

Construction of evaluation index system of overseas investment project of Petroleum Technology Service Enterprises

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Abstract. In the development of oil field, the traditional economic evaluation index system and methods can't adapt to the uncertain environment of investment project evaluation currently prevalent, to establish a more comprehensive evaluation of the scientific method of petroleum development project has important theory value and practical significance. In view of the existing investment economic evaluation indexes of petroleum in China Problems and contradictions, this paper further supplement and improve some evaluation index; the use of project value theory, the operations research theory, established overseas investment projects of China Petroleum Technology Service Enterprises AHP comprehensive evaluation model based on the proposed scheme, optimization decision method, improve scientific decision-making in petroleum development project. The research work and the results will help to improve and perfect the evaluation means and evaluation methods in China petroleum development project, the Chinese petroleum enterprises can more accurately evaluate the oil development project value, improve the efficiency of oil investment decisions, promoting China's oil industry safety, high efficiency, rapid development.

Keywords: petroleum technology service enterprise; overseas investment; comprehensive evaluation.

1. Introduction

Since 2014, with the international crude oil prices continued to decline, major oil companies are in a gradual reduction of the investment, like petroleum technology Service Corporation Schlumberger has suspended a \$6500000000 investment in the project, all this shows that in the next time the major oil companies will have to consider how to further open up the profit source problems. According to the International Energy Agency forecast, the next 20 years, China oil consumption demand will continue to maintain rapid growth, the gap between supply and demand further expand. Large oil shortfall ultimately can only rely on overseas oil resources to fill. Therefore, foreign investment in oil is the effective way to solve the problem of supply and demand of petroleum in china.

In order to meet the needs of the investment decision-making, a lot of theoretical research and exploration and method of mature enterprises have economic evaluation of oil development investment project, and obtained a lot of achievements. In the developed industrial countries, economic evaluation is called the insurance certificate to the investor. Mature petroleum enterprises, to carry out the petroleum development business in a certain area, are to carry out economic evaluation and evaluation results to make a decision based on. After the evaluation of the oil development project success rate will be greatly improved.

International oil cooperation is gradually entering the mature stage, and in the international petroleum development, downstream on many aspects of cooperation. As a result of years of development, the foreign research institutions and large oil companies for petroleum cooperation contract some research on the economy, and set up a set of evaluation system for petroleum investment projects, but due to the private enterprise mainly set up the system of foreign countries is not fully applicable in China with the public ownership as the main body enterprise. In the financing

structure and the distribution of interests are different, but also there is a big difference between the accounting system. In China, due to the international petroleum cooperation project in China to carry out the study of late, there is little system in this field, but most of the existing research abroad for domestic petroleum investment, according to the research on the taxation system of overseas oil resources in the area of rare. Economic evaluation of overseas oil development project has caused economic management researchers' attention, many scholars evaluation related issues from a different side of investment project discussion and oil economy, method and program for economic evaluation of investment project of oil. However, due to the complexity of the input-output system influence and overseas oil development investment project, the present study also cannot meet the needs of scientific decision-making, the vast majority of overseas investment projects due to lack of operable method without doing a scientific economic evaluation in depth. Therefore, the economic evaluation of overseas oil development investment project is an urgent need to study thoroughly.

2. The factors affecting the economic value of overseas petroleum investment project

Oil and gas resources investment project has potential economic value, only in the appropriate technical and economic conditions will be discovered and developed its value can be achieved. Petroleum exploration and development is a complex process of input and output, resource exploration and exploitation technical and economic conditions are various factors influencing the economic nature of the process state.

2.1 Economic factors

From an economic point of view, the influence factors of the oil and gas resources investment project value, including exploration project investment and development project investment, operating cost, sales revenue, profits and taxes. Among them, the exploration project invested by the geophysical prospecting, drilling, well logging, mud logging, oil test investment, comprehensive research and engineering supporting structure; development project invested by the investment of the ground system engineering and drilling engineering structure; sales revenue is determined by the product yield, commodity rate and the price of oil and gas, the middle period, stable period and decline period and changes with the development of resources; tax is mainly composed of a value-added tax, business tax, city maintenance and construction tax, additional education, resource tax, income tax form. In the above factors, oil and gas prices are the most sensitive factors to affect economic investment project of oil and gas resources value.

2.2 Geological factors

Oil and gas resource is the long geological evolution results, and in accordance with the Geological Occurrence Regularity in geological bodies in a particular. Oil and gas geological condition is the material base of oil and gas resources investment project with economic value, is the most basic factors influencing factors of its economic value. According to the characteristics of technology and economy of exploration and development, influence of geological factors on oil and gas resources value can be divided into the effects of geological exploration and development of oil and gas resources value of geological factors. These factors mainly affect the undiscovered oil and gas resources of economic value, its effects include the amount of resources, the difficulty associated with the geological conditions of the resources exploration and investment risk, corresponding effective degree, and the expansion of the prospect of oil and gas exploration and development in the field of possibility. From the economic evaluation, the influence is a quantity of oil and gas resources for the development of the investment scale, two. In addition, the oil and gas reservoir lithology, clastic constituents and cementation type, oil gas water distribution of oil and gas reserves economic value influence.

2.3 Geographical factors

The petroleum industry is a resource extractive industry, which restricts its economic benefits by the geographical conditions. Oil and gas resource location, have a great impact on the project investment and production cost, economy and thus investment in oil and gas resources project also

has a direct influence. Influence of geographical factors of oil and gas resources value are mainly the following aspects: the natural and geographical conditions, climate conditions, geographical location, infrastructure conditions, social conditions, its influence is mainly for ground system engineering construction investment, the long pipeline investment, dealing cost, operating risk.

2.4 The resource factors

The main factors of the resource itself refer to the physical properties and chemical composition of the oil and gas resources. The former to the oil and gas exploitation degree of difficulty and the production efficiency of the corresponding influence; the latter have influence on the oil and gas quality and the corresponding sales price, both of which have an impact on the final recovery efficiency and oil recovery rate.

2.5 Technology progress

The petroleum industry is a technology intensive industry, the progress of science and technology can be showed to improve operation efficiency, reduce the production cost, increase oil production rate, improve the ultimate recovery, expand the reserve scale, invalidate reserves into economic recoverable reserves, extend the service life of oil and gas resources in the role of oil gas exploration development resources. No matter how all forms, increase investment to reduce or income in the economy.

Long term since, pay enough attention to the problem of technological progress to improve resource economic effect did not invest in resource projects in economic evaluation. Exploration and development of oil and gas resources is little more than a dozen years more than dozens of years of things, the technical level of static in the oil and gas resources assessment of the value of the point in time to estimate the development of oil and gas resources and economic effect is not reasonable, generally get the evaluation value will be lower than the actual situation.

3. The comprehensive evaluation index system for overseas petroleum investment project

3.1 Oil development investment project economic evaluation index of the current

The main reference for China's current economic evaluation of petroleum exploration and development is "economic evaluation methods and parameters of construction project" Petro China Co Ltd, the main evaluation index with the use of net present value, internal rate of return, investment recovery period and the benchmark discount rate. Due to similarities, in the construction aspects of petroleum exploration and development projects and the construction projects for many years, the index has played an important and positive role in the economic evaluation of oil investment in our country, and provides an important basis for investment decision-making. However, due to the oil exploration and development investment has its own particularity, and the use of some index choice also exist some problems in theory and practice, the influence of objective evaluation on the economic benefit of petroleum investment. And with the reform of the management system of petroleum industry of our country, the oil exploration and development of internationalization development, major changes have taken place in petroleum exploration and development environment, rely solely on past economic evaluation traditional methods to solve various problems in actual work, science and accuracy is difficult to achieve face different operating environment and conditions or different investment decisions project. The main problems existing in the actual operation of these indicators is currently:

Ignored the efficiency in the use of funds. The net present value index is an absolute index, reflecting the absolute contribution of investment projects, the index can only reflect the economic effect of investment project quantity index and cannot reflect the characteristics of quality, can't reflect the efficiency in the use of funds.

Ignores the time value of capital factors. International Oil Co was used to investigate the resources of profitability, mostly for the dynamic index, the investment recovery period is the use of financial evaluation in China is a static index. Its advantages are simple calculation, can reflect the project's economic effect and the size of the risk to a certain extent, but the drawback is that without

considering the time value of money, the project in the investment recovery period of investment in the amount of compensation although equal, but cannot objectively reflect its value.

The benchmark discount rate without considering the risk compensation problem. The benchmark discount rate is the investors want to get the minimum rate of return on investment, which is composed of a weighted average cost of capital and risk compensation composition. Because each enterprise risk desire is different, with its benchmark discount rate is also different; different types of projects, risk also exists bigger difference, economic evaluation benchmark discount rate should also be different; inflation, interest on loans will change with the change of economic situation, the cost of capital also along with it change, reflected in the benchmark discount rates are also different.

3.2 Improvement of economic evaluation index

There are two principles of "transformation of evaluation index system of economic methods and parameters", one is the revision and supplement to the defective index, the index system more scientific and rational; two is to increase the risk measure index, the index system can better reflect the project inputs output effect. Specific approach is reflected in the following aspects:

For "methods and parameters in the" net present value index cannot reflect the efficiency in the use of funds, insufficient cannot reflect the quality characteristics, the introduction of expected net present value index (ENPV). This indicator reflects the estimated profit at risk program; index is greater than 0 is feasible or not is the cut-off point.

The introduction of risk value index (RPVR), to make up for the lack of "financial evaluation methods and parameters in the" benchmark discount rate without considering the risk compensation problem.

Considering the time value of capital factors, the introduction of dynamic investment recovery period index (T1),

In addition, according to the needs of the comprehensive evaluation on the overseas investment projects, has introduced a variety of quantitative and qualitative index.

4. The establishment of comprehensive evaluation index system for overseas petroleum development projects

4.1 The qualitative indexes

In the qualitative evaluation stage, the main assessment project of the strategic position and the level of risk. The strategic position of evaluation mainly inspects the development strategy of the company, the two indicators of political stability; risk level evaluation mainly inspects the status and development prospects of economic and social partners, credibility, environmental impact, human resources and technology status indicator.

4.2 The quantitative index

The project profitability. Expected net present value (ENPV)

Expected net present value (ENPV) is a NPV probability weighted value of an item.

$$ENPV = P_s \times NPV - (1 - P_s) \times CF$$

(1)

In the formula:

P_s —the probability of success of the project;

NPV —The NPV of a project case will get success;

CF —The NPV of a project case will get success;

This indicator reflects the estimated profit at risk program, index is greater than 0 is feasible or not is the cut-off point.

The probability of success after tax expected NPV = project x [(net interest income * * wellhead price (reserve) an investment operation fee + + wellhead tax + income tax)] - project failure probability * [dry after tax cost + geological research and ground rent]

The expected net present value expression after tax, uncertainties exist in each of the parameters in addition to net interest income in the. These uncertain factors vary, including geology, engineering,

legal, political, and economic and luck, etc. The formula contains several important judgments are as follows,

Firstly, according to the provisions of the tax laws and regulations of the mineral resources permit, invest in the development of the mineral producers can only get a certain percentage of the revenue in the product into, this proportion is net interest income (NRI). The rest to the mineral owner, usually the owner of the land;

Secondly, the gain or loss expression is displayed in consideration of the investment, production decline, fluctuation of price, cost (including tax) net cash flows and inflation factors;

Thirdly, in order to consider the time effect of capital, net cash flow is expressed as the discounted cash flow, so the investment can be compared and the current investment.

Per barrel profit. A barrel of income equal to the ratio of the number of barrels of oil and. Because of the net total income is equal to the exploration and development cost, production cost, the government income and contract revenue and profit, so a barrel by a single bucket of exploration and development costs, single barrel production cost of government income, a barrel and single barrel under contract income form. Therefore, this indicator reflects the revenue, expense (exploration and development cost, production cost, income and income) relationship between governments, is an important index to measure single barrel profit ability, but also measure the risk of error operation period. A barrel of higher income scheme not only has high marginal revenue, and in the production and business operation period when risk occurs (such as the decline in oil prices) and more stable.

The efficiency of investment items. Risk discount rate (RPVR).

Present value rate risk ratio of expected net present value and risk of net cost net cost risk, which said in consideration of negative cash flow current value under risk.

$$RPVR = \frac{P_s \times NPV - (1 - P_s) \times Cf}{P_s \times I + (1 - P_s) \times Cf}$$

(2)

In the formula:

P_s —The probability of success of the project;

NPV —The NPV of a project case will get success;

Cf —The failure of the project cost under the condition of net loss;

I —The maximum negative cumulative discounted net cash flow;

This indicator reflects the consideration of risk investment in the unit case bring excessive profits.

2) Unit of economic cost (CPUE).

Unit of economic cost ratio of the number of oil or barrels of oil equivalent investment value and network rights, reflect the use level of the input of funds.

3) The purchase cost rate (VBR).

The cost of the acquisition rate for the expected net present value and discount purchase cost ratio, the purchase cost to obtain the amount at risk, a project may take include: signing on fee or get the cost; the seismic work and exploration costs; the small amount of appraisal well cost and block test fee. Generally for the exploration projects including the two, also known as the failure cost; on the development plan includes two items 1 and 3. This index contains the risk factors and provide a reasonable comparison, reflecting the unit purchase fees bring value, namely each take a unit in which a scheme to bring charges the maximum value.

4) The investment recovery period (T).

Static investment recovery period is defined by the T_0 type

$$C_0 = \sum_{t=1}^{T_0} Rt \quad (3)$$

Dynamic investment recovery period is defined by the type T_1 :

$$\left[\sum_{t=1}^{T_1} \frac{Rt}{(1+i)^t} \right] - C_0 = 0 \quad (4)$$

In the formula:

C_0 —The initial investment;

R_t —Net income in the year t ;

This indicator reflects the recovery speed of investment funds, also indirectly reflects the risk of the project size.

Study on the transformation of "financial index system method and parameter" in, the comprehensive evaluation index system are studied in this paper to establish overseas oil development investment project is divided into 2 major categories and 11 indices (for details, see Figure 1.). The establishment of the index system, an oil company cans analysis and evaluation of investment in petroleum development project from different angles, to meet the different development environment and the need of various evaluation perspective.

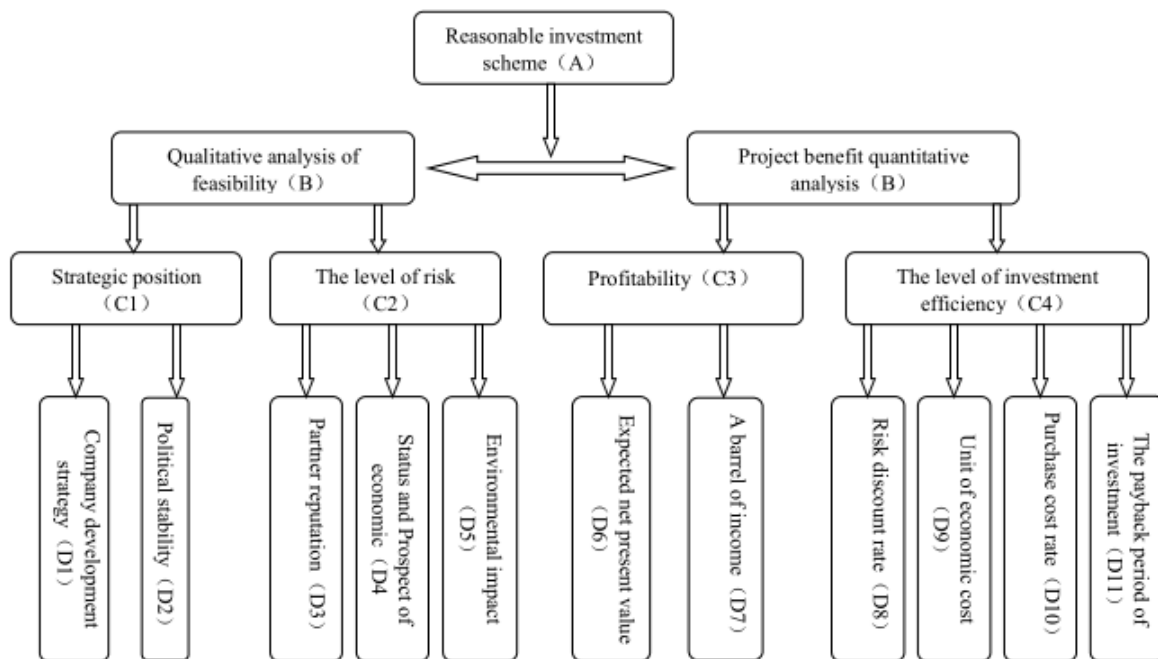


Figure 1 the comprehensive evaluation index system of Petroleum Investment Project

5. Conclusions

Petroleum investment is a hot topic of global attention. The deep theoretical research carried out relevant theoretical research of economic evaluation method of petroleum development project is the need for comprehensive use of economics and management two big subjects, but also need practice in petroleum enterprise management and implementation of the project evaluation as the foundation, therefore has considerable difficulty and challenge. The oil development project of different types, different types of projects have different characteristics, need specific analysis, the use of economic evaluation of different methods. Many factors affect the oil development project, except the factor of economic factors and technology, will be the impact of technology, production dynamic change characteristics and other technical factors and cost characteristics of dynamic changes in economic factors associated, objectively reflect the characteristics of the oil development project, establish and improve the technical and economic evaluation index system and evaluation method is a very important issue, which needs to be studied in the future more in-depth and meticulous.

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