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Research of preferential tax policies for backfill coal mining in China

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ABSTRACT

Backfill mining, which is important for the effective development of Chinese coal resources and the ecological construction of coal enterprises, is also the main point of the sustainable development of the coal industry in China for the future. In order to promote the method of backfill coal mining in China, this paper proposed preferential tax policies to adapt to the current market environment based on the analysis of the development strategy. According to analysis of economic benefits of coal enterprises using backfill mining, some recommendations were proposed in this paper.

KEYWORDS

Backfill mining; Preferential tax policy; SWOT analysis; Scenario analysis.

INTRODUCTION

Coal is China's basic energy, but mining coal resources with regular cave mining methods results in the waste of residual coal that is left behind. According to incomplete statistics, at present, China's residual coal under villages, railway lines, and rivers may be as high as 14 billion tons (Feng Guangming, et al., 2010). By 2010, there has been approximately 6.6-7.0 billion tons of leftover coal dumped into wells (Ma Zhanguo et al., 2011). The environmental impacts of regular cave mining include land subsidence, a decline of groundwater levels, soil erosion, and even weakening of ecological functions because of the damage to the original geological environment of the mining site and surrounding areas. Backfill mining is a method consisting of advancing the working face, gangue, flyash, construction wastes, and special materials filled into goaf. Backfill mining helps recover the coal remaining under villages, railway lines, rivers, and other places unreachable by regular mining methods (Wang Jiachen and Yang Shengli, 2010; Sun Xikui and Wang Wei, 2011), and improves the resource recovery rate by replacing the unused ground material. At the same time, backfill mining can prevent initial geological damage and ecological deterioration, and protect groundwater resources by effectively controlling the surface subsidence (Qian Minggao et al., 1996). Therefore, backfill mining is conducive to the coordination between the efficient development of coal resources and effective protection of the environment. It will be the inevitable choice for sustainable development of China's coal industry in the future.

According to the results of this investigation, the theoretical analysis (Zhang Zhennan et al., 2005; Miao Xiexing and Zhang Jixiong, 2007; Xu Jialin, et al., 2007; Sun Yuanchun and Shang Yanjun, 2009; Ding Yu, et al., 2011; Li Yang, 2011; Sun Qi, et al., 2013) and typical demonstration (Liu Jiangong, 2011; Feng Guorui, et al., 2011; Chen Shajie, et al., 2011; Wang Jiachen, et al., 2012) of backfill mining technology applied in Chinese coal mines has been completed. And now China possesses a series of innovative technologies with independent intellectual property rights (Zhou Huaqiang, et al., 2004; Xu Jialin, et al., 2006; Sun Xikui and Li Xuehua, 2008; Miao Xiexing, et al., 2010; Cui Zengdi and Sun Henghu, 2010; Liu Jiangong and Zhao Qingbiao, 2010; Feng Guangming, et al., 2010) that will be promoted in the appropriate regions, such as areas rich in coal under villages, railway lines, rivers, and leftover coal, and even environmentally fragile areas. In order to promote backfill mining in Chinese coal mines, this paper considered that a preferential tax policy was the prime strategy to adapt to the current coal market environment based on the analysis of the development strategies of backfill coal mining in China. In this paper, the economic benefits of coal enterprises using backfill mining were researched under four tax scenarios and some recommendations were made.

THE DEVELOPMENT STRATEGY ANALYSIS OF BACKFILL MINING APPLIED IN CHINESE COAL MINES

As a method of research on strategic planning, SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis originated in the 1950s, and has been widely applied in related research fields (Yuan Mu, et al., 2007). The results of strategic analysis of backfill mining in Chinese coal mines by SWOT analysis are shown in TABLE 1.

In TABLE 1, there are four developmental strategies used in Chinese backfill coal mining, including the S-O (strengths-opportunities) strategy, W-O (weaknesses-opportunities) strategy, S-T (strengths-threats) strategy and W-T (weaknesses-threats) strategy. TABLE 1 show that the advantages and disadvantages of backfill mining exist side by side, along with opportunities and challenges. However, backfill mining is better for the transition of the current coal production mode to a modern coal industry system in the future in China, due to its features like high recovery rates, high safety factors, significant ecological protection effects, and social benefits. Therefore, backfill mining technology will be widely applied in coal mines in appropriate regions in China. Then the S-O approach would be the advantageous strategy for the development of backfill coal mining. First of all, it is important to create a better environment for the S-O strategy implementation, through S-T strategy and W-O strategy implementation step-by-step. In the market environment, it is beneficial to encourage and support the promotion of backfill coal mining by adopting a series of encouraging policies by means of the adjustments of taxes.

ANALYSIS OF TAX POLICIES FOR BACKFILL COAL MINING IN CHINA

Review of tax policies for backfill coal mining in China

At present, there are no preferential tax policies for Chinese backfill coal mining. The coal enterprises using backfill mining methods pay taxes and fees including value added tax (VAT), corporate income tax, coal price adjustment fund, mineral resource compensation fees, land use fees, urban construction and maintenance fees, resource tax, additional education tax, sales tax, property tax, stamp tax, geological governance deposits, just as other coal enterprises have to pay.

Sensitivity analysis of taxes and fees of backfill coal mining in China

The impacts of different taxes and fee adjustments on coal enterprises are different. In this paper, the sensitivity index of a tax or fee is defined as the added value of a coal enterprise's net profits after the tax or fee, reduced by 10%. The sensitivity analysis results from each tax or fee are shown in TABLE 2 by calculating the sensitivity index. From TABLE 2, the more sensitive taxes or fees are corporate income tax, VAT, coal price adjustment fund, mineral resource compensation fees, land use fees, urban construction and maintenance fees, resources tax, and additional education fees.

TABLE 1 : The SWOT analysis of development of backfill mining in Chinese coal mines

Internal factors Strategies External factors	Strength – S S1- Efficient usage of coal resources S2- Significant ecological and social benefits S3- Mature technologies and advanced mechanical equipment	Weakness - W W1- Higher costs W2- Inadequate sources of raw materials W3- Lower filling efficiency
Opportunities – O	S - O	W - O
O1- The coal industry transformation to high efficiency and more safety, economic and clean O2-The relatively scarce coal resources and the implementation of national strategy of energy saving & emission reduction O3-Higher demands of environmental protection and social harmony in the coal industry	Actively promote transition	Through the innovation of science and technology, 1- Reduce costs 2- Develop alternative sources of raw material and research new filling materials 3- Improve filling efficiency
Threats –T	S - T	W - T
T1-The gaps of national policy to encourage T2-The competition of regular caving mining method	1- The introduction of encouraging policies 2- Enhance the market competitiveness of backfill mining	Development at slower speed

Considering the advantages of backfill coal mining and China's development strategy, in order to promote the application of backfill mining, the government should adjust five taxes and fees, including the value added tax, corporate income tax, coal price adjustment fund, and mineral resources compensation fees, and resources fees.

TABLE 2 : The sensitivity analysis results of taxes and fees of backfill coal mining

Unit: RMB/T

Tax category	Current Payment		Tax reduction		Net profit
	Tax rate	Amount	Proportional	Amount	
VAT	0.17	84.51	0.10	8.45	8.45
Sales tax	0.05	0.15	0.10	0.01	0.01
Urban construction and maintenance fees	0.05	4.23	0.10	0.42	0.42
Additional education fees	0.03	2.42	0.10	0.24	0.24
Resources tax	3.6 (y/t)	3.60	0.10	0.36	0.36
Corporate income tax	0.25	17.99	90% of income	17.3	17.3
Property tax	0.012	0.48	0.10	0.05	0.05
Land use tax	8(y/m^2·a)	4.38	0.10	0.44	0.44
Stamp tax	0.0003	0.22	0.10	0.02	0.02
Mineral Resources Compensation fees	0.009 *	6.23	0.10	0.62	0.62
Geological environment Governance deposited	0.3(y/m^2·a)	0.06	0.10	0.01	0.01
Coal price adjustment fund	10 (y/t)	10.00	0.10	1.00	1.00

Note: In the table, the tax rate and amounts in the current payment column are based on investigation results.

THE BUILDING OF PREFERENTIAL TAX POLICY SCENARIOS OF BACKFILL COAL MINING

The scenario building basis

According to the above analysis, five taxes and fees will be adjusted in this paper based on:

- Value added tax (VAT). The relative policies of value added tax relief and important significances of backfill mining in a comprehensive utilization of resources.
- Corporate income tax. The relative policies of corporate income tax relief and the important role of backfill mining in environmental protection and energy savings.

- Mineral resource compensation fees. The relative policies of mineral resource compensation fee exemption and the important role of backfill mining in the efficient utilization of resources.
- Resources tax. The relative policies of resources tax relief and the unavailability of coal under villages, railway lines, rivers, and leftover coal from regular cave mining methods.
- Price adjustment fund. There is no detailed charge standard on the coal price adjustment fund.

The scenario building

In light of the above analysis, this paper introduced four scenarios, including the Baseline scenario, the Half of VAT scenario, the Relief of VAT & Corporate Income Tax scenario, and the Relief of Five Taxes and Fees scenario. These scenarios are listed in TABLE 3.

TABLE 3 : The table of four preferential taxes policies scenarios

Scenario	Tax relief				
	VAT	Corporate income tax	Resources tax	Mineral resources compensation fee	Price adjustment fund
Baseline scenario	0	0	0	0	0
Half of VAT scenario	0.5	0	0	0	0
Relief of VAT & Corporate income tax scenario	0.5	Reducing 50% of backfill mining cost from taxable income	0	0	0
Relief of five taxes and fees scenarios	0.5	90% of income	1	1	1

SCENARIO ANALYSIS OF PREFERENTIAL TAX POLICIES FOR BACKFILL COAL MINING

Based on the investigation date, the coal enterprises economic benefits of coal product units in each scenario were calculated and are shown in Figure 1.

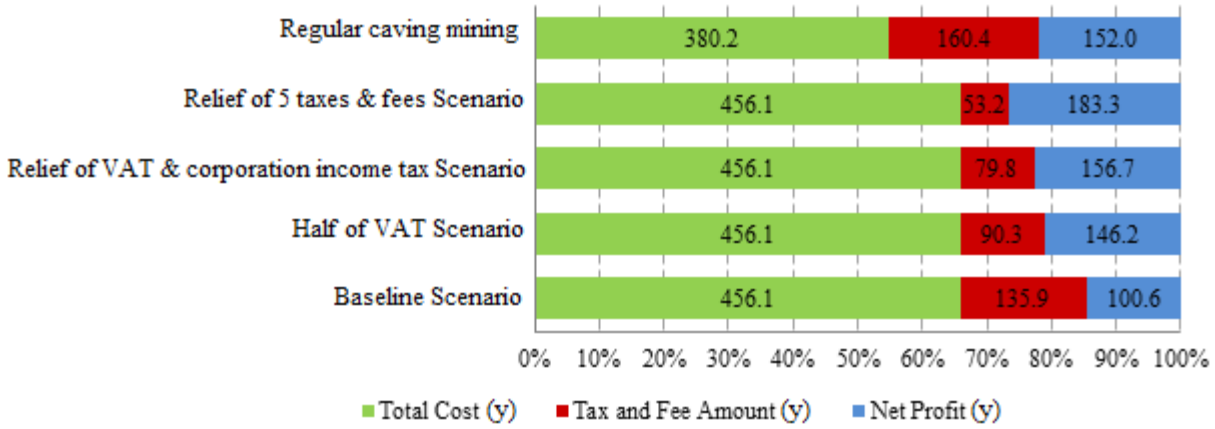

Figure 1 : The results of scenario analysis of preferential tax policies for backfill coal mining in China

From Figure 1, the following information can be gleaned:

- In the Baseline scenario, the net profits of a coal enterprise using backfill mining were 66.2% of a regular coal enterprise. It is harmful to the promotion of backfill mining to show that the profits are lower than regular mining.
- In the Half of VAT scenario, the net profits of a coal enterprise using backfill mining were 96.2% of a regular coal enterprise, which could enhance the market competitiveness of coal enterprises.
- In the Relief of VAT & Corporate Income Tax scenario, the net profits of a coal enterprise using backfill mining was 103.1% of a regular coal enterprise, which is helpful to the promotion of backfill mining in the old coal mines that have residual coal resources under villages, railway lines, and rivers.
- In the Relief of Five Taxes and Fees scenario, the net profits of a coal enterprise using backfill mining were 120% of a regular coal enterprise. Compared to the regular cave mining method, the backfill mining method has a stronger market competitiveness, which can promote the application of backfill mining in environmentally vulnerable regions of China.

The net profits of a coal enterprise using backfill mining were increased by different levels in the above four scenarios. Compared to the Half of VAT scenarios, in the Relief of VAT & Corporate Income Tax scenario and the Relief of Five Taxes and Fees scenario, the net profits of a coal enterprise using backfill mining was higher than a regular coal

enterprise using cave mining, which could improve the market competitiveness of a coal enterprise using backfill mining and could advance the promotion of backfill mining in environmentally sensitive areas and regions rich in residual coal resources. For this reason, the Relief of VAT & Corporate Income Tax scenario and Relief of Five Taxes and Fees scenario were effective for the promotion of backfill mining.

CONCLUSIONS

The backfill mining method is important for the efficient development of coal resources, construction of ecological evolution of coal enterprises, successful transformation of the coal industry, and the establishment of a modern coal industry system. Backfill mining has many benefits for both the environment and citizens, and should be promoted in suitable regions of China. Based on the above analysis, four conclusions are summarized as follows:

The S-O strategy, in which backfill mining would be actively promoted in Chinese coal mines, will be an advantageous strategy for the promotion of backfill coal mining applied in China.

In the market environment, it was helpful to the endorsement of backfill coal mining to appropriately adjust five taxes and fees for coal enterprises that utilize backfill mining, including the value added tax, corporate income tax, coal price adjustment fund, mineral resource compensation fees, and resource fees.

Four preferential tax policy scenarios were introduced in this paper, including the Baseline scenario, the Half of VAT scenario, the Relief of VAT & Corporate Tax scenario and the Relief of Five Taxes and Fees scenario. And compared to the Half of VAT scenario, the relief of VAT & Corporate Income Tax scenario and Relief of Five Taxes and Fees scenario were effective in the promotion of backfill coal mining.

In order to promote backfill coal mining in China, two preferential tax schemes were proposed. One is coal products, produced by coal enterprises using backfill mining, and should be listed as comprehensive utilization products, which can enjoy half of VAT and relative relief of corporate income taxes. At the same time, the government adjusts VAT, corporate income tax, coal price adjustment fund, and mineral resource compensation fees.

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