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## ARTICLE

# RESEARCH ON FINANCIAL RISK EVALUATION AND CONTROL OF LISTED ENERGY ENTERPRISES IN OUR COUNTRY—BASED ON THE EXAMPLE OF CHINA COAL ENERGY RESEARCH

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## ARTICLE DETAILS

## ABSTRACT

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China's "14th Five-Year Plan" to build a modern infrastructure system, to build a modern energy system, promote the energy revolution, the construction of clean low-carbon, safe and efficient energy system, improve energy supply security.

As an important energy industry in China, the coal industry has long occupied the leading position of energy. However, the coal industry suffers from chronic problems such as overcapacity, uneven development level of coal mines and environmental pollution, and needs to accelerate the supply-side structural reform of the coal industry. The coal industry is not only under the pressure of reform to upgrade its own industry, but its development is also constrained by the upstream and downstream relationship and funding. According to the position of the coal industry in the industrial chain and the relationship between the coal industry and other industries, the price and profit of the coal industry are greatly affected by the international crude oil price, while the downstream demand, including the production of synthetic ammonia, cement production, pig iron production and thermal power generation, respectively represent the demand of the chemical industry, building materials, steel and electric power industry, as well as the influence factors of shipping costs. Moreover, the coal industry has the characteristics of post-cycle, and the sensitivity of economic cycle is lagging behind. The large amount of receivables and payables of enterprises is also the reason for the fragile capital chain of enterprises. In addition, macro policies and other factors will intensify the financial risk of enterprises. China Coal Energy as a large coal enterprise in China, from the previous years of financial statements data can be found that the net profit of the enterprise is not very ideal for a long time. Therefore, the enterprise financial risk identification, evaluation and prevention, effective risk management measures will avoid the enterprise into financial crisis. Based on this purpose, this paper tries to take China Coal Energy as the research object, uses the analytic hierarchy process to build the enterprise financial risk evaluation model, and puts forward risk prevention and control suggestions according to the analysis of the evaluation results.

## KEYWORDS

Financial Risk; Coal Energy; Modern Infrastructure; Low-Carbon

## 1. RESEARCH BACKGROUND

The rapid development of Chinese economy drives the rapid growth of coal consumption in electric power, iron and steel industry and other industries. Since 2012, it has been found that the change trend of total coal production and consumption in the coal power industry is basically consistent with the change trend of the total coal consumption in China, which is basically consistent with the characteristics of the primary energy structure dominated by coal. In recent years, with the adjustment of industrial policies, the share of coal consumption has been declining year by year, but the rate of decline is slow, and the average annual consumption of coal is in a structural decline at a rate of less than 1%<sup>[1]</sup>. In 2018, the proportion of coal consumption in energy consumption was still as high as 59%<sup>[2]</sup>. However, after a brief decline, China's total coal consumption gradually increased, reaching 2.8 billion tons in 2019, almost the same as the total coal consumption of 2.81 billion tons in 2013. Despite the completion of industrialization in some regions and

the slowing growth of electricity demand, China's energy demand will continue to grow in the future. The non-fossil energy represented by Fengshui core is growing rapidly, but it still cannot fully meet the incremental part of China's energy demand.

There is contradiction between supply and demand of thermal coal in the 14th Five-Year Plan, and the demand is still difficult to reach the peak: The State Council's Action Plan for Carbon Peak before 2030 requires accelerating the pace of coal reduction, strictly and reasonably controlling the growth of coal consumption in the 14th Five-Year Plan period, and gradually reducing it in the 15th Five-Year Plan period. In practice, however, it is easier to reduce coal supply than to reduce coal consumption. Especially under multiple tapering policies, it is easier to reduce coal production than to increase it. On the demand side, if the installed demand of thermal power is required to increase 0, the installed CAGR of wind power and photovoltaic will be as high as 15% and 25% during the "14th Five-Year Plan". According to the mainstream

expectation, the growth rate of the above two should be around 10% and 20% respectively. This means that the coal power demand “14 th Five-Year” difficult to reach the peak, will maintain a certain low growth.

Many factors will affect the development of China’s coal industry, which is not only affected by the fluctuation of crude oil price, but also closely related to the development of thermal power, steel, building materials and other downstream industries. The economic downturn will directly affect the demand for coal. At the same time, with the integrated development of the global economy and the evolution of the international coal market, the dependence of Chinese coal on foreign countries has increased, which will also have a significant impact on the development of Chinese coal industry.

Coal enterprises must have strict requirements on the ability to resist risks, therefore, it is necessary to carry out financial risk analysis on coal enterprises. In order to improve the anti-risk ability of enterprises, to ensure the sustainable healthy and green development of enterprises.

China National Coal Energy Group Co., Ltd. is a key state-owned backbone enterprise managed by the State-owned Assets Supervision and Administration Commission of the State Council. Its predecessor was China National Coal Import and Export Corporation, which was established in July 1982. In 2009, it was restructured into a wholly state-owned company.China Coal Energy, the second largest listed coal company in China, is a majority-owned subsidiary of China National Coal Energy Group Co., LTD., which holds 57.36% of its equity.By the end of 2021, the company had revenue of 300 billion yuan and 130,000 employees.It has been listed in the Fortune 500 Global Companies list for three consecutive years and ranked 297th in 2022.During the period, its attributable net profit continued to decline from 2012 to 2015, showing a loss in 2015. Although the attributable net profit of China Coal Energy began to increase in 2016, the growth trend was slow. The profitability of China Coal Energy is still not optimistic. Therefore, determine the enterprise’s future development strategy planning, using the enterprise’s financial data and other relevant information, analyze the financial risks and causes of coal energy to avoid financial risks, adapt to the economic development situation, provide control measures and development ideas.

## 2. RESEARCH CONTENT

(1) Related concepts are defined, including the definition of energy enterprises and financial risk; (2) Elaborated the financial risk related theories of China’s listed energy enterprises, will analyze the capital structure theory, analysis of listed energy enterprises financial risk causes, construction principles, evaluation dimensions, etc.; (3) Take China Coal Energy as the research object, based on the financial statements of China Coal Energy, to analyze the current situation of the financial risk of China Coal Energy, and then according to the hierarchy of the financial risk evaluation system, determine the judgment scale, and then calculate the financial risk score and risk grade of China Coal Energy; (4) Give prevention and control suggestions from two perspectives of financial risk prevention and control and risk management system construction; (5) Industry development forecast; (6) Conclusion and development.

## 3. THE THEORETICAL BASIS OF FINANCIAL RISK ASSESSMENT

### 3.1 Reduce the financial risk

Based on the theory of capital structure, the theory of internal control and risk management as the support, based on the analytic hierarchy process evaluation system, the main financial risk points of the enterprise judgment, reduce the financial risk.

#### 3.1.1 Capital structure is the starting point of capital activities

And also the initial source of financial risks in enterprise activities. It is the determination of enterprise ownership.To a large extent, the capital structure determines the solvency and refinancing ability of an enterprise, and it is an important indicator reflecting the financial status of an enterprise.Therefore, the results of financial risk evaluation guide the optimization of capital structure of enterprises, play the regulating role of financial leverage, reduce the financing and agency costs of enterprises, and achieve a virtuous cycle of corporate capital activities [3].

#### 3.1.2 About internal control

The change of internal and external environmental factors can lead to the fluctuation of financial risk, among which the failure of internal control is one of the main reasons for the change of internal environment. The improvement of enterprise internal control is an important link to ensure the effective prevention and control of financial risks.

#### 3.1.3 The theory of risk management is a dynamic process to deal with the complex and changeable external market environment of an enterprise

It covers the identification, measurement, evaluation and response strategy of risks. Financial risk management is an important branch of enterprise risk management. It is a continuous, cyclic and dynamic process. The ultimate goal of enterprise financial risk evaluation is to serve enterprise risk management. Therefore, this paper will look for the main financial risk points, put forward risk management measures to reduce the risk, to ensure the healthy long-term development of enterprises [4].

## 3.2 Analysis of the causes of financial risks of listed energy enterprises

The global economic environment is down, affecting the domestic coal industry fluctuates greatly. Corporate financial activities are also subject to fluctuations. Therefore, we have taken measures to improve the industrial structure and management system of the coal industry, improve the industrial environment of the coal industry, enhance the ability of coal enterprises to resist risks, and put forward supply-side structural reform.The following is mainly from the political environment, economic environment, social and cultural environment and industrial environment four aspects of the external causes of financial risk of Chinese listed energy enterprises.

## 3.3 Policy requirements

The “dual carbon” policy has been gradually implemented in recent years, promoting the change of China’s power generation structure. In terms of policy, national leaders and relevant departments have put forward strict requirements on “coal control and coal reduction”, especially in the aspects of coal consumption and coal power construction.The National Energy Administration has made clear the expected target of “reducing the proportion of coal consumption to below 56%” in the Guidance for Energy Work in 2021.On February 2, 2021, The State Council issued the Guiding Opinions on Accelerating the Establishment of a Sound Green Low-carbon Circular Development Economic System, indicating that it strictly controls the newly installed coal power capacity, sticks to the priority of energy conservation, and improves the dual control degree of total energy consumption and intensity.

## 3.4 Economic environment

Since 2009, due to the impact of the international financial crisis and the global economic recession, the international coal price and sea transportation cost have been greatly reduced. The foreign coal price is lower than the domestic price. The eastern coastal areas with a large

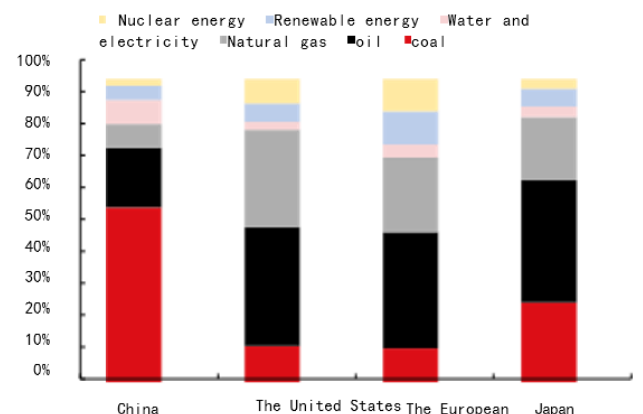


Figure 1: The Proportion of Coal Consumption in Primary Energy Consumption is too High (Data source: BP World Bank CITIC Futures Institute)

**Table 1:** Balance Sheet of China's Coal from 2008 to 2018 (Unit: billion Tons)

Coal	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Available quantity	27.51	30.13	35.56	36.06	41.87	42.50	41.18	39.71	37.85	38.21	41.42
Production volume	28.02	29.73	34.28	35.16	39.45	38.74	38.74	37.47	34.11	35.24	36.8
Volume of imports	0.40	1.26	1.83	1.82	2.88	2.91	2.91	2.04	2.56	2.71	2.81
Volume of exports (-)	0.45	0.22	0.19	0.15	0.09	0.06	0.06	0.05	0.09	0.08	0.05
Consumption	28.11	29.58	34.90	34.30	41.17	41.16	41.16	39.70	38.46	38.57	38.96

Note: Data from China Statistical Yearbook

**Table 2:** Financial Risk Evaluation Index System

Level 1 Index	Level 2 Indicators	Specific Ratios
Fundraising risk	Asset-liability ratio	Total liabilities/total assets
	Interest cover multiple	(Total interest + Interest expense)/Interest expense
	Current ratio	Current assets/current liabilities
	Quick ratio	Quick assets/current liabilities
	Cash current liability ratio	Net cash flows from operating activities/current liabilities
	Debt ratio with interest	Interest-bearing liabilities/total liabilities
	Contingent liability ratio	Contingent liabilities/total liabilities
Investment risk	Return on total assets	(Total profits + interest expense)/Average total assets
	Return on equity	Net income/average shareholders' equity balance
	Net profit rate on sales	Net profit/sales revenue
	Cost expense margin	Net profit/(Total expenses + total costs)
	Return on invested capital	Operating profit before interest and after tax/invested capital
	Net margin on fixed assets	Net profit/average balance of fixed assets
	Inventory turnover	Cost of goods sold/average inventory balance
Capital chain risk	Accounts receivable turnover	Sales revenue/average accounts receivable balance
	Net income cash ratio	Net cash flows from operating activities/net income
	Operating income cash ratio	Net cash flows from operating activities/operating income
	Debt protection ratio	Net cash flows from operating activities/total debt
	Cash recovery rate on assets	Net cash flow from operations/total assets
	Earnings per share	Net income attributable to common shareholders for the period/weighted average of common shares outstanding for the period
	Dividend distribution rate	Cash dividend per common share/earnings per common share amount
Distributive risks	Sales growth rate	Current sales growth/previous sales
	Growth rate of total assets	Growth in Total assets at current period/Total assets at beginning of period
	Growth rate of capital preservation	Year-end owner's equity/beginning of the year owner's equity
	Net profit growth rate	Net profit Growth for Current Year/Net profit for last year
	Growth in basic earnings per share	Current year basic EPS growth/Previous year basic EPS growth

demand for coal and rapid economic development have given up the domestic market and prefer to purchase coal from the international market. At the same time, under the influence of the national supply-side reform, low-quality small coal mines in China have been forcibly closed, and the industrial rectification of relevant coal enterprises has slowed down the country's coal production. Multiple factors have caused significant changes in China's coal import and export pattern: the amount of coal imported from abroad has increased rapidly, while the domestic export volume has decreased significantly, and the coal export volume is much lower than the coal import volume.

### 3.5 Industrial environment

By the end of 2022, China will rank fourth in the world in coal reserves and lead the world in annual coal mining output. In 2018, China's total coal output was 3.68 billion tons, accounting for about 47 percent of the global total. Total energy consumption in 2021 was 5.24 billion tons of standard coal, an increase of 5.2% over the previous year.

Coal consumption increased by 4.6%. BP Statistical Yearbook of World Energy [5]. Data released to the public shows. Power, iron and steel, building materials and chemical industry are the major coal consumption industries in China, accounting for four-fifths of the total coal consumption. The economic prosperity of coal industry is closely related to the development of these four industries, and there are obvious periodic changes.

### 3.6 The analytical framework of risk assessment is based on the finance of listed energy enterprises

We divided the indicators into first and second level indicators, and summarized them to build the basic framework of the enterprise financial risk evaluation index system. At the same time, refer to the State-owned Assets Supervision and Administration Commission's "Enterprise Performance Evaluation Standard Value 2018" [6].

### 4. CASE OF APPLICATION OF THE ANALYTIC HIERARCHY PROCESS

## FOR FINANCIAL RISK ASSESSMENT OF CHINA COAL ENERGY

**Table 3:** Main Business Segments and Operating Revenue of China Coal Energy in 2018 (Unit: RMB 100 million)

Business Segment	2018 Operating Revenue	Accounted for	Year-on-Year Growth Rate
Coal business	804.60	73.95%	26.95%
Coal chemical business	179.61	16.51%	41.29%
Coal mine equipment manufacturing	66.66	6.13%	26.53%
Other businesses	37.14	3.41%	15.99%
A combined	1088.00	100%	28.66%

**4.1 China Coal Energy has abundant coal resources and prominent advantages in the scale of the main coal industry. The coal mining, washing and mixing technologies are in the leading position in the industry**

Up to now, China Coal Energy is the only large energy enterprise in the world that can engage in coal machine manufacturing, coal mining, washing and processing, logistics and trade, with the advantages of the whole industrial chain of coal business.

**4.2 About financial risk assessment of China Coal Energy****4.2.1 Cash flow analysis of financing activities**

Data show that the inflow of financing in 2016 is also the least, resulting in the first negative net financing that year, and 2017 and 2018 net financing is still negative, borrowing as high as 99.99%, if there is a

**Table 4:** Output Value and Operating Revenue of Coal Mining Equipment in 2018

Coal Mine Equipment	Output Value (100 million Yuan)			Operating Revenue	
	In 2018,	In 2017,	Change ratio Rate (%)	In 2018,	Accounting for operations of the Coal Mine Equipment Division Share of Revenue (%)
Main delivery products	32.5	25.4	28.0	31.8	45.1
Main supporting products	22.8	13.8	65.2	23.2	32.9
Other	14.2	12.5	13.6	15.5	22.0
A combined	69.5	51.7	34.4	70.5	-

**Table 5:** Cash Flow Statement of China Coal Energy's Financing Activities from 2014 to 2018 (Unit: RMB 100 million)

Project	2014	2015	2016	2017	2018
Absorb cash received from investments	3.15	5.14	2.49	0.51	0.03
Obtain the cash received by the loan	366.87	236.91	136.05	207.04	190.93
Receipt of other cash in connection with fundraising activities	3.69	0.06	0.00	0.00	0.00
Cash received from issuance of bonds	14.83	119.71	29.93	39.90	69.90
Subtotal of cash inflow from fundraising activities	388.53	361.82	168.47	247.44	260.86
Cash paid to repay debts	129.28	178.59	339.13	259.52	246.25
Cash paid to distribute dividends, profits or repay interest	62.39	61.51	61.43	61.33	65.66
Disburse other cash related to fundraising activities	1.02	0.73	7.42	2.63	25.09
Subtotal cash outflow from financing activities	192.69	240.82	407.98	323.49	337.01
Net cash flows generated from financing activities	195.85	120.99	239.51	76.04	76.14

**Table 6:** China Coal Energy's Statement of Cash Flows from Investment Activities for 2014-2018 (Unit: RMB 100 million)

Project	2014	2015	2016	2017	2018
Recoup cash received from investments	13.02	0.02	0.00	0.24	0.03
Earning investment income Cash received	1.91	2.06	2.05	1.37	10.86
Net cash recovered from disposal of fixed assets, intangible assets and other long-term assets	1.72	0.69	14.76	7.86	0.89
Net cash received on disposal of subsidiaries and other operating units	0.00	4.31	7.37	0.00	0.00
Cash received in connection with other investment activities	58.27	15.91	260.02	63.26	52.95
Subtotal of cash inflows from investing activities	74.93	22.99	284.20	72.73	64.73
Cash paid for the purchase and construction of fixed assets, intangible assets and other long-term assets	196.95	114.41	90.16	85.09	94.28
Cash paid by investment	37.89	23.72	9.17	7.15	11.80
Obtain net cash paid by subsidiaries and other operating units	1.73	0.38	0.65	0.00	0.00
Cash paid in connection with other investment activities	16.02	147.71	78.46	80.62	104.76
Subtotal cash outflow from investing activities	252.59	286.22	178.45	172.86	210.85
Net cash flows generated from investing activities	177.67	263.22	105.75	100.13	146.11

project period problem will produce the financial risk of returning principal and interest.

#### 4.2.2 Analysis of cash flow of investment activities

Data showed that most of the net cash from China Coal Energy's investment activities in the past five years was in an outflow state. Mainly because in the reform of the coal industry, China coal energy enterprises have steadily adjusted their own development strategies.

#### 4.2.3 Low profitability of products

**Table 7:** Earnings Performance of China Coal Energy from 2014-2018

Project	2014	2015	2016	2017	2018
Sales revenue (billion)	706.64	592.71	606.32	811.23	1041.40
Gross margin on sales (medium Coal energy)	30.04%	31.34%	33.50%	32.41%	28.64%
Gross margin on sales (rows Industry average)	23.10%	19.44%	25.76%	32.72%	31.65%
Net interest rate on sales (medium Coal energy)	1.73%	-3.48%	4.84%	5.48%	5.98%
Net interest rate on sales (line Industry average)	7.87%	1.72%	6.68%	12.76%	11.93%
Return on equity	0.88%	-2.97%	2.4%	2.76%	3.78%
Return on equity (industry average)	1.56%	-6.75%	-1.4%	7.72%	7.48%

Data show that before 2016, the sales revenue had a downward trend due to the depressed coal market environment, and then with the increase of coal market price, the sales revenue also increased, indicating that the external pressure resistance of China Coal energy is not strong, vulnerable to the adverse factors in the industry environment.

#### 4.2.4 China Coal Energy's inventory management

**Table 8:** Relevant inventory of China Coal Energy (2014-2018)

Project	2014	2015	2016	2017	2018
Inventory (100 million yuan)	86.22	68.25	73.91	74.47	82.53
Current assets (billion Yuan)	557.81	620.19	445.41	488.71	554.44
Inventory/current assets	15.46%	11.00%	16.59%	15.24%	14.88%
Inventory/Current Assets (China Shenhua)	13.36%	10.59%	10.00%	8.78%	4.27%
Inventory turnover (times)	6.41	5.27	5.67	7.39	9.47
Industry average (times)	11.82	9.81	11.27	14.31	16.89

#### 4.2.5 China Coal Energy receivables management

**Table 9:** China Coal Energy's receivables Management 2014-2018

Project	2014	2015	2016	2017	2018
Accounts receivable (RMB 100 million)	82.22	96.80	76.59	65.17	48.81
Sales revenue (RMB 100 million)	706.64	592.71	606.32	811.23	1041.40
Receivables as a percentage of operating revenue	19.05%	22.39%	23.85%	19.12%	4.69%
Accounts receivable turnover	8.69	6.71	7.09	11.61	18.53
Accounts receivable turnover ratio (Shenhua, China)	10.85	7.52	9.26	16.86	24.23
Accounts Receivable turnover Ratio (Yanzhou Coal)	36.77	31.14	38.71	45.17	38.01

**Table 10:** Comparison of Cash Recovery Rates for Coal Energy Assets

Project	2014	2015	2016	2017	2018
Net cash flows generated from operating activities (RMB 100 million)	50.84	72.85	120.68	178.07	204.14
Total assets (billion Yuan)	2427.06	2569.80	2418.49	End at 2488.39	2646.58
Cash recovery on assets (China Coal Energy)	2.09%	2.83%	4.99%	7.16%	7.71%
Cash recovery on Assets (Shenhua, China)	12.68%	10.00%	14.32%	16.78%	15.03%
Cash recovery on Assets (Yanzhou Coal)	4.41%	2.03%	4.07%	8.24%	11.01%

#### 4.2.6 Assigning risk

According to the data, the dividend ratio in 2017 and 2018 is nearly 30%, which is still within the normal range and also matches the performance of the enterprise at the current stage.

The above analysis of the 2014-2018 financial data of China Coal Energy roughly identifies the four main sources of risk in financing, investment, capital chain and distribution. Next, it will be decomposed on the basis of analytic hierarchy process (AHP) based on China Coal Energy's financial position.

### 4.3 Build the financial risk index system of China Coal Energy

#### 4.3.1 Construction of hierarchy

We will take four dimensions of financial risk, namely financing risk, investment risk, capital chain risk and distribution risk, as first-level indicators. From the basic framework of the financial risk evaluation index system in Figure 2, three indicators are selected as the second-level indicators.

**Table 11:** China Coal Energy's 2014-2015 Earnings Distribution Profile

Project	2014	2015	2016	2017	2018
Dividend (RMB 100 million)	3.18	0	5.15	7.24	10.3
Net profit attributable to shareholders of listed companies	7.67	25.2	20.28	22.92	34.35
Dividend to net income ratio	41.48%	0.00%	25.41%	29.99%	29.99%
Basic earnings per share growth rate	- 77.78%	- 416.67%	- 178.95%	20.00%	44.44%
Capital preservation growth rate	100.03%	97.38%	101.94%	104.04%	104.33%
Total asset growth rate	12.92%	5.88%	- 5.89%	2.89%	6.36%

**Table 12:** Scale Quantification Table

Importance	Meaning
1	If two elements are compared, they are of equal importance
3	If two elements are compared, the former is slightly more important than the latter
5	If two elements are compared, the former is obviously more important than the latter
7	If two elements are compared, the former is more important than the latter
9	If two elements are compared, the former is more important than the latter
2, 4, 6, 8	The importance level is somewhere between the above
The bottom	If two elements are compared, scale the importance of the latter to the former

**Table 13:** Weight Table of Financial Risk Evaluation Indexes of China Coal Energy (Percentage System)

Target Layer	Level 1 Indicators	Second Level Indicators	Combined Weights
China Coal energy source financial risk assessment system	Financing risk dimension (35.94)	Quick ratio (56.23)	20.21
		Current ratio (12.17)	4.37
		Asset-liability ratio (31.6)	11.36
	Investment Risk Dimensions (19.61)	Net interest rate on fixed assets (14.87)	2.92
		Net profit rate on sales (56.66)	11.11
		Return on equity (28.47)	5.58
		Inventory turnover (53.96)	20.23
	Capital chain risk dimension (37.49)	Accounts receivable turnover (29.7)	11.13
		Cash recovery on assets (16.34)	6.13
		Basic EPS growth rate (49.34)	3.43
	Assigning risk dimensions (6.95)	Capital preservation growth rate (31.08)	2.16
		Growth rate of Total assets (19.58)	1.36

#### 4.3.2 Determine the judgment scale

In the evaluation model, there is a certain correlation between the indicators at each level. Therefore, the elements in each level need to be compared with all the others to determine their relative levels of importance. The specific quantification method uses the 1-9 scale method, as shown in Table 15.

According to the calculation, the comprehensive weight of each evaluation index of the financial risk of China Coal energy can be obtained, and the weight summary results are shown in Table 13.

The calculation formula of financial risk assessment model is as follows:

$$A=0.2021*C1+0.0437*C2+0.1136*C3+0.0292*C4+0.1111*C5+0.0558*C6+0.0203*C7+0.1113*C8+C9+0.0343+0.0613*C10+0.0216+0.0136*C11+C12$$

By analyzing the data in Table 13, it can be found that among the four risk dimensions of the financial risk of China Coal Energy, the capital chain risk accounts for the highest proportion, with a weight of 37.49%. The second is the financing risk, the weight is 35.94%. In addition, investment risk and distribution risk were 19.61 percent and 6.95 percent, respectively.

Among capital chain risks, the largest weight is inventory turnover (53.96

percent), followed by accounts receivable turnover (29.7 percent); In financing risk, the highest weight is speed ratio (56.23%), followed by asset-liability ratio (31.6%); Among investment risks, the highest weight is net interest rate on sales (56.66%), followed by return on equity (28.47%);

According to the annual report data of China Coal Energy in 2018, the single score value of each indicator is calculated according to the formula (see Table 14), and then the score result of the overall financial risk of the enterprise is obtained through the efficiency coefficient method (see Table 15).

Finally, the overall financial risk score of coal Energy in 2018 is 57.94, and the evaluation grade is medium. It is consistent with the statement of the financial status quo of China Coal Energy in Section 4.2 of this paper.

Among the four dimensions of financial risk of China Coal Energy, the capital chain risk score with the highest weight is 25.70. The analysis coefficient excludes the influence of weight on the score of individual indicators. The lowest analysis coefficient of capital chain risk is the inventory turnover, which indicates that there is a certain risk in the inventory management of enterprises.

Financing risk ranked second, with a score of 17.16. However, the

**Table 14:** Calculation Table of Single Evaluation Index of Financial Risk of China Coal Energy in 2018

Evaluation Indicators	The Actual Value	Standard Value	Indicator Weight	Standard The Coefficient of	Base Score of This File	Efficacy the Coefficient of	Base Points for Upper File	Adjust The Points	Individual Scoring
Quick ratio	45.06	38.30	20.21	0.4	8.08	0.23	12.13	0.94	9.03
Current ratio	80.23	71.33	4.37	0.4	1.75	0.48	2.62	0.42	2.17
Asset-liability ratio	58.18	65.29	11.36	0.4	4.54	0.63	6.82	1.42	5.97
Net fixed asset rate	6.35	(4.36)	2.92	0.2	0.58	0.89	1.17	0.52	1.10
Net interest rate on sales	5.98	0.20	11.11	0.2	2.22	0.98	4.44	2.18	4.40
Return on equity	3.78	3.40	5.58	0.6	3.35	0.07	4.46	0.07	3.42
Inventory turnover	9.47	9.20	20.23	0.6	12.14	0.07	16.18	0.28	12.42
Accounts receivable turnover	18.53	13.32	11.13	0.6	6.68	0.78	8.90	1.73	8.41
Cash recovery on assets	7.71	1.40	6.13	0.6	3.68	0.97	4.90	1.19	4.87
Basic EPS accretion rate	44.44	38.26	3.43	1.00	3.43	1.00	-	0.00	3.43
Capital preservation growth rate	104.33	103.90	2.16	0.8	1.73	0.06	2.16	0.02	1.75
Total asset growth rate	6.36	3.10	1.36	0.6	0.82	0.53	1.09	0.15	0.96

**Table 15:** Results of the Consolidated Score of China Coal Energy's Financial Risk in 2018

	The Weight	Score	Analytical Series	Risk Classes	The Weight	Score	Analysis Factor
Quick ratio	20.21	9.03	0.45				
Current ratio	4.37	2.17	0.50	Financing sub-risk	35.94	17.16	0.48
Asset-liability ratio	11.36	5.97	0.53				
Net fixed asset rate	2.92	1.10	0.38				
Net profit rate on sales	11.11	4.40	0.40	Investment risk	19.61	8.93	0.46
Return on equity	5.58	3.42	0.61				
Inventory turnover	20.23	12.42	0.61				
Accounts receivable turnover	11.13	8.41	0.76	Capital chain risk	37.49	25.70	0.69
Cash recovery on assets	6.13	4.87	0.79				
Basic EPS growth rate	3.43	3.43	1.00				
Capital preservation growth rate	2.16	1.75	0.81	Distributing risk of Wind	6.95	6.14	0.88
Total asset growth rate	1.36	0.96	0.71				
Combined score of 57.94							

analysis coefficient of financing risk is insufficient. Heavy asset enterprises in coal mine construction projects, cash input is more, the liquidity of assets is poor. The capital structure needs to be optimized.

#### 4.4 Prevention and control measures and suggestions

##### 4.4.1 Suggestions on capital chain risk prevention and control measures

China Coal Energy should optimize and adjust the production plan of the enterprise and reasonably plan the inventory. According to the production cycle, planned production of coal products within the pre-sale quota. Enterprises should increase their sales revenue, attach importance to the performance evaluation system of the sales department, and give rewards according to the performance of the completion of the situation. At the same time, speed up the turnover of inventory, reduce the capital chain risk of the enterprise.

For the accounts receivable part, China Coal Energy can effectively reduce the financial risk in the process of capital turnover by reasonably extending the accounts payable and negotiating with customers to extend the payment term of the enterprise.

##### 4.4.2 Suggestions on financing risk prevention and control measures

The asset-liability ratio of China Coal Energy is higher than the average of the industry, while the quick ratio is lower than the average of the industry, so it bears a higher debt repayment risk. In this survey results can also be concluded that this is an important risk point of the enterprise. It is suggested that enterprises can properly expand financing channels, take additional preferred stock or common stock to increase equity financing. According to the 2018 annual report, credit loans alone account for 96% of long-term borrowings, which is too high. A large number of long-term credit loans will increase the risk adverse analysis of the bank on the enterprise, resulting in China Coal Energy will not be able to obtain loans from the bank in a timely manner, which will have an adverse impact on the development of the enterprise.

##### 4.4.3 Suggestions on investment risk prevention and control measures

A large number of coal development projects have a long construction cycle, a large amount of funds, and problems such as short-term failure to make profits and slow fund recovery. Although the coal industry market recovery, but enterprises still need to do a good job in the evaluation of investment plans and risk tracking, to ensure the normal

implementation of investment projects.

With the country attaching importance to the environment and ecology, the coal industry is gradually attaching importance to the research and development of clean coal, and the integration of new technologies will increase the production cost of coal products. Coal sales account for 80 percent of its three major businesses. The homogeneity of coal products has reduced the product differences among enterprises, and it is suggested that China Coal Energy, which has many industry-leading patent technologies in the field of coal chemical industry, broaden the production line of coal products through coal chemical technology to complete the upgrading of industrial structure. Coal sales are greatly affected by national policies, industrial prices and other factors, and the adjustment of coal industrial structure is conducive to the diversification of enterprise risks.

#### 4.4.4 Suggestions on risk prevention and control measures for allocation

In terms of dividend distribution in recent years, China Coal Energy did not pay dividends in 2015 only because of corporate losses, but paid dividends in other years. Although the income distribution of enterprises is conducive to shaping the reputation of enterprises, it also increases the financial burden of enterprises. It is easy to fall into the situation of passive capital. Therefore, it is suggested to choose the policy of basic dividend plus additional dividend. Basic dividend can maintain the normal dividend for existing investors. When the market improves and corporate profits increase, additional dividend can stimulate the enthusiasm of investors and reduce the refinancing resistance of enterprises.

### 5. INDUSTRY DEVELOPMENT FORECAST

At the end of 2021, China's National Development and Reform Commission and the National Energy Administration jointly launched the Implementation Plan for the Transformation and Upgrading of Coal Power Units, which aims to "reduce the average coal consumption of thermal power generation to less than 300g standard coal/KWH by 2025". Through historical data, it can be found that with the development of technology, the coal consumption rate of power supply has been gradually optimized in recent years, but the average annual optimization efficiency has been reduced. Therefore, combined with the national regulations, we expect the average annual coal consumption rate of power supply to decrease by 1.1g/KWH during the "14th Five-Year Plan" period. During the "15th Five-Year Plan" period, or with the enhancement of supercritical unit technology, the average annual coal consumption rate of power supply will decrease by 1.7 g/KWH. Based on this, we estimate that the demand for thermal coal may peak at 2.55 billion tons during the 15th Five-Year Plan period.

In terms of supply, coal production is expected to be 4.39 billion tons (yoy7.9 percent) in 22 years, and the import of 290 million tons (yoy-9.4%). It is expected to produce 4.48 billion tons (yoy2.1 percent) and import 300 million tons (yoy3.5 percent) in 23 years. On the demand side, coal consumption is expected to be 4.3 billion tons (yoy0.7 percent) in 22 years. It is estimated that the coal consumption in 23 years will be 4.45 billion tons (yoy3.5 percent), including 2.57 billion tons (yoy4 percent) in the power industry, 690 million tons (yoy3 percent) in the steel industry, 530 million tons (yoy3 percent) in the building materials industry and 350 million tons (yoy5 percent) in the chemical industry. From the perspective of pace, considering the base and the impact of the epidemic, the demand in the second half of the year is relatively good. In terms of price, it is estimated that the average price of thermal coal market in 23 years will drop by about 200 yuan/ton (yoy-14.7%), and that of coking coal market will drop by about 400 yuan/ton (yoy-14.8%). In terms of the industrial chain, the price center of the upstream will move down, the demand of the downstream will improve, and the profit of the midstream (coke, coal chemical industry) is expected to recover.

In accordance with national requirements, China Coal energy needs to give overall consideration to energy saving and consumption reduction of coal power, heating and flexible manufacturing, and carry out important measures to enhance the flexible regulation capacity of the power system.

However, a decline in coal consumption as a percentage of total energy consumption does not conflict with an increase in total coal production. In the early stage of the reform, the rational release of coal capacity will not only affect the pace of the country's efforts to push forward the "double carbon" goal, but also improve the country's strategic energy security capacity. Therefore, the coal industry will also usher in certain opportunities to achieve the carbon peak of the coal industry.

### 6. CONCLUSIONS AND DEVELOPMENT

According to the analysis, coal enterprises need to pay attention to their own financial risks, through the financial risk evaluation to timely judge the financial risk situation of enterprises, nip in the hole. In this paper, China Coal Energy as the research object, in view of the financial risk, put forward the following suggestions:

Financing activities: expand the financing channels of enterprises, optimize the capital structure of enterprises in line with laws and regulations; (2) investment: to improve the ability of enterprises to resist risks, to carry out evaluation and supervision of investment projects before, during and after the event, adjust the industrial structure of enterprises; (3) In the capital chain, to improve the asset turnover rate of enterprises, it is necessary to strengthen the inventory management, accounts receivable management and accounts payable management of enterprises; (4) In the distribution process, optimize the dividend policy suitable for the development of enterprises.

Looking forward to the development trend in 2023, it will usher in the era of flexible supply and new opportunities for industry transformation. (1) Carbon neutrality and energy security have become the dual requirements of the coal industry. On the one hand, the goal of carbon neutrality limits the expansion of coal capacity; On the other hand, energy security requires coal as a backstop. (2) New coal mine capacity and intelligent construction will be accelerated. Industrial investment growth accelerated in the January-October period of 2022, up 27.5 percent year on year. The country is promoting capacity building of coal reserves, and investment growth is likely to remain high, with intelligent investment becoming a new direction of investment. (3) Flexible supply to smooth market price fluctuations. The fluctuation of overseas energy prices and the mismatch of domestic supply and demand require the support of flexible supply, so as to achieve the goals of intelligent and flexible production, safe and stable supply and dynamic supply and demand balance of coal supply. (4) The clean and efficient utilization of coal continues to be promoted, and new hydrogen storage materials are developed based on the transformation of the existing coal electrochemical industry. Enterprises are facing new opportunities for development.

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