



# Research on Two-Way Hedging Strategy of Baosteel

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## ABSTRACT

The iron and steel industry is the core industry of the ferrous metal industry and its development is related to the steady state and growth of the economy. As a world-class iron and steel conglomerate, Baoshan Iron & Steel Co., Ltd. imports, produces, and consumes large amounts of iron and steel products. However, at present, the tense international situation has affected the normal operation of the steel industry. The share price of Baoshan Iron & Steel Co., Ltd. has declined at the beginning of 2022 with the decrease in net profit. In this regard, this paper uses literature research, case analysis, comparative analysis, and other methods, and combines the concept of hedging to design a strategy for the hot-rolled coil which has the greatest impact on the company's profitability. Then we use the hot-rolled coil and its raw material iron ore futures and spot prices to evaluate the effect of hedging and compare the profit before and after taking the strategy, whose results show that the strategy can increase the proportion of gross profit, proving that the strategy is effective. In addition, the residual risk generated by the strategy is analyzed and some corresponding measures are put forward to improve the original plan, improving the feasibility of the strategy. Finally, the method of hedging strategy of steel enterprises is summarized. Based on the current international background, this hedging strategy is beneficial to the development of iron and steel enterprises.

**Keywords:** Hedging, Baosteel, Residual risk, Hot rolled coil, Iron ore, Futures.

## 1. INTRODUCTION

Since China joined the WTO in 2003, the industry has shown an explosive growth trend and the demand for steel has continued to grow rapidly [1]. China is the world's largest steel importer, producer, and consumer. As of 2017, the import and production of related products in China's steel industry accounted for more than 50% of the world's, and consumption accounted for 60%. Since 2003, the average price of imported iron ore in China has continued to rise, reaching its peak in 2011 at \$163.8/ton. The import volume rose from 148 million tons in 2003 to 743 million tons in 2012. The overall trend is that the price rises and the volume increases, indicating that China's dependence on the three major mines has increased [2]. As the largest and most modern steel conglomerate in China, Baosteel will sell 18.96 million tons of hot-rolled coils in 2021 and nearly 70 million tons of commercial billets in 2020. However, the iron and steel industry is currently facing the problem of overcapacity. The average annual growth rate of China's crude steel and steel production is 16.58% and 14.26%

respectively. In 2015, affected by the weak global economy and sluggish demand for steel, the output value of crude steel experienced negative growth for the first time, and the capacity utilization rate was only 70%, showing that the problem of excess capacity became increasingly apparent. In addition, at the beginning of 2022, the international situation has become tense with the Russian-Ukrainian war and the overseas market has fluctuated greatly, driving the price of bulk commodities soaring, which has increased the cost of buying raw materials for Chinese steel enterprises. Affected by the domestic epidemic, Product transportation has been restricted, downstream sales have been pessimistic, and there may be a risk of product price reduction. The steel industry is an important basic industry of the national economy. At this time, iron and steel enterprises need to seek breakthroughs, adjust the industrial structure and use financial derivatives to reduce risks, stabilize production and operation and ensure profit growth such as futures. At the same time, iron and steel enterprises have information advantages, professional advantages, experience advantages, and resource supply that financial

institutions do not have. These "intelligence" resources can be cashed in the financial market. It is also an important idea for enterprises to innovate, transform and upgrade by providing customers with derivative products and services to capture customers with common needs and common values [3]. By using futures tools, reasonable prices for buying raw materials and selling products can be locked in advance to ensure the normal operation of iron and steel enterprises. In addition, futures prices can timely reflect the changes in market supply and demand, and make accurate predictions on the development trend of the futures market, which is conducive to risk management [4].

Taking Baoshan Iron and Steel Co., Ltd. as an example, this paper selects the hedging theory to design a strategy for the company and analyses it. Hedging is mainly used to avoid the risk of price fluctuations. Due to the gradual globalization of the economy, more and more uncontrollable factors affecting price changes make changes difficult to predict, but the use of hedging can ensure the economic benefits of enterprises, which is the reason why the paper chose the hedging strategy [5]. Hedging can guide ferrous metal industry chain enterprises to efficiently use the futures market to transfer price risks, which is beneficial to the establishment of an international futures market and a bulk commodity pricing center [6]. Yanan Song proposed a comprehensive hedging method, showing that we can buy and sell hedging at the same time and design a hedging strategy for the three major links of procurement, processing, and sales [7].

This paper analyses the production and sales volume of Baoshan Iron and Steel Co., Ltd. and finds that the marketing of hot rolled coils accounts for a large proportion of profits. In addition, the company's operation is positively correlated with the change in its stock price, and affected by the current international background, the company's stock price begins to show a downward trend in 2022. Therefore, according to Baosteel's actual production and sales capacity, through literature analysis, data integration, model design, and risk analysis, this paper designs a double-variety reverse hedging model for the company's hot-rolled coil and its main raw materials, locking the company's profit by locking the cost of iron ore and the selling price of hot-rolled coils. And the actual profit is calculated using the existing spot price and futures price. It is finally confirmed that the strategy stabilizes the gross profit at 73.2%, indicating that the hedging is effective. But there are still unavoidable residual risks. This paper analyses them and proposes improvement measures to make the strategy more operable. This paper finally draws the conclusion that according to the double-variety reverse hedging strategy, in the financial trading environment, Chinese steel enterprises represented by Baosteel can buy futures and sell the spot for hedging on the raw material side to counteract the risk of rising costs, then sell futures

and buy the spot for hedging on the product side to resist the downside risk of profits.

The contributions of this paper are as follows: First, Peng Zhao once studied the hedging business of M Company. Considering seasonal factors, he avoided the risk exposure at both ends of the sales side and the raw material side, which confirmed the feasibility of the two-way hedging strategy [8]. But the evaluation of the effect of the strategy is not perfect. In addition, there is a certain periodicity in seasonal factors, which can only prove that the strategy is effective in dealing with risks caused by conventional factors, and it cannot be shown whether the strategy is still effective when the international situation has changed. In the effect evaluation, this paper considers the cost analysis of using futures and analyzes the hedging effect of hot-rolled coil and iron ore respectively to highlight the effectiveness of the strategy. The research of this paper also broadens the applicable conditions of the strategy, and the two-way hedging strategy is still effective for market fluctuations caused by unexpected changes in the situation, which deepens the research on hedging theory.

Secondly, through case analysis and data summary, this paper can provide accurate and stable data support for the existing hedging strategy. At the same time, through the design and risk analysis of the double-variety reverse hedging strategy, the research on the relationship between futures and spot markets is broadened, and new ideas and viewpoints are provided for iron and steel enterprises to conduct financial market transactions.

Third, due to the continuation of the epidemic and the conflict between Russia and Ukraine, the market environment is complex and volatile, and domestic and foreign trade has been hindered, resulting in a sharp rise in the prices of steel raw materials and sharp fluctuations in the prices of steel products, which greatly affects the normal production and operation of iron and steel enterprises. Hedging avoids the risk of loss of profits caused by changes in market conditions. It inspires various steel companies to formulate more complete corporate strategies in combination with the financial market. This behaviour is conducive to enhancing the overall competitiveness of the steel industry and the long-term survival and development of enterprises.

Finally, affected by the current international market, the price of iron ore remains high, reflecting that the domestic steel market pricing mechanism is not perfect. The extensive use of futures tools such as hedging has enabled the continuous improvement of the futures market, which is conducive to the development of the steel pricing system.

The rest of the paper is organized as follows: In Section 2, we describe the company profile; In Section 3, we design a hedging strategy and analysis the strategy effect; In Section 4, we analyse the rest of risks; In

Section 5, we improve the scheme; The last section presents our conclusions.

## 2. FIRM DESCRIPTION

Baoshan Iron & Steel Co.,Ltd. is a world-class steel conglomerate, mainly in the steel industry. Its business scope includes the smelting and processing of steel, the production and sales of chemical materials and its products, the development and transfer of technologies, the import and export of commodities and technologies and so on. Some related businesses of IT, finance as well as electronic commerce are all involved. Its main steel products are carbon steel, stainless steel and special steel.

### 2.1. Sales volume, production and inventory of the company's main products from 2017 to 2020

**Table 1.** Company business situation from 2017 to 2020 (unit: 10,000 tons)

	2017	2018	2019	2020
Sales volume	4617	4710	4719	4598
Sales volume of hot rolled carbon steel coil	2134	2054	2107	1896
Sales volume of cold rolled carbon steel coil	1724	1852	1781	1799
Sales volume of other steel products	546	403	414	509
Sales volume of steel tube products	213	222	219	198
Sales volume of long products	--	179	197	195
Sales volume of commodity billets	4617	4709.8	4718.5	4597.5
Production	4538	4675	4687	4562
Production of hot rolled carbon steel coil	2101	2027	2082	1861
Production of cold rolled carbon steel coil	1705	1845	1776	1798
Production of other steel products	535	399	414	507
Production of steel tube products	535	224	218	202
Production of long products	--	180	198	195
Inventory	243	242	236	211
Inventory of cold rolled carbon steel coil	153	158	145	127
Inventory of hot rolled carbon steel coil	55	47	48	44
Inventory of steel tube products	15	19	18	19
Inventory of other steel products	20	14	18	17
Inventory of long products	--	4	8	5

### 2.2 Correlation analysis between company operation and stock price

According to Table 2 and Figure 1, the company's gross revenue showed a downward trend during the past five year. As of the third quarter of 2021, it was 278,950,489,100 yuan. The net profit started falling in

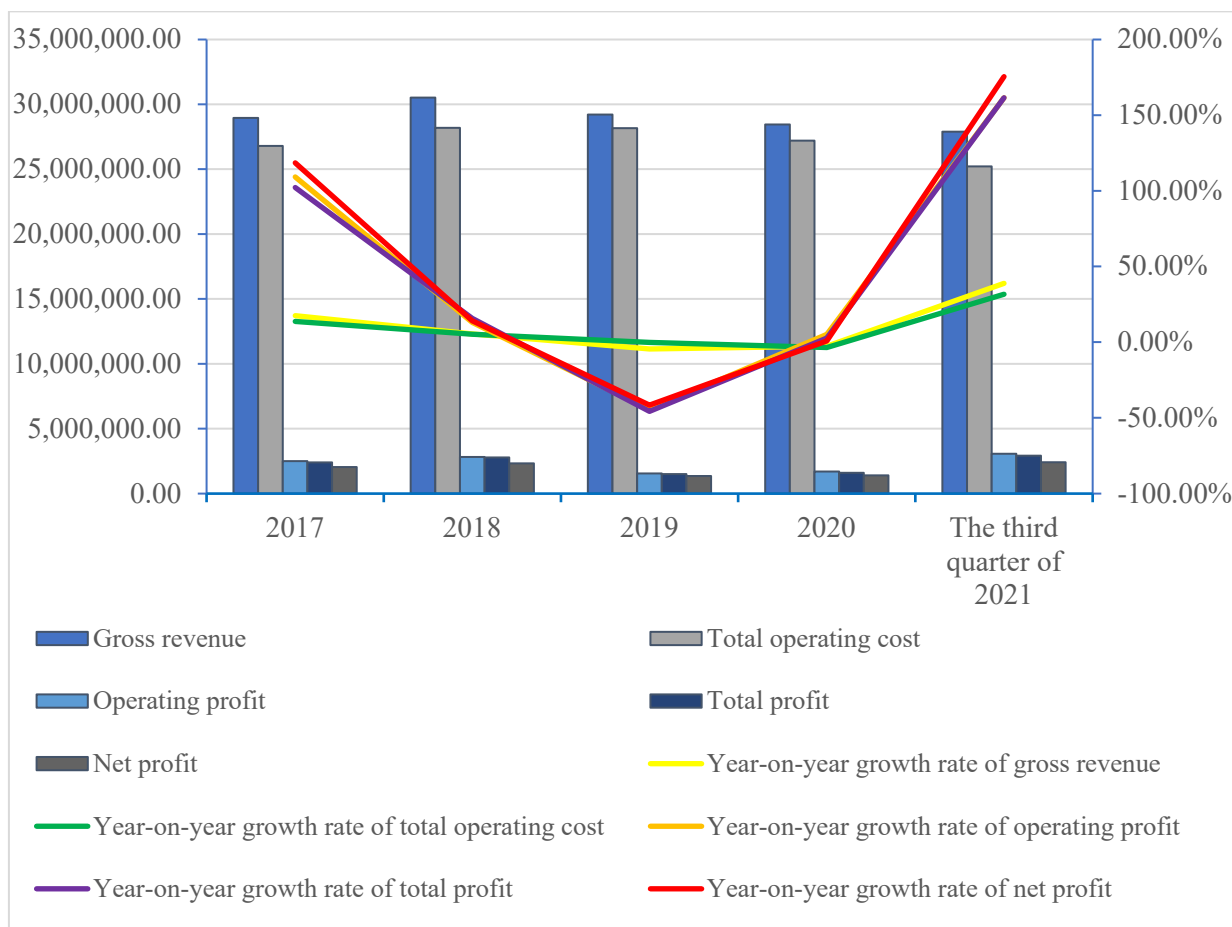
As shown in the following Table 1, on the whole, the company's production, sales volume and inventory showed an upward trend from 2017 to 2019, but there was an inflection point in 2020. Due to the impact of the epidemic that year, the import and export of raw materials and products were restricted, and the superposition of multiple factors led to the larger price fluctuations of raw materials and products, affecting the enterprise operation seriously.

In terms of product subdivision, the production and sales volume of hot rolled carbon steel coils accounted for the largest proportion, followed by cold rolled carbon steel coils and other steel products, indicating that the company's profit is mainly based on selling hot rolled carbon steel coils.

2018 and then rebounded in the third quarter of 2021, reaching 24,097,141,400 yuan, exceeding the peak in 2018. This phenomenon is related to the gradual recovery of downstream demand against the backdrop of the recovery of the domestic economy in 2021 as well as the significant role played by the company in taking relevant derivatives strategies.

**Table 2.** Company revenue from 2017 to the third quarter of 2021 (unit: 10,000 yuan)

	2017	2018	2019	2020	The third quarter of 2021
Gross revenue	28,949,779.19	30,520,486.68	29,205,746.28	28,443,649.72	27,895,048.91
Year-on-year growth rate of gross revenue	17.48%	5.43%	-4.40%	-2.73%	38.87%
Total operating cost	26,797,794.76	28,192,934.78	28,160,948.91	27,199,200.13	25,211,578.63
Year-on-year growth rate of total operating cost	13.70%	5.21%	-0.19%	-3.47%	31.75%
Operating profit	2,492,417.04	2,818,330.83	1,551,460.09	1,695,500.24	3,064,090.86
Year-on-year growth rate of operating profit	109.11%	13.08%	-44.49%	5.17%	161.53%
Total profit	2,403,513.01	2,781,605.76	1,499,404.83	1,602,165.46	2,913,081.01
Year-on-year growth rate of total profit	102.16%	15.73%	-45.64%	2.70%	161.56%
Net profit	2,040,313.72	2,327,814.09	1,346,901.45	1,398,538.33	2,409,714.14
Year-on-year growth rate of net profit	118.47%	14.09%	-41.55%	0.82%	175.47%

**Figure 1** Company revenue from 2017 to the third quarter of 2021 (unit: 10,000 yuan)

As shown in Figure 2 below, the share price rose from 2017 to 2018, maintained a downward trend between 2018 and 2020, and went up to 11.49 yuan again in the third quarter of 2021, exceeding the maximum price of 9.35 yuan in 2018. From the fourth quarter of 2021 to the beginning of 2022, the company was under pressure the

increasing raw material prices and was subjected to the policy of limiting production and electricity, causing the decline in production. During the same period, there was a drop in demand, which affected the company's performance, leading to a fall in its share price.



Figure 2 Share price of Baosteel (A shares) in the past five years (unit: yuan)

The share price trend is similar to the net profit trend, illustrating that the rise in net profit drives the share price up. It can be seen that the share price needs to be supported by the operation of the enterprise. In the long run, the operating efficiency of the enterprise determines the trend and magnitude of the share price. Under the above-mentioned share price trend, the company can take a hedging strategy to maintain normal operations, helping the share price to recover.

### 3. HEDGING STRATEGY

The company's sales volume and production of hot-rolled coils are so large that deeply affect the gross revenue, so the hot-rolled coils are hedged. The raw materials of the hot-rolled coil are mainly iron ore and coke raw materials are not considered temporarily. Under the advocacy of low-carbon environmental protection idea and the international situation of the war of Russia

and Ukraine, the domestic iron ore decreased by 10.28% and its import volume decreased by 0.24% in January and February of 2022 while the steel mills resumed normal operations led to the higher upstream demand, presenting the situation where the supply decreased and its demand increased, so the raw material prices are at risk of rising. As for the hot-rolled coils, because the domestic epidemic situation has intensified in recent months, there is a negative impact on the downstream demand side. In addition, its spot price has fluctuated and gone up recently and the gross profit started rising in 2021 as shown in Figure 3 below. The main reason is that the intervention of national policies at the end of last year affected the price trend of raw materials, and iron ore and coke raw materials fell rapidly. It attracts various enterprises to increase their production efforts with the aim of making high profits, presenting the situation where supply exceeds demand, so the prices are at risk of falling.

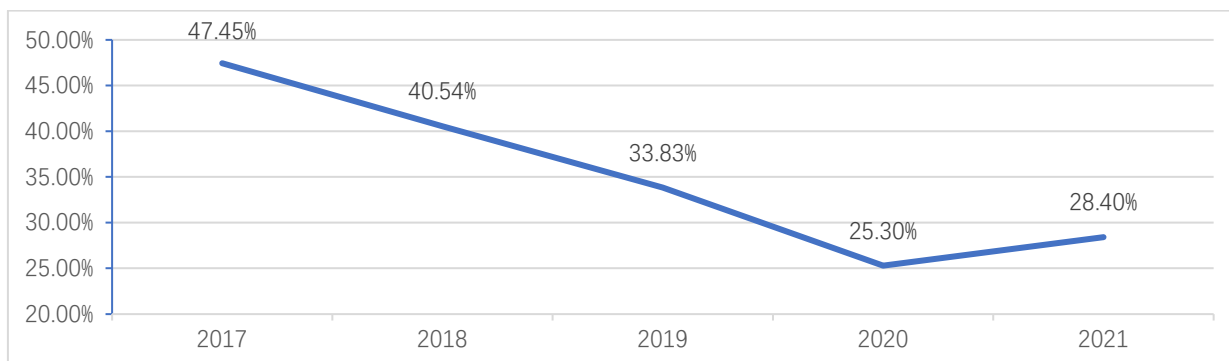


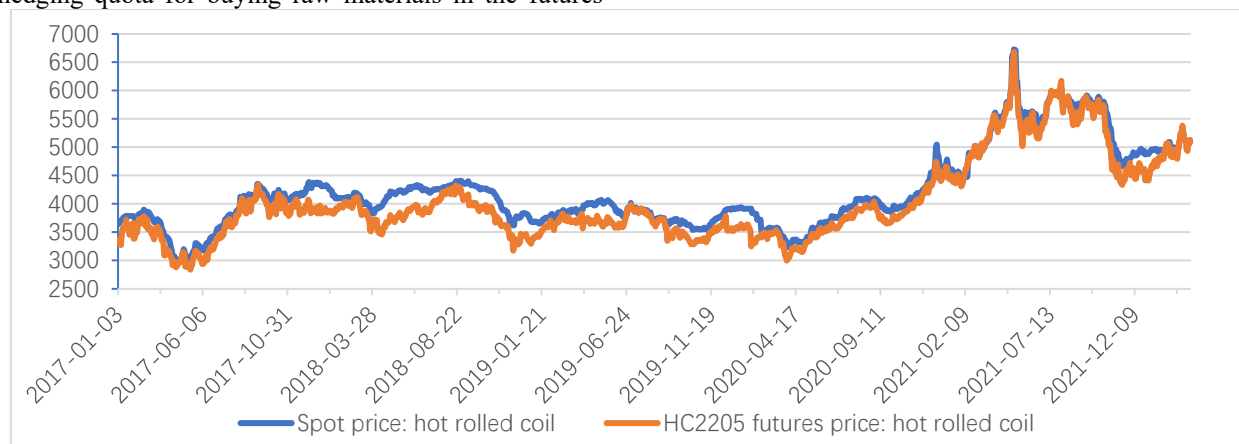
Figure 3 Year-on-year growth rate of hot rolled carbon steel coil gross profit (unit: %)

In order to avoid the above risks, the company can take a two-way hedging strategy, selling the hot-rolled coil hedging to lock the sale proceeds in advance and buying the raw material iron ore hedging to lock the production cost in advance. Due to the high activity of

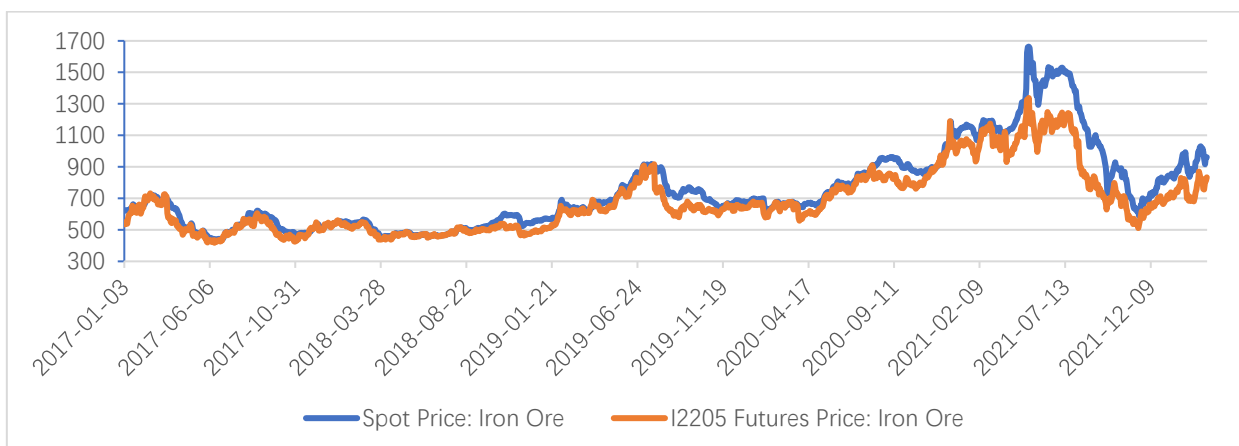
the May contract recently, the hot rolled coil HC2205 futures contract and the iron ore I2205 futures contract are selected. The hot-rolled coil quota company plans to hedge is 2.2 million tons of hot rolled coil during 2022, that is 183,000 tons per month, so 183,000 tons of hot

rolled coil will be hedged by selling. The consumption of iron ore is determined according to the plan based on the proportion of 1.65 tons of iron ore required for one ton of hot rolled coils, 302,000 tons per month, which is the hedging quota for buying raw materials in the futures

market. According to the Figure 4 and Figure 5, since the spot price change and futures price fluctuation of hot rolled coil and iron ore have tended to be the same in the past year, we set the hedge ratio is equal to one here ( $h=1$ ).



**Figure 4** Spot price and futures price of hot rolled coil (unit: yuan/ton)



**Figure 5** Spot price and futures price of iron ore (unit: yuan/ton)

As of March 7, the spot price of hot rolled coil was 5,302 yuan/ton and the futures price was 5,380 yuan/ton, the spot price of iron ore was 995 yuan/ton and the futures price was 870 yuan/ton. The hedging quantity for selling 183,000 tons of hot rolled coil futures is 183,000 tons / 10 tons/board lot = 18,300 board lots. On March 7, the margin ratio was 10%, so the margin required is 18,300 board lots \* 10 tons/board lot \* 5380 yuan/ton \* 10% = 98,454,000 yuan. In order to resist the risk fluctuations, half-position trading is better, so based on 50% of the

position, the required capital scale is  $98,454,000/50\% = 196,908,000$  yuan. The hedging quantity for buying 302,000 tons of iron ore futures is 302,000 tons / 100 tons/board lot = 3020 lots. On March 7, the margin ratio was 12%, so the margin required is 3020 board lots \* 100 tons/board lot \* 870 yuan/ton \* 12% = 31,528,800 yuan, the required capital scale is  $31,528,800/50\% = 63,057,600$  yuan. So we get the scheme as shown in Table 3 below.

**Table 3.** Two-way hedging scheme

Scheme	Hot rolled coil	Iron ore
Contract selection	Shanghai Futures Exchange HC2205	Dalian Commodity Exchange I2205
Amount of hedging	18300 board lots	3020 board lots
Trading direction	Sell	Buy
Time of opening position	March 7	March 7
Time of closing position	May 19	May 19
Range of limit move	8%	10%

Margin ratio	10%	12%
Amount of margin	98,454,000 yuan	31,528,800 yuan
Capital scale	196,908,000 yuan	63,057,600 yuan

**Table 4.** Hedging cost analysis

Project	Standard of cost	Cost
Transaction fee	0.01%	Hot rolled coil: 18300 board lots * 10 tons/board lot * 5380 yuan/ton * 0.01% = 98,454 yuan Iron ore: 3020 board lots * 100 ton/ board lots * 870 yuan/ton * 0.01% = 26,274 yuan Total: 98,454 + 26,274 = 124,728 yuan
Interest on funds	74 days in total Annual interest rate: 3%	$74/365 * 3% * 124,728 = 758.6$ yuan
Delivery service charge	2 yuan/ton	$(183,000 + 302,000) * 2 = 485,000$ yuan
Inspection fee	2 yuan/ton	$(183,000 + 302,000) * 2 = 485,000$ yuan
Total		$124,728 + 758.6 + 485,000 + 485,000 = 1,095,513.6$ yuan

Notes: The cost not included in the table is not considered in the scheme for the moment, such as added-value tax, the cost of being put in storage, auxiliary material fee, etc. The data of Table 4 is from the article [9], [10].

**Table 5.** Effect of two-way hedging strategy

March	Spot market	Futures market
Hot rolled coil	5302 yuan/ton 183000 tons * 5302 yuan/ton = 970,266,000 yuan	Sell the HC2205 contract, 5380 yuan/ton 18300 board lots * 10 ton/ board lots * 5380 yuan/ton = 984,540,000 yuan
Iron ore	995 yuan/ton 302000 tons * 995 yuan/ton = 300,490,000 yuan	Buy the I2205 contract, 870 yuan/ton 3020 board lots * 100 ton/board lots * 870 yuan/ton = 262,740,000 yuan
Cost	300,490,000 yuan	$262,740,000 + 1,095,513.6 = 263,835,513.6$ yuan
Profit and loss	Gain $970,266,000 - 300,490,000 = 669,776,000$ yuan	Gain $984,540,000 - 263,835,513.6 = 720,704,486.4$ yuan
	Taking two-way hedging strategy can gain $720,704,486.4 - 669,776,000 = 50,928,486.4$ yuan	

According to the Table 5, if the company dose not take this strategy, it will gain 669,776,000 yuan. If it buys the I2205 contract and sells the HC2205 contract, it will gain 720,704,486.4 yuan, the spread of profit is 50,928,486.4 yuan. The proportion of cost is  $263,835,513.6 / 984,540,000 = 26.8\%$  and the proportion of gross profit is  $720,704,486.4 / 984,540,000 = 73.2\%$ , this strategy keeps gross profit steady at 73.2%.

**Table 6.** Effect of hot rolled coil hedging

Hot rolled coil	Spot market	Futures market
March 7	Buy the spot, 5302 yuan/ton	Sell the HC2205 contract, 5380 yuan/ton

March 18	Sell the spot, 5096 yuan/ton	Buy the HC2205 contract, 5129 yuan/ton
Profit and loss	Loss 5096 - 5302 = -206 yuan/ton	Gain 5380 - 5129 = 251 yuan/ton
	Actual sale proceeds: 5096+251=5347 yuan/ton 5347 yuan/ton * 183000 tons = 978,501,000 yuan	

**Table 7.** Effect of iron ore hedging

Iron ore	Spot market	Futures market
March 7	Sell the spot, 995 yuan/ton	Buy the I2205 contract, 870 yuan/ton
March 18	Buy the spot, 961.11 yuan/ton	Sell the I2205 contract, 833.5 yuan/ton
Profit and loss	Gain 995- 961.11=33.89 yuan/ton	Loss 833.5-870=- 36.5 yuan/ton
	Actual purchase cost: 961.11+36.5=997.61 yuan/ton 997.61 yuan/ton * 302000 tons = 301,278,220 yuan	

According to the Table 6 and Table 7, if the company took the two-way strategy on March 7, the hot rolled coil would gain 251 yuan/ton and the iron ore would lose 36.5 yuan/ton on March 18. Due to the influence of some market factors, there are some differences between the spot price fluctuations and the rise and fall of the futures prices at times, affecting the book value of profit and loss fluctuations. But the spot and futures prices move essentially the same, the risk will be small. Therefore, the actual sale proceeds are 978,501,000 yuan; the actual purchase cost is 301,278,220 yuan; the cost during hedging is 1,095,513.6 yuan and the actual profit is 676,127,266.4 yuan.

## 4. RISK ANALYSIS

### 4.1. Hedging ratio error risk

The above hedging model adopts the traditional hedging method, that is, 1:1 hedging according to the actual production of coke required and the actual production of iron ore. However, the current price fluctuation is often not exactly the same. Due to the

different basis differences of the spot current price, the large fluctuation of the basis may lead to the unsatisfactory hedging effect. Enterprises can adjust their hedging ratios by calculating the effectiveness of the futures market to reduce risks and stabilize returns.

### 4.2. Single risk of the hedging variety

The hedging model in the upper section only hedges hot-rolled coil and iron ore, Baosteel stainless steel, rebar steel, and other business scope is not hedging. When the current price has large fluctuations, stainless steel, rebar appeared large fluctuations. There are certain risks to corporate profits.

### 4.3. Physical delivery risk

Physical delivery risk includes quality risk and delivery place risk. Quality risk: although it is within the scope of quality standard, the product quality is different at delivery, or the product quality is damaged during transportation. Delivery place risk: The buyer and the seller may face additional transportation costs, or the product cannot be transported to the customer due to unexpected reasons, such as war. It is difficult to deal with such risks.

### 4.4. Risk of hedging timing error

The entry time of the above model in hedging is relatively subjective, and the entry time of building positions and holding positions is generally determined according to the contract signing time and production and sales time. The timing is sometimes not the maximum profit timing of the entire contract cycle, often resulting in the annual profit is only higher than the average level of the company's production and operation, rather than a relatively high level [11].

### 4.5. Single tool, capital occupation risk

This model mainly uses futures, a financial derivative tool, for arbitrage. In addition to using futures tools, Baosteel can use options and forward combinations to achieve the purpose of risk control. The above model only uses the condition of the future and will face the uncertain risk of the market investment. And futures trading requires a large amount of margin, once there are sharp fluctuations to lead to margin losses. Moreover, futures trading has easy manipulation of forwarding contracts and drastic fluctuations in the price of futures contracts, which will lead to a reasonable deviation of futures prices. Baosteel only uses futures for hedging, and the drastic fluctuations may lead to huge losses [11].



#### 4.6. Fixed pricing risk

The hedging conducted by Baosteel is based on the product trading contract signed by the company. The contract is signed with the mode of the fixed sales price of steel, fixed the sales price of steel, which will lead to the increase brought by the spot price rise can not be obtained under this fixed mode.

### 5. IMPROVE THE PLAN

(1) Iron and steel enterprises through the balance test, eliminate the error brought by the basis, adjust the hedging ratio, to realize the futures, and spot complete hedging.

(2) Baosteel can choose multiple varieties of hedging. At present, the upstream and downstream products of the iron and steel industry have been basically available, iron ore, rebar, stainless steel, hot rolled coil, wire, coking coal, coke, thermal coal, silicon manganese, iron silicon nearly ten varieties, hedging trading conditions for steel enterprises. Therefore, Baosteel can achieve the purpose of risk avoidance through diversified hedging.

(3) Iron and steel enterprises can predict the production and sales situation of the company, and sell the products with an accumulated inventory. In order to alleviate the negative scissors gap, they can hedge according to the principle of 80% hedging and 20% risk exposure. At the same time, the scale hedging can be carried out through the annual and monthly production strategies of enterprises, and the irrational price fluctuations of futures contracts can be used to hold strategic open positions for the hedging of products and raw materials.

(4) Baosteel can increase the flexibility of hedging trading. Since commodity futures have the function of price discovery, enterprises can predict the price fluctuations in real-time according to the futures market and choose the entry time more accurately. For example, they can hold short positions in hot-rolled coil futures and buy iron ore and coke to reduce the risk of price fluctuation; or when the gross profit is low, enterprises can hold long positions and short positions in raw materials [11].

### 6. CONCLUSION

This paper analyses the reality of hedging case and research background, analyses the significance of the portfolio for iron and steel enterprises, and Baosteel company as an example, analyses the company's background information, business, financial situation, and recent stock price, combined with the company about hot rolled coil, iron ore hedging model, calculate the profit before and after the hedging and discusses the effectiveness of the hedging. At the same time, this paper analyses the risk model, multiple angles to explore the

completeness of the scheme, and by using data and calculation formulas to give targeted solutions, through the above steps finally designed a set of hedging strategies represented by Baosteel Chinese steel enterprises in the financial trading environment, can buy futures in raw fuel, sell spot hedging, fight rising cost risk, and sell futures, buy spot hedging, combat earnings downside risk. And analyze its advantages and disadvantages, as follows:

#### Advantage:

(1) This paper reanalyses the risk exposure of Baosteel company and determines its hedging direction and strategy, and analyses and estimates the enterprise hedging effect.

(2) Through comparison, the main product of Baosteel company is hot-rolled coil, and hedging it in the opposite direction to effectively lock the company's profits.

(3) Hedging of iron ore at the material end, effectively improving the accuracy through two-variety reverse direction hedging.

#### Deficiency:

(1) The data collection channel adopted in hedging is relatively narrow, and the accuracy of data is weak, resulting in insufficient accuracy of the final hedging effect.

(2) The hedging strategy in this paper mainly focuses on the hedging of hot rolled coil and iron ore. Other varieties of enterprises have an industrial chain relationship with the above varieties, and the lack of hedging for other varieties will reduce the ability to resist price fluctuations.

(3) Because the research on the basis of iron ore and hot rolled coil in this paper is relatively weak, when the futures market has specific situations such as approaching the delivery date and excessive speculation, which lead to large price fluctuations, the ability of companies to resist the price changes is not strong.

#### Suggestions:

(1) Steel enterprises can use the hedging strategy designed above to avoid risks and lock in profits

(2) Iron and steel enterprises should conduct more fundamental analysis, analyse the price trend of upstream and downstream products in the industry, compare the current orders with the average profit level of the company, and reasonably arrange the production scale.

(3) Iron and steel enterprises should increase the flexibility of commodity trading. According to enterprise strategy and industry rules, when the current product price or futures price is high, or raw materials and finished products are highly undervalued, enterprises can selectively hold long and short positions to achieve the

purpose of reducing the risk of profit fluctuations and locking high profits.

(4) Enterprises should establish a suitable trading system according to their own historical data. Adjust and improve the hedging strategy according to the company's capital scale, production scale, risk preference and investment style.

(5) Steel companies can open independent hedge accounts, deposits and fees in advance to ease the pressure on their cash flow.

## REFERENCES

- [1] J. Liu. (2013). Countermeasures of iron and steel enterprises under the background of iron ore pricing financialization (Master's thesis, East China Normal University). DOI: <https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CMFD201401&filename=1014150510.nh>
- [2] H.H. Xu. (2021). Design of cross-variety hedging strategy for iron and steel enterprises (Master's thesis, Nanjing Normal University). DOI: <https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CMFDTEMP&filename=1022405685.nh>
- [3] Y.S. Li. (2020). Constructing a hedging system based on the integration of industry and finance in the steel industry in the post-epidemic period. *Continental Bridge Vision* (09), 56-57. DOI:
- [4] P. Huang. (2018). Analysis of hedging practice in my country's steel industry (Master's thesis, Xiamen University). DOI: <https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CMFD201902&filename=1018257323.nh>
- [5] M.M. Bu. (2018). Research on hedging of enterprises in the ferrous metal industry chain (Master's thesis, Hebei Institute of Finance). DOI: <https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CMFD201901&filename=1018092200.nh>
- [6] Y.N. Song. (2019). A case study of hedging in N steel company (Master's thesis, University of Electronic Science and Technology of China). DOI: <https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CMFD202001&filename=1020716794.nh>
- [7] P. Zhao. (2020). Research on Hedging Strategy of Steel Futures of M Steel Co., Ltd. (Master's Thesis, Donghua University). DOI: <https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CMFD202002&filename=1020758240.nh>
- [8] P.J. Zhao. (2019). Application of iron ore hedging in steel enterprises in my country (Master's thesis, Tianjin University of Finance and Economics). DOI: <https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CMFD202002&filename=1020029819.nh>
- [9] N.X. Liu. (2014). J Steel Company Hedging Strategy Research (Master's Thesis, Shandong University). DOI: <https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CMFD201501&filename=1014309744.nh>
- [10] X.R. Zhao. (2014). A Research on Hedging Scheme of Iron and Steel Enterprises (Master's Thesis, Yunnan University). DOI: <https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CMFD201502&filename=1015577295.nh>
- [11] J.L. Liu. (2021). Optimal Analysis of Hedging Strategy of G Enterprises (Master's Thesis, Hebei University of Finance). DOI: <https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CMFD202102&filename=1021577774.nh>

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