

OVERSEAS OIL INVESTMENT EVALUATION MODEL AND ITS APPLICATIONS ON OVERSEAS OIL INVESTMENT PROJECTS

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Overview

China has tremendous energy consumption and still with rapid growth rate. With constantly increase of energy external dependency, current NPV based energy investment evaluation or resource allocation methods can not take such uncertainties into account and manage the flexibility and strategy in energy investment. This dissertation based on modern financial theory, proposed a comprehensive energy investment evaluation method EIRP (Energy Investment evaluation with Real options and Portfolio theory). And based on EIRP method and LSM method, several energy investment evaluation models have been established to study overseas oil investment .

From the perspective of oil investment value, we establish an overseas resource countries' oil investment evaluation model based on EIRP method. With the application of real options theory we take different countries' investment factors such as tax, interest rate, oil development cost, production decline rate, and uncertainty factors like oil prices, exchange rate into a unified analytical framework. And the investment-environment factor is also been quantified and added to oil-resource valuation. In this model an option value index (OVI) has been defined for comparing different countries' oil-investment situation.

For specific overseas oil investment projects, according to EIRP framework, we establish an overseas oil investment evaluation model. With the consideration of the complexity and dynamics in overseas oil investment, the model incorporates real options and Monte Carlo method and the model is solved by Least Squares Monte-Carlo (LSM) method. With an investee country chosen as case study, the project values of three typical sized oil fields have been calculated. And the simulations of different oil resource tax system are also presented in discussions.

Methods

LSM(Least Squares Monte-Carlo) method

Results

First, we focus on overseas oil resources evaluation of investment projects, through the establishment of real option model, the real option method combined Monte-Carlo modeling with the LSM method.

Second, referred to the oil price, exchange rate, investment environment and investment cost and other uncertain factors in the modeling and analysis, we studied the overseas petroleum investment projects of different types of oil valuation problem.

Third, through the path of the large sample simulation of the international oil price, exchange rate, investment environment and investment cost of overseas project in the future may change and the correlation between these factors change

Fourth, Model has good adaptability, when the actual data filled into the model, a resource countries can analyze various factors of three types in overseas investment (large, medium and small sizes) on oil fields the influence of the valuation, and simulated the different oil resources tax's influence on the oil investment

Conclusions

According to the results of the investment value and risk evaluation of the overseas petroleum investment in three typical fields, we can get the conclusions that compared with large size oilfields, the investment risk and valuation of small and medium-sized oil fields of uncertainty factors make the sensitivity stronger. Especially when small oilfields investment value and risk affected by these factors, the changes are small, so the large fields should be preferred in overseas oil investment.

Additionally, resources countries will weigh the balance between the domestic oil and gas resources development and the control of oil and gas resources benefits . So companies should pay attention to the following aspects in negotiations with resources. One is that try best to low the portion of the resources countries taking to gain more investment benefits. Another is that trying to avoid the provision of the windfall tax, in order to reduce the small and medium-sized overseas oilfield investment risk.

References

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