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A Model for Converting Oil and Gas Revenues Into Sustainable Income Using Economic Security Principles

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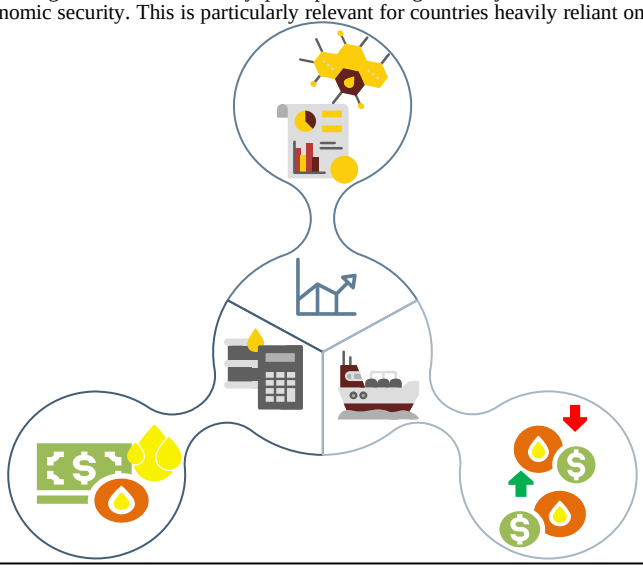
P A P E R I N F O

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A B S T R A C T

Economic security has become a crucial concept in the modern world, attracting considerable attention from policymakers across various fields. This paper delves into one of the major challenges faced by oil-producing countries: transforming oil and gas revenues into sustainable income within the framework of economic security. We first introduce different methods for converting oil revenues into sustainable income. Subsequently, we employ the Ordered Priority Approach (OPA) and consult with a specialized community to assign weights to these methods based on established economic security criteria. Among the six methods evaluated, the approach involving forward contracts and the establishment of oil funds receives the highest score, identifying it as the most suitable method for converting oil revenues into sustainable income within the context of economic security. Based on our findings, employing a combination of diverse methods while emphasizing investment-based strategies and adhering to economic security principles can significantly contribute to enhancing a country's long-term economic security. This is particularly relevant for countries heavily reliant on oil and gas revenues.



1. Introduction

Rising Concerns Drive Exploration of Sustainable Income Strategies in Oil-Rich Nations. The oil price shocks of 2014 and 2015, coupled with growing environmental considerations increasingly impacting policies and business practices, have prompted oil-producing countries to explore strategies for income stabilization and, critically, the conversion of oil and gas revenues into sustainable income streams. The intricate relationship between revenue volatility and the long-term benefits derived from oil and gas sales is a complex and multifaceted issue influenced by a range of economic, political, social, and cultural factors.

Oil's Unique Complexity: Oil's unique status as the most political and simultaneously crucial commodity influencing diverse sectors injects added complexity. This intrinsic complexity, when interwoven with the intricate nuances of economic knowledge, creates multi-faceted challenges exceeding those associated with other commodities.

Economic Security, A Vital Pursuit: Converting national income into stable income streams underpins economic security and fosters national economic stability, ultimately leading to sustainable development and resilience against economic shocks, including sanctions.

Interdisciplinary Research for a Dynamic World: The evolution of scientific inquiry and the expansion of its frontiers have driven the need for

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interdisciplinary studies and hybrid concepts, particularly within the humanities. Economic security, encompassing various dimensions and components, exemplifies this trend. This topic necessitates becoming a key concern for researchers, policymakers, and executives, especially in light of recent, punitive sanctions imposed on the Iranian people.

Energy Sector: A Key Player in Economic Security: The energy sector presents itself as a vital realm closely linked to the concept of economic security in all nations, particularly Iran. By leveraging its inherent advantages in this sector, Iran can bolster its defenses against diverse threats to economic security.

Converting Oil Revenue into Sustainable Income: An Economic Security Model for National Stability

Aim and Scope: This article proposes a model based on economic security principles for transforming oil and gas revenues into stable income streams, thereby enhancing a nation's economic security. Through comprehensive document and library research, the article investigates and refines various methods for achieving this objective. We further utilize the sequential priority method (OPA) to evaluate these methods against the components and criteria of economic security as defined by Eftekhari and Sohri Athar [1]. By selecting the optimal method, we seek to maximize the potential for achieving economic security within the given context.

Evaluation by the order priority method of the contract by which the best method during which more economic security can be provided can be extracted and presented.

In order to understand the place of stability of the revenues from the sale of oil and gas in improving the economic security of the country, the concept of economic security must be introduced first. Basically, economic security is a category that can be said to have been emphasized and noticed by societies for a long time, but it was seriously noticed by governments and political systems since 1945 [2] defined economic security by examining the lexical roots: "Lexually, economic security is a compound of the word security and economy. The word security in English comes from the Latin word Secarus, which se means to know and curus means distress, is taken to mean healthy security and Safe means freedom from anxiety, freedom from doubt and uncertainty, freedom from fear and danger, and confidence. In general, "security is a general discussion about the pursuit of freedom from threats". Based on this, economic security means freedom from any kind of fear, doubt and ambiguity in fulfilling obligations and demands while ensuring the enjoyment of fruits. Activities that take place in the field of wealth production and its distribution and consumption.

From another point of view, it can be said that economic security is one of the layers of national security. This word can be defined in two ways according to the definition of economy. If economy is defined as issues related to livelihood, then economic security should be defined as "the absence of any unusual factor that adversely affects production activities, exchanges and consumption, etc. or their environment." But if economics is defined with its newest and most scientific definition, which is the science of choice, then the field of economic security has expanded and concepts such as "desirability, rationality, efficiency, excellence, etc..." should be examined [3].
Hashemian Esfahani and Gerji [2] defined economic security from an institutionalist point of view. According to them, it can be said that national security is related to all the characteristics and institutional characteristics of the economy of a country, including organizations, laws, customs and ideology. Economic security can be defined as an institutional framework that encourages and gives confidence to economic activists to work harder and ensure the physical security of people and the legal security of transactions.

The first stage: identifying the experts and determining the priority of the experts based on the level of work experience or educational qualification.

The second stage: identifying the criteria and determining the priority of the criteria by each expert.

The third stage: Identifying the options and determining the priority of the options in each criterion by each expert.
The fourth stage: forming the linear programming model and solving it by optimization software such as Gems, Lining, and MATLAB.

Max Z
S.t.
$Z \le r_i \left(r_j\left(w_{ijk}^{r_k} - w_{ijk}^{r_k+1}\right)\right) \quad \forall i,j \text{ and } r_k$
$\backslash newline$
$Z \le r_i r_j r_m w_{ijk}^{r_m} \quad \forall i,j \text{ and } r_m$

The weight of each option is calculated by the following formula:

$$\sum_{i=1}^{p}\sum_{j=1}^{n}\sum_{k=1}^{m} w_{ijk} = 1$$
$\backslash newline$
$w_{ijk} \ge 0 \quad \forall i,j \text{ and } k$
Z : Unrestricted in sign

The weight of each criterion is calculated by the following formula:

$$w_i = \sum_{j=1}^{n}\sum_{k=1}^{m} w_{ijk} \quad \forall i$$

And the weight of each expert is calculated by the following formula:

$$w_k = \sum_{i=1}^{p}\sum_{j=1}^{n} w_{ijk} \quad \forall k$$

This method has been used to rank the indicators based on the purpose of this research. In fact, in order to answer the main question of this research, which model of converting the income from the sale of oil and gas into sustainable income is more effective in providing the economic security of the country, it has been answered in this way.

2. Method

2.1. Methodology

The main method of this research is the study of documents and libraries, which by referring to various sources and relevant documents, the methods of converting the income from the sale of oil and Gas has been explored and provided for stable incomes. These methods have been extracted based on various articles, interviews with related thinkers and general economic policies. [4].

Various methods have been proposed to solve multi-criteria decision-making problems. The basis of most methods is the matrix of paired comparisons or the system matrix. However, the characteristic pairwise comparison matrix is faced with these errors. In their book, Munir and Hontoria provided a complete review of the results of the Matrices comparisons of payment pairs. Based on the results, they provided It is difficult for the human mind to determine accurately which may lead to wrong results. For example, an expert knows that the first option is better than the second option. But it is difficult for his mind to express the degree of betterness using few numbers. To overcome this problem, the OPA method, which stands for Ordinal Priority Approach It is the first TB in 2020 .Some researchers stated that the comparisons in the OPA method are very simple and user-friendly, and the best results A multi-criteria decision-making method [5-8].

The OPA method is based on medical data to calculate the weight of experts, averages, and options. For example, the expert only needs to state whether the first option is greater or smaller than the second option in any criterion, etc. The entrance time for the particles will be much easier, which can lead to the best results. Among the features of this method, the following can be mentioned:

- No need for the matrix of paired comparisons.
- Calculating the weight of experts, criteria and options at the same time.
- No need to normalize the input data (using different normalization methods can lead to different results).
- Support for group decision-making without using mediation methods.
- Relying on incomplete data if you do not have sufficient knowledge [9-12].

Due to the application of OPA method in different fields and areas, this method has been used and developed by many rese archers. for example:

Sotoudeh-Anvari in his review article of the OPA method as a new method with unique capabilities such as calculating the weight of experts, criteria and options. He also discussed its applications in corona disease. Mahmoudi et al. used the OPA method under fuzzy environments.Akhashtei and development of sustainable construction, D. Sadeghi et al. In another study, Sadeqi et al. In the construction industry, first and foremost, they dealt with the requirements of development and its application using the fuzzy OPA method. Pamukar et al. evaluated the model discussed sustainable transportation using the OPA method. Abdulbasit et al. used the OPA method in the neutrosophy environment. A product in Vietnam was paid using the OPA method. Chaparro et al. evaluated alternative methods in the field of physical rehabilitation using the OPA method. Alkadem et al. evaluated the economics of solar and wind energy using the OPA method [12-14].

investigated autonomous vehicles and their performance in the field of metaverse using the OPA method. The OPA model is a linear programming model that does not have high complexity. The steps of this method are as follows:

The first stage: identifying the experts and determining the priority of the experts based on the level of work experience or educational qualification.
The second stage: identifying the criteria and determining the priority of the criteria by each expert.
The third stage: Identifying the options and determining the priority of the options in each criterion by each expert.
The fourth stage: forming the linear programming model and solving it by optimization software such as Gems, Lining, and MATLAB.

3. Results and Discussion

3.1. Investigating the Ratio of Revenues From Oil Sales in Iran's Economy

In the last years before the Islamic revolution, due to global developments and the sharp increase in oil prices, Iran's oil income Suddenly there was a significant increase. This increase in income and its injection into the society increased the consumption demand of the society. In order to respond to this amount of demand, the government had to import consumer goods. In addition, the government implemented welfare plans and increased salaries. All this caused the country's budget to become heavily dependent on oil revenues. Incomes that did not go to the production sector but to the import of consumer goods. Now the government's expenses had increased so much that only rich oil revenues could answer it [14-16].

Before the 1950s, agriculture had a significant share in Iran's economy, but with the influx of income, it was the oil and gas sector that had the largest share. In 1346, the share of agriculture was 66.13% and in 1353, it was 47% of the GDP. While the share of oil revenues from the government budget increased from 46 to 50 percent in 1345 to 1350 to 85.5 percent in 1353.

Shajari and his colleagues have investigated the relationship between the budget and the balance of payments, budget and liquidity, and finally oil revenue and the government budget in Iran using the ordinary least squares method and with the help of the simultaneous equations system. According to their results, with a one percent increase or decrease in oil revenue, the government budget increases or decreases by 47 percent. This shows a significant relationship between the government budget and oil revenues in Iran) (Shajari, Houshang; Ustadi, Hossein; Pir Moradian, Ilham 1388.

During the years when oil became the most important part of Iran's economy, there were jumps in the price of oil.

It is expected that if the income resources are used correctly and the resource curse phenomenon does not occur, the increase in oil prices will improve the economic indicators of the countries that have this resource.

However, the examination of economic indicators shows that the increase in oil prices and the consequent increase in the country's income through the sale of oil, either had a small positive effect on the indicators or had no positive effect at all. In some cases, it has even had a negative impact. Regarding the poverty index, according to statistics, although the increase in oil prices had short-term effects on reducing poverty, the general trend of the years after the 1950s, which in general increased The accompanying price shows a decrease in the per capita income of Iranians .This means that the people are getting poorer. This issue, along with the increase in inflation, which is partly caused by the sudden increase in the price of oil, shows it. At least the increase in oil revenues has not been able to have a serious impact on poverty reduction. In the case of the unemployment index, like the poverty index, although there has been a temporary improvement in periods with the increase in the price of oil, it has not had a significant and lasting effect. In the case of the inflation index, too. As it was said, during this period, it has always been one of the serious problems of Iran's economy. Finally, the increase in oil prices has had a significant negative impact on the inequality index and has caused an increase in inequality.

The graph below shows the dependence of the GDP on oil and gas production, based on these statistics, the highest dependence is in 1974 with more than 47% dependence and the lowest in 1986 with almost 5% dependence, which can be said as an average. The dependence of Iran's GDP on crude oil is close to 30%.

Table 1. Expert experimental expertise (year).

0.340847	10	E1
0.116355	5	E2
0.083433	3	E3
0.200413	6	E4
0.258951	7	E5

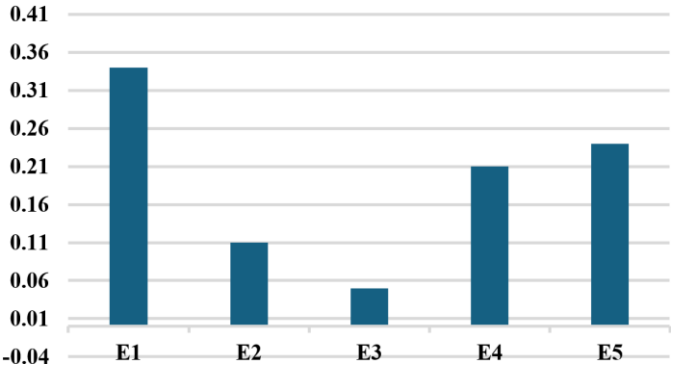


Figure 1. Expert experimental expertise.

In the next section, the weight of the criteria should be extracted. For this purpose, experts from 1 to 4 to these criteria rated these criteria in economic security.

Table 2. Expert experimental expertise.

Access to Resources	0.116499
Power Upgrade	0.286346
Wealth Growth	0.196184
Independency	0.400971

And finally, all the experts based on the above criteria (economic security criteria) have scored the patterns of converting the incomes from the sale of oil and gas into sustainable incomes.

Table 3. Expert experimental expertise.

The pattern of converting revenues from oil and gas sales into sustainable revenues Establishment of oil funds	0.183376
Attracting foreign investment in the energy sector	0.122243
Sale of oil futures Exchange with strategic goods Buying shares of refineries in other countries Oil and gas swap Exchange with strategic goods	0.204426
Buying shares of refineries in other countries Oil and gas swap	0.172418
Buying shares of refineries in other countries	0.160883
Oil and gas swap	0.156654

4. Conclusions

In this research, the patterns of converting oil revenues into sustainable revenues were analyzed using 6 methods of documentary and library study. These methods include: oil and gas swaps; buying shares of refineries in other countries; clearing with strategic goods; selling oil futures; attracting foreign investment in the energy sector and establishing oil funds. In the following, by referring to the opinion of experts and confirming the opinion of Athar, the criteria of economic security were examined and weighted by referring to the elite society. The weight of these criteria is according to their role in converting the resulting income From the sale of oil and gas to sustainable incomes, these experts were examined. According to this index (the role of these criteria in converting the incomes from oil and gas into sustainable incomes), in order of the highest weight are: non-dependency, promotion of power, The growth of wealth and access to resources [17].

After confirming and weighting these components, the experts of this research, whose weight is determined based on their experience, the methods of converting oil and gas revenues into sustainable incomes were ranked, and based on this, the mentioned methods were ranked in order of priority. It consists of: 1) sale of oil futures; 2) establishment of oil funds; 3) exchange with strategic goods; 4) purchase of shares of refineries in other countries; 5) oil and gas swap and 6) attraction of foreign investment in the sector Energy.

What is obtained from the process of this research is that if the policy makers of the oil and gas industry want to take action in accordance with the criteria of economic security in order to convert the incomes from the sale of oil and gas into sustainable incomes, they should do so in accordance with the output of this article and according to the weighting of the experts. Make policy [18].

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