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ARTICLE

The Use of The Cost-Plus Method in Calculating The Profits of Oil Companies and Its Impact on Public Budget Revenues (A Case Study in The Iraqi Oil Sector)

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Abstract
The aim of this research is to analyze the impact of adopting the (Cost Plus) method in determining the shares of foreign oil companies operating in Iraq on the revenues of the state's general budget. Since oil revenues constitute the primary source of government income. The research examines how this method affects the financial and economic aspects related to the general budget revenues by determining the capex, opex costs, and the fixed profit margin of the contracting companies for oil production on the share returned to the Iraqi government from oil revenues, especially in light of rising operational costs and fluctuations in energy markets. The methodology relies on quantitatively analyzing the financial data of the Rumaila oil field using the cost-plus method, and comparing it with the Production Sharing Agreement (PSA) model to identify the key differences between the two. The research results revealed an inverse relationship between rising costs and the decrease in the government's share. Cost inflation (Capex/Opex) reduces government revenue by 5-7% annually, especially with weak oversight. That is, an increase in costs by more than 15% reduces the government's share to less than 90% even with high prices. The research confirms that the company's profit is fixed regardless of the oil price, reducing budget flexibility during crises. Additionally, the fixed profit margin in Cost Plus leads to unfair distribution during price fluctuations. The research recommends linking the company's profit to the price by adopting the equation (Company Profit = Target Selling Price * Company Profit Margin), which ensures a provision of $0.5-1 billion annually when prices rise. And the establishment of a revenue stabilization fund, where 20% of the revenue is saved when the price of a barrel of oil is above $85, and withdrawn when the price is below $60 per barrel, which contributes to reducing the budget deficit by 60% during economic crises. The importance of the research lies in providing an applied analysis of the impact of using the Cost Plus method for policymakers and decision-makers in the Ministry of Oil to improve contract terms and increase revenues for the state's public budget.

Keywords: Cost Plus method, public budget, profits of oil companies

Introduction

1.1 Research problem:

The research problem lies in the variation in the level of public budget revenues of the state in light of the challenges, risks, and global changes in oil prices when using the Cost-Plus method in pricing crude oil in Iraq [1]. The decline in prices below the cost level leads to a significant decrease in revenues, which has a very substantial financial impact on the Iraqi public budget. Accordingly, the research problem can be formulated in the following questions:

a. What are the financial and economic impacts on the general budget revenues in light of using the Cost-Plus method in oil pricing?

b. To what extent is the Cost-Plus method effective and efficient in concluding Iraqi oil contracts with foreign companies?

c. What is the impact of calculating allowable costs and guaranteed profit under the Cost-Plus method on the government's share of oil revenues?

d. What are the challenges and risks facing the Iraqi public budget due to reliance on the Cost-Plus method?

1.2 Research Objectives:

a. Analysis of the theoretical foundations and practical mechanisms of the Cost-Plus method in determining the cost of producing a barrel of oil and its profits [2].

b. Evaluation of the application of the Cost-Plus method in managing the cost of oil barrel production and calculating its selling profit.

c. Measuring the impact of the Cost-Plus method on the Iraqi government's general budget revenues from the oil sector [3].

d. Identifying the factors that affect the efficiency of the Cost-Plus method (cost transparency, R-Factor profit margin, oil prices

e. Providing recommendations to improve the Cost-Plus method or suggesting alternatives to maximize public budget revenues [4].

1.3 Importance of the research:

a. Knowing the most important recommendations from the literature that addressed the Cost-Plus method.

b. Providing an applied analysis on the impact of using the Cost-Plus method for policymakers and decision-makers in the Ministry of Oil to improve contract terms and increase revenues.

c. Contributing to the sustainability of the Iraqi public budget, which heavily relies on oil (more than 90% of revenues).

1.4 Research Hypotheses:

The research relies on a main hypothesis stating that (the use of the Cost-Plus method in calculating the profits of foreign oil companies operating in Iraq under service contracts negatively affects Iraq's general budget revenues). From this hypothesis, it can be derived

a. Does the Cost-Plus method contribute to a temporary increase in the general budget revenues?

b. Does the Cost-Plus method contribute to negative effects on public budget revenues in the medium and long term?

1.5 Research methodology:

For the purpose of achieving the research objectives and hypotheses, the following methodology is followed:

a. Descriptive-Analytical Method: To describe and evaluate the Cost-Plus mechanism in Iraqi contracts.

b. The quantitative approach: To measure the financial impact on government revenues.

c. Case Study: Focusing on Iraq as a case study rich in information and challenges

1.6 Community and Research Sample:

The research will focus on the oil sector in Iraq, as it is one of the countries where the oil sector constitutes a significant part of the general budget. Financial data is adopted through simulation with 90% actual data from oil companies operating in Iraq as a sample for the research, in addition to the general budget reports.

Previous studies

Here is a summary of the most important previous studies that addressed the use of the (Cost Plus) method in the oil sector and its impact on company profits and public budget revenues, with a focus on the objectives and main results of those studies, which are as follows:

1 -Study: American Chamber of Commerce in Iraq Title: *"Impact of Service Contracts on Iraq's Oil Revenue

This study aimed to analyze the Iraqi service contracts (such as the Rumaila and West Qurna fields). It was found that 70% of oil revenues go to recovering the companies' costs. It recommended renegotiating the "Fee Per Barrel" rate to link it to the oil price instead of keeping it fixed.

2- Study: University of Oxford Title *"The Response of Oil Contracts to Price Volatility*"

The study aimed to compare the performance of Cost-Plus contracts versus PSA during price fluctuations between (1990–2000). And during periods of price collapse (such as 1998), the revenue yield for governments under Cost Plus contracts was more stable (because the profit is guaranteed). But during the price surge (such as 2000–2008), PSA models achieved 40% higher revenues due to the government's share in super profits. The study recommended using hybrid contracts that combine the stability of Cost Plus with profit-sharing in PSA.

3- Study: The World Bank) Title

"* :Petroleum Exploration and Production Rights: Allocation Strategies and Design Issues*"

The study aimed to compare oil contract models (concession, production sharing, service) in 12 countries. The study showed that Cost Plus contracts transfer price and operational risks to the government, reducing revenue collection when costs rise. In Indonesia and Nigeria, weak cost control led to a 15-30% decrease in the government's net revenue compared to Production Sharing Agreement (PSA) models. The study recommended the necessity of enhancing transparency and adopting contracts based on a hybrid model to improve incentives.

4- Study: International Monetary Fund Title: *"Fiscal Regimes for Extractive Industries*"

The study aimed to analyze the impact of tax systems and contracts on financial stability in oil-exporting countries. The study indicated that Cost Plus contracts impose a financial burden on the budget during the exploration phases due to the pre-recovery of costs. In the case of Iraq (service contracts after 2009), production costs increased by 25% above initial estimates, which reduced the government's net revenues. The study recommended linking part of the company's fees to production performance or cost efficiency [5].

Common points between previous studies that were not highlighted or mentioned are as follows:

1. Lack of open data: Difficulty accessing contract details (especially in the Middle East.
2. Focus on the production phase: Neglecting cost analysis in the exploration stages
3. Overlooking political factors: such as the impact of financial corruption, which contributes to increasing costs.

Our research aims to distinguish itself from previous studies according to the comprehensive principle that takes into account all the variables and conditions surrounding the contract conclusion process in terms of cost determination and profit margin percentage between the parties to oil contracts and their impact on the general budget revenues, which is demonstrated by the practical application of the research [6].

Methodology

Cost Plus method

The Cost-Plus method is one of the fundamental approaches in service contracts that governments enter into with international oil companies for the exploration, development, and production of oil and gas. This method focuses on compensating the company for its direct costs while ensuring a predetermined profit margin, raising questions about its efficiency in maximizing the state's general budget revenues. This theoretical aspect examines the foundations of this method and its impacts on corporate profits and the state budget revenues.The International Monetary Fund (IMF) defines Cost Plus as a model that determines

a company's profitability in advance by ensuring cost recovery and a profit margin, which reduces the company's risks but exposes government revenues to cost fluctuations. And it is defined by Cost Plus: It is a pricing method for oil service contracts where it is agreed that the government will bear the risks of financing and operation, while the company receives a compensation for costs and a fixed profit.And as Cost Plus was defined by It is a pricing methodology through which production companies are paid their confirmed costs in addition to a specified profit margin calculated as a percentage of those costs or as a fixed value, without sharing in the ownership of the production.Researchers believe that the Cost Plus method can be defined as a contractual approach in the oil industry in which the government (or the national company) commits to reimbursing the oil production company for all the costs incurred in exploration, development, and production operations, in addition to granting it a guaranteed profit margin predetermined as a specific percentage of the total costs of producing an oil barrel (referred to as Fee or Reward) in exchange for the services provided. This method is characterized by transferring the risks of rapid economic and political changes (especially price and operational) to the government, while the company receives a limited profit regardless of the variables and fluctuations in oil prices.

Based on the previous concepts of Cost Plus, the main pillars of the Cost-Plus method can be identified as follows:

a. Cost Recovery Cost Recovery:

The company will recover all approved expenses (such as drilling, wages, equipment) provided they are approved by the government.

b. The specified profit margin or fee

An additional amount is calculated in one of two ways:

- ✓ A fixed percentage of the costs (such as 15%).
- ✓ A fixed amount per barrel produced

c. Production ownership: It goes entirely to the government, and the company does not have a share in it.

2-1-1 -The theoretical foundations of the (Cost Plus) method:

a. Principle of cost reimbursement: It relies on the idea that the oil company (the contractor) bears significant technical and financial risks during the exploration and development phases. The principle of cost reimbursement: It relies on the idea that the oil company (the contractor) bears significant technical and financial risks during the exploration and development phases. Therefore, the contract guarantees compensation for all the costs incurred, provided that the agreed-upon standards are adhered to

b. Guaranteed profit margin (Fee): In addition to cost recovery, the company receives a bonus (Fee) or a predetermined profit margin. This margin can be calculated in several ways:

- A fixed percentage of the costs (Percentage of Cost): such as 15% of the total production costs.
- Fixed Fee per Barrel: A specified amount for each barrel produced.
- Return on Investment (RoI): A guaranteed return on the capital invested by the company.

c. Production allocation: Typically, the entire produced oil output goes to the ownership of the government or the national oil company (NOC). Production allocation: Typically, the entire produced oil output goes to the ownership of the government or the National Oil Company (NOC). The producing company does not own a share in the production itself; it only receives cost reimbursement and a profit margin .

d. Risk transfer: This method transfers the majority of commercial risks (especially market risks and oil price risks) from the producing company to the government that owns the resource. Risk transfer: This method transfers the majority of commercial risks (especially market risks and oil price risks) from the producing company to the government, which is the resource owner. The company bears operational and technical risks within the limits of the contract .

The application of the cost-plus method can be illustrated if an oil company spent 10 million on field development, and the agreed profit margin is 12%.
The costs incurred by the operating oil company (recoverable costs) = 10 million.
Profit margin = 12% × 10 million = 1.2 million.
The total amount the company receives from costs and profit margin = 10 + 1.2 = 11.2 million.
(The remaining oil revenues go to the government after this recovery)

2-1-2-The impact of the Cost Plus method on the profits of oil companies:

a. Limited and guaranteed profitability: The profits of companies according to the Cost-Plus method are characterized by the following:

✓ Limitations: The profit is predetermined (percentage) and is not directly linked to the global oil price or production volume after reaching a certain level (unlike participation or franchise models).

✓ Guarantee: As long as the costs are approved, the profit is guaranteed regardless of oil price fluctuations (unless the contract specifies otherwise).

b. Incentives for cost control according to the Cost Plus method: There are two conflicting theories:

✓ Weak Incentives Theory: The company may lack a strong incentive to reduce costs or innovate to increase efficiency, because high costs mean a higher profit margin (if it is a percentage) or because profit is guaranteed regardless (fixed margin contracts). This may lead to inflation in spending

✓ Indirect incentive theory: Modern service contracts (especially with a fixed profit margin or return on investment) may motivate companies to reduce costs and accelerate production to achieve higher returns on their investments in a shorter period, or to build their reputation to secure future contracts

c. Profitability versus risk: Limited profitability reflects the transfer of significant risks to the government. Companies consider that this model provides a lower return but with lower risks compared to participation or traditional franchise models in high-risk environments

Researchers believe that the cost-plus method, when applied, leads to many advantages for production companies in oil projects and fewer disadvantages for them, whereas the opposite is true for oil resource owners represented by states that rely on oil as a primary resource, accounting for no less than 90% of the state's general budget revenues, such as Iraq.

Results and Discussion

The general budget

The budget is defined as an estimated statement for a future period that outlines government expenditures and revenues over a specific period, usually one year , and the budget is also defined as the financial plan issued under legislative cover and defined.The budget is defined as a preliminary estimation of the required inputs and outputs expected to express the specified goals to be achieved within a certain time period. The government budget is divided into two sections: expected revenues and expected expenditures. The total expected revenues are achieved [7] .

The budget represents an important tool for indicating the political, economic, and financial direction of countries, as it reflects the future orientation of the state by presenting its financial plans to the world. Based on the resources included in the budget, the state undertakes its economic, political, and social responsibilities. The budget is prepared based on the expected expenditures and the expected financial resources to be collected for a future financial period (usually a year). Here, it is necessary to consider the risks of one side of the budget expanding at the expense of the other, such as when expenditures exceed revenues, resulting in a deficit. The other direction, which represents a positive case, is when revenues exceed expenditures to achieve a surplus the size of government expenditures determined in

the budget depends on the expected revenue size [8]. Therefore, an increase in oil prices significantly affects the increase in revenue as well as the increase in expenditure size. However, this is influenced by another factor, which is the stability level of oil prices. An increase in prices is not sufficient to increase expenditure size unless there are guarantees for the relative stability of oil prices [9].

The impact of oil pricing on oil revenues in the general budget

Oil revenues represent the most important source of funding for Iraq's general budget, which relies heavily on revenues from oil exports, with oil accounting for 90% of total revenues. Therefore, Iraq's economy is severely affected by fluctuations in global oil prices and the cost of oil extraction locally Iraq's oil wealth has made the country's economy highly susceptible to any change in oil prices [10]. According to Journal Gas Oil, Iraq ranks fifth globally in terms of oil reserves, accounting for approximately 18% of proven reserves in the Middle East and about 9% of global reserves. Since the price of oil is determined by international markets (external), any change in the global economy can be reflected in the local economy by affecting public budget revenues. Therefore, it is necessary to control the pricing of oil services domestically. The instability of oil prices over the past four decades has led to significant fluctuations in revenues [11]. During periods of sudden drops in oil prices, the Iraqi government has been forced to incur budget deficits, which has had a significant impact on the volume of operational and investment spending and has changed the government's approach to the future. This impact has led to a sharp decline in the country's economy pointed out that oil revenues represent the largest source of income in Iraq and, therefore, the country's budget is affected by oil price fluctuations. It is therefore necessary to take all possible measures to reduce the impact of price changes on the country's budget, and that estimating the price per barrel of oil is insufficient in the absence of guaranteed oil price stability. The following table shows the volume of oil revenues compared to the price per barrel of oil in Iraq's general budget [12].

Table 1. The Impact of Oil Barrel Prices on Oil Revenues

Estimated oil revenues	The price of a barrel of oil $	The year
57139932935000	39,60	2020
84079264846000	45	2021
97725412346000	50	2022
105722342346000	50	2023
115786152346000	51	2024

(Source: Iraqi Ministry of Finance data)

Through the above table, it is clear that the value of oil revenues in Iraq's general budget varies according to the estimated price of a barrel of oil. The estimated oil prices are affected by two main factors: the global oil price and the local oil pricing cost. Despite the rise in global oil prices, a large part of this price goes towards the cost of oil extraction [13]. Therefore, a decline in the global oil price, along with the cost level, could lead the country into a dark tunnel of budget deficit and the inability of the realized revenues to cover the cost of oil extraction as well as government expenditures. The following chart illustrates the impact of oil prices on oil revenues in Iraq's general budget based on the data from Table No.(1) .

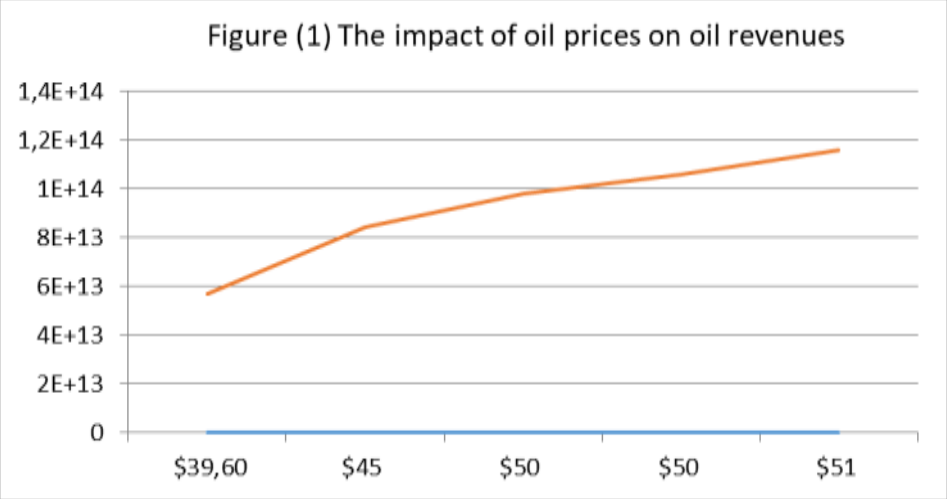

Figure 1. the impact of oil prices on oil revenues

The impact of the Cost-Plus method on public budget revenues:

a. The complexity in revenue forecasting: Government revenues heavily depend on:

•Global oil prices: All production is owned by the government, so its direct revenues are strongly linked to fluctuations in oil prices (up and down).

•Production volume: Revenue is directly linked to production levels.

a. Actual costs: The higher the costs paid by the government to the company (as reimbursement), the lower the net revenue available for the budget

b. Limited flexibility in the face of rising costs:

•Rising costs reduce net revenues: Any increase in actual costs (whether real or due to unnecessary cost increases) is fully recovered from sales revenues before any funds reach the general budget (Fig 1).

•This reduces the government's share of oil revenues, especially in the high-cost early development stages

•Exposure to cost overrun risks: The government bears the full risk of planned cost overruns.

C. Not fully benefiting from the rise in prices: While the government fully benefits from the rise in oil prices (due to its ownership of production), this does not necessarily compensate for the negative impact of rising costs on its net share, especially if the costs are already high.

D. The need for a strong cost control system: To ensure that the reimbursed costs are genuine, efficient, and in accordance with the contract, which requires high technical, administrative, and supervisory capabilities from the government/national oil company to avoid cost overruns

F. Comparison with other models: Compared to Production Sharing Agreements (PSA) or Concessionary/Tax Royalty models, the Cost Plus method may provide lower revenues to the government in the long term in large, highly profitable fields, as it typically does not allow for government participation in windfall profits resulting from significant price increases

And the above can be summarized as follows:

The (Cost Plus) method offers an approach that significantly transfers commercial risks to the government and ensures relatively limited and stable profitability for companies operating in the oil sector. Theoretically, this method can be attractive to countries that wish to maintain full control over their resources or to companies operating in high-risk environments where they do not dare to bear the risks and rapid changes in the global oil market [14]. However, its impact on public budget revenues is characterized by complexity and high sensitivity to fluctuations in oil prices and production volume, especially the actual cost level and its oversight. High costs or poor management of them may lead to a significant erosion of the government's net revenues. Therefore, the successful implementation of this approach requires high transparency, a strong and effective cost control system, a robust government capacity to manage and monitor contracts, in addition to a sound institutional and legal environment to reduce the chances of mismanagement and ineffective practices [15].

3- Practical Application

The practical application in the research focuses on simulating the data of the Rumaila oil

field (Iraq), which is located in southern Iraq (Basra), the largest in the country. It was discovered in 1953, and actual operations began in 1970. Its production ranges around 1.4 million barrels per day (30% of Iraq's production). It constitutes a high percentage of reserves amounting to over 17 billion barrels (the second largest Iraqi reserve after Majnoon) [16]. A group of companies operates this field, including a consortium of (BP 46.4%, Chinese CNPC 46.4%, Algerian Sonatrach 4%, and the Iraqi National Oil Company 3.2%). These companies operate under the Cost Plus service contracts with a fixed profit margin for the companies estimated at (15% - 20%). This field is of great importance as it is the backbone of the Iraqi budget revenues. The above numerical data can be represented as follows(Fig 2):

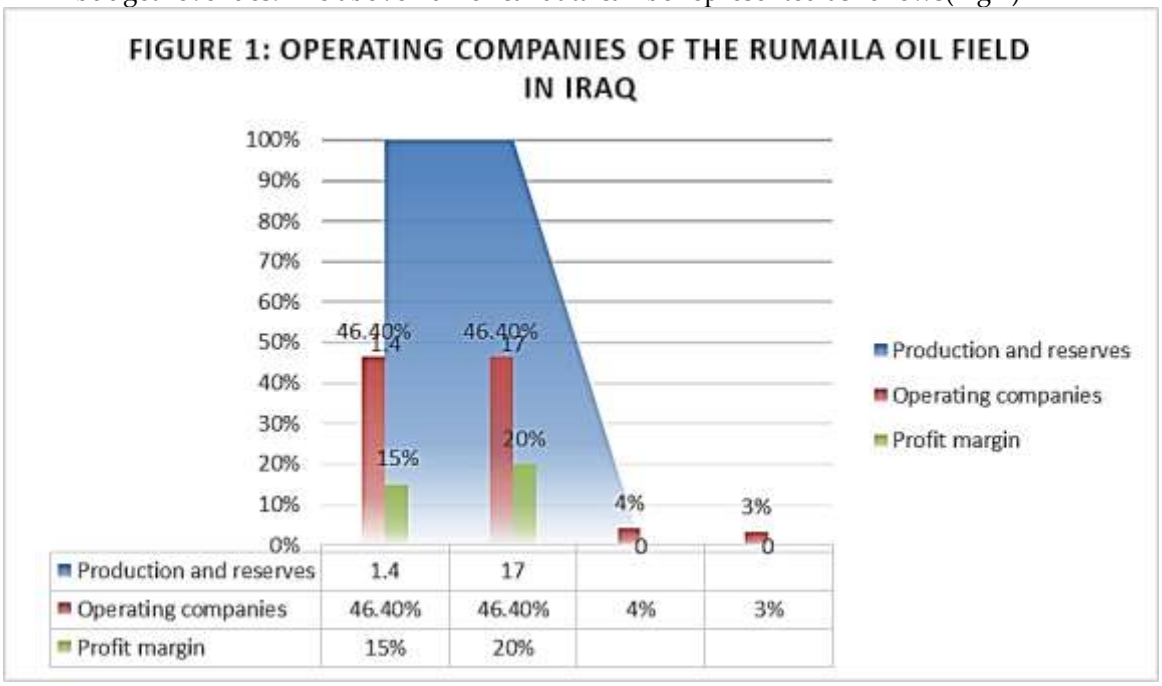

Figure 2 .operating companies or of the rumaila oil field in Irag

3-1-The basic equations used: The basic equations used:

A. Total costs = Opex (operating expenditure) + Capex (capital expenditure)

B. The profit margin for contracted oil companies = total costs × fixed profit margin percentage

C. The barrel selling price = the price determined according to the global OPEC organization based on the average oil prices of the oil-producing member countries, also relying on price indicators such as (Brent) and (Dubai).

D. The share of the public budget = the selling price per barrel – total costs – profit margin

3-2- Data collection (for the Ramila field 2020-2023):

Table 2. Elements of Capex (capital expenditure) for the Rumaila field 2020-2023

Total costs Capex ($ million)	Drilling services costs ($ million)	Drilling material costs ($ million)	Direct drilling costs ($ million)	The year
1,200	400	200	600	2020
1,100	375	175	550	2021
1,300	425	225	650	2022
1,400	450	250	700	2023

Table (2) shows the elements of capital expenditure (Capex) for the Rumaila field from 2020-2023, where it is evident that direct drilling costs represent the highest percentage of total Capex. These costs are directly related to drilling operations for oil production. The costs of drilling materials and drilling services are considered secondary costs to direct drilling costs [17].

Table 3 . Elements of Opex (Operating Expenditure) for the Rumaila Field 2020-2023

Total costs Opex $)million(	Electricity costs $)million(	Platform maintenance costs $)million(	Employee salary costs ($ million)	Operating costs $)million(	The year
800	125	175	200	300	2020
850	135	185	205	325	2021
900	145	190	225	340	2022
950	150	200	250	350	2023

Table (3) illustrates the Opex (operating expenditure) elements for the Rumaila field from 2020 to 2023. It is evident that operating costs constitute the highest percentage among the Opex cost elements related to the operational processes of the oil production field, as they represent the primary component for the operation and management of the field [18]. On the other hand, employee salaries, maintenance costs, and electricity costs are crucial for the sustainability and continuity of work within the field. These costs have an inverse relationship with production volume; as production volume increases, these costs also rise, thereby affecting the total Opex costs positively. This, in turn, leads to an increase in the company's profit margin according to the cost-plus method.

Table 4 . Data for Rumaila Field 2020-2023

Profit margin	Opex cost ($ million)	Capex cost ($ million)	Oil price ($/barrel)	Daily production (thousand barrels/daily)	The year
%20	800	1,200	41.5	1,400	2020
%20	850	1,100	70.9	1,450	2021
%20	900	1,300	100.8	1,500	2022
%20	950	1,400	82.1	1,480	2023

Table (4) illustrates the simulated data for the Rumaila oil field in Iraq, showing the daily production of oil, operational costs (opex), and capital costs (capex) incurred by production companies, as well as the profit margin determined during the operational contracts for the field from 2020 to 2023.

3-3- Applied Accounts (2022 Model):

a. Total revenue:

1,500 =thousand barrels daily production × 365 days × 00.8 price per barrel = $55.1 billion

b. Total costs:

=cost Opex) (operating expenditure + cost Capex)(expenditure capital

= 1.3 billion + 900 million = 2.2 billion dollars

c. Company profit:

=Total costs × Fixed profit margin percentage

2.2 billion dollars × 20% = 0.44 billion dollars equivalent to($ 440,000,000)

d. Government revenue:

=Total revenue - Total costs + Profit (company)

55.1 billion dollars - 2.2 billion dollars + 0.44 billion dollars = 52.46 billion dollars

f. The government's share of total revenues:

52.46 billion dollars ÷ 55.1 = 95.2%

It is clear from the application of the basic equations in calculating the shares between the contracting companies for oil production in the Rumaila field and the Iraqi government that the reliance is on the cost-plus method in the distribution mechanism by determining the fixed profit margin for the production companies [19]. Additionally, it relies on the statements of the total costs (capex, opex) incurred by the companies, also known as recoverable costs, which are paid to the companies. Based on these, the share of the profit due to the companies is also determined [20]. It becomes clear that the share of the state's general budget from oil revenues is affected by two main factors: oil prices and the recoverable costs, in addition to the profit due to the companies. The higher the recoverable costs (total costs), the higher the profit due

to the companies, and consequently, the lower the share of the state's general budget from oil revenues.

3-4 - Sensitivity analysis (data for the Rumaila field in 2022):

Table 5. Sensitivity Analysis Data for Rumaila Field in 2022

Government share (%)	Government revenue ($ billion)	Company profit ($ billion)	The cost ($ billion)	Oil price ($)	The scenario
%95.2	52.46	0.44	2.2	100.8	Actual situation
%92.1	26.2	0.44	2.2	50.4	50% price reduction
%93.1	51.67	0.57	2.86	100.8	30% increase in cost
%96.5	70.0	0.44	2.2	131.0	30% price increase
%94.8	41.0	0.44	2.2	100.8	20% decrease in production

It is evident from Table (5) the cases arising from the rapid changes in the business environment in the oil sector for each scenario through the use of the sensitivity analysis method for the Rumaila oil field data for the year 2022, where the following is clear from those cases:

a. The decrease in oil selling price sharply reduces government revenue while the company's profit remains constant. The drop in oil sale prices sharply reduces government revenue while the company's profit remains stable [21].

b. Rising costs reduce the government's share even with the oil selling price remaining constant. Rising costs reduce the government's share even with the oil selling price remaining constant.

3-5-PSA model for comparison with the Cost plus method (same 2022 data):

The participation model (PSA) usually refers to a Production Sharing Agreement, which is a common model in the oil and gas industry. The mechanism by which this model (PSA) operates is:

a. The government grants the company the right to explore and produce in a specified area. The government grants the company the right to explore and produce in a specific area [22].

b. The company bears all costs and risks (exploration, drilling, development). The company bears all costs and risks (exploration, drilling, development) [23].

c. After the production starts:

- ✓ Costs are first deducted from the production (as a reimbursement of expenses).
- ✓ The remaining portion ("profit oil") is divided between the government and the company in specified ratios (80% for the government, 20% for the company).

To compare the PSA model and the Cost-Plus method (using the same 2022 data for the Rumaila oil field), we follow these steps:

a- Assumptions of the Participation Model (PSA):

- ✓ Recovered cost: 4% of the revenue
- ✓ Remaining profit: 80% for the government, 20% for the company

b- Accounts:

- ✓ Total revenue: $55.1 billion
- ✓ The recoverable cost (Capex + Opex) = 55.1 billion dollars × 4% = 2.2 billion dollars
- ✓ The remaining profit = 55.1 billion dollars - 2.2 billion dollars = 52.9 billion dollars
- ✓ The company's share = 52.9 billion dollars × 20% = 10.58 billion dollars
- ✓ Government revenue (general budget share) = 52.9 billion dollars - 10.58 billion dollars = 42.32 billion dollars [24].

Table 6. Comparison between the PSA model and the Cost-Plus method for Rumaila Field data in 2022

The difference)PSA - Cost Plus(	Cost Plus	PSA	The standard
0	55.1 billion dollars	55.1 billion dollars	Total revenue
10.14+billion dollars	0.44 billion dollars	10.58 billion dollars	Company profit
10.14-billion dollars	52.46 billion dollars	42.32 billion dollars	Government revenue
%18.4-	%95.2	76.8%	The government's share percentage

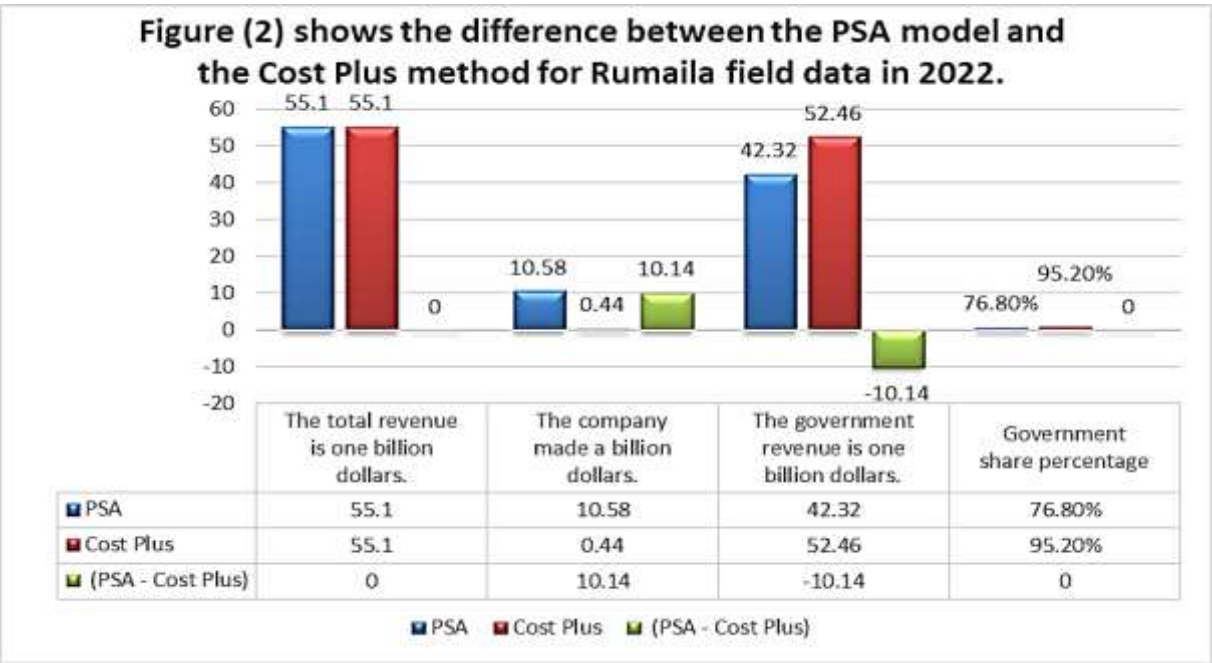

Figure 3. shows the difference between the PSA model and the Cost Plus method for Rumalla field data in 2022

It is clear from Table No. (6) and Figure No. (3) the differences that appear when applying both the PSA model and the Cost-Plus method by determining the company's profit standard, government revenue, and the government's share ratio (the share of the general budget from total revenues) by dividing government revenue by total revenue [25]. Where the difference appears positive in favor of the company's profit when applying the PSA model by an amount of (+10.14 billion dollars), and the difference appears negative in favor of government revenue when applying the PSA by an amount of (-10.14 billion dollars), which is a percentage of (-18.4%) [26]. It can be concluded from this that:

a. Cost Plus benefits the government during periods of rising prices (larger share).

b. PSA benefits companies in high-profit fields.

It can be said that the quantitative application shows that the Cost-Plus system ensures stability for company profits, but it [27]:

- ✓ - It exposes government revenues to the risks of price fluctuations.
- ✓ - Reduces returns during periods of rising costs.
- ✓ -The Cost Plus method leads to negative effects on public budget revenues in the medium and long term due to:
- ✓ Inflating the costs reported by oil companies [28].
- ✓ Reducing incentives to lower production costs and increase efficiency.
- ✓ Increasing the financial burden on the state by recovering ineffective costs.

✓ Which reduces Iraq's share of crude oil revenues and threatens the sustainability of revenues.

3-6- Cost Plus Methodology Improvement Map :

A roadmap can be formulated to improve the cost-plus method, contributing to the balance between contracting parties in the seed fields [29]. We call it the proposed cost-plus improvement matrix, as shown in the table(7) below:

Table 7 . Proposed cost-plus improvement matrix

Expected impact	The quantitative solution	The problem	The distance
Savings of $1.2-1.8 billion/year	Establish an independent audit unit with the following formula: Approved Capex = 0.9 × average regional cost	Capex inflation of 15-20%	Cost control
8-12% increase in production over 3 years	Adjusting the profit margin equation: Profit margin ratio 12% + (0.5 × production increase ratio)	23% decrease in extraction efficiency	Linking profit to performance
Reducing the budget deficit by 35% during crises	Establish a stability fund: Reserve = 20% of revenue when price > $85	A loss of 18% of revenue at $60 per barrel of oil	Revenue protection

When following the improved Cost-Plus model, it guarantees budget stability by 92% to 85%, thereby contributing to boosting the state's general budget revenues in times of economic crisis, as well as ensuring fairness and balance between the contracting parties [30].

Conclusions

1. Impact of critical costs: Cost inflation (Capex / Opex) reduces government revenue by 5-7% annually, especially with weak oversight. That is, a cost increase of more than 15% reduces the government's share to less than 90%, even with high prices.

2. Fixed profit risk: The company's profit is fixed regardless of the oil price, reducing budget flexibility in crises, and the fixed profit margin in Cost Plus leads to unfair distribution when prices fluctuate.

3. High volatility: Government revenues are affected by ±35% with price fluctuations (twice as much as their counterpart in PSA contracts).

4. Oversight gap: 15-20% of costs are not approved due to the absence of uniform standards and independent auditing.

5- Recommendations:

1. Linking the company's profit to the price by adopting the following equation:

Company profit = target selling price * company profit margin

Based on the above equation, savings of $0.5-1 billion/year can be achieved when prices rise.

2. Cost ceiling: Adopt a cost that does not exceed 110% of the Gulf average .

3. Create a revenue stabilization fund based on the philosophy of saving surpluses, whereby 20% of revenue is saved when the price exceeds $85 per barrel of oil and withdrawn when the price falls below $60 per barrel of oil. This contributes to reducing the budget deficit by 60% in times of economic crisis.

4. Adopting a corporate performance incentive system by linking 40% of the company's profits to the following indicators: Production efficiency, Cost reduction, Environmental quality.

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