098
Model Diagnostics	R-squared	0.994390428
	Adjusted R-squared	0.993689232
	S.E. of Regression	0.014858315
	Sum Squared Residual	0.014129250
	Log Likelihood	208.491304449
	F-statistic	1418.133811663
	Prob(F-statistic)	$5.950506459 \times 10^{-69}$
	Durbin-Watson Statistic	1.805469099
Information Criteria	Akaike Information Criterion	-5.4655151
	Schwarz Criterion	-5.183129
	Hannan-Quinn Criterion	-5.352979727
Descriptive Statistics	Mean Dependent Variable	2.66214
	S.D. Dependent Variable	0.187037

Source: Researchers' work based on the outputs of the ARDL program (EViews13).

The estimate is as follows: Model equation:

$$Y = 0.014129 + 0.21128X_1 + 0.112839X_2$$

The equation used to estimate the relationship between studies variables using the ARDL model reveals that the marginal slope of the parameter X_1 , which represents the public debt ratio, has a weak statistical impact on the unemployment rate. This is indicated by the parameter's value ($0.21128B_1 = 0.21128$), where an increase of one unit leads to a 0.21 increase in the unemployment rate. This reflects the prevailing economic reality: despite government borrowing to finance economic projects, these funds do not go to productive sectors that could alleviate unemployment. Therefore, unemployment is a structural problem stemming from structural imbalances in the Iraqi economy due to the dominance of the oil sector, which focuses on capital concentration

Conclusions

1. Public budget variables, such as public expenditures, public revenues, and the budget deficit, affect fiscal sustainability indicators and the structure of the gross domestic product (GDP) in the Iraqi economy.
2. ARDL model prove the public debt ratio, has a weak statistical impact on the unemployment rate.
3. 3- Changes in total public revenues affect the financing of public expenditures, making fiscal sustainability and the Iraqi economy more vulnerable to various shocks.
4. 4- Economic measurement of the relationship between the model variables demonstrates that the model is first-order integrated and that short-term discrepancies can correct long-term fluctuations.
5. The deep structural imbalances in the Iraqi economy and its reliance on a single source of public revenue affect the long-term sustainability of public debt.
6. The budget was characterized by the dominance of current spending over investment spending, which weakens the prospects for building productive capacity capable of sustaining the state's public finances independently of oil in the long term.
7. Unemployment rates declined, and sustainability indicators improved for the period 2004-2021. However, this decline resulted from public sector employment policies that were not aligned with the marginal productivity of labor.
8. 8- The Iraqi economy was subjected to two shocks: the terrorist attacks after 2014 and the COVID-19 pandemic. These shocks have led to a rise in unemployment rates, a logical consequence of local conflicts and economic globalization resulting from the interconnectedness of various economic and political relationships at the international level.

Recommendations

1. The general budget should be prepared according to the actual needs of the development process and in accordance with international standards of transparency and governance.
2. The productivity of non-oil sectors should be enhanced to mitigate the impact of potential shocks to oil revenues, which are subject to supply and demand conditions in the international market.
3. Establishing specific standards for the productivity of

public spending that are commensurate with the large volume of public expenditure in Iraq.

4. Prioritizing investment spending in the general budget at the expense of current spending, as the latter is unproductive.
5. Directing the budget deficit towards developing productive sectors to ensure structural adjustments to their relative contributions to the gross domestic product (GDP).

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