

Assessment of Petroleum Fiscal Regimes in Algeria: A Comparative Analysis with Libya and Nigeria

Mokhtar Osmani¹

¹Chadli bendjedid University - Algeria

✉ m.osmani@univ-eltarf.dz

 0009-0000-3899-5275

Abdelhamid Affif²

²Akli Mohand Oulhadj University, Bouira - Algeria

✉ a.afif@univ-bouira.dz

 0009-0006-9721-7012

Sofiane Osmani³

³Laboratory of Partnership and Investment in Small and Medium Enterprises in the Euro-Maghreb Area

University of Setif 01 Ferhat Abbas - Algeria

✉ osmanisofiane@univ-setif.dz

 0009-0000-0313-4686

Received: 09-19-2025

Accepted: 11-17 -2025

Published: 12-30-2025

Abstract:

This study assesses Algeria's petroleum fiscal regime in comparison with those of Libya and Nigeria by applying four key indicators: the Front-Loading Index, Government Take, Discounted Government Take, and the Composite Score. The results demonstrate that Algeria offers the most attractive investment environment, balancing high government revenue with reduced early-stage financial risk. Furthermore, the findings confirm that Hydrocarbons Law No. 19-13 has significantly enhanced Algeria's competitiveness. By contrast, Libya and Nigeria could improve their attractiveness to investors by alleviating early-stage fiscal pressures.

Keywords: Petroleum fiscal regimes; Government Take; Discounted Government Take; Front-Loading Index; Composite Score.

Jel Classification Codes : H21; H25; L71 ; Q32 ; Q38

Cite this article

Osmani, M., Affif, A., & Osmani, S. (2025). Assessment of Petroleum Fiscal Regimes in Algeria: A Comparative Analysis with Libya and Nigeria. *Economic Researcher Review*, 13(2), 282–294.



This article is licensed under a Creative Commons Attribution-NonCommercial 4.0 International license

1. Introduction.

The upstream oil and gas industry operates within a highly complex institutional framework shaped by petroleum cooperation contracts established by resource-owned states (Luo & Yan, 2010, p. 756). These contractual arrangements introduce additional layers of risk and uncertainty by defining the legal and operational boundaries within which international oil companies (IOCs) operate. They also intersect with national taxation regimes, compelling IOCs to evaluate not only the fiscal implications of after-tax returns across diverse countries but also the specific contractual terms governing petroleum activities in each country (Blake & Roberts, 2006, p. 96). For many resource-rich economies, the limited domestic capacity to effectively manage the petroleum sector necessitates reliance on foreign investment (Bindemann, 1999, p. 5). This dependence generates a delicate policy trade-off: Governments must capture an equitable share of resource rents while maintaining an investment climate conducive to attracting international capital and technology. Thus, the design of petroleum fiscal regimes represents a critical policy challenge: balancing sovereign developmental objectives with the competitiveness required to secure foreign participation in a globalized market (Salahudin Mohamed, Mohamed Khattab, Kamel El-Sayed, El-Noby, & Mohamed El-Rammah, 2024, p. 2).

Algeria exemplifies this dynamic: As one of the leading oil and gas producers in Africa, the country remains heavily dependent on hydrocarbon revenues, which have historically accounted for 50–60% of public revenues over the past decade (IMF, 2023, p. 5). In response to ongoing fiscal and investment challenges, Algeria enacted Law No. 19-13 in December 2019, introducing a new hydrocarbon law that substantially reconfigured the country's legal and fiscal framework. However, its effectiveness in promoting investment and ensuring fiscal sustainability remains to be fully assessed.

This study analyzes Algeria's upstream petroleum fiscal regime to evaluate its attractiveness compared to neighboring producers, particularly Libya and Nigeria. The significance of this study is threefold: First, it provides Algerian policymakers with a timely evaluation of the investment climate under the new legal framework when fiscal sustainability and foreign investment are both crucial. Second, the findings offer comparative insights into IOCs when considering investment opportunities in North Africa, where Algeria directly competes with Libya and Nigeria. Third, this study contributes to the academic literature, in which integrated comparative assessments of petroleum fiscal regimes in Africa remain limited. The remainder of this paper is organized as follows. Section 2 sets out the theoretical framework based on the concept of economic rent. Section 3 reviews the existing literature. Section 4 presents the analytical approach and a comparative discussion of fiscal regimes. Section 5 provides the results, and Section 6 concludes the study with key findings and policy recommendations.

2. The theoretical framework of the study.

2.1. Exploring Petroleum contracts: Fiscal Frameworks and Evaluation Methods

International petroleum cooperation agreements are divided into two primary categories: concessionary systems and contractual systems. The Production Sharing Contract (PSC) is currently the most widely used agreement, followed by the tax/royalty (T/R) system. Many countries employ both types of systems, and various versions of each type. As a result, the number of fiscal systems in use today far exceeds that of petroleum-producing countries (Johnston D., 1994, p. 24).

In the context of asymmetric information, host countries strategically offer diverse contracts to attract International Oil Companies (IOCs). This approach facilitates the automatic self-selection of IOCs based on their risk preferences and operational characteristics. As (Blake & Roberts, 2006, p96) note, host governments primarily aim to maximize their fossil resource wealth while maintaining

control over oil activities. To achieve these goals, they implement work commitments and specific fiscal systems (Yúnez & Chapa, 2017, p. 1541).

The international petroleum contract is the link between international oil companies (IOCs) and the petroleum resource country, which regulates the rights and duties of parties with legal effects. These cooperation patterns vary globally and are influenced by national legislation, international relations, and resource development. However, the major difference lies only in resource ownership transfer (Johnston, Johnston, & Roger, 2008, p. 1). international petroleum contracts include operating provisions, fiscal terms, and legal provisions.

Fiscal terms in the oil and gas sector aim to ensure sustainable resource exploitation, benefiting both the current and future generations. They defined operational terms across all stages of the petroleum process, from exploration to production and trade. Financial terms in these contracts are crucial, as they determine profit and economic rent distribution among international oil companies (IOCs) and petroleum resource countries throughout the duration of the contract. This distribution significantly impacts the attractiveness of investment in the sector, balancing national interests with international business practices and long-term resource management strategies (Asanga, Adaobi Stephenie, & Okoroma, 2021, p. 160).

Upstream petroleum fiscal regimes in the oil and gas exploration and production (E&P) industry encompass various financial mechanisms. These include royalties, profit-based and non-profit-based taxes, bonus payments, cost recovery limits, and profit-split arrangements. These regimes also involve host government participation, domestic market obligations, and investment credits (Gallardo, Castro, & Carlos , 2019, p. 82).

Research on upstream petroleum fiscal regimes encompasses both qualitative and quantitative approaches. Qualitative methods focus on analyzing policymakers' perspectives on the impact of fiscal systems. while Quantitative analyses leverage the economic rent concept to evaluate these regimes. The assessment of upstream petroleum fiscal systems typically involves a set of criteria including neutrality, revenue generation capacity, government stability risks, timing of government income, impact on investor risk perceptions, adaptability, and progressivity (Daniel, Goldsworthy, & Watson, 2010, p. 190).

Quantitative approaches employ various indicators and analytical techniques to examine these evaluation criteria. These methods allow researchers to gain comprehensive insights into the effectiveness and implications of different fiscal regimes in the upstream petroleum sector, providing valuable information for policymakers in host nations and international oil companies (IOCs) .

2.2. Quantitative method for Petroleum Fiscal Regime evaluation

Currently, no universally recognized or standardized approach exists for assessing and contrasting the various contract types across different nations. The appeal of a country's fiscal terms is not determined by the specific type of fiscal regime, individual provisions, or isolated values. Rather, it is the collective impact of all fiscal terms that truly defines their attractiveness (Luo & Yan, 2010, p. 758).

a. Government take

Government Take is considered one of the most comprehensive indicators for comparing petroleum fiscal terms, as noted by (Johnston D. , 1994, p. 9). Most research on petroleum fiscal regimes indicates that the Cash Flow Model is the principal framework for determining Government Take, (Kaiser & Pulsipher, 2004; Kaiser, 2007; Johnston, Johnston, & Roger, 2008; Adenikinju &

Oderinde, 2010; Mardiana, Husla, & Kartoatmodjo, 2019) . There are three main methods for calculating Government Take (Luo & Yan, 2010, p. 758).

a.1 Non-Discounted Cash Flow (NDCF) method

Johnston (1994) and Luo & Yan (2010) describe this method as one that simulates the cash inflows and outflows over the contract period at a certain level of prices and production, without considering the time value of money.

a.2 Discounted Cash Flow (DCF) method

The Discounted Cash Flow (DCF) approach is one of the most widely applied methods for valuing a project, as it derives the present value from projected future cash flow. This approach applies a discount rate to calculate the present value of projected future cash flow, as noted by Qing and Xueyan (1999). DCF is particularly crucial in the oil and gas exploration and production sectors, where projects often span more than 20 years, necessitating careful consideration of the time value of money (Johnston, Johnston, & Roger, 2008, p. 141). The significance and application of the DCF method have been extensively studied by numerous researchers. Notable contributions come from (Luo & Yan, 2010); (Laporte & Diouf, 2017); (Thiri Swe & Nnaemeka, 2018); (Asanga, Adaobi Stephenie, & Okoroma, 2021). These studies have underscored the importance of this method for long-term project valuation. The widespread adoption of DCF in the oil and gas industry is evident, with (Thiri Swe & Nnaemeka, 2018, p. 5) reporting that 99% of International Oil Companies use this technique. Its popularity stems from its ability to account for the time value of money, which makes it particularly suitable for projects with extended lifespans.

However, it is important to note that the DCF method is not without criticism. Researchers, such as (Nakhle, 2004, p. 243) has identified certain limitations and drawbacks associated with this approach. These critiques suggest that although DCF is a valuable tool, it may not be perfect for all scenarios and should be used with an awareness of its potential shortcomings

b. Prompt and Intuitive method

The Prompt and Intuitive Method, as described by (Luo & Yan, 2010) provides a quick way to evaluate petroleum fiscal regimes without relying on complex cash flow models. It assumes a total income of 100% and allocates it according to contractual proportions, allowing International Oil Companies (IOCs) to rapidly assess fiscal attractiveness when detailed data are unavailable. However, the constant income assumption limits its analytical depth, making it suitable only for preliminary assessments rather than detailed economic analysis.

c. Front Loading Index (FLI)

Luo & Yan(2010) developed the Front-Loading Index (FLI) to measure the impact of the temporal distribution of revenue flows on a host country's overall attractiveness for petroleum projects. Specifically, this indicator captures the difference between the discounted Government Take (GT_i) and the non-discounted Government Take (GT). Since International Oil Companies (IOCs) prioritize profit maximization and the rapid recovery of invested capital, fiscal arrangements that defer substantial transfers of revenue to the host country tend to enhance project attractiveness by facilitating earlier cost recovery.

It is also essential to recognize that host country revenues are shaped by factors beyond project profitability. Policies such as value-added taxes, import duties on machinery, and signature or discovery bonuses generate fiscal revenues during the construction phase independent of IOC profits.

These mechanisms account for the observed gap between discounted and nondiscounted governments. Conversely, in fiscal regimes in which host country revenues are entirely contingent upon project profitability, front-loading effects would not occur, as payments to the host state would fully align with project performance.

Accordingly, the FLI offers a straightforward interpretation: the lower its value, the less financial risk IOCs bear in the project's early stages, thereby increasing the attractiveness of the fiscal regime to investors

d. Composite Score

To reflect the decision-maker's preferences regarding their respective contributions to the fiscal regime's attractiveness, Luo & Yan (2010) introduced the Composite Score (CS), a comprehensive evaluation indicator that combines the Government Take (GT) and Front Loading Index (FLI). Crucially, the computation of CS removes variables such as oil prices, project scale, and field resource potential, guaranteeing that cross-country comparisons are based only on the fiscal regime's structure and not on external circumstances.

Using the CS to compare petroleum fiscal regimes in Myanmar, Cambodia, Indonesia, Vietnam, Australia, the United States, Canada, and Mozambique, Thiri Swe & Nnaemeka (2018) expanded on this methodology. According to their research, Cambodia had the most alluring regime, followed by the US, Canada, Indonesia, Australia, Vietnam, Mozambique, and Myanmar. CS was interpreted in both studies so that the more attractive the fiscal regime, the lower its value. It is important to note that no comparable study has yet been conducted on Algeria's fiscal framework, despite the fact that these contributions demonstrate the value of CS in cross-country comparisons of petroleum fiscal regimes.

3. The experimental framework for the study.

International investors employ diverse evaluation techniques to compare petroleum fiscal regimes within the oil and gas exploration and production (E&P) sector, each with its respective strengths and limitations. However, identifying indicators that comprehensively capture the combined effects of different fiscal systems remains challenging, as no universally accepted methodology currently exists for assessing upstream oil and gas contracts. To address this gap, the present study adopts the evaluation framework proposed by Luo and Yan (2010), which integrates three key indicators: Government Take (GT), Front-Loading Index (FLI), and Composite Score (CS).

In addition to considering the time value of money and the sequencing of revenue allocation, these indicators were chosen for their thoroughness in representing the income allocation ratio between International Oil Companies (IOCs) and the host nation. Finally, as these metrics have a direct impact on the total benefits received by IOCs, they offer a systematic framework for evaluating the attractiveness of fiscal regimes.

3.1 Host Government Take (GT)

Government Take (GT) is a key metric for assessing the desirability of petroleum fiscal regimes. GT is the percentage of the host country's total project revenue over the course of the contract period, including government and national oil company revenue. It combines the effects of several fiscal tools, including government equity participation, profit oil/gas split, royalties, bonuses, and various tax levels, into a single measure. International Oil Companies (IOCs) find contracts with higher GTs less appealing, whereas contracts with lower GTs reflect more favorable fiscal regimes.

In petroleum fiscal studies, Government Take is typically estimated using two principal approaches: the Non-Discounted Cash Flow (NDCF) method and the Discounted Cash Flow (DCF)

method. Each approach offers a distinct perspective on the distribution of revenues between the host government and international oil companies (IOCs)

a. The method of non-discounted cash flow (NDCF)

Without taking the time value of money into account, the Non-Discounted Cash Flow (NDCF) method models cash inflows and outflows over the course of the contract. Johnston (1994) created this strategy, which (Luo & Yan, 2010), and (Thiri Swe & Nnaemeka, 2018) later employed. The host government's take is computed as follows :

$$GT = \frac{NCF(GOV)}{(NCF(GOV) + NCF(IOC))} * 100\%$$

where, NCF (Gov) denotes the net cash flow accruing to the host government, while NCF (IOC) represents the net cash flow of the international oil company. The interpretation of the Government Take (GT) indicator in relation to fiscal regime attractiveness is that a higher GT value implies reduced attractiveness of the contractual fiscal regime for the IOC.

b. The method of discounted cash flow (DCF)

The time value of money is taken into account by the Discounted Cash Flow (DCF) method, which is essential for long-term oil and gas projects that usually last for more than 20 years. It is frequently used to estimate future cash flows and determine the present value of the host country's revenue using a predetermined discount rate (Luo & Yan, 2010). This is the discounted GT formula:

$$GT_i = \frac{NCF(GOV) * (1+i)^t}{((NCF(GOV) + NCF(IOC)) * (1+i)^t)} \times 100\%$$

where GT_i is the discounted Government Take, i is the discounted rate, and t is the time of cash flow.

3.2 Front Loading Index

An alternative metric for assessing the appeal of petroleum fiscal regimes from the viewpoint of International Oil Companies (IOCs) is the Front-Loading Index (FLI). It illustrates the distinction between the discounted Government Take (GT_i) and the non-discounted Government Take (GT), capturing the impact of the host country's timing of revenue collection . This indicator is especially crucial because some fiscal tools used early in a project, such as discovery and signature bonuses, construction-phase taxes (such as import duties and value-added tax), royalties, and production-based levies, can speed up the host nation's revenue collection compared to project profits. This can have a front-loading effect on the IOC and affect the profitability of the entire project. The following formula is used to determine the FLI:

$$FLI = \frac{GT - GT_i}{GT} \times 100\%$$

where the discounted Government Take is denoted by GT_i, and the non-discounted Government Take by GT. The reduced financial risk for the IOC in the early phases of the project is indicated by a lower FLI value, which also signals more favorable fiscal terms (Luo & Yan, 2010, p. 759).

3.3 Composite Score

By using weights derived from qualitative analysis and survey techniques, the Composite Score (CS) is a comprehensive indicator that combines the effects of the Front-Loading Index (FLI) and Government Take (GT). This indicator reflects the relative weight that decision-makers assign to each element in assessing the overall desirability of a petroleum fiscal regime. A linear weighting function was used to determine the Composite Score:

$$CS = W1 \times GT + W2 \times FLI$$

where W1 and W2 are the weights given to the GT and FLI , respectively, and CS is the Composite Score. These weights capture the contribution of each indicator to perceived fiscal attractiveness. While host countries favor higher values (Luo & Yan, 2010, p. 759) claim that a lower Composite Score denotes greater appeal to international oil companies. Thus, the interpretation of CS is that the lower its value, the more appealing the petroleum fiscal regime is to possible investors.

3.4 data

This study employs a comparative analytical approach to assess the fiscal frameworks of the petroleum regimes in Algeria, Libya, and Nigeria. The analysis for Algeria is grounded in the provisions of Hydrocarbons Law No. 19-13, whereas for Libya and Nigeria, it draws on fiscal parameters from the Ernst and Young Global Oil and Gas Tax Guide (2019) and relevant prior studies.

The assessment focuses on three primary fiscal instruments: royalties and cost recovery mechanisms, accounting for the application of additional taxes and fees specific to each petroleum fiscal system, and corporate income tax (CIT). Secondary instruments, including surface fees, gas flaring penalties, and water usage charges, were excluded because of their limited impact on overall government revenue and investor returns, as presented in Table (1). This approach aligns with international best practices in petroleum fiscal analysis, which prioritize instruments with significant economic effects.

Table .1 Main Fiscal Parameters of Algeria, Lybia and Nigeria

Descriptions	Algeria		Libya		Nigeria	
	Gov	IOC	Gov	IOC	Gov	IOC
Royalty Rate	10%		16.75%		20%	
Profit Petroleum	51%	49%	70%	30%	60%	40%
Cost Recovery		100%		100% cost of devlopement		100%
Petroleum Income Tax (PIT)	50%				50%	
Income Tax	30%		20%			
Jihah tax			4%			
SurTax			41%			
					2%	

**Tertiary
education tax**

Source: Ernst & Young. 2019. Global Oil and Gas Tax Guide

- Hydrocarbons Law No. 19-13, Official Journal of the Algerian Republic, Dec. 11, 2019.

Production and expenditure data were obtained from Kaiser (2007), a widely recognized benchmark for evaluating the influence of fiscal parameters on investment attractiveness. The Oil price assumptions were based on data from the International Energy Agency (IEA 2024) to ensure consistency with global energy market forecasts and realistic revenue projections. Owing Due to data limitations, reference values were adopted and adjusted to cover a fifteen-year project horizon (2021–2035), including an investment phase from 2021 to –2024 and production commencing in 2025.

Capital expenditures are estimated at USD 101 million, allocated as 20% intangible and 80% tangible assets, and depreciated on a straight-line basis over five years. Operating expenditures are projected at USD 117 million (equivalent to USD 2.9 per barrel) and are assumed constant throughout the production period. All costs are incorporated into cost recovery mechanisms in accordance with the provisions of each fiscal regime. The data were compiled from official government documents, IEA price projections, and assumptions adopted from previous studies, as summarized in Table 2.

Table 2: Data Sources, Key Parameters, and References for Evaluation Indicator.

Indicator	Necessary Parameters	Data Source	Previous Studies
GT (NDCF)	Production profile, capital and operating costs (CAPEX, OPEX), depreciation and amortization (DD&A), price levels, and fiscal parameters (royalties, cost recovery, profit-sharing, taxation)	Kaiser (2007) International Energy Agency . Ernst & Young (2019). Global Oil & Gas Tax Guide Hydrocarbons Law No. 19-13, (Balhasan, Towler, & Miskimins, 2013)	Kaiser (2007) - Bindermann (1999) - Johnston (1994) - Thiri Swe & Nnaemeka (2018) Assumption: Oil price and relevant taxes are sufficient to calculate expected cash flows for determining investor's return and government take (Nakhle, 2004)
GT (DCF)	Discount Rate (10%)	Nakhle (2004). Petroleum Taxation	Assumption: A real discount rate of 10% is applied, consistent with the majority of published studies, to mirror the industry's standard discount rate
CS	Weights (Attitude of Decision Makers)	Primary source: survey questionnaire of energy economics experts from the Universities of Sétif, El Tarf, and Bordj Bou Arreridj	Scores and weightings should be determined using techniques such as the Delphi method, peer review, or structured questionnaires

In Libya, government and investor shares under EPSA-IV contracts are determined by factor A, which is linked to the R-factor (cumulative revenues/cumulative costs). According to Balhasan, Towler, and Miskimins (2013), the project's R-factor is 8.68, resulting in $A = 0.30$, whereby the investor receives 70% of revenues and the government 30%. In Algeria, Petroleum Income Tax (PIT) was calculated under Law 19-13 (Articles 179–184), with an annual factor exceeding three, yielding a 50% tax rate.

A real discount rate of 10% was applied, consistent with industry standards and regional investment risk assessments. Finally, the weights for the Composite Score Index (CSI) for both Government Take (GT) and the Front-Loading Index (FLI) were determined through surveys of energy economics experts from the Universities of Sétif, El Tarf, and Bordj Bou Arreridj, ensuring an accurate and objective comparative evaluation of the three petroleum fiscal regimes.

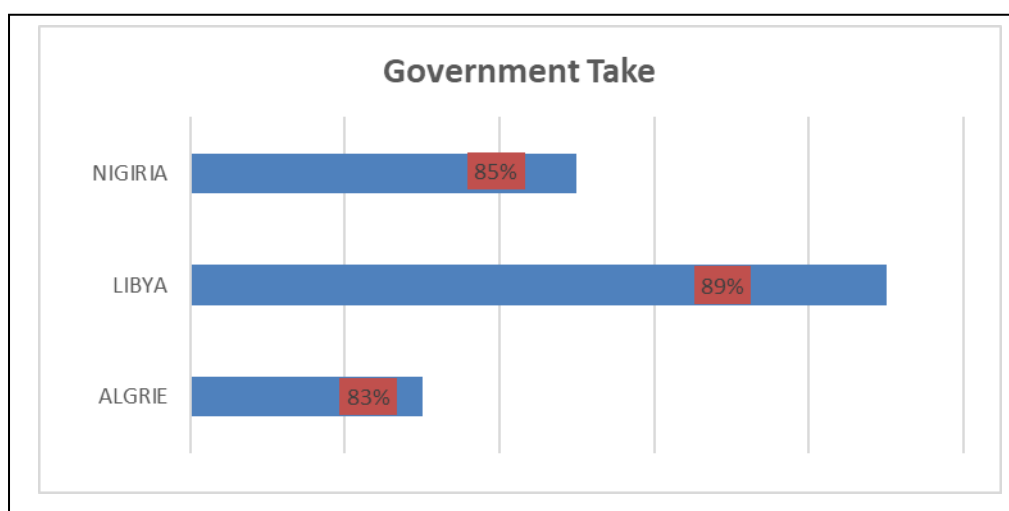
4. Result and discussion

This section summarizes the main results of the quantitative analysis of petroleum fiscal regimes in Algeria, Libya, and Nigeria. The discussion begins with an evaluation of the Government Take (GT), followed by the Discounted Government Take (GTi) and the Front Loading Index (FLI), and concludes with the Composite Score (CS) to provide a comprehensive assessment of fiscal attractiveness from the perspective of international oil companies (IOCs) while highlighting early stage investment risk.

4.1 Government Take (GT)

GT represents the total government share of revenue without considering the time value of money (see Figure 1). The Algerian system demonstrates a balanced allocation between high shares and flexible revenue flows, with a government take of 83%, followed by Nigeria at 85%, and Libya at 89%. Although Libya has the highest share, this does not necessarily indicate greater attractiveness, as excessive early cash flow pressure can reduce investment appeal (Thiri Swe & Emodi, 2018)

Figure 1 :Government Take calculated through the non-discounted cash flow model

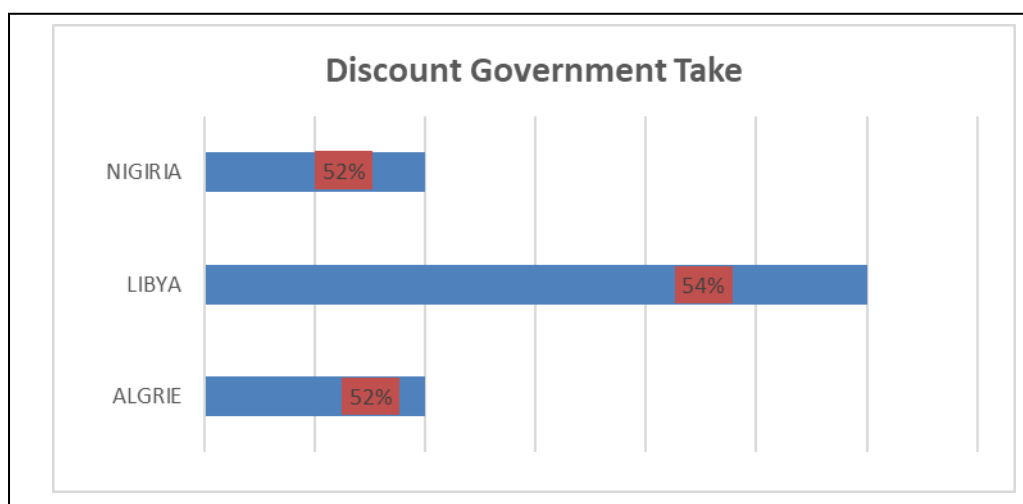


Source: Authors calculations.

4.2 Discounted Government Take (GTi)

GTi accounts for the time value of money, reflecting early cash flows and their impact on investor decisions (see Figure 2). Algeria maintains high attractiveness, with a GTi of 52%, compared to Libya at 54% and Nigeria at 52%. This indicates that the timing of revenue is crucial: regimes with heavy early stage cash flow demands may be less attractive despite high overall shares (Luo & Yan, 2010).

Figure2 : Government Take calculated through the discounted cash flow model

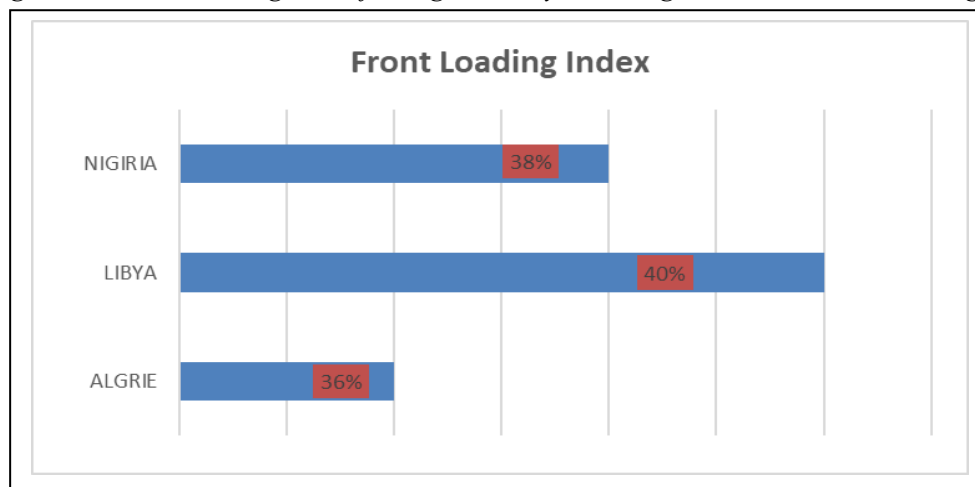


Source: Authors calculations

4.3 Front-Loading Index (FLI)

The FLI reflects the early-stage financial pressure on investors (see Figure 3). Algeria exhibits a relatively low pressure of 36% compared to Libya at 40% and Nigeria at 38%. A lower FLI indicates reduced early financial risk, enhancing the overall attractiveness of the regime (Johnston, Johnston, & Roger, 2008).

Figure 3 : Front Loading Index for Algeria, Libya and Nigeria Petroleum Fiscal Regimes

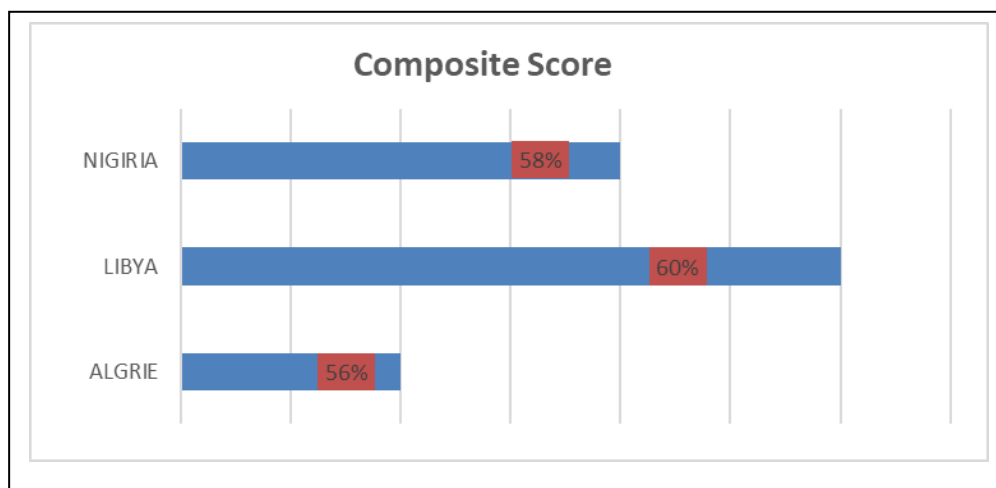


Source: Authors calculations

4.4 Composite Score (CS)

The CS combines GT and FLI with weighted contributions according to decision-makers' preferences, where FLI carries a larger weight (58%) and GT a smaller one (42%), reflecting the overall attractiveness of the system (see Figure 4). Algeria tops the ranking, with a CS of 56%, followed by Nigeria at 58%, and Libya at 60%. This ranking indicates that the Algerian system is the most attractive to international investors, balancing returns with early stage

Figure 6.5 Composite Score for Algeria, Libya and Nigeria Petroleum Fiscal Regimes



Source: Authors calculations

4.5 Overall Comparative Analysis of Fiscal Regimes

Drawing on these four indicators, the comparative ranking of petroleum fiscal regimes places Algeria at the top, followed by Nigeria, and finally Libya. Algeria has emerged as the most balanced and attractive framework, successfully combining substantial government revenues with the efficient management of early cash flows. Nigeria occupies a middle position, offering relatively high returns but exposing investors to certain risks during the initial stages of project development. Libya ranks lowest, as its higher GTi and FLI values created considerable financial pressure in the early phases, thereby reducing its investment appeal.

Overall, the analysis highlights that investment attractiveness is determined not solely by the total government share, but more importantly, by the equilibrium between GT, GTi, and FLI. Algeria exemplifies this balance by providing a system that ensures robust returns while mitigating early stage risks. These results reinforce earlier findings in the literature, which underline the necessity of employing multiple indicators when assessing petroleum fiscal regimes (Thiri Swe & Emodi, 2010; Luo & Yan, 2010).

5. Conclusion

This study conducts a comparative evaluation of upstream petroleum fiscal regimes in Algeria, Libya, and Nigeria, employing four key indicators: Government Take (GT), Discounted Government Take (GTi), the Front-Loading Index (FLI), and the Composite Score (CS). The findings reveal that Algeria presents one of the most favorable investment environments, recording a Composite Score of 56%, compared to 58% for Nigeria and 60% for Libya. Algeria's relative competitiveness stems from its ability to balance substantial government revenues with lower financial risks during the early stages of investment

Algeria's low Front-Loading Index (36%) demonstrates minimal upfront financial pressure on investors, while its non-discounted GT of 83% ensures significant state revenue. These findings highlight that investment attractiveness depends not only on total government revenue but also on the equilibrium between revenue levels and the timing of cash flows.

The results validate the effectiveness of Hydrocarbons Law No. 19-13 in enhancing Algeria's fiscal competitiveness and appeal to foreign investment. For Libya and Nigeria, this study suggests that reducing early stage fiscal pressures could improve investment attractiveness.

This study also provides a replicable framework for evaluating petroleum fiscal regimes in North Africa and underscores the importance of considering broader comparative analyses. Future studies should incorporate non-fiscal factors, such as political stability and regulatory efficiency, to provide a more holistic assessment of investment conditions. Overall, these findings offer valuable guidance for policymakers seeking to optimize petroleum fiscal terms and for international oil companies making strategic investment decisions in the evolving North African energy sector.

References

1. Laporte, B., & Diouf, A. (2017). OIL CONTRACTS AND GOVERNMENT TAKE: ISSUES FOR SENEGAL AND DEVELOPING COUNTRIES. *The Journal of Energy and Development* , 43 (1/2), 213-234.
2. Nakhle, C. (2004). Petroleum Taxation: A Critical Evaluation with Special Application to the UK Continental Shelf. University of Surrey, Guildford, UK.
3. Salahudin Mohamed, I., Mohamed Khattab , H., Kamel El-Sayed, S., El-Noby, M.-k., & Mohamed El-Rammah, S. (2024). A new progressive and efficient production sharing Contract for upstream. *Geoenergy Science and Engineering* , 235, 1-16.
4. Asanga, R. S., Adaobi Stephenie, N.-A., & Okoroma, J. (2021). Comparative Analysis of Petroleum Fiscal System in Africa (A Case Study of Nigeria, Angola, Algeria, and Libya). *RIK International Journal of Science and Technological Research* , 7 (1), 160-189.
5. Bindemann, K. (1999). *Production-Sharing Agreements: An Economic Analysis*. Oxford Institute for Energy Studies.
6. Blake, A., & Roberts, M. (2006). Comparing petroleum fiscal regimes under oil price uncertainty. *Resources Policy* , 31 (02), 95-105.
7. Daniel, P. h., Goldsworthy, B., & Watson, A. l. (2010). Evaluating fiscal regimes for resource projects: an example from oil development. In P. Daniel, M. Keen, & C. McPherson, *The Taxation of Petroleum and Minerals: Principles, problems and practice* (pp. 187-240). London: Routledge.
8. Gallardo, R. P., Castro, A. O., & Carlos , R.-A. (2019). Modeling the Influence of Attractive Petroleum Fiscal Regime Dimensions on Marginal Fields' Investment Climate in Malaysia. *International Journal of Energy Economics and Polic* , 9 (4), 81-90.
9. IMF. (2023). *IMF Country Report No. 23/69: Algeria Selected Issues*. Washington, D.C.: International Monetary Fund.
10. Johnston, D. (1994). *International Petroleum Fiscal Systems And Production Sharing*. Tulsa, Okla: PennWell Books.
11. Johnston, D., Johnston, D., & Roger, T. (2008). *International Petroleum Taxation for the international independent petroleum association*. Washington, DC : Independent Petroleum Association of America.
12. Luo, D., & Yan, N. (2010). Assessment of fiscal terms of international petroleum contracts. *PETROLEUM EXPLORATION AND DEVELOPMENT* , 37 (6), 756-762.
13. Oil risk contracts, business conduct and performance patterns: Data panel analysis 2017 *Contaduría y Administración* 62051538-1552

14. Thiri Swe, W., & Nnaemeka, V. (2018). Assessment of Upstream Petroleum Fiscal Regimes in Myanmar. *Journal of Risk and Financial Management* , 1-23.