Evaluating sustainable geological exploration: an environmental and economic efficiency assessment of joint investment projects

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Abstract. International cooperation and globalisation have become vital in the contemporary world, and most organisations seek opportunities to expand beyond their national boundaries through foreign operations. This essay aims to compare the tax regimes of the Russian Federation and the Republic of Uzbekistan for oil production companies to assess the feasibility of joint venture investments. The authors, in line with the objectives of this study, address several key tasks: analysing existing domestic and international practices in the division of natural rent between the state and oil companies; evaluating the efficacy of investment projects under different conditions; and exploring geological exploration investment projects for partnership opportunities in the Republic of Uzbekistan. The focus of the study is the regulatory framework governing investment projects for geological surveys in Uzbekistan.

1 Introduction

Russia currently has a relatively rigid system of natural rent distribution, which allows the state to receive a significant portion of revenues from the oil industry. However, the system of natural rent distribution continues to improve and recent changes are possible in the future.

The key principles of natural rent distribution in Russia:

- Natural resources, including oil, are under the ownership of the state.
- Companies in the oil industry receive the right to extract oil under license agreements with the state.
-The state receives a part of the natural rent through taxes and other obligatory payments.
- Oil companies receive part of the natural rent as profit.

Mechanisms of natural rent distribution in Russia:

- Taxation is the primary mechanism of natural rent distribution. Russia applies several types of taxes in the oil industry, including mineral extraction tax (MET), oil export duty and corporate profit tax.
- Royalty is a payment that oil industry companies pay to the state for the right to use subsurface resources. The royalty is calculated as a percentage of the value of oil produced.

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Production Sharing Agreements (PSAs) - a mechanism whereby the state and oil industry companies jointly develop a field and share the resulting production (oil) in pre-agreed proportions.

State participation in the capital of oil industry companies - the state may own shares in oil industry companies and receive part of the profits as dividends.

Experience of distribution of natural rent between the state and oil industry companies in different countries:

Norway:

- The state-controlled oil company, Statoil, channels substantial dividend payments into the national treasury.
- High taxes and royalties providing the state with over 90% of oil industry revenues.
- Establishment of a sovereign oil fund to invest future oil revenues.

Saudi Arabia:

- A fully state-owned oil company, Saudi Aramco, which generates enormous revenues for the government.
- Minimal use of taxes or royalties, as the government owns the entire industry.
- The revenues from oil are used to fund social programs and development initiatives.

US. Flexible tax policy for resource industries. The appropriation and utilization of the majority of natural resource rents are managed at the state, not the federal, level.

Egypt. There are production sharing agreements between the state oil company and foreign oil contractors.

Indonesia. The national oil and gas corporation partners with foreign entities through production sharing agreements.

Nigeria. Subsoil use relations are based on various forms of interaction.

The distribution of natural rent between the state and oil companies in foreign countries is also subject to changes depending on political, economic and market conditions. We note an increasing share of the state in oil and gas revenues. This is because of the government's aim of augmenting budget revenues and promoting equitable allocation of natural resources.

The systems of taxation for oil companies in both the Russian Federation and the Republic of Uzbekistan share features of similarity and differences. As observed, "the Russian tax model does not imply differentiation of profit tax rates" [1], a feature shared with the Republic of Uzbekistan tax regime. Both are tailored to generate income from natural resource extraction and stimulate industry operations. Table 1 provides a comparative analysis of the taxation systems of the Russian Federation and the Republic of Uzbekistan.

Table 1. Comparative analysis of the tax systems of the Russian Federation and the Republic of Uzbekistan*.

Taxes	Russian Federation	Republic of Uzbekistan
Structure of the tax system	Main taxes: VAT, Corporate Profit Tax, Personal Income Tax (PIT), Excises, Customs Duties.	Main taxes: VAT, Income Tax, Personal Income Tax, Property Tax, Turnover Tax (for small businesses).
Tax rates	VAT: 20% Corporate Profit Tax: 20% (increasing to 25% from 2025) Personal Income Tax (PIT): Progressive scale from 13% to 22% starting in 2025	VAT: 15% Corporate Profit Tax: 15% Personal Income Tax: 12% Turnover tax: up to 5%

Continuation of Table 1.

Taxes on production	Corporate Profit Tax: 20% (increasing to 25% from 2025) Personal Income Tax: progressive scale from 13% to 22% from 2025 Mineral extraction tax (MET) is levied on the value of extracted oil and gas. The tax rates depend on the type of resource and the region of extraction. Export duty is levied on oil and gas exports. Duty rates are adjusted depending on world prices for oil and gas.	A royalty is charged on the volume of oil and gas produced. Royalty rates vary depending on the field and type of hydrocarbon. Profit Tax is levied on revenues from oil and gas production. The tax rate is 20%.
Production and export taxes	Value-Added Tax (VAT) is levied on the production and sale of oil and gas products. The VAT rate is 20%. Excise tax is levied on the production and import of petroleum products such as gasoline and diesel fuel. The government sets excise rates annually.	VAT is levied on production and turnover of oil and gas products. The VAT rate is 15%. Customs duties are levied on import and export of oil and gas. The Ministry of Finance of Uzbekistan sets the duty rates.

[*]*Source: compiled by the authors based on [2], [3].*

As seen from Table 1, rates of taxation in the Republic of Uzbekistan are lower compared to the Russian Federation. One of the most cited negative determinants of investment behavior is the level of the tax burden. Researchers argue that high tax burdens are linked to low levels of investment activity [4].

The authors noted that "the Russian market lacks a unified approach to determining the royalty rate." Valuation methods are used for its calculation, and industry-specific rates are considered. However, standard rates are not formally established; they are included in statistical reference books and are determined by industry experts based on existing practices [5].

According to the Methodological Recommendations for assessing the value of intellectual property rights, "because royalty rates lack normative regulation and public accessibility, experts can consult foreign information sources and paid databases during valuation activities," [6]. The annual report of Rospatent for 2022 states, "In foreign policy changes, Rospatent is working on the creation of methodological recommendations and a domestic database of average industry royalty rates for determining license fees" [7].

In project management, a crucial element is the detailed analysis of financial factors, since tax rates significantly affect the success metrics of investment projects.

2 Methodology

Let's conduct a comparative assessment of the efficiency of investment projects in geological exploration works under the taxation conditions of the Republic of Uzbekistan and the Russian Federation.

The calculation period is divided into steps or segments, during which data used to assess financial indicators are calculated. The steps are sequentially numbered (1, 2, 3...n), and the time within the calculation period is measured in years. In drilling and exploration, the calculation period spans 20 years, which represents the average operational lifespan of a well. The well is placed into production during the first step.

"Performance evaluation is calculated by determining cash flows from operating and investing activities. The line 'inflows from operating activities' equals revenue, while the line

'outflows from operating activities' includes production costs, property tax, and profit tax. The outflow from investment activities includes well construction costs, such as drilling and development" [8].

The discount rate, established at 10%, serves as the prevailing economic standard for evaluating the efficacy of GEO investment ventures. Established methodologies are employed in the assessment of economic efficiency, emphasizing four key indicators:
- Net Present Value (NPV).
- Profitability Index (PI).
- Internal Rate of Return (IRR).
- Payback Period.

In the oil and gas industry of the Republic of Uzbekistan, taxation includes subsoil use tax and rent tax, which can be based on either the volume of extracted minerals or the value of extracted products, calculated as a percentage rate. Other taxes apply to oil and gas companies in Uzbekistan, such as profit tax and property tax (Table 2).

Table 2. Initial data for evaluating the efficiency of geological exploration investment projects under the taxation conditions of the Republic of Uzbekistan*.

Indicators	Unit of measurement	Values
Discount rate	%	10
Rent tax		25
Subsoil use tax		10
Variable costs	$ per ton	4, 7
Price per ton of oil		438
Property tax	%	1,50%
Profit tax		12%
Capital investments		
Wells	t/$	2068
Equipment		2238
Oil production decline rate	fractions of units	0,99
Average daily flow rate of wells	tons per day	20

**Source: compiled by the authors.*

To begin with, we calculated the yearly volume of additional oil expected to be produced from implementing geological exploration investment projects. Projections show a cumulative oil extraction of 132,927.9 thousand tons over the next two decades. Based on this, we determined the average annual oil production volume, which represents the average amount of oil extracted per year: 132927.9/20 = 6646.4 thousand tons.

Figure 1 illustrates the dynamics of oil production volume. In the first year, the volume of oil production amounted to 7,300 thousand tons, while in the last year it decreased to 6,031 thousand tons. This represents a decline of 1,269 thousand tons compared to the first year.

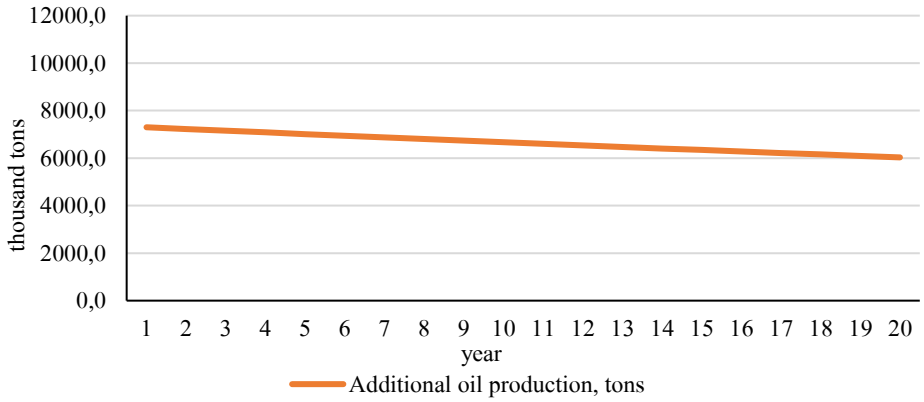

Fig. 1. The dynamics of oil production under the geological exploration investment project implemented in the Republic of Uzbekistan over 20 years, thousand tons*.
**Source: compiled by the authors.*

Figure 1 illustrates that oil production decreases each year because of field depletion. As fields are depleted, oil extraction decreases reserves.

The yearly reduction in oil production has a direct impact on revenue, as illustrated in Figure 2. Revenue decreases in parallel with oil production, with a total reduction of $555 million.

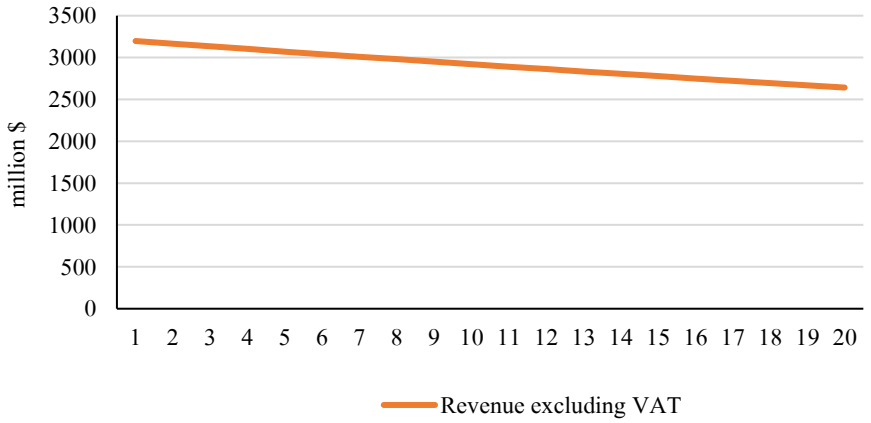

Fig. 2. The dynamics of revenue under the geological exploration investment project implemented in the Republic of Uzbekistan over 20 years, million $*.
**Source: compiled by the authors.*

The Net Present Value (NPV) represents the net profit expected from the project after deducting all costs. Figure 3 demonstrates that this indicator exhibits positive values following the first year, indicating swift project recovery and a strong return on investment. The results of the calculations show that the project's payback period will be 3.4 years.

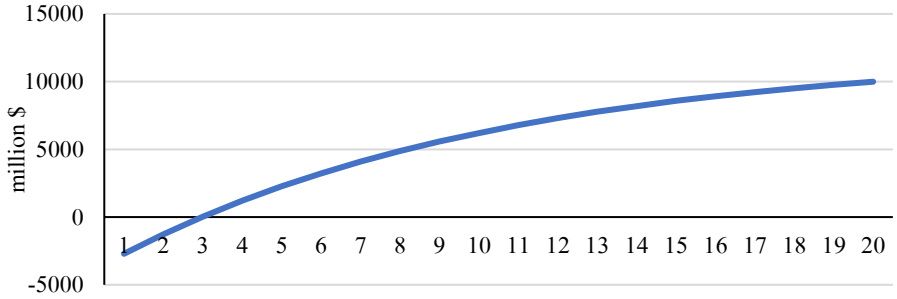

Fig. 3. Dynamics of NPV on the investment project of geological exploration realized in the Republic of Uzbekistan for 20 years, million $*.
**Source: compiled by the authors.*

The Profitability Index for the exploration project in view was found to be 3.19 monetary units; meaning, for every unit of investment, 3.19 units of inflows are expected. This key indicator shows that the project has great profit potential and hence will be an excellent investment opportunity. We can conclude that despite the decline in oil production, and with it the revenue, NPV gives a positive effect, which shows the rapid receipt of income. Under Uzbekistan's taxation conditions, the project proves effective.

Let's consider how taxation in the Russian Federation will affect the investment project of geological exploration. Tax payments that can significantly affect the financial results of the project (profit tax, mineral extraction tax and others) are added to the key indicators. All calculations are carried out similarly. MET is Russia's primary oil and gas tax. This tax depends on many factors such as the current oil price, production level, coefficients related to the characteristics of the field. For this project, MET is $337 per ton, income tax - tax rate of 20%, property tax - 2.2% (Table 3).

Table 3. Initial data for evaluating the efficiency of geological exploration investment projects under the taxation conditions of the Russian Federation*.

Indicators	Unit of measurement	Values
Discount rate	%	10
Variable costs	$ per ton	4,7
MET		337
Price per ton of oil		438
Property tax	%	2,20%
Profit tax		20%
Capital investments		
Wells	t/$	6856
Equipment		4531
Oil production decline rate	fractions of units	0,969
Average daily flow rate of wells	tons per day	7,3

**Source: compiled by the authors.*

Let's consider how these taxes affected the efficiency indicators of the exploration project. Note that such indicators as oil production and revenue remain unchanged, as they depend on the same factors and changes in tax rates do not affect their value.

Tax rates for profit tax and property tax in the Republic of Uzbekistan are lower than in the Russian Federation (Table 4).

Table 4. Tax Rates in Russia (RF) and the Republic of Uzbekistan (RU)*.

Type of Tax	Tax Rate in the Russian Federation	Tax Rate in the Republic of Uzbekistan
Profit Tax	20,0%	12,0%
Property Tax	2,2%	1,5%

**Source: compiled by the authors.*

Table 5 presents the tax rates applied to oil extraction: in the Russian Federation – Mineral Extraction Tax (MET), and in the Republic of Uzbekistan – Subsoil Use Tax and Rent Tax.

Table 5. Comparison of tax rates for Mineral Extraction Tax (MET), Subsoil Use Tax, and Rent Tax*.

Type of tax	Unit.	Tax rate
Mineral Extraction Tax (RF)	$ per ton	337
Subsoil Use Tax (RU)	%	10
Rent tax (RU)	%	25

**Source: compiled by the authors.*

The MET is calculated as a percentage of the total value of the extracted products and depends on the profitability level of the project.

The tax base for the subsoil use tax is the value of the volume of extracted minerals.

The taxable object for the rent tax is the rent income generated from the sale of extracted oil. We define rent income as the difference between revenue from the sale of extracted raw materials and the costs of extracting them.

Let us compare the amounts of profit tax for the geological exploration investment project in the Russian Federation and the Republic of Uzbekistan (Figure 4).

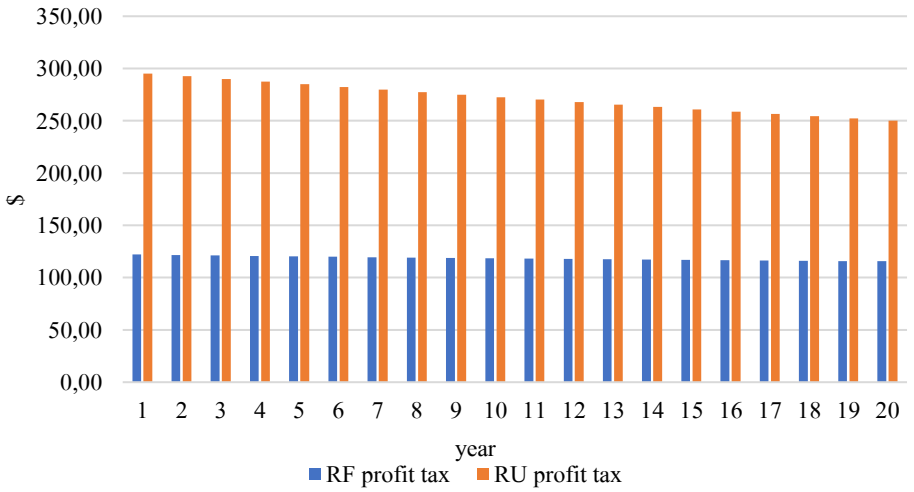

Fig. 4. Analysis of the dynamics of profit tax amount for the geological exploration investment project with implementation in the Russian Federation and the Republic of Uzbekistan, $*.
**Source: compiled by the authors.*

The figure shows that the company pays less income tax at a higher rate, which can have a positive impact. When using a low rate, there is a significant saving of funds. The change in the cost of production for the 1st year of the project realization in the Russian Federation

is 2494 million $, and in the Republic of Uzbekistan - 674 million $. A more attractive rate for the enterprise will be 12%.

Let us also consider the property tax, its rate in the project with Uzbekistan is 1.5%, and in the project in the Russian Federation - 2.2%. The dynamics is presented in Figure 5.

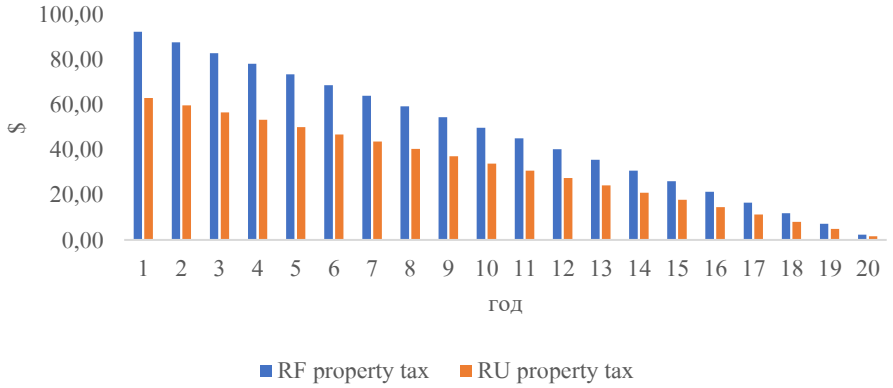

Fig. 5. Analysis of the dynamics of the amount of property tax on the investment project of geological exploration with implementation in the Russian Federation and in the Republic of Uzbekistan, $*.
**Source: compiled by the authors.*

Figure 6 shows the formation of tax amounts when implementing an investment project of geological exploration.

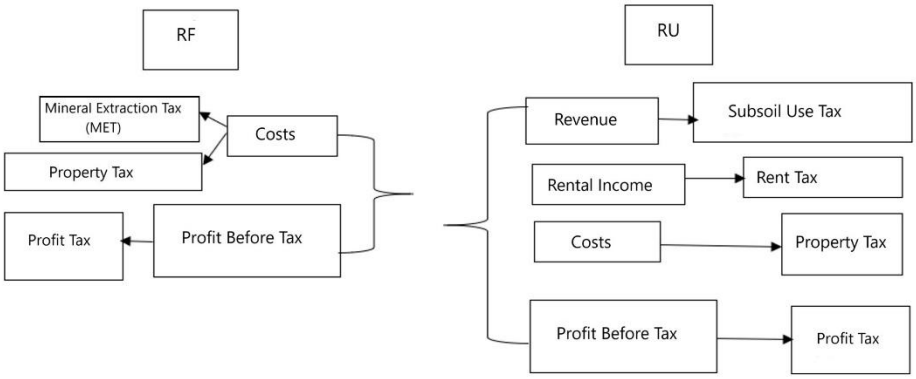

Fig. 6. Formation of tax amounts for implementing the geological exploration investment project in the Russian Federation and the Republic of Uzbekistan*.
**Source: compiled by the authors.*

The net profit over 20 years from implementing the geological exploration investment project in Russia amounts to $9,482.8 million, which is $17,076 million less than in the Uzbekistan project (Table 6). The company's profit depends on oil prices, production volumes, operating costs, and tax rates. Lower tax rates in the Republic of Uzbekistan likely positively influence the net profit value.

Table 6. The influence of taxation on the net profit generated by the geological exploration investment project*.

Russian Federation				Republic of Uzbekistan			
Indicator	**Type of tax**	**Rate**	**∑, million $**	**Indicator**	**Type of tax**	**Rate**	**∑, million $**
Costs	Mineral Extraction Tax	337 $	44797	Revenue	Subsoil Use Tax	10%	13293
	Property Tax	2,2%	947	Costs	Property tax	1,5%	645
				Rental income	Rent tax	25%	13479
Profit before tax	Profit tax	20%	2370	Profit Before Tax	Profit tax	12%	3621
Net profit			9482,8	Net profit			26558

*Source: compiled by the authors.

Figure 7 illustrates a yearly increase in the net present value (NPV), indicating the project's profitability after considering all expenditures and the time value of money. The geological exploration project is profitable for the company. However, the project will start generating income only after 8 years.

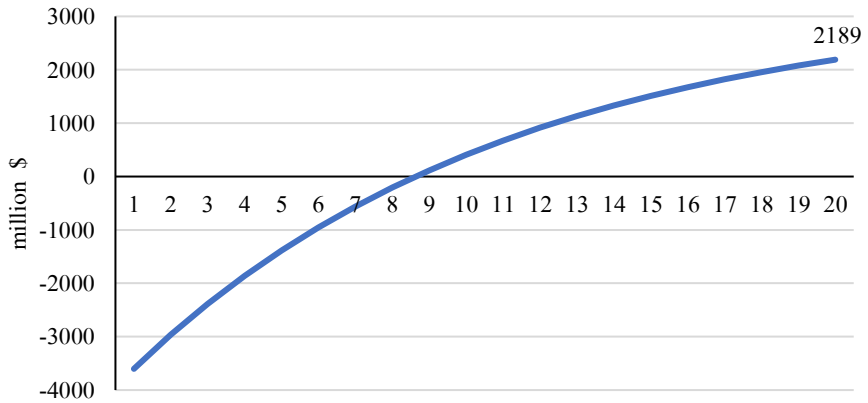

Fig. 7. Dynamics of Net Present Value at realization of the investment project of geological exploration in the Russian Federation for 20 years, million $*.
*Source: compiled by the authors.

The internal rate of return (IRR) allows for the assessment of investment efficiency and determines whether the project will be profitable at a level of return. The IRR is defined as a positive value E_v such that, at a discount rate $E = E_v$, the net discounted income of the project equals zero. For all higher values of E, the net discounted income is negative, and for all lower values of E, it is positive.

This project yielded a 7% internal rate of return (IRR) against a 10% discount rate, suggesting a prolonged period of negative net present value.

The Uzbekistan project exhibits more positive indicators than that of the Russian Federation (Table 7).

Table 7. Comparative analysis of key indicators of the investment project in the Russian Federation and the Republic of Uzbekistan.

Indicator	Unit	Value	
		RF	RU
NPV	million $	2189	10941
PI	monetary units	1,18	3,15
IRR	%	7,8	42
Payback period	years	9	3,2

**Source: compiled by the authors.*

Figure 8 shows that the NPV of the Republic of Uzbekistan is way higher compared to that in the Russian Federation, which definitely means the exploration project in Uzbekistan is very attractive for investors and outlines great returns in the near future.

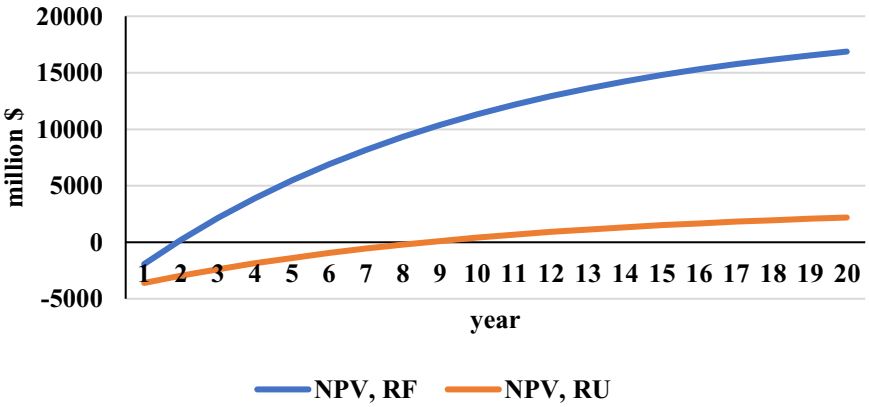

Fig. 8. Comparative dynamics of Net Present Value in two projects – in the Russian Federation and the Republic of Uzbekistan, million $*.
**Source: compiled by the authors.*

Having compared two projects with different tax systems, we can conclude that the project in Uzbekistan will be more attractive for the investor. Lower tax rates lead to higher net profit.

3 Results

"When assessing the effectiveness of investment projects, situations are considered where all consequences of any risky decision are known or can be foreseen, allowing for the calculation of potential outcomes from any changes in the situation" [9]. When evaluating the effectiveness of geological exploration investment projects, it is important to account for uncertainty, which arises from incomplete and inaccurate information. The presence of risk shows the potential for changes in the performance indicators of the investment project. For investment project participants, it is essential to identify and mitigate the likelihood of negative deviations in efficiency indicators, i.e., the potential deterioration of the project's economic metrics.

Project sustainability refers to its ability to remain effective under specific changes in implementation conditions, such as the realization of alternative scenarios. We consider a project absolutely sustainable if it remains effective under all implementation scenarios,

mitigating potential adverse effects through measures outlined in the project's organizational and economic mechanisms.

We can assess the sustainability of a project in relation to changes in implementation conditions both at individual steps of the calculation period and for the entire realization period. To achieve this, break-even and efficiency boundaries are determined for the project's key parameters and external factors (e.g., production volume, product prices).

A project is sustainable if its break-even point, calculated after the development of project capacities, remains below 0.7–0.8.

The results of the calculations show that with an average annual production of 6,646.40 thousand tons, the average break-even level will be 0.4 units (Table 8). This value implies that even with a reduction in production volume (all other factors remaining equal) to a level determined by multiplying the average production volume for the period by the break-even level coefficient, the enterprise would achieve zero profit. The production volume stability margin is calculated as 1 – 0,4 = 0,6 = 60,0%.

Calculations for the geological exploration investment project in the Republic of Uzbekistan show that with an average annual production of 6,646.4 thousand tons, the projects would ensure zero profit. The average break-even level is 0.10 units, and the production volume stability margin is 1 – 0,10= 0,9 = 90%.

Table 8. Break-even levels for the investment project of geological exploration in the Russian Federation and the Republic of Uzbekistan*.

Step number	Annual production under geological exploration projects, tons	Russian Federation		Republic of Uzbekistan	
		Break-even level	Break-even production volume, tons	Break-even level	Break-even production volume, tons
1	7300,00	0,44	3195,16	0,11	805,04
2	7227,00	0,44	3145,96	0,11	795,70
3	7154,73	0,43	3096,77	0,11	786,35
4	7083,18	0,43	3047,58	0,11	777,01
5	7012,35	0,43	2998,39	0,11	767,67
6	6942,23	0,42	2949,20	0,11	758,33
7	6872,81	0,42	2900,01	0,11	748,98
8	6804,08	0,42	2850,82	0,11	739,64
9	6736,04	0,42	2801,63	0,11	730,30
10	6668,68	0,41	2752,44	0,11	720,95
11	6601,99	0,41	2703,25	0,11	711,61
12	6535,97	0,41	2654,06	0,11	702,27
13	6470,61	0,40	2604,87	0,11	692,93
14	6405,90	0,40	2555,68	0,11	683,58
15	6341,84	0,40	2506,49	0,11	674,24
16	6278,43	0,39	2457,30	0,11	664,90
17	6215,64	0,39	2408,11	0,11	655,55
18	6153,49	0,38	2358,91	0,11	646,21
19	6091,95	0,38	2309,72	0,10	636,87
20	6031,03	0,37	2260,53	0,10	627,53
Average value	6646,40	0,41	2727,84	0,10	716,28

**Source: compiled by the authors.*

We can conclude that the sustainability of the considered projects is not questionable (the break-even level is much less than 0.7). Investment projects in the Republic of Uzbekistan have an indicator of break-even level and marginal price level higher than investment projects

in the Russian Federation. This is explained by better economic indicators of the investment project of its realization in the Republic of Uzbekistan.

4 Discussion of results

This analysis will appraise the economic efficiency related to the realization of an investment project based on geological exploration activity undertaken by an oil and gas company of the Russian Federation together with an oil and gas company of the Republic of Uzbekistan.

One form of financing capital-intensive development of oil and gas fields is a production sharing agreement (PSA), which is a special type of joint venture agreement. "Usually, a production sharing agreement is a contract concluded between a foreign production company (contractor) and a state enterprise (state party) authorizing the contractor to conduct prospecting, exploration and exploitation within a certain area (contract area) under the terms of the agreement" [10]. Realization of an investment project of exploration jointly with another country has many advantages. It can lead to risk reduction as a joint project distributes risks between partners. The state can provide access to new territories or geological basins previously inaccessible to individual countries, and it also expands exploration opportunities and increases the probability of discovering new resources.

Three projected scenarios, P90, P50, and P10, have been modeled for implementing PJSC TATNEFT's exploration investment project in the Republic of Uzbekistan.

Calculations for the first scenario P90 - this scenario means that with a probability of 90% oil reserves can be confirmed, in the second scenario P50 - with a probability of 50%, in the third scenario P10 - 10%. Table 9 presents the input data for the scenarios.

Table 9. Input data for the calculation of scenarios for implementing investment projects of geological exploration*.

Indicators	Value
Exchange rate 1 USD, RUB	62,85
Crude oil price on the external market, $/barrel	60
Crude oil price on the external market, $/ton	438,0
Oil price for economic evaluation, $/ton	438,0
Cost-stop, %	75
Share of PJSC Tatneft in profitable production, %	75
Royalty for P90 and P50 scenarios, %	0
Royalty for the P10 scenario, %	10
Signing and production start bonuses, thousand $	0
Uplift, %	8
Preliminary R&D, thousand $	151
Legal and consulting services, thousand $	80
Reprocessing of historical seismic profiles, thousand $	48
Common Depth Point (CDP) 2D method, thousand $	3182
CDP 2D processing and interpretation, thousand $	124
Conducting geochemical and geophysical studies, thousand $	188
Exploration well drilling project, thousand $	32
Cost of an exploration well, thousand $	4788
Cost of a production well, thousand $	2068
Development of an exploration well, thousand $	2238
Development of a production well, thousand $	2270
Equipment for a production well, thousand $	24
Fixed costs, thousand $/DFS (Dynamic Flow System)	5,6
Payroll fund, thousand $/year	412
Administrative and general expenses, thousand $/year	398

Continuation of Table 9.

Variable costs for fluid lifting, $/ton of fluid	0,8
Variable costs for oil treatment, $/ton of oil	3,9
Variable costs for transportation by rail tank cars, $/ton of oil	16,3
Variable costs for transportation by road, $/ton of oil	10,7
Training expenses, thousand $/year	25
Abandonment fund, % of capital investments	10
Corporate income tax, %	12
Other taxes (land and water), $/bbl.	0,1
Payroll tax, %	12
Unified Social Tax (UST), %	12
Discount rate, %	10

**Source: compiled by the authors.*

At the initial stages, we consider it advisable to apply the "cost-stop" mechanism in Production Sharing Agreements (PSAs). This mechanism helps to limit the level of the investor's cost recovery and ensures a certain level of profitable oil production at the early stages of implementing the exploration investment project. In this project, the cost-stop is set at 75%, while the share of profitable production for PJSC Tatneft is also 75%.

To enhance the investment attractiveness of PSA projects, it is possible to establish zero royalty rates in the agreements. Therefore, royalty rates of 0% were considered in scenarios P90 and P50, while a rate of 10% was applied in scenario P10.

The costs for salaries, administrative and business activities, and research and development (R&D) were added to the minimum PGR program. The two-year PGR program was estimated at $8.6 million, with additional expenses ($1.78 million) and R&D costs ($0.47 million) bringing the total to $10.83 million.

Subsequently, it was reduced exploration costs to $10.1 million. Reductions included R&D expenses (by $0.3 million), drilling of exploration wells (by $0.3 million), and other expenses (by $0.16 million).

The Uzbek party adjusted oil transportation costs: transportation by truck to the railway station was reduced to $10.7/t (a decrease of $0.6/t because of a depreciation of the Uzbek exchange rate), while transportation by rail increased to $16.3/t (an increase of $5/t because of adjustments in the oil delivery distance to the refinery).

Table 10 summarizes the key technical and economic indicators.

Table 10. Key technical and economic indicators of the geological exploration project*.

Indicators	**P90**	**P50**	**P10**
Development period, years	20	15	14
Profitable period, years	-	10	13
Commissioning of exploration wells, wells	1	1	1
Commissioning of production wells, wells	0	1	2
Oil production, thousand tons	25,0	96,1	191,0
Revenue from sales, million $	10,9	42,1	83,6
Capital investments, million $	10,9	15,2	19,6
Operating costs, million $	20,3	17,5	19,3
NPV, million $	-14,5	0,8	17,5
NPV for the profitable period, million $	-	1,4	17,5
IRR for profitable period, %	-	13,6	42,7
Payback period, years	no payback	7,0	4,9

**Source: compiled by the authors.*

From the results of the efficiency calculation for the geological exploration investment project, we can conclude that the P90 scenario, compared to P50 and P10, is not effective. Oil production in P90 is 71.1 thousand tons and 166 thousand tons less than in P50 and P10, respectively. This discrepancy stems from the commissioning of a single exploratory well in the P90 scenario, in contrast to the commissioning of two and three wells in the P50 and P10 scenarios, respectively.

Capital expenditures are lower by $4.3 million and $8.7 million in P90 compared to P50 and P10, respectively. These costs include exploration, well drilling, well development, and well equipment, all of which depend on the number of wells commissioned.

Net Present Value (NPV) characterizes the efficiency of investments in the project and reflects the value of cash flows over the project's lifecycle. NPV is the sum of discounted inflows and outflows for a specific project. Figure 9 illustrates the NPV dynamics across the three scenarios. In P10, the NPV is 20% higher than in P90. This shows that, in P10, the inflows exceed the outflows of the project, demonstrating positive dynamics.

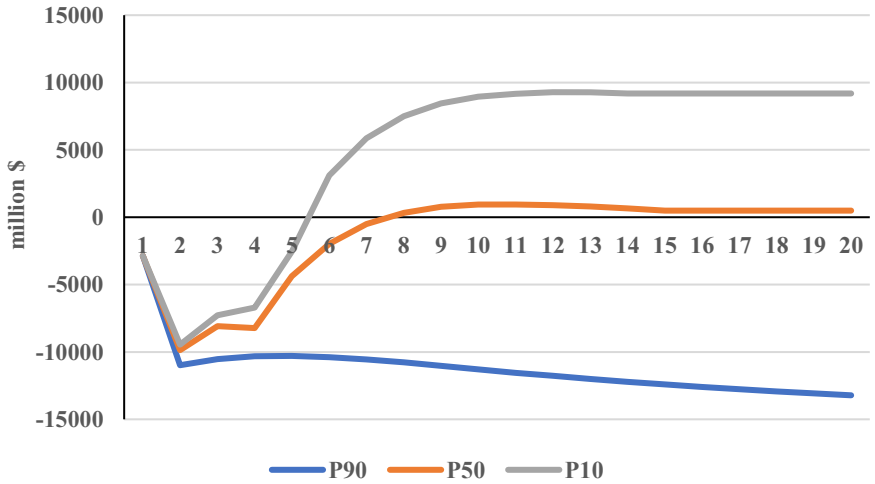

Fig. 9. Dynamics of NPV for three scenarios P90, P50, P10, million $*.
**Source: compiled by the authors.*

IRR is an indicator that helps evaluate the profitability of investments or a project. It shows the rate at which an investor will break even, considering the time value of money, if they invest in the project. Figure 10 shows the dynamics of IRR.

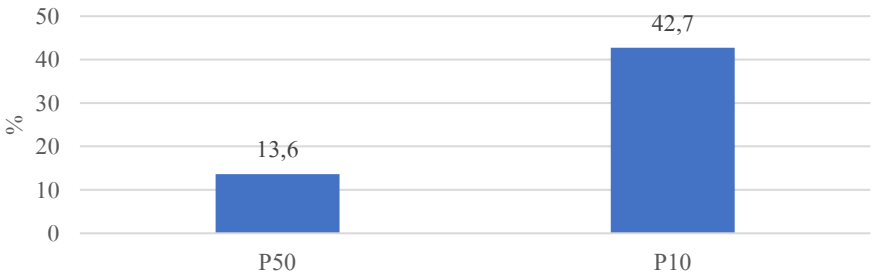

Fig. 10. Dynamics of IRR for two scenarios P50, P10, %*.
**Source: compiled by the authors.*

Table 10 shows that the P90 scenario is not profitable because of the absence of an IRR. However, Figure 10 illustrates the IRR dynamics for P50 and P10, from which we can conclude that the investment project in these scenarios shows a high rate of profit growth. This emphasizes the project's high profitability and strong prospects.

According to the data in Table 10, the P90 scenario does not achieve payback, while the payback period is 7 years for the P50 scenario and 4.9 years for the P10 scenario. P10's reduced payback period demonstrates its superior investment return.

The Profitability Index (PI) increases from 0.6 monetary units in the first scenario to 1.01 monetary units in the second scenario and 1.24 monetary units in the third scenario (Figure 11). This suggests that the second and third scenarios provide higher returns compared to the first scenario.

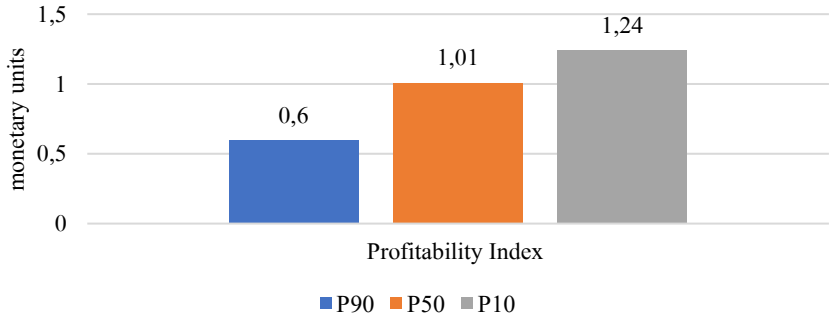

Fig. 11. Profitability Index of the investment project of geological exploration under three scenarios, monetary units*.
**Source: compiled by the authors.*

We can conclude that the P90 scenario shows negative dynamics for all key indicators.

4 Conclusion

The oil industry tax systems in the Russian Federation and the Republic of Uzbekistan have both similarities and differences. These tax systems target revenues from natural resource extraction and reward activity in this industry.

The share of natural resource rents between the state and oil companies in foreign countries often oscillates with political, economic, and market conditions. There has been an observable trend to increase the state's share in the revenues of oil and gas. The main reason for this is government efforts to increase budget revenues and ensure a fairer share of natural resources.

Foreign projects of PJSC Tatneft have become one of the obvious factors in developing the oil and gas industry of the Russian Federation and have opened new horizons for the company in the international market.

In Uzbekistan, oil and gas companies pay royalties. The value of the royalty can be set as a share of revenues or profits from production activities or as a fixed amount for a period.

The major tax in the oil and gas industry of the Russian Federation is the Mineral Extraction Tax. This tax is influenced by various factors, including the current oil price, production levels, and coefficients related to the field's characteristics.

By comparing two projects operating under these different tax systems, we conclude that the project in Uzbekistan is more attractive for investors. Reduced tax rates result in higher net profits. This conclusion is supported by an analysis of key indicators of investment project efficiency. For example, the net discounted income for the project in Uzbekistan exceeds that

of the Russian Federation by $14.683 billion. The profitability index of discounted costs in Uzbekistan is 3.14 monetary units, compared to 1.18 monetary units in the Russian Federation.

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