

Discussion on Investment Risks in Overseas Oil and Gas Projects

Meili Zhang, Xingmeng Yuan*, Yelin Luo

School of Economics and management, Southwest Petroleum University, Chengdu, 610500, China

Abstract

Because of the scarcity of oil resources, many oil companies have made cooperation in the development of overseas oil and gas a strategic goal. Oil and gas investment abroad is a cross-border investment. However, domestic enterprises started late and lacked experience in the risk management of overseas oil and gas investment. External natural, political, economic, market, policy, and other factors make the risk of overseas oil and gas investment difficult to control. Internal technology, management, and other factors affect the risk of overseas oil and gas investment for enterprises. Therefore, it is of great significance to explore the venture capital of overseas oil and gas projects in depth. Taking oil and gas venture capital as the research object, the paper extracts the current risk characteristics of overseas oil and gas investment enterprises, conducts in-depth analysis of the risk factors of overseas oil and gas investment at this stage, studies the problems encountered by enterprises in the process of overseas oil and gas investment, and finally puts forward prevention and control measures to solve the risk problems.

Keywords

Development of Oil and Gas Resources; Venture Capital; Risk Factors.

1. Introduction

In recent years, the international economy has faced challenges, and the security situation has been prominent. The economic recovery was further delayed; overall economic growth did not meet expectations; and international investment risks intensified. China's petroleum industry will run smoothly in 2021. Oil and gas production tends to stabilize; crude oil production increased slightly; crude oil processing increased; crude oil imports decreased; and refined oil products declined for three consecutive years. With the continuous conflict between Russia and Ukraine, the political situation on the main overseas supply side of China Petroleum is unstable, and the price of oil is unstable, which seriously affects China's oil supply. Coupled with the current increasing demand for oil in China, in the face of increasingly sharp oil supply and demand under the international situation, China's oil enterprises need to actively explore overseas oil markets and strengthen in-depth exploration of investment management of overseas oil projects.

2. An Overview of Overseas Oil and Gas Investment Projects

Compared with domestic oil and gas investment projects, overseas oil and gas investment projects have the characteristics of high comprehensive risk, high uncertainty, high investment, high income, and a long investment recovery period. The risks faced mainly come from the external environment and the internal environment. External environmental risks are caused by the environment in which overseas oil and gas investment projects are located. External environmental risks include natural risks caused by the terrain and environment where the investment project is located; political risks caused by the partner countries or the international political landscape and surrounding geopolitical situations; changes in the

international economic situation, changes in the strength of the companies of both parties, and economic systems of the two countries, economic risks caused by differences in economic strength; market risks caused by changes in international and domestic market demand and market conditions; policy risks caused by changes in policies of both countries, etc. The risk factors of these external environments are often determined by the international and domestic environments and national entities, and individual enterprises are basically difficult to change. Therefore, external environmental factors are often uncontrollable for overseas oil and gas investment companies. They can only try to predict risks in advance, assess risks, avoid risks, and transfer some risks. In addition, overseas oil and gas investment enterprises are also facing risks from the internal environment, such as technical risks from technical operations or technical research and development of technical personnel; management risks caused by inadequate risk control of managers and inadequate personnel management, etc. These internal environmental impact factors are generated within the enterprise, and the enterprise can reduce or eliminate the impact of internal risks on project risks by establishing appropriate risk control methods .

3. Risk Factors that Affect Overseas Oil and Gas Investment Projects

3.1. Nature Factor

When Chinese enterprises invest in overseas oil and gas projects, natural factors are often difficult to control. Irregular changes in natural forces often lead to damage to the oil and gas investment activities of enterprises, and the investment losses caused by damage are often huge. Compare the producing oil and gas investment projects with less risk of natural factors and the exploration oil and gas investment projects that are greatly affected by nature. It reflects that producing projects are significantly de-risked relative to exploration projects. While their standard deviation is not absolutely zero, producing projects have significantly lower variability in their returns than exploration projects, and can be likened to risk-free assets [1]. This shows that natural factors have a huge impact on overseas oil and gas investment projects. At present, the oil and gas investment risks caused by natural factors mainly include: natural disaster risk, meteorological environmental risk, original resource storage risk, geological structure development risk, and environmental policy protection risk . Natural disasters such as lightning strikes and fires may cause oil depots to explode, triggering the risk of oil resource storage; earthquakes, etc., may lead to changes in the geological structure of the oil extracted, increasing the risk of oil exploitation, which will have a direct impact on overseas oil and gas project investment. In 2001, the O'Lyon Refinery in Norco, Louisiana, USA and the Chebinia Refinery in Poland in 2002 caused huge losses to oil companies due to fires caused by natural lightning strikes, which fully confirmed that the risk of natural factors was difficult to control.

3.2. Political and Economic Factors

Overseas oil and gas investment projects are large-scale transnational investment projects that generally have the characteristics of a long cycle and large capital demand. Therefore, a stable political situation in a country is crucial to the success of oil and gas investment projects, and political factors have become an important factor in the risk control of oil and gas investment projects. When domestic and surrounding geopolitical situations are turbulent or even wars break out, oil and gas resources are usually regarded as bargaining chips in political wars because of their important strategic value, which will damage the profits of multinational oil and gas investment companies. In the war between Russia and Ukraine, oil was used as an important bargaining chip in the Russian war, causing many domestic and overseas oil and gas projects cooperating with Russia to suffer losses. Today, the global geopolitical situation has undergone structural changes, the global game has intensified, and the environmental risks of

overseas oil and gas cooperation have intensified. In the future, the risk situation of key resource countries will develop in waves. This makes overseas oil and gas investment risks more difficult to control due to political influence.

Overseas oil and gas investments often have a huge amount of capital investment and the investment payback period is long, generating a large amount of cash outflow. Therefore, the strength of the economy is directly related to the risk of overseas oil and gas investment projects. A good economic environment, a strong economic foundation for both sides, a stable economic environment of the two countries, and a sound economic system provide support for overseas oil and gas investment projects and reduce investment risks. In the current post-epidemic era, the lack of economic recovery and the unstable changes in the economic environment have further increased the risk of overseas oil and gas investment and the difficulty of risk control.

3.3. Market and Policy Factors

Market factors are an important factor affecting the risk of overseas oil and gas investment. When there is a change between the actual supply and demand of the market and the forecast of the market supply and demand between the investment parties, or when the fierce competition in the market exceeds the actual expectations, or the market price undergoes periodic adjustment, it will directly affect the income of overseas oil and gas investment projects and bring direct risks to the project investment. The national markets on both sides of the investment, as well as the international market, influence overseas oil and gas investment. The international market forecast is often more difficult, and it is easy to deviate, making it difficult to control the market factors of overseas oil and gas investment projects.

Overseas oil and gas investment as a cross-border investment, a series of policies adopted by resource countries to attract foreign investment injection, adjustments and changes in the fiscal and taxation system, policies and measures on pollution control and environmental protection, and the completeness of the laws of the two countries on oil and gas on both sides of the investment, will have a direct impact on the cost of overseas oil and gas investment projects. For example, since 2015, there have been some fluctuations in the investment environment in Brazil due to the country's favorable resource prospects and investment incentive policies, the probability of high risks is gradually decreasing [2]. In order to attract more foreign investment in Central Asia, Central Asian governments have promulgated a series of laws and regulations on economic development and investor protection, as well as preferential policies. However, the policies and systems of different countries are different, and they are not fixed. Investment enterprises cannot control them independently. Therefore, policy factors are uncontrollable for overseas oil and gas investment companies.

3.4. Technical Factor

The impact of technical factors on the risk of overseas oil and gas investment projects is mainly manifested in the internal engineering technology, resource exploration technology, ground construction technology, development technology progress, production improvement measures, and human operations within the development enterprise. First of all, the success of engineering is the key to the success or failure of the entire project. The exploration of recoverable reserves serves as the foundation for determining whether to intervene in oilfield development and whether rolling exploration and development of oilfields is feasible. The maturity of ground construction technology and transportation technology directly determines whether oil and gas products can be transported in a timely manner and whether the expected production capacity can be achieved as scheduled to achieve the expected sales volume. The development of production capacity and production potential of overseas oil and gas investment projects, as well as the length of the industrial production cycle, are directly affected by whether development technology lags behind and whether production measures are in

place. Improper human operations are often a common cause of an oil and gas accident, and these internal technical factors ultimately affect the realization of the project's expected benefits. The 2010 Gulf of Mexico crude oil spill confirmed the impact of technical factors on project risks. enterprises' lack of technical capacity to prematurely extract deep-sea oil. Enterprises hurried to catch up with the construction period, but the technical ability could not keep up quickly. This means that the quality of the project in the Gulf of Mexico crude oil is not guaranteed, resulting in the spill.

3.5. Management Factor

In terms of management factors, management risk can be divided into the human resource risk, intercultural management risk, contract management risk, refinery operation and management risk, and coordination risk [3].

Inappropriate and imperfect internal management of personnel, systems, organizations, risks, etc., will cause the production efficiency of oil and gas investment projects to fall short of expectations, damage returns, and lead to project investment risks. Such as: improper allocation of human resources; problems with the organizational structure of the enterprise; improper management of contracts leads to non-performance of the contract by one party, and the enterprise cannot receive due compensation; improper coordination of local relations and religious issues leads to differences of opinion and poor communication between the two sides of the enterprise; local contractors disagree; HR management of overseas employees is not perfect. These risks brought by internal management to overseas oil and gas investment projects can be reduced or completely eliminated by implementing certain risk control methods within the enterprise.

4. Measures to Prevent Investment Risks in Overseas Oil and Gas Projects

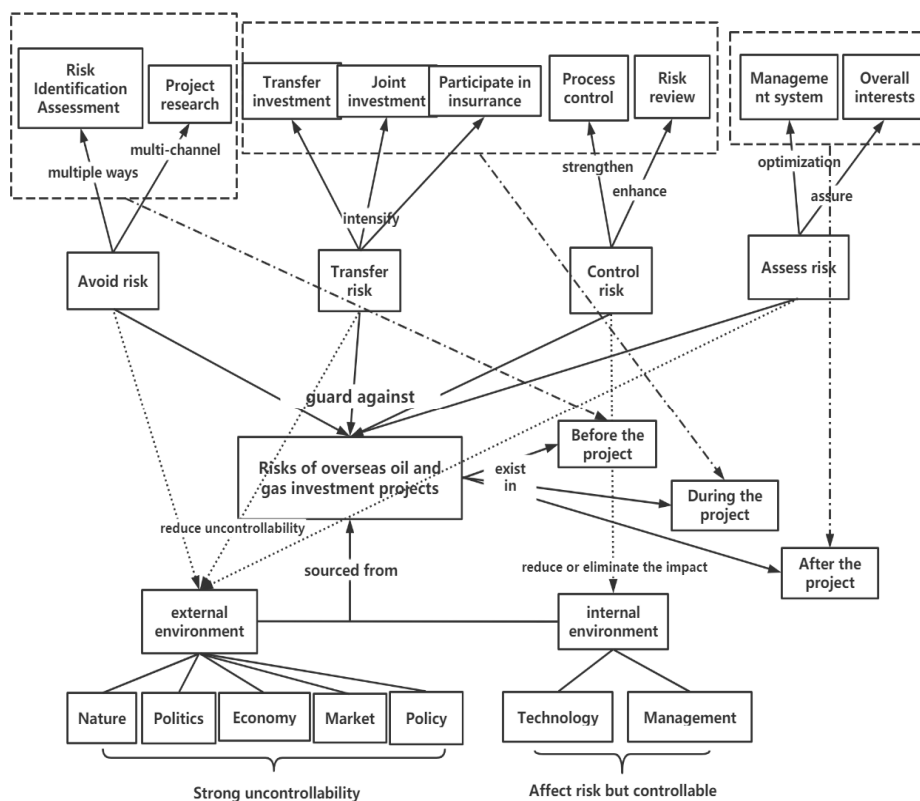


Figure 1. Implementation path of risk prevention measures for overseas oil and gas investment projects

4.1. Avoid Risk

Risk avoidance, as the most thorough means of risk control, is to take effective avoidance measures and means to eliminate certain risks in advance before the project is carried out, or choose to directly abandon the project investment according to the assessment of the project risk results. Risk management in a project is not limited to noting down all the pros and cons or putting a label 'negative risk' on each disturbing and causing thrill of positive emotions event. Management is a complex, long-lasting and far-reaching process that begins long before the investment and sometimes lasts even after its completion. To wisely manage risk does not mean to avoid it, but to identify it correctly and determine all associated opportunities and hazards [4].

Before the start of overseas oil and gas investment projects, first conduct research on the project and have a deep understanding of the cultural, religious, and other political conditions of the countries where the cooperative enterprises are located; Conduct on-site surveys of natural conditions such as topography and land forms of oil and gas development projects; Collect relevant information on the operation status and management status of cooperative enterprises; Establish a scientific approach to political risk assessment, conduct a more detailed risk assessment of the situation in the resource country, and conduct a political risk analysis for each project. At the same time, a variety of methods are used to assess the economic changes and policy trends of the partners' countries and to ensure a comprehensive investigation of various risk factors.

Managers should conduct a comprehensive and fully identified investigation and analysis of various risks that exist, are expected to exist, or are temporarily unknown before assessing the risk factors of each party. A variety of methods are used to make investment management decisions, such as the net present value method, the discounted flow method, etc., to evaluate the relevant expected returns. An evaluation index system was constructed by selecting indicators such as number of wells, well spacing, final recoverable reserves (EUR), decreasing yield rate, effective resources, and theoretical volume. Introduce Bayesian risk models to correct subjective factors in prior probabilities. Use the real option analysis method to construct a risk-based investment decision-making model. According to the research results of the risk factors affecting the overseas oil and gas investment of the project, the overall risk assessment of the project is carried out, and investment decisions are implemented. If the risk assessment result seriously does not meet the expectations of the investment company, the investment project will be abandoned directly, and the loss will be stopped in time to completely eliminate the project risk.

4.2. Transfer Risk

Risk transfer means that the risk-bearing subject voluntarily transfers risks and losses to other subjects through some technical and economic means before the project starts. Overseas oil and gas investment companies can partially transfer oil and gas investment risks before the project starts by means of transfer investment, joint investment, and participation in insurance. Transfer investment. When the oil and gas investment company find that the probability of success of the project is low according to risk assessment and risk decision-making models before or during the project, the company withdraws in time and transfers the risks and losses arising from the subsequent continuation of the project to other entities in a timely manner.

Joint investments and risk portfolios. When facing overseas oil and gas investment projects, overseas oil and gas investment companies can form diversified venture capital entities by joining forces with some strong and powerful companies, thereby reducing overseas investment risks, solving the shortage of risk capital, and diversifying investment risks. By increasing the number of risk-bearing entities, more enterprises can share risks, reduce the risks taken by individual investment firms, and increase overall risk-bearing capacity.

Purchase insurance. Take part in science and technology insurance or project insurance. Overseas oil and gas investment companies pay a small determined cost to an insurance company, such as purchasing insurance related to the safety of construction personnel, to compensate for large losses produced by relevant uncertain risks.

4.3. Control Risk

As a transnational investment, overseas oil and gas investments face a complex and volatile external environment. As a project progresses, project risks may differ significantly from those assessed before the project begins due to changes in various risk factors. Therefore, in overseas oil and gas investment, on the one hand, in the face of risks identified before the project starts, risk managers should follow up closely in a timely manner to fully understand the actual development of risk factors. Assess and judge consistency between the development of the original risk management implementation strategy and the actual risk. Re-evaluate risk factors that deviate from the pre-project assessment at any time and propose corresponding risk management strategies. On the other hand, for the risk factors that were not identified before the start of investment or were unknown at the time, it is necessary to continuously identify and conduct systematic real-time monitoring, find countermeasures to reduce or improve risks, and adjust risk management methods. Establish a risk supervision and management mechanism in which risk monitoring and risk response control of overseas investment enterprises are constantly alternated, and strengthen risk management and control in the project process.

In addition, the technical personnel and management personnel within the enterprise should also carry out process control in a timely manner in the project. Through strengthening the professional and technical training of technicians to reduce unnecessary errors in the technical operation process of technicians through human resource management methods, enterprises strictly review the qualifications of engineering project management practitioners. Deepen the checks and balances of the management organization structure, internal financial management business checks and balances, external internal audit and internal financial checks and balances. Besides, investors should pay close attention to the policy tendency of host countries' resources and timely adjust the investment plan according to the investment strategy of their governments. In the meantime, the investment pattern of oil and gas should be updated and the cooperation with the low-risk host countries of resources should be enhanced in the form of acquisition, merger and diversified equity investment [5].

4.4. Assess Risk

When oil and gas investment projects are nearing their end, they face some risks that are difficult to avoid and transfer. It is necessary to adopt a realistic attitude and actively control risks to ensure the smooth completion of the entire investment. Under the premise of ensuring the fundamental or overall interests of investors, part of the risk is retained, and efforts are made to minimize risk losses.

After an overseas oil and gas investment company ends an oil and gas investment project, it conducts a post-project assessment according to the entire risk management process system of the project. According to the characteristics of the project's geology, oil (gas) reservoir, and exploration, combined with the actual situation of the project investor, taking into account the region, social and national interests are mainly based on project objectives, processes, benefits, and continuous evaluation. Based on the assessment results, the risk early warning system was optimized, a summary meeting was held, regular inspections were optimized, and the monitoring system for public opinion sensitivity was improved to improve the monitoring of political factors, regularly conduct risk management simulation training, strengthen risk situation awareness, and increase risk management special business training.

Acknowledgments

Foundation Item:2022 Provincial College Students' Innovation and Entrepreneurship Training Program Project "Research on risk investment decision-making of shale gas resource development projects".

References

- [1] Mutavdzic, M. and B. Maybee, An extension of portfolio theory in selecting projects to construct a preferred portfolio of petroleum assets. *Journal of Petroleum Science and Engineering*, 2015. 133: p. 518-528.
- [2] Duan, X., et al., Dynamic Risk Assessment of the Overseas Oil and Gas Investment Environment in the Big Data Era. *Frontiers in energy research*, 2021. 9.
- [3] Li, H., et al., Risk Assessment of China's Overseas Oil Refining Investment Using a Fuzzy-Grey Comprehensive Evaluation Method. *Sustainability (Basel, Switzerland)*, 2017. 9(5): p. 696.
- [4] Jerald Silao, Ralph Lery Guerrero, Carlito Pantalunan, Christine Renomeron, Salvador Loria, Jr.. Pandemic Risk Management in Construction Projects[J]. *International Journal of Recent Technology and Engineering (IJRTE)*, 2021, 10(2).
- [5] Tang, B., H. Zhou and H. Cao, Selection of overseas oil and gas projects under low oil price. *Journal of petroleum science & engineering*, 2017. 156: p. 160-166.