

A STUDY ON IMPACTS OF MINERAL RIGHT REGIME ON CHINA'S SHALE GAS MARKET STRUCTURE BASED ON A MULTI-STAGE COMMON VALUE AUCTION MODEL

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Overview

China is faced up with challenges to foster a competitive shale gas drilling market in recent years. The type of market structure has a closely relationship with the mineral right regime, since mineral ownership decides reasonable returns for entrepreneurial gas firms from their early investments in technology innovations. This paper examines the mineral right regime in China and its impact on the market structure of shale gas development. It conducts a statistical review on the current market structure and progress of China's shale gas drilling, and builds up a multi-stage common value auction model with imperfect information to illustrate the optimal strategies of government agencies, oil and gas companies and small and median-sized new entrants. Both the modelling and the results gained from the two rounds of shale bidding have confirmed that a release of successful signal is the key to motivate others to participate and further form a competitive landscape. Given no positive signals and high-competence incumbents, hundreds of potential entrants can hardly participate in the game. This article also suggests ways to optimize China's mineral rights transaction mechanism to escalate the circulation of mineral right transfer, which eliminates the underlying risks and lowers the threshold for late comers.

Methods

Statistical analysis and a three-stage common value auction model

Results

First, the current shale gas development in the most geologically favorable areas are led by Sinopec and PetroChina, two of China's national oil companies. China's shale gas industry have been dominated by these two majors, controlling about 70% of China's total gas assets, both conventional and unconventional, and accounting for nearly all shale gas initiatives.

Second, the results of two rounds of shale gas bidding confirms that adverse selection occurs after bid opening in the absence of any successful precedent. To the contrary, the quick expansion of shale gas leasing in the United States supports the statement that a release of successful signal is the key to motivate others to participate and form a competitive landscape.

Third, the market structure is determined by the mining right system. The number of market players and the types of participants depend on the finding results in the previous auctions and the type and behavior of the incumbents:

- In the first scenario, discovery by winners in the previous stage will greatly stimulate the enthusiasm of the late entrants. High-competence incumbent determines high barriers to entry, easy to form a centralized market structure, while low-competence incumbent determines low barriers to entry, easy to form the relatively decentralized market structure with fierce competition and frequent replacement of the dominator;
- To the contrary, in the second scenario, it will make the late entrants more cautious and more conservative if no findings happens in the initial stage or competent bidders take no action, leading to a market structure with speculators for enclosure without exploration, low-ability bidders gradually withdrawing, and few high-competence enterprises continuing mining investment.

Conclusions

This paper conducts a statistical analysis on the current market structure of China's shale gas drilling and the results of two rounds of shale gas bidding for prospecting right. It develops a three-stage common value auction model to explain the results of past two rounds of mineral right auctions and the stagnancy of the yet-to-come third auction

projected by MLR. The model reveals that, in an auction, there are three important factors that determine the market structure: the positive signal of findings by previous winners, the types of incumbents, and the sufficiency of information to evaluate the underlying asset.

In order to improve incentives of participants and form a competitive market structure, the government needs several adjustments in its current management of mining right, including: 1) Reinforcing the incentive effect of these key demonstration plots. (2) Accelerating the transfer of mineral rights to promote the quality of bidding asset. (3) Disclosure of detailed information on bidding asset to reduce winner's curse. (4) Bundling cooperation agreement on prospecting between the government and the bid winners; (5) Firm implement of supervision while lowering barriers to entry.

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