



Full length article

The origin and prospect of billion-ton coal production capacity in China

Manzhi Liu^{a,*}, Meng Chen^a, Gang He^{b,*}^a School of Management, China University of Mining and Technology, Xuzhou 221116, China^b Department of Technology and Society, College of Engineering and Applied Sciences, Stony Brook University, New York 11794, USA

ARTICLE INFO

Keywords:

Overcapacity
 Simultaneous scenario analysis
 Regulation suggestion
 Coal industry
 China

ABSTRACT

This study thoroughly explored the origin of coal production capacity using simultaneous equation model (SEM) with 2006–2014 data sample. Scenario analysis, including market regulation scenario (MRS), central policy strengthening scenario (CPE), and two-level government policy strengthening scenario (TPE), was also conducted to determine the degree of influence on resolving overcapacity considering construction industry development, policy control, forecasted coal production capacity, and future supply and demand changes. Results show that (1) construction industry development plays a significant and sustained role in the advancement of four major coal-consuming industries. (2) Construction industry development, coal prices, industrial policy, and natural resources positively affect capacity investments in coal production. (3) The policies put forward by the central government inhibiting capacity investments exert greater effect than those promoting capacity investments. (4) The central and local governments make production policies based on their independent interests has minimal success. And the effect of refinement policies by local governments is generally better than that of those by the central government. (5) Under MRS, CPE, and TPE, the coal production capacity (CPC) will reach 5.399, 5.044, and 4.952 billion tons, respectively, by 2020; the coal supply will reach 4.304, 4.174, and 4.139 billion tons, respectively, by 2020. The coal demand will reach 4.03 billion tons by 2020. By 2020, coal supply is projected to be at least 109 million tons greater than coal demand. From industrial restructuring and upgrading to refining and implementing capacity policies are suggested along with the market-oriented reform of the supply side of coal industry.

1. Introduction

Since the 1980s, persistent and widespread overcapacity has been frequently observed in the economic operations of China. The settlement of overcapacity has become an urgent problem as the economy of China has gradually entered a new normal (Zheng and Zhou, 2014). Coal, as a basic energy resource, is expected to continuously present long-term stability and maintain an irreplaceable position in the national economy. Rapid economic growth in China is largely dependent on coal as its main energy source (Xu et al., 2016). Under the condition that the current economy of China is declining, imbalance between coal supply and demand is prominent, and this disproportion continues for a long period. Coal prices also continue to fall with the high inventories and serious surplus of coal. Meanwhile, the coal consumption reduction caused by changes of industrial structure, energy intensity and energy mix exacerbated the excess capacity of the China's coal industry. (Tang et al., 2016), the Central Government has published the Guidance on Deepening the Reform of the Coal Market and has unified the dual-track pricing system for coal to solve the overcapacity in coal industry (Yang

et al., 2016). Studying the causes of coal overcapacity, the formation mechanism of changes in coal production, and the optimization of relevant regulations is significant to the healthy and sustainable development of the coal industry of China under these circumstances. By establishing the formation mechanism of coal production capacity, this study investigates the capacity regulation of the coal industry, establishes an optimization model for capacity deregulation, and obtains an effective regulation and optimization scheme to guide the establishment of long-term stable relationship between coal supply and demand. Establishing such relationship can not only avoid large fluctuations in the coal market but also provide a theoretical basis for designing a government-related policy system. The remainder of this study is organized as follows. Section 2 reviews the related literature. Section 3 specifies the materials and methods. Section 4 describes the data and variables. Section 5 presents the evaluation results and discussion. Section 6 carries out scenario analysis. Finally, Section 7 discusses the results, summarizes the paper, and offers policy recommendations.

* Corresponding authors.

E-mail addresses: liumanzhi@cumt.edu.cn, liumanzhi@126.com (M. Liu), Gang.He@stonybrook.edu (G. He).

2. Literature review

In the existing literature on overcapacity, some scholars explored the causes of overcapacity from institutional aspects. Among domestic scholars, Wang and Ju (2012) and Wang et al. (2014) found that the improper intervention of local governments leads to excessive investment, thus resulting in overcapacity. Geng et al. (2011) stated that the policy subsidies of local governments distort the prices of factor markets, thus depressing the investment cost and forming excess capacity. Gan et al. (2015) discussed the causes of overcapacity from a government official perspective and found that the impulse to expand capacity leads to the formation of overcapacity when the resource cost is reduced. Among the foreign scholars, Blonigen and Wilson (2010) analyzed the relationship between overcapacity and government subsidies in exports, and they argued that an important cause of overcapacity is excessive subsidies to exporters. Zhang et al. (2016a, 2016b, 2016c) concluded that government subsidies are one of the factors contributing to overcapacity in the wind and solar industries. Bossche and Gujar (2010) attributed overcapacity to excessive government intervention in microeconomics; they argued that the best solution to overcapacity is liberalizing private sector investment. Yuan et al. (2016) quantified the rational capacity and potential investment of coal power in China during the 13th Five Year Plan period (2016–2020), and they found that if all the coal power projects submitted for environmental impact assessment (EIA) approval were put into operation in 2020, overcapacity will reach 200 GW, which will cause disastrous consequences. Wang et al. (2016) proposed a system dynamic model to forecast the change of China's coal production capacity in three baseline scenarios, namely, usual scenario, policy regulation scenario, and strengthening policy scenario; they found that China's coal overcapacity will continue and face severe challenge in the future. Zhang et al. (2016a,b,c) established Hicks-neutral and Solow-neutral models respectively to assess the coal capacity, and found a reasonable range (89%–105%) for China's coal capacity utilization and overcapacity cordon (85%). Foreign scholars have focused on a market perspective when analyzing the causes of overcapacity and considered overcapacity as a normal product under market economy. Lin et al. (2007, 2010) found that enterprises in developing countries can easily form a social consensus on the prosperous prospects for national economy, which can lead to “investment tide” and overcapacity. Jiang and Cao (2009) and Jiang et al. (2012) argued that investment surges are actually caused by the investment subsidies of local governments during regional competition, which distort the results of business investment behavior. To the contrary, this phenomenon should not cause overcapacity, especially overinvestments on many industries under the background of Chinese transition.

Most scholars have analyzed the causes of overcapacity only from a single point of view or subjective judgment. Wang et al. (2015) analyzed the internal logic relationship among the causes of overcapacity in the coal industry of China from three levels. These three levels are pressure-driven behavior (corporate profit-driven behavior, local development impulse), state reflection (market supply and demand changes), and response measures (government administrative intervention, the central and local interests of the game). However, this analysis was only qualitative; in-depth quantitative analysis was not performed. Zhang et al. (2016a,b,c) explored the cause of coal overcapacity based on system dynamics but did not include government regulation as an important regulatory factor and thus failed to conduct a comprehensive study. Overall, the current analysis on the mechanism of coal production overcapacity has yet to form a complete logic framework. Existing studies present obvious flaws, such as the separation of government and enterprises, the neglect of market price mechanism, and the environment of supply and demand.

This study therefore conducts an in-depth quantitative analysis on the formation mechanism of coal production to explore the cause of coal overcapacity under the background of coal supply and demand environment, with construction industry development as the driving

force, market price mechanism as guide, and government policies as control measures.

3. Materials and methods

3.1. Research framework

The formation of excess coal production capacity is due to structural reasons. The supply of coal products exceeds the demand under certain economic conditions, and the dramatic changes in the market generates cyclical fluctuations in market demand, resulting in decreased utilization of equipment and high degree of idle equipment in the coal industry. The weak demand for coal consumption reduces coal consumption, and the excessive pursuit of coal enterprises increases the investment capacity of the coal industry, and, thus, coal production continues to grow. The increasing coal production causes the imbalance of supply and demand in the coal industry to seriously hinder the healthy development of the industry.

The basic principle of supply and demand (Marx, 2004) indicates that the value determines the price, the price determines the supply and demand, supply and demand control prices, and prices constrain supply and demand. According to demand theory (Jorgensen, 1966), provided that other conditions remain unchanged, a commodity demand and its own price change in opposite directions, that is, the demand decreases as the price of the commodity rises and increases as the price of the commodity decreases. Changes in coal prices tend to affect changes in coal demand. Therefore, in exploring coal supply and demand relations must take full account of coal prices; the rise in coal prices will lead to lower coal consumption to a certain extent. Tobin's q theory is an investment theory of stock price and investment expenditure, and it is widely used in stock market investment analysis and helpful to analyze macroeconomic investment activities. Tobin's q theory is also based on the theory of cost and price, and the firm's profit behavior is the starting point, through which the relationship between asset market value and replacement cost determines investment efforts (He, 2010). For coal enterprises whose purpose is to profit, when the market value of coal products is determined to be higher than the cost of the products, these coal enterprises will continue to increase investment in coal production capacity to pursue profit maximization. The increase in production capacity due to increased capacity investment will stimulate an increase in coal supply.

The supply and demand imbalance of the coal industry caused by low consumption and high supply increases overcapacity. Coal enterprises not only did not limit and cut production but also were trapped in the “the more excess capacity, the more desperate to produce” vicious circle. The failure of this market situation makes the implementation of industrial policies, such as production capacity, imminent. “Market failure” theory implies that changing the market mechanism is not a panacea, as many shortcomings remain although the market mechanism is effectual. Industrial policies are mainly the remedy measures took by the government to address the problems caused by market mechanism.

The framework combs the internal logic relationship among the causes of coal production capacity in the coal industry of China from the perspectives of market supply and demand changes as well as central and local government administrative intervention based on the above theories. Relational and conductive feedback paths are constructed, and these paths reflect the relationship between coal production capacity and related factors.

The proposed model consists of four paths (Fig. 1), namely, (1) the transmission of the construction industry to the coal industry, (2) mechanism of coal production capacity investments, (3) the reduction of the backward production capacity mechanism, and (4) factors affecting coal production. Specifically, coal production capacity is the result of the new capacity over the years, the previous phase of the coal production capacity, and the accumulation of backward production

Download English Version:

<https://daneshyari.com/en/article/5118649>

Download Persian Version:

<https://daneshyari.com/article/5118649>

[Daneshyari.com](https://daneshyari.com)