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Economic regulations of coal enterprises' scale expansion in China

Qing Xia^{a,*}, Yunqiu Qiu^b, Min Zhou^a

^a School of Management, China University of Mining and Technology, Xuzhou, 221116, China

^b Yantai Nanshan University, Yantai, 265716, China

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ABSTRACT

Since 2012, coal enterprises of China facing grim situation. Sluggish economic growth affects market demand of coal production. Environment issues, like high carbon emission and global warming problems further restraint coal consumption. After a period of high speed development, China's coal enterprises' scale expansions have suffered much economic regulations. This paper analyzed these economic regulation factors under the framework of scale effect theory. There are several factors will influent the scale expansion of coal companies, including transaction cost, management cost, total capital, and etc. This paper built a regression model of panel data to test the influence of these factors with the data of 23 large-scale coal corporations since 2007–2014. The regression result of fixed effect model showed that market competitiveness, regional economic growth, total capital, transaction cost, all have positive effect on scale expansion. The effect of labor force is negative for scale expansion. After a decade of fasting expansion, the effects of management cost and investment in fixed assets are not significant any more in the study period.

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1. Introduction

Coal is referred to be the “king, or the father of the Fuel Revolution” (White, 2008). The resource stock makes China heavily rely on coal in long times (Guan et al., 2008; Bloch et al., 2012), which contributes to approximately 75% of China's energy production and 70% of energy consumption during the past two decades (NBS-National Bureau of Statistics of China, 2012). China's coal consumption used to keep growing nearly in the same speed as national economic development. After the long-term high-speed increases in last over thirty years, the economic growth of China has reduced from over 8% to 6.9% in 2015.¹ The expansion of some manufacturing sectors in the last decades created much more production supply not in conformity with demand. In 2011, there were 5 corporations whose productivity beyond 100 million tons while were only 2 in 2010. And the number has become 7 since 2012. China has become the largest coal supplier and consumer with over capacity of production and collapsed market price and profit rate, which made these industries, appeared into the development of slump. This situation is much more significant in resource-based industries, including coal, iron & steel. The China Coal Market Climate Index (CCMCI)

has fallen from nearly 50 in Jan 2010 to –43.3 in May 2016, which means the market sentiment of the whole coal industry continued in the too cold zone since 2012 (China National Coal Association, 2016).

In the other side, the high-speed extensive path caused high energy consumption and carbon emission. Climate change issues and other environmental problems attract the global concerns on China. The international community has agreed on the Copenhagen Accord envisions that the global warming should be limited to below 2C, which requires 40%–70% emission reductions by 2050 compared to 2010 (Intergovernmental Panel on Climate Change, 2014). For China, government promise to reduce the carbon intensity 60%–65% by 2030 compared to 2005 (Enhanced Actions on Climate Change, 2015), which makes China has to take measures to control carbon emission, especially on coal's production and consumption. On this condition, economic investment and policy support is not continued focus on coal industry anymore (Moran et al., 2014). The development of it faces more economic threats than any past times.

Due to improving safety management of coal mine, China encouraged consolidation of coal enterprises in the past few years, like in Shanxi Province (Liu et al., 2016), which further aggravated the competition. This over capacity situation and carbon-control requirements causes economic restrains on coal industry of China. The whole industry, almost including all enterprises is having a rather hard time. The government has published production-limit

* Corresponding author at: School of Management, China University of Mining and Technology, No1, Daxue Road, Xuzhou, Jiangsu, 221116, China.

E-mail address: xqz.js@163.com (Q. Xia).

¹ http://www.stats.gov.cn/tjsj/zxfb/201602/t20160229_1323991.html.

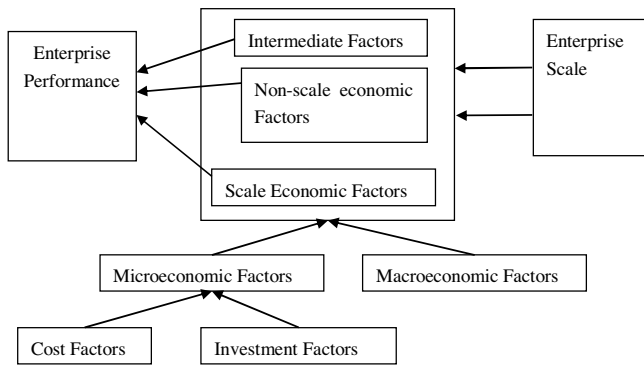


Fig. 1. Impact factors of enterprises' scale.

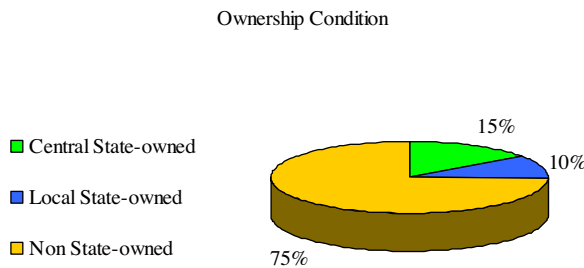


Fig. 2. The ownership condition of China coal companies.

and cut-off policy for coal enterprises to saving the marketing performance. The estimated production peaking time was the late 2020s and early 2030s (Bo-qiang and Jiang-hua, 2010). But even under relatively high growth rate (annual 7.8%), the predicted consumption turning point has moved up to 2019 (Hao et al., 2015) (Figs.1–2).

The largest two coal corporations, China Shenhua Energy Company and China Coal Energy Company, are the first responded positively. However, some other corporations took a countered attitude to the policy in order to maintaining normal capital turnover. The expansion of these large-scale enterprises is continuing to pursuing scale effect on efficiency (Vickers and Yarrow, 1988; Austvik, 2012). And these corps couldn't find out a moderate scale to improving efficiency and keep competitiveness. So considering the marketing performance under current circumstance, what are the factors would influence the scale expansion of these corporations, and what kind of economic constrains these factors would produce. The answer to these two questions would explain the differences of profit margin among large scale coal enterprises and help them defining their competitive position.

This paper focus on the regulation factors of scale effect which expressed in the progress of expansion by regression model of panel data. The rest of the paper is organized as follows. The literature reviews are detailed elaborate in Section 2. The theoretical hypothesis, estimation of different regression model and methodology choice is detailed formulated in Section 3. The empirical regression result and analysis on regulation factors are discussed in Section 4. Section 5 concludes the paper and outlines the future research.

2. Literature reviews

2.1. Literature reviews

Since neoclassical economists discovered scale effects (Marshall, 1890), enterprise scale is taken seriously in development. Companies compete to gain the largest customer base, produce the highest sales, and obtain the leading market share in

their industry (Patatoukas, 2011). There are two different opinions on enterprise scale. Considering the investment, enterprise scale can be described by staff number, capital and occupation. Productivity and selling condition could be used to measure it in output. Scale expansion is also related with manufacturing cost, which is actually further connected with many other factors, capital stocks, output features, market demand and technique conditions et al. (Yoder et al., 2016). These various components of productivity growth can also provide information for assessing performance to judging the existing of scale effect (Chi-Chuan and Tai-Hsin, 2016).

In China, state-owned economy is dominated in coal industry. Since 2005, the government pushed forward nationalization process for safety consideration. And the process is culminated in Shanxi in 2008, which made its scale expansion is not truly coming from efficiency (Gao, 2011). For coal enterprises, the differences between marketing transaction cost and organizational coordination cost under different coordinated manner determines their key competence and expansion scale (Zhang, 2012; Cardoza et al., 2016). No matter of vertical and horizontal scale, coal enterprises need to keep in suitable scale to obtain scale effect in the process of reorganization (Xue and Tian, 2009).

Normally, the scale expansion of companies is a process under the influence of both production and marketing conditions, which should consider micro and macro environment (He et al., 2009; Dou and Dong, 2005; Hoffman et al., 2016). These influencing factors construct the economic regulations on scale expansion of coal enterprises, which including transaction fee, investment in product resource, market scale and capacity, industrial competition, industrial policies, specialized division, and et al. (Zhang et al., 2013).

As an important factor, present research has confirmed that energy price would partially and temporary pass through into inflation for China's economy (Chen, 2009). For coal mine sector, the impact of coal price is not such significant (Chen, 2014). The externality of coal price made coal corporations non-initiative in pricing. They are facing the same price level at the same time, which further reducing the constrained effects on scale expansion. The falling of coal price since 2012 did not stop some corporations' expansion. The larger company is larger, the smaller is smaller. Because of the lacking of pricing power, coal price was considered to be as an external environment variable which has the same influence on all samples. So this paper did not take it in discussion for its universality and externality. For methodology, the index decomposition analysis (IDA) and the structure decomposition analysis are the two popular decomposition techniques which both have been applied extensively in energy. IDA is often adopted in a specific energy consumption sector, such as industry to study energy use and emission problems. And SDA is used primarily used with input-output (I-O) analysis (Su and Ang, 2012). Though this paper tries to explain the economic regulations on scale expansion of coal industry, the study objects are coal enterprises and large-scale corporations which would be defined in the following part. The macro input-output (I-O) neither can be used in the research. Considering the sample objects and selected data, the paper built a regression model in pooled OLS model of panel data to explain the economic indexes that may have direct effect on scale expansion of coal corporations.

3. Methodology and theoretic hypothesis

3.1. Theoretical hypothesis

Based on the theory that transaction determines enterprises' scale (Williamson, 1975, 2010), the influence factors on enterprises' can be the connection between enterprise scale and enterprise performance, which could be divided into three kinds, intermedi-

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