Anggaran: Jurnal Publikasi Ekonomi dan Akuntansi
Volume. 3, Nomor. 3, September 2025
e-ISSN : 3031-3384, p-ISSN : 3031-3392; Hal. 250-266
DOI: https://doi.org/10.61132/anggaran.v3i3.1630
Available online at: https://journal.areai.or.id/index.php/anggaran

Oil Rents and the Structure of Public Finances in Iraq

Ali Ayed Nasir[1*], Zainab Hadi AlKhafajy[2], Noof Ali Awad[3]
[1,2,3] Department of Economics, Faculty of Administration and Economics,
University of Kerbala, Iraq
Email : ali.ayed@uokerbela.edu.iq [1], zainab.hadi@uokerbala.edu.iq [2], noof.a@uokerbala.edu.iq [3]

Abstract. *The Iraqi economy demonstrates that, despite the substantial magnitude of oil revenues, these resources have not been effectively utilized to establish a diversified economic base capable of supporting comprehensive development and securing the rights of current and future generations. Instead, the majority of these revenues are allocated to consumption patterns or to financing current expenditures, which do not contribute to achieving sustainable development goals. This study examines the interdependence between oil rent revenues and their management, assessing the resulting improvements or declines in Iraq's financial and economic performance. It emphasizes the necessity of adopting prudent financial management and diversifying income sources to ensure long-term stability and prosperity for the country. The research problem lies in the heavy reliance of Iraq's public finances on oil rents, which exposes the economy to significant risks due to volatile global oil prices. This dependency leads to structural weaknesses in the revenue and expenditure framework, limiting its flexibility and sustainability, and consequently hindering efforts to achieve comprehensive economic development. The results of the estimated model indicate that current public revenues are heavily dependent on the previous year's revenues, suggesting that revenue generation is influenced by external factors, particularly expectations regarding fluctuations in oil prices.*

Keywords: *Economic Rents, Public Revenues, Public Expenditures, Oil Rents, State Public Finances.*

1. INTRODUCTION

Given the ongoing economic and political challenges facing Iraq, analyzing the relationship between its primary income source—oil rents—and the structure of its public finances has become increasingly critical. Understanding how public revenues and expenditures are shaped under heavy reliance on oil, as well as identifying the strengths and weaknesses of this structure, is a vital step toward designing more sustainable and resilient economic policies. This study aims to provide an in-depth analysis of this relationship, taking into account recent developments in global oil markets and Iraq's efforts to diversify its income sources.

Iraq is a quintessential oil-rentier state, with oil rents constituting the vast majority of its public revenues, a characteristic feature of its unique economic model. In such states, the oil sector's contribution to public revenues can reach 90% or more, granting significant economic influence. Countries are often classified based on this percentage: those where oil rents exceed 90% of public revenues are considered archetypal rentier states, followed by those with 50% or less. Iraq, with the world's second-largest oil reserves, exemplifies a rentier state. Its strategic position generates substantial revenues that could be leveraged for comprehensive development. The oil industry could finance tangible sectors such as industry, agriculture, and

Received: April 5, 2025; Revised: Mei 5, 2025; Accepted: Mei 19, 2025; Online Available: Juli 08, 2025;

infrastructure, as well as intangible sectors like public service provision. However, this heavy reliance on oil rents poses challenges related to economic diversification and financial sustainability, particularly in the face of volatile global oil prices.

This study is premised on the hypothesis that a causal relationship exists between oil rents and the state's public revenues. Excessive dependence on oil rents creates fragility in the Iraqi economy, constraining economic development and weakening the public budget's resilience.

2. LITERATURE REVIEW

The Concept of a Rentier Economy

A rentier economy is characterized by a country's reliance on the extraction of natural resources, such as oil, as its primary source of income. Typically, such an economy is fragile, heavily dependent on trade exchanges, and fosters a consumer-oriented society dominated by imports. In a rentier economy, minimal emphasis is placed on developing manufacturing industries or agriculture. Oil-dominated economies often exemplify this pattern, where significant financial returns are generated through the sale or extraction of resources. These revenues are primarily allocated to construction, employee wages and salaries, and importing goods to meet domestic needs, rather than being invested in productive sectors or acquiring developmental assets such as equipment and machinery that could stimulate economic growth and create job opportunities. Consequently, economic growth remains tied to rentier gains, which are not necessarily driven by the dynamics of internal or external development through the promotion of other productive sectors. The degree of an economy's dependence on rents is measured by the relative contribution of a specific sector to the gross domestic product (GDP). In oil-based economies, the oil sector's contribution often surpasses that of other sectors, such as agriculture and industry (Saleh, 2013: 4).

1. Natural resource rent

Natural resource rent is defined as the difference between the revenue generated from a natural resource at its current or market price and the opportunity cost of the capital, labor, and organizational inputs involved in its production. Alternatively, it represents the surplus of the product's price over the opportunity cost of all factors contributing to its extraction or production. Notably, scarce rent is defined as the price minus the marginal cost, with the rent influenced by market prices driven by demand and affected by changes in production costs, which are shaped by evolving technology, prices of substitutes, and other factors (Ahmed,

2020, 23). Some scholars argue that natural resource rent comprises two components: differential rent and absolute rent. Absolute rent refers to sovereign fees imposed by the state, as the sole owner of the resource, on each unit produced, which increases the product's price by the amount of the fee. For instance, if oil-producing countries impose an additional 10% fee on crude oil sales, oil prices may rise by up to 10%, allowing the state to capture the absolute rent from consumers (Marius, 2012, 4).

2. Economic rent

Economic rent is the surplus income earned by a factor of production beyond the amount required to sustain its current use or attract its utilization. For example, if a worker earns $100,000 but would accept $75,000 for the same role, the economic rent is $25,000. When land is considered a factor of production, it generates a transfer return, and any surplus above this return constitutes economic rent (Joseph, 2016, p. 48). In cases where a resource is exploited by a company independent of the landowner or resource owner, this concept is practically significant in concession agreements or production-sharing arrangements. Here, the government, as the resource owner, must secure a minimum return based on alternative uses. However, the minimum price for land services remains within the conceptual framework of rent but outside the scope of economic rent. It is important to note that the price of a natural resource, such as oil, which includes rent, is considered a fair price, and the rent reflects the fair value of the resource's inherent characteristics. To reconcile the concepts of economic rent and natural resource rent, rent can be understood as comprising two components: the yield from the natural resource and the land itself. The size of economic rent depends on objective factors, such as the location of extraction. For instance, oil extracted from offshore or desert areas differs in cost and rent from that extracted near urban or agricultural areas (Ahmed, 2020, 25).

a. The economic importance of oil

Oil and natural gas account for approximately 66% of global energy consumption, with a particularly significant role in Middle Eastern countries, which hold an estimated 89% of OPEC's reserves and 62% of global reserves. The economic importance of Middle Eastern oil stems from several factors: large reserve volumes, low domestic consumption, high average well productivity, low per-barrel production costs, and the presence of numerous large and giant fields. Additionally, vast unexplored areas in these countries hold significant potential to meet future global oil demand. Ongoing efforts to enhance the production efficiency of existing

fields further bolster this capacity. The geographical advantage of Middle Eastern countries, characterized by their strategic location bridging East and West and their relative immunity to natural disasters, enhances their role as a reliable energy supplier. Consequently, countries such as Saudi Arabia and Iraq are poised to remain critical to global energy markets, serving as dependable sources of oil to sustain modern economies (Said, 2016, 113–114). Iraq possesses proven oil reserves estimated at 115 billion barrels, ranking third globally after Saudi Arabia and Iran, with a share of approximately 15% of OPEC's reserves and 12% of global reserves, according to a 2014 OPEC report. Some oil experts suggest that Iraq's reserves may be significantly larger, as exploration activities were halted during the 1980s and 1990s and only resumed on a limited scale in southern Iraq after 2012. Vast regions, such as the Western Desert, which is estimated to contain around 100 billion barrels, remain largely unexplored (Nabil & Khalid, 2016, 86). Oil plays a pivotal role in driving economic development for both exporting and importing countries. It provides essential energy for transportation, lubricates machinery and engines, and supports industrial and residential heating. Additionally, by-products of the oil industry are critical to the production of dyes, pharmaceuticals, plastics, and fertilizers. Oil constitutes approximately 40% of global energy sources, underscoring its status as a vital component of numerous industries. Given this significance, industrial nations and global markets have prioritized the oil industry, encouraging both oil and non-oil companies to engage in this sector. Non-oil companies contribute by supplying machinery and equipment to support oil production and related industries (Ali, 2014, 9–10).

Oil Rents and the Asian Production Pattern

Oil rents in Iraq have served as a critical resource for revitalizing the Asian mode of production, which, according to Karl Marx and Friedrich Engels, represents a form of centralized capitalism observed in Europe. This mode is characterized by specific economic and social structures, with oil rents playing a pivotal role in its revival in the Iraqi context (Khaled & Ali, 2020, 1038).

1. Capitalism, defined by the sale of labor and productive capacity in a market system, emerged predominantly in Europe. This led Karl Marx to argue that the characteristics of capitalism were absent in Eastern societies, where a distinct economic pattern prevailed, rooted in collective and tribal ownership. In this pattern, small production units are dominated by a central entity that appropriates the surplus labor of its members. According to Marx, this structure combines exploitative relationships with a collective framework and can persist in

Eastern societies. However, its dissolution typically requires external interventions, such as colonial occupation.

2. Exploitation of the Mode of Production by the State: In the Asian mode of production, land is considered public property under state control, suggesting an absence of exploitation. However, Karl Marx argued that the state emerges as the primary exploiter in this system. Consequently, the Asian mode of production does not neatly fit within Marx's historical stages of economic and social development (communal, feudal, capitalist). Some scholars interpret Marx's view as suggesting that the Asian mode of production represents a transitional phase from a classless society to a class-based society. Despite communal ownership, it incorporates various forms of exploitation, characterized by a domineering, authoritarian state. This mode is distinct from communal ownership, slavery, or feudal systems, as it lacks private land ownership. The direct producer is subordinate to the state, which acts as both the political ruler and the sole beneficiary, merging rent with taxation. In this context, surplus production is appropriated by the state or the collective in the absence of private or class-based property. Thus, class struggle and exploitation operate independently of state authority.

Marx emphasized that, unlike in systems with private ownership, the direct producer in the Asian mode is not subject to an individual owner but is instead enslaved or subordinated to the state as the supreme owner and ruler. Consequently, rent and taxation become indistinguishable, reducing the need for political or economic pressures beyond the general subordination to state authority. However, the theory of the Asian mode of production has been criticized for conflating economic and political dynamics and lacking historical precision, particularly in its attempt to confine capitalism to the Western world. Marxist critics of the theory argue that it deviates from the progressive historical trajectory of communalism, slavery, and feudalism, which they consider a universal model. The scientific analysis of the Asian mode, as per Marxist theory, establishes a dialectical relationship between state ownership and communal production. In contrast, Wittfogel's political analysis links Eastern authoritarianism to hydraulic agriculture, framing it as a political system rather than a rigorous political-economic analysis of pre-capitalist societies.

In Iraq, a historical cradle of hydraulic agriculture during the phase of oil recovery, oil rents have been instrumental in reviving the Asian mode of production. The loss of these rents, particularly during the economic siege of the 1990s and the international administration following 2003, led to social contradictions. These contradictions reshaped Iraq's social

structure, creating constraints on the development of Eastern authoritarianism due to shifting rent patterns between urban and rural areas (Mudhhar, 2010, 35).

The Emergence of Oil Rents in Iraq

Oil concessions in Iraq were characterized by uniform elements and conditions, covering vast areas of the country for extended periods, often up to seventy years. In return, oil companies committed to paying fixed sums to the Iraqi government for each barrel of oil extracted and exported. The issuance of Iraqi Law No. 80 in 1961, followed by the nationalization of oil in 1973, led to the reclamation of approximately 6% of the land under oil concessions. Consequently, oil rents became a direct source of revenue for the government, marking a pivotal shift in Iraq's political-economic framework. This shift influenced the trajectory of development, either toward transitioning from pre-capitalist societies to a modern socio-economic system characterized by institutional structures and democratic governance, or toward reinforcing non-institutional frameworks, such as the Asian mode of production with an updated template, while sidelining market economy principles.

Oil rents in Iraq have been instrumental in reviving Eastern authoritarianism, supported by state-owned agricultural land, with minor exceptions of private agricultural ownership that have limited impact. This reflects an ancient heritage in Iraq, where state control over agricultural land predominates over private ownership. The export-oriented nature of the oil sector and its extractive activities has isolated it from domestic economic processes. However, the resources generated have contributed to the emergence of a social structure characterized by stagnation, reinforcing the Asian mode of production and the rise of Eastern authoritarianism (Mudhhar, 2010: 36).

3. METHODOLOGY

Research Problem

The research problem lies in the fact that the state's public finances' heavy reliance on oil rents exposes them to significant risks due to significant fluctuations in global oil prices. This leads to a weakness in the structure of revenues and expenditures, limiting their flexibility and sustainability, and thus hindering efforts to achieve comprehensive economic development.

Research Objective

The research aims to identify the general theoretical framework of economic rents and the financial structure of the economy, including revenues. It also aims to clarify and measure the impact of reliance on oil rents on public revenues and the impact of fluctuations in global oil prices.

Research Hypothesis

The research is based on the hypothesis that there is a causal relationship between oil rents and the state's public revenues, and that excessive reliance on oil rents leads to fragility in the Iraqi economy, thus limiting economic development and weakening the general budget.

Research Methodology

The research methodology relies on a combination of a deductive approach based on the theoretical study of the relationship between economic rents and the financial structure of the Iraqi economy and an inductive approach based on deriving results after stabilizing the trends of statistical data. The Koyc Transformation model was used to determine the amount of change in oil revenues that is converted into public revenues on the one hand, and the amount of change in public revenues that is reflected in public expenditures on the other hand, in light of changes in the exchange rate of the Iraqi dinar against the US dollar.

4. RESULTS

Analysis of the Reality of Public Revenues

Public revenues for the years (2005–2008) amounted to 4,050,289 million Iraqi dinars and 80,252.182 million Iraqi dinars, respectively. This increase was driven by higher oil exports and rising global oil prices due to increased demand, with oil prices rising from 74,643.36 to 110,636.8 per barrel in 2008. However, revenues declined in 2009 to 55,243.526 million Iraqi dinars, following a drop in oil prices to 71,440.2 (Central Bank of Iraq, various years). Subsequently, public revenues for 2010–2012 decreased to 70,178.223 million Iraqi dinars and 119,817.224 million Iraqi dinars, respectively, reflecting fluctuations in global oil demand and subsequent price recovery.

From 2013 to 2016, public revenues further declined to 113,767.4 million Iraqi dinars and 66,470.25 million Iraqi dinars, respectively. This downturn was primarily due to deteriorating security conditions caused by terrorist groups (ISIS), which disrupted oil

production, particularly in western Iraq (Maih, 2021, 149–150). During (2017–2019), oil revenues rose to 77,335.96 million Iraqi dinars and 107,566.995 million Iraqi dinars, respectively, driven by improved global oil prices, which positively impacted public revenues. In 2020, revenues fell to 63,199.989 million Iraqi dinars due to the economic disruptions caused by the COVID-19 pandemic. Subsequently, public revenues for (2021–2022) increased to 109,081.464 million Iraqi dinars and 161,697.437 million Iraqi dinars, respectively (Maih, 2021, 151).

1. Public expenditures

Public expenditures in 2005 amounted to 26,375.18 million Iraqi dinars. These expenditures increased during (2006–2008) to 33,487.88 million Iraqi dinars and 59,403.38 million Iraqi dinars, respectively, driven by the rise in public revenues during this period. However, in 2009, public expenditures decreased to 52,567 million Iraqi dinars (Central Bank of Iraq, various years).

From 2010 to 2013, public expenditures rose to 64,352 million Iraqi dinars and 106,873 million Iraqi dinars, respectively, due to increased global oil sales and improved economic activity. However, during 2014–2016, expenditures declined to 83,556.23 million Iraqi dinars and 6,706.44 million Iraqi dinars, respectively. This reduction was caused by two major shocks to the Iraqi economy: first, a sharp decline in the average price of exported crude oil from 110,653.4 Iraqi dinars to 42,552 Iraqi dinars per barrel during this period; second, the deterioration of the security situation due to the control of terrorist groups (ISIS) over several Iraqi governorates, which necessitated increased allocations for military spending and support for displaced persons (Ministry of Planning, 2016, 4).

From 2017 to 2019, public expenditures increased to 75,490.12 million Iraqi dinars and 117,235.523 million Iraqi dinars, respectively, driven by rising average oil prices of 58,371.2 Iraqi dinars and 71,369.16 Iraqi dinars per barrel, respectively. This upward trend was interrupted in 2020 due to the economic impact of the COVID-19 pandemic, which reduced expenditures. However, public expenditures rebounded by 2023, reaching 142,435.6 million Iraqi dinars (Central Bank of Iraq, various years).

Table 1. Public Revenues and Public Expenditures in Iraq (2005-2023)

Year	TR Million Dinar	TO Million Dinar	TE Million Dinar	EX Dinar/$	PO$	PO Dinar
2005	40,502.89	39,480.069	26,375.18	1,474	50.64	74,643.36
2006	49,055.545	46,534.31	33,487.88	1,391	61.08	84,962.28
2007	54,599.451	51,701.3	33,545.14	1,217	69.08	84,070.36
2008	80,252.182	75,358.291	59,403.38	1,172	94.4	110,636.8
2009	55,243.526	48,871.708	52,567	1,170	61.06	71,440.2
2010	70,178.223	66,819.67	64,352	1,170	77.45	90,616.5
2011	108,807.392	98,090.214	69,640	1,170	103	120,510
2012	119,817.224	116,597.076	90,374	1,166	107	124,762
2013	113,767.4	110,677.542	106,873	1,166	103	120,098
2014	105,386.62	97,072.41	83,556.23	1,166	94.9	110,653.4
2015	66,470.25	51,312.62	70,397.52	1,190	44.7	53,193
2016	54,409.27	44,267.06	67,067.44	1,182	36	42,552
2017	77,335.96	65,071.93	75,490.12	1,184	49.3	58,371.2
2018	106,569.83	95,619.82	80,873.19	1,182	65.98	77,988.36
2019	107,566.995	99,216.318	111,723.523	1,182	60.38	71,369.16
2020	63,199.689	54,448.514	76,082.443	1,304	40.69	53,059.76
2021	109,081.464	95,270.298	102,849.659	1,450	68.4	99,180
2022	161,697.437	153,623.277	116,959.6	1,450	95.6	138,620
2023	135,681.3	124,428.75	142,435.6	1,300	79	102,700

Source: Ministry of Planning, Annual statistical reports, various years

Measuring and Analyzing of Public Revenue and Expenditure Functions

1. Specification of econometric model variables and stability diagnostics

Given the critical role of time lags in analyzing economic phenomena, incorporating lagged variables into econometric models is essential to broaden the scope of analysis and enhance its alignment with real-world dynamics. Unlike static models, which assume variables depend solely on contemporaneous values, dynamic models account for variables that may depend on past periods, transforming them into kinetic or dynamic frameworks. Among various time-lag models, the Koyck distributed lag model is employed in this study, represented by the following equation:

$$Y = a_0 + b_0 X_t + b1 X_{t-1} + b_2 X_{t-2} + Ut \quad ----------(1)$$

Koyck specified two conditions for this model: (1) all parameters (Bi) share the same sign, and (2) the coefficients decline geometrically according to:

$$Bi = B_0 \lambda^i \quad ---------- (2)$$

where λ is a decay parameter with values between zero and one, i.e. ($0 < \lambda < 1$).

The parameter λ determines the rate of decline in the distributed lag coefficients, with $(\lambda - 1)$ reflecting the adjustment speed. Equation (2) implies that the coefficients (Bi) decrease as λ remains positive and less than 1, ensuring all (Bi) parameters maintain the same sign, such that:

B1 > B2 > B3 as well as BOλ > BO λ^3 > BOλ^2

The value of Bi depends partially on $B0$ and partially on λ, As λ approaches 1, the rate of decline in Bi slows, meaning past values of X_t have a more persistent effect on Y_t. Conversely, as λ approaches 0, the coefficients decline more rapidly, indicating that past values of X_t have a diminishing influence compared to current or recent values.

Substituting Equation (2) into Equation (1) yields:

$$Y_t = a + B_0\lambda^0 X_t + B_0\lambda^1 X_{t-1} + B_0\lambda^2 X_{t-2} + \cdots .. + ut - - - - - - - - - - (3)$$

Here, B_0 (where $\lambda^0 = 1$) represents the short-run effect. The long-run effect is the sum of the geometric series of coefficients. Since the model is non-linear in its parameters, ordinary least squares (OLS) estimation is not directly applicable. To address this, Koyck proposed a transformation using a single lag period. Consider the lagged form of Equation (3):

$$Y_{t-1} = a + B_0 X_{t-1} + B_0\lambda X_{t-2} + B_0\lambda^2 X_{t-3} \ldots .. + ut - 1 - - - - - - - - - - (4)$$

Multiplying Equation (4) by λ:

$$Y_{t-1} = \lambda a + B_0\lambda X_{t-1} + B_0\lambda^2 X_{t-2} + B_0\lambda^3 X_{t-3} \ldots .. + \lambda ut - 1 - - - - - - (5)$$

Subtracting Equation (5) from Equation (3):

$$Y_{t-\lambda}Y_{t-1} = a(1-\lambda) + B_0 X_t + (u_t - \lambda u_{t-1}) - - - - - - - - - (6)$$

Rearranging the terms of Equation (6) yields the Koyck transformation (7):

$$Y_t = a(1-\lambda) + B_0 X_t + \lambda Y_{t-1} + vt - - - - - - - - - - - (7)$$

Where $V_t = (u_t - \lambda u_{t-1})$ represents a moving average error term. Equation (7) is known as the Koyck transformation, which simplifies the estimation of the distributed lag model.

Based on the estimation of the Koyck model, the following indicators can be derived:

a. Short-Run Impact: $SR = B_0 = a(1-\lambda)$
b. Long-Run Impact: $LR = b_1/(1-b_2)$
c. Average Lag period: $AL = \lambda/(1-\lambda)$
d. Variation of the Lag period: $VL = \lambda/(1-\lambda)2$
e. Lag Weights: $W_i = (1-\lambda)^{\lambda^i}$

Having outlined the Koyck model used to estimate the functions, the model variables are specified as follows:

1- Dependent variables

a. Total Public Revenues (TR).

b. Total Public Expenditures (TE).

2- Independent variables

a. Oil Prices (PO).

b. Total Oil Revenues (TO).

c. Total Public Revenues of the Previous Year (TR_{t-1}).

d. Total Public Expenditure of the Previous Year (TE_{t-1}).

Based on these variables, the functions to be estimated take the following forms:

1- Total public revenues function (at current prices):

$TR = F(PO, TR_{t-1})$

$TR_t = a(\ (1-\lambda)b_o PO_t + \lambda TR_{t-1} + V_t$

2- Total public expenditures function:

$TE = F(TO, TE_{t-1})$

$TE_t = a(\ (1-\lambda)b_o TO_t + \lambda TE_{t-1} + V_t$

3-Time series stability testing

Stability testing involves two primary conditions: stationarity of the variable's mean and constancy of its variance. Determining whether variables are stationary or non-stationary is critical to avoid spurious regression results. After conducting the Augmented Dickey-Fuller (ADF) unit root test, the results are presented in the following table:

Table 2. Time Series Stability Test Results

At Level		TR	TE	PO	TO
With Constant	t-Statistic	-2.4716	-0.9362	-2.2794	-2.7452
	Prob.	***0.1390***	***0.7521***	***0.1883***	***0.0871***
		n0	n0	n0	*
With Constant & Trend	t-Statistic	-3.3089	-2.3635	-2.2133	-3.2922
	Prob.	***0.0982***	***0.3834***	***0.4549***	***0.1009***
		*	n0	n0	n0
Without Constant & Trend	t-Statistic	0.7153	1.0900	-0.3767	-0.0347
	Prob.	***0.8593***	***0.9211***	***0.5342***	***0.6578***
		n0	n0	n0	n0
At First Difference					
		d(TR)	d(TE)	d(PO)	d(TO)
With Constant	t-Statistic	-4.8476	-5.0246	-3.7350	-4.5833

	Prob.	***0.0017***	***0.0011***	***0.0143***	***0.0028***
		***	***	**	***
With Constant & Trend	t-Statistic	-4.6495	-4.8673	-3.5720	-4.3939
	Prob.	***0.0103***	***0.0064***	***0.0654***	***0.0161***
		**	***	*	**
Without Constant & Trend	t-Statistic	-4.6834	-4.4723	-3.8660	-4.5403
	Prob.	***0.0001***	***0.0002***	***0.0007***	***0.0002***
		***	***	***	***

Source: Prepared by the researcher based on outputs from the EViews.

***** Indicates stationarity at a 1% significance level, ** indicates stationarity at a 5% significance level, * indicates stationarity at a 10% significance level.**

The results from Table 2 indicate that all variables were non-stationary at their levels but became stationary after first differencing, implying they are integrated of order one, I(1). This holds whether a constant or a constant and trend are included in the Augmented Dickey-Fuller (ADF) test, with stationarity achieved at a 1% significance level. This confirms that the time series are free of unit roots.

Estimating the Functions of Total Public Revenues and Public Expenditures

1. Total public revenues function

$TR = -11874.27 + 0.701918PO_t + 0.465958TR_{t-1}$

t -0.72 4.47 3.40

Prob 0.4818 0.0004 0.0039

$R^2 = 0.735$ $R^{-2} = 0.70$ $F = 20.87743$ Prob(F-statistic) 0.000046

The estimation results demonstrate that the independent variables explain approximately 73% of the variation in the dependent variable $R^2 = 0.73$, with the remaining variation attributed to factors outside the model. The model is statistically significant overall, as indicated by the F-statistic's p-value (0.000046).

The estimated parameters for oil prices (PO_t) and lagged public revenues (TR_{t-1}) align with economic theory. An increase in oil prices by one unit leads to 70 unit in public revenues, significant at the 1% level. Similarly, a one-unit increase in the previous year's public revenues results in 46 unit in current-year revenues, also significant at the 1% level. Based on these results, the following indicators are derived:

a. Short-Run Impact: The short-run impact is represented by the coefficient of oil prices (PO_t) in the estimated equation, which indicates that a one-unit increase in the price of a barrel of oil leads to a (70 unit) in public revenues within the same year. This means that 70 unit of the increase in oil prices translates into an immediate increase in actual public revenues during the same year.

b. Long-Run Impact: The long-run impact is derived from the following formula:

$$LR = b_1/(1 - b_2)$$

LR= 0.701/ (1-0.465) =1.310

The long-run value indicates that a one-unit increase in the price of a barrel of oil results in a 1.310-unit increase in public revenues over the long term.

c. Average Lag Period: Also known as the weighted lag, this measures the speed of the dependent variable's response to changes in the independent variable, specifically the impact of oil prices on total public revenues. It is calculated as follows:

$$AL = \lambda/(1 - \lambda)$$

$$AL = \frac{0.46}{1-0.46} = 0.85$$

This implies an average lag period of (0.85 × 12 = 10.2) months, representing the time required for public revenues to fully respond to changes in the price of a barrel of oil.

d. Lag Period Variance

$$VL = \lambda/(1 - \lambda)2$$

VL= 0.46/ $(1\text{-}0.46)^2$ = 1.577

This translates to a variance of (1.577 × 12 = 18.9) months, indicating a relatively short dispersion between the actual and estimated lag periods for public revenues.

e. Lag Weights:

$$W_i = (1 - \lambda)^{\lambda^i}$$

$$W_0 = (1 - 0.46)(0.46)^0 = 0.54$$

$$W_0 = (1 - 0.46)(0.46)^1 = 0.25$$

$$W_0 = (1 - 0.46)(0.46)^2 = 0.11$$

The results of the lag weights demonstrate a geometric decline, consistent with the Koyck model. The estimated equation, incorporating these weights, is rewritten as:

$$TR = -11874.27 + 0.701918PO_t + \mathbf{0.54}PO_{t-1} + \mathbf{0.25}PO_{t-2} + \mathbf{0.11}PO_{t-3}$$

Thus, the lag weights for the explanatory variables were estimated without the model being affected by multicollinearity. The weights indicate that 0.70 unit of the increase in the price of a barrel of oil (PO_t) translates into an increase in total public revenues within the same

year, 0.54 of the increase in PO_{t-1} contributes to revenues after one year, 0.25 after two years PO_{t-2}, and 0.11 after three years PO_{t-3}.

2. Total Public Expenditures Function

$TE = -160.1913 + 0.495334TO_t + 0.529689\ TE_{t-1}$

t	-0.01	4.47	4.01
Prob	0.9868	0.0004	0.0011

$R^2 = 0.838058$ $R^{-2} = 0.816466$ $F = 38.81295$ Prob(F-statistic) 0.000001

The estimation results indicate that independent variables explain approximately (83%) of the variation in the dependent variable ($\boldsymbol{R^2 = 0.83}$), with the remaining variation attributed to factors outside the model. The modeh is statically significant overall, as evidenced by the F-statistic's p-value (0.000001).

The estimated parsmeters for oil revenues (TO_t) and lagged public expenditures (TE_{t-1}) are the consistent with economic theory. A one-unit increase in oil revenues results in a 49 unit in public expenditures, significance at the (1%) level. Similarly, a one-unit increase in the previous year's public expenditures leads to a 0.529689-unit increase in current-year expenditures, also significant at the 1% level. Based on these results, the following indicators can be derived:

a. Short-Run Impact: The short-run impact is represented by the coefficient of oil revenues ($b_0 = 0.49$). This indicates that a one-unit increase in oil revenues leads to a 0.495334-unit increase in public expenditures within the same year, meaning 49.53unit of the increase in oil revenues translates into immediate expenditure growth.

b. Long-Run Impact: The long-run impact is calculated using the following formula:

$LR = b_1/(1 - b_2)$

LR= 0.495/ (1-0.529) = 1.0509

The long-run impact indicates that a one-unit increase in oil revenues (TO_t) leads to a 1.059-unit increase in total public expenditures (TE_t) over the long term, as derived from the formula:

c. Average Lag Period: Also known as the weighted lag, this measures the speed of the dependent variable's response to changes in the independent variable, specifically the impact of oil revenues on total public expenditures. It is calculated as follows:

$$AL = \frac{\lambda}{1-\lambda}$$

$$AL = \frac{0.52}{1-0.52} = 1.08$$

This implies an average lag period of (1.126 × 12 = 13.5) months, representing the time required for public expenditures to fully respond to changes in oil revenues.

d. Lag Period Variance

$VL = \lambda/(1-\lambda)2$

VL= 0.52/ $(1\text{-}0.52)^2$ = 2.256

This translates to a variance of (2.394 × 12 = 28.7) months, indicating the dispersion between the actual and estimated lag periods for public expenditures.

e. Lag Weights

$W_i = (1-\lambda)^{\lambda^i}$

$W_0 = (1-0.52)(0.52)^0 = 0.48$

$W_0 = (1-0.52)(0.52)^1 = 0.24$

$W_0 = (1-0.52)(0.52)^2 = 0.12$

These weights decline geometrically, consistent with the Koyck distributed lag model. The estimated equation, incorporating these weights, is:

TE =-160.1913 + 0.495334$_t$ TO_t $+0.48TO_{t-1}$ $+0.24TO_{t-2}$ $+0.12TO_{t-3}$

The lag weights indicate that 0.48 of the increase in oil revenues (TO_t) translates into expenditure growth within the same year, 0.48 of the increase in TO_{t-1}contributes after one year, 0.24 after two years TO_{t-2}, and 0.12 after three years TO_{t-3}. The model avoids issues of multicollinearity among the explanatory variables.

5. DISCUSSION AND CONCLUSIONS

The results from the estimated Koyck distributed lag model reveal that total public revenues (TR) are heavily dependent on the previous year's public revenues (TR_{t-1}). This dependency suggests that public revenues are influenced by external factors, particularly expectations regarding fluctuations in oil prices. By incorporating lagged variables into the analysis of the public revenue function, it was found that a significant portion of an increase in oil prices (PO_t) translates into an immediate increase in public revenues within the same year (70%), as indicated by the short-run impact coefficient (b_0 = 0.701918). Additionally, the lagged oil price (PO_{t-1}) contributes to a 53% increase in public revenues one year later, equivalent to (53%) of the oil price increase. This underscores the significant role of the first-

year lag in the Koyck model, highlighting its importance in capturing the dynamic behavior of public revenues. The estimated lag parameter (λ = 0.465958) further indicates a substantial time-lag effect, explaining the trajectory and behavior of current revenues.

Similarly, the results for the public expenditure function (TE) demonstrate a strong dependence on the previous year's public expenditures (TE_{t-1}). This can be attributed to factors such as policy inertia, habitual spending patterns, and expectations driven by oil revenue fluctuations. While a significant proportion of oil revenues (TO_t) is converted into public expenditures within the same year (49%), as indicated by the short-run impact coefficient (b_0 = 0.49), the lagged oil revenues (TO_{t-1}) contribute a comparable (48%) increase in expenditures after one year (lag weight W_1 = 0.47). This near-equivalence between immediate and lagged effects emphasizes the critical role of the first-year lag in the Koyck model for public expenditures. The estimated lag parameter (λ = 0.529689) reinforces the influence of time lags in shaping expenditure behavior.

The importance of the time dimension in explaining the dynamics of both public revenue and expenditure functions highlights the need for further research incorporating distributed lag variables. The government's expenditure patterns are significantly influenced by temporal factors, driven by traditional spending mechanisms and expectations tied to oil revenues, which are, in turn, dependent on oil price volatility. Future studies should explore additional time-lag models to enhance the analysis of these functions, accounting for the complex interplay between oil-driven revenues and public spending in resource-dependent economies like Iraq.

REFERENCES

Ali, A. A. A. (2020). *Theory of rent*. Central Bank of Iraq, Research and Studies.

Ali, H. (2004). *The future of financing Iraq's oil industries* (Issue 104). Emirates Center for Strategic Studies and Research.

Baldiaf, K., & Allah, A. S. (2022). Marx and Engels' analysis of the Asiatic mode of production and its relation to European centralism. *Mi'yar Journal*, *26*(3).

Bulearca, M., et al. (2012). Resources management and rent theory in mining industry. *International Business Information Management Association (IBIMA) Publishing, 2012,* Article ID 790264.

Central Bank of Iraq. (n.d.). *Statistical bulletins for various years*. Directorate General of Statistics and Research.

Collins, J. L. (2016). *Possession vis-à-vis power: Rent theory, global mining and modern landed property in Australia 1861–2014* (Doctoral dissertation). Western Sydney University.

Hamawi, S. K. (2016). *Fundamentals of energy production (oil, electricity, gas)*. Akademiyoon for Publishing and Distribution.

Marsumi, N., & Mattar, K. (2016). *The future of the rentier state in Iraq* (1st ed.). Ghadeer Printing and Publishing Company.

Ministry of Planning, Central Statistical Organization. (2016). *Preliminary estimates of gross domestic product*.

Salih, M. M. (2010). *An introduction to the political economy of Iraq: The rentier state from economic centralism to market democracy* (Issue 19). Iraqi House of Wisdom.

Shammari, M. S., & Shanan, S. H. (2021). The reality and prospects of public revenues and inflation rates in Iraq (1990–2019). *Journal of the College of Education for Girls for Human Sciences, 29*.

Yasir, S. (2013). *The rentier system and building democracy: The impossible duality. The case of Iraq*. Friedrich-Ebert-Stiftung, Policy Paper, Jordan and Iraq Office.