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The Risk of Hedging Management based on Case of Tsingshan Holding Group Co.

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Abstract

The use of futures for hedging is a common method to manage risk in trading and capitalize on arbitrage opportunities. However, as trading volume increases, many cases demonstrate inadequate risk management by companies. Therefore, this essay will analyze the case of Tsingshan Holding Group Co. and conduct research on risk management in hedging. The article will consist of parts of introduction, case description, reason that cause fluctuation, the equation we used to evaluate risk of hedging and suggestion.

Keywords

Tsingshan Holding Group; Margin Call; Nickel Futures; Risk Strategies.

1. Introduction

1.1. Research Background

As the world becomes more economically interconnected, the importance of commodity supply chains on a global scale is increasingly evident. The complex nature of the global market and geopolitical influences have led to greater fluctuations in commodity prices, making companies more exposed to risks related to price changes in raw materials and finished products. Given the current unpredictable international environment, international commodity trade is now more vulnerable than ever to external factors and unexpected events.

Many businesses use futures for hedging to reduce commodity price risk, but there are inherent risks that cannot be avoided. In particular, the frequent occurrence of unexpected events in recent years have led to increased price volatility in the global futures market, requiring companies to consider and address a wider range of risks when using futures for hedging. Failing to implement hedging programs based on sound principles may expose companies to greater risks. At the same time, issues such as incomplete risk control and inadequate regulatory systems could lead to significant losses for enterprises involved in hedging activities.

As a result, effective risk management is crucial throughout the entire hedging process to optimize corporate hedging strategies, minimize price risks, and enhance overall risk management capabilities. For large companies with substantial trading volumes, losses in hedging can have widespread impacts on the entire supply chain.

Therefore, it is necessary to implement strong risk management and corresponding measures to improve market stability and foster industry development. This study aims to investigate and propose steps for improving enterprises' risk management in futures hedging.

1.2. Literature Review

Zunhao Xia found that when hedging, firms should take into account the impact of price fluctuations and spread the risk by taking longer deliveries rather than concentrating them over a short period of time [1]. Ge Wang, Hanyi Zhao, Zixin Zhang and Shengze Wu He blamed the LME's inadequate oversight of the market and Tsingshan's poor liquidity management for

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the incident [2]. Cheng Jing found that hedging by using future products has kind of risk but truly efficient, so firm should keep on using it [3]. Jiahao Zhang mention that a risky hedging can lead to a big loss on company's profit, even it has a huge volume [7].

1.3. Frame Used

The primary methodology employed in this article is a case study, based on case of fluctuation in LME nickel price which affect Tsingshan Holding Group. We'll analyze the reason led to the change of price and give suggestions for firms which use hedging strategy.

2. Case Description

2.1. Company Background

Tsingshan Holdings, established in the 1980s, was founded by Zhejiang Ouhai auto doors and Windows manufacturing company, Zhejiang Tsingshan Special Steel Company and other companies. In June 2003, it was registered as the largest group company. Since then, it has successively established Shanghai Dingxin Investment Group, Qingtuo Group, Yongqing Group, Yongqing Technology and other companies. It has formed five group companies under the jurisdiction, composed of more than 300 subsidiaries.

As of September 2018, the company's registered capital is 2.80 billion yuan with Dingxin Investment holding 23.70% of the company's equity as the largest shareholder. Xiang Guangda and Tsingshan Management hold 22.30% and 11.50%, respectively while Xiang Guangtong? and other natural persons hold 42.50%. The actual control of the company is a natural person Xiang Guangda. Tsingshan Holdings' revenue in 2021 exceeded 350 billion yuan making it the world's largest nickel and Stainless steel producer with a full industrial chain layout from nickel mining to stainless steel plate production along with new energy battery production for energy storage systems and electric vehicles in the field of new energy using raw materials and intermediate products produced by themselves.

2.2. The Review of Cases

In March 2022, there was a significant increase in nickel futures prices on the LME, causing a stir in global financial markets. Trading volume on the LME was twice during this time and emergency measures were put in place. Throughout 2021 and early 2022, nickel prices on the LME remained relatively steady at around $20,000 per metric ton.

However, at the end of February 2022, tensions between Russia and Ukraine led to sanctions imposed by Western countries on Russia. Market concerns about potential trade restrictions and delivery disruptions for related resources resulted in substantial volatility in global commodity prices. From March 1st to 4th, nickel prices on the LME showed a continuous upward trend for four consecutive trading days, reaching a peak price of over $30,000 per metric ton. Then, on March 7th and 8th, front-month nickel futures contracts on the LME broke historical records with an unprecedented increase of 250%.

On March 7th, nickel futures opened at $29,770 and briefly surged to a historic high of $55,000 during intraday trading. Overnight trading on March 8th saw continued escalation in nickel futures prices as they surpassed the $1000 and reached a peak price of $101,365 (as shown in Figure 1 and Figure 2).

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Figure 1. Nickel Trade Price Between Feb 4 to Apr 1 in 2022[5]

Contract	Expiry Date	Holdings (Lots)	Holdings (Tons)	Large Holder Short Ratio	Short Sale Volume (Tons)
Month 1	March 23	19,417	1,165,021	50%-80%	58,251
Month 2	April 20	37,251	223,506	45%-70%	100,577.7
Month 3	May 18	42,073	252,438	35%-70%	88,353.3
Total	-	98,741	592,446	-	247,182

Figure 2. LME position [5]

Tsingshan Holding Group, a prominent nickel producer, held an 18% share of the global market in 2020. In order to mitigate the risk associated with fluctuating nickel prices, the company implemented a futures hedging strategy involving short positions in nickel futures.

Tsingshan Group is potentially facing losses ranging from $11.4 billion to $15.2 billion based on the peak price of $101,000 per ton observed on March 8th due to speculative short positions ranging from 150,000-200,000 tons and an initial short position with the strike price of approximately $25,000 per ton before March 6, 2022.

Despite their hedging strategy allowing for spot delivery upon expiration date with sufficient underlying goods for physical delivery to lock in arbitrager opportunity, Tsingshan Group encountered challenges due to insufficient delivery commodities and failure to timely adjust their positions. On March 15th, 2022, Tsingshan Group announced that it had reached a tacit agreement with a consortium of futures banking creditors during this silent period where participating futures banks have agreed not to close out Tsingshan's positions or demand additional margin on existing positions.

As part of this arrangement, Tsingshan Group is expected to gradually reduce its existing positions as abnormal market conditions subside; however, it is already evident that irreversible losses have been incurred by the company.

2.3. High Risk Hedging

Assuming:

$E(\Delta S - h \cdot \Delta F)$

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$= \mathrm{E}(\Delta\mathrm{S}) - \mathrm{h}\cdot\mathrm{E}(\Delta\mathrm{F})$
$= 0 - \mathrm{h}\cdot 0$

From a statistical perspective, because the probabilities of rising and falling are equal, the expected values of both ΔS and Δh are zero.

Therefore:

$\mathrm{Var}(\Delta\mathrm{S} - \mathrm{h}\Delta\mathrm{F})$
$= \mathrm{E}(\Delta\mathrm{S} - \mathrm{h}\Delta\mathrm{F})^2 - \cancel{\mathrm{E}^2(\Delta\mathrm{S} - \mathrm{h}\Delta\mathrm{F})}$
$= \mathrm{E}[(\Delta\mathrm{S})^2 - 2\cdot\Delta\mathrm{S}\cdot\mathrm{h}\cdot\Delta\mathrm{F} + \mathrm{h}^2\cdot(\Delta\mathrm{F})^2]$
$= \mathrm{E}(\Delta\mathrm{S})^2 - 2\mathrm{hE}(\Delta\mathrm{S}\cdot\Delta\mathrm{F}) + \mathrm{h}^2\cdot\mathrm{E}(\Delta\mathrm{F})^2$

$$\frac{d(Var)}{dh} = 2h\cdot E(\Delta F)^2 - 2E(\Delta S\cdot\Delta F)$$

$$2h\cdot E(\Delta F)^2 - 2E(\Delta S\cdot\Delta F) = 0$$

$$2h\cdot E(\Delta F)^2 = 2E(\Delta S\cdot\Delta F)$$

$$\mathrm{h} = \frac{E(\Delta S\cdot\Delta F)}{E(\Delta F)^2}$$

$$= \frac{\mathrm{Cov}(\Delta S\cdot\Delta F)}{\sigma^2\cdot\Delta F}$$

$$= \rho[\frac{\sigma(\Delta\mathrm{S})\cdot\cancel{\sigma(\Delta\mathrm{F})}}{[\sigma(\Delta\mathrm{F})]^{\cancel{2}}}]$$

$$= \rho\frac{\sigma\mathrm{S}}{\sigma\mathrm{F}}$$

From a statistical perspective, a perfect hedge occurs when the formula

$$\mathrm{h} = \rho\frac{\sigma\mathrm{S}}{\sigma\mathrm{F}}$$

holds true. The mistake made by Tsingshan Group arose from their assumption that the volatility of futures and the volatility of spot prices were equal in the past will lead to the same result in the future.

This assumption implied a correlation between futures prices and spot prices close to one. This assumption is generally valid, but in Tsingshan Group's case, other market disruption caused this assumption to fail. The volatility of high-grade nickel futures suddenly increased significantly, far exceeding the volatility of low-grade nickel spot prices.

As a result, the hedge ratio dropped sharply. At this point, Tsingshan Group should have adjusted their hedge ratio, but they were unable to do so in time. Therefore, their data did not satisfy the formula, leading to a failure.

3. The Reason Cause Market Volatility

We propose that there are four factors contributing to this situation: on a macro scale, the impact of the Russia-Ukraine conflict on global nickel supply; on a micro scale, Global nickel stocks fall to low levels, an imbalance in supply due to the growth of the electric vehicle industry, and Tsingshan Holdings' undisclosed foreign capital forced position.

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3.1. Russia-Ukraine Conflict affect Global Supply

The conflict between Russia and Ukraine has led to an increase in tensions, resulting in Western countries imposing sanctions on Russia. As a major global producer and exporter of nickel, Russia contributes 8% of the world's nickel supply, with its production of electrolytic nickel exceeding 20% of the global total. This gives Russia a significant role in the nickel supply chain.

The imposition of sanctions by Western countries increases the risk for the nickel spot market, causing disruption in trading and potentially leading to a shortage of LME (London Metal Exchange) nickel stocks. This creates conditions for higher nickel prices and increased volatility in the futures market. Market participants are concerned about potential instability in the nickel supply and are taking measures to address possible shortages. Despite a recent gradual decline in Russia's global market share for LME standard delivery goods - electrolytic nickel, with Norilsk Nickel industry accounting for about 15% of global electrolytic nickel production, it remains an important player in this industry. As Figure 3 shown:

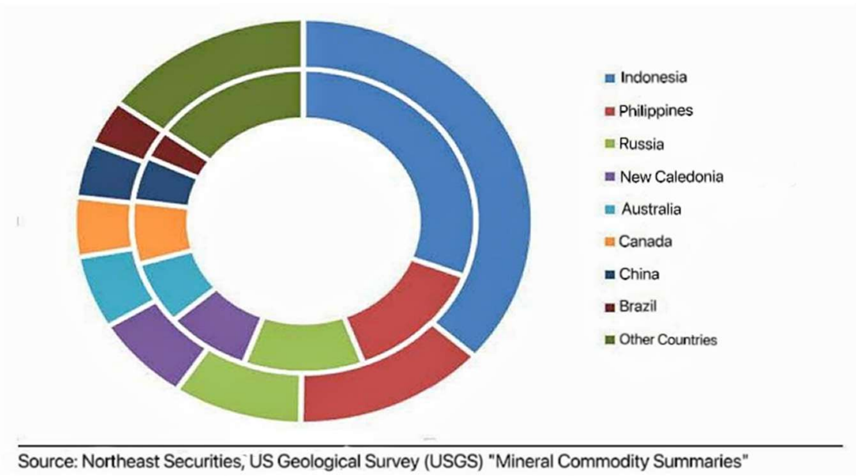

Figure 3. Nickel supply of world [6].

3.2. Global Nickel Stock Fall to a Low Level

As of 25 March, LME nickel stocks totaled 72,900 ton, down more than 70% from 270,000 ton at the end of 2021 April. As Figure 4 shown:

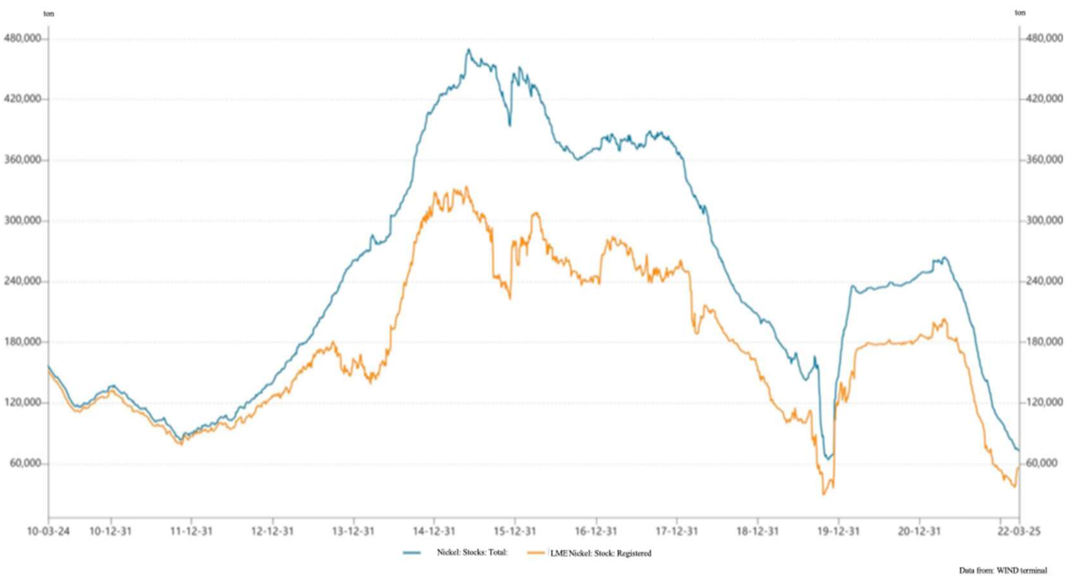

Figure 4. Inventory Level of Nickel [4]

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3.3. Supply Gap

The development of electric vehicles increases the demand of nickel that used to manufact vehicles' battery.

Tsingshan Holdings is one of the biggest nickel suppliers in the world, and all its development is basic on its industrial in Indonesia, also, Indonesia accounted for 37 per cent of global nickel production in 2021. However, since June 2021, Indonesia has started to restrict the entry of foreign laborers because of the aggravation of the Covid-19 epidemic in Indonesia. Hence, nickel production has been limited.

3.4. Party with Long Position Squeezing Out

On February 14th, Bloomberg reported that Tsingshan was becoming a major short seller in a battle against nickel inventory holders. By early March, Bloomberg and several other foreign media outlets reported that an unidentified trader controlled 50% to 80% of the nickel warrants monitored by the LME by the end of February.

Clearly, with knowledge of trading counterparts and position transparency, substantial funds had accumulated a significant portion of the long positions in the LME nickel market, preparing for a concentrated short squeeze. Tsingshan's final tally of short positions has not been disclosed, but the prevailing market view estimates it to be around 150,000 to 200,000 tons of LME nickel.

In 2021, global nickel production was only 2.7 million ton, with most being nickel pig iron rather than electrolytic nickel, which is required for specific uses such as stainless steel production. As shown in Figure 5, Figure6.

Contract Type	Nickel (NI)
Base Metal	Minimum purity 99.80%
Contract Size	6 tons
Quotation Unit	USD/ton
Currency	USD, JPY, GBP, EUR
Minimum Price Fluctuation	1. Public Quotation of Ring: $5
	2. Quotation of LME Select: $5
	3. Quotation of Inter-Office: $0.01
Settlement Type	Physical Delivery

Figure 5. The quality standard of LME nickel [4]

Contract	Expiry Date	Holdings (Lots)	Holdings (Tons)	Large Holder Short Ratio	Short Sale Volume (Tons)
Month 1	March 23	19,417	1,165,021	50%-80%	58,251
Month 2	April 20	37,251	223,506	45%-70%	100,577.7
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Figure 6. Short position owned by Tsingshan Holding Group co. [4]

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4. Suggestion

4.1. Increase the Time Period of Delivery

The delivery dates within three months left Tsingshan with no chance to react to market fluctuations, putting them in the position of default. In fact, if Tsingshan chooses to lengthen the delivery time, it will make their defense line less easily penetrated.

4.2. Use a Variety of Financial Derivatives to Diversify Hedging Risks

Instead of just using futures, Tsingshan can use forward, options, etc., to hedge risks. Futures' tough delivery standards and deadlines largely contributed to Tsingshan's losses. If Tsingshan uses options and forwards to hedge risks, it may lose some efficiency, but it can avoid the dilemma of unable to deliver to a certain extent

4.3. Don't Cluster Futures in One Exchange

In this case, Tsingshan chose to hedge only in the LME market, which made it so concentrated that it was completely affected by the market changes of the LME. This has certainly weakened its resilience in extreme situations. If it spreads its short position across different exchanges its exposure to price fluctuations on a single exchange may decline

4.4. Do Not Blindly Trust Model

We believe that Tsingshan Holdings needs to keep up with the changes in the market and change the data all the time to ensure the accuracy of the model. In this case, Tsingshan suffered heavy losses because it failed to change its strategy in time. This may be due to the untimely data replacement within the model.

5. Conclusion

In addition to establishing a thorough understanding of risk and developing a personalized hedging strategy, companies may also need to consider how macroeconomic factors could impact their hedging activities. This might involve keeping an eye on fluctuations in interest rates, exchange rates, and commodity prices, as well as evaluating the overall economic forecast. Furthermore, companies may need to stay informed about regulatory changes that could affect their hedging activities, such as modifications in accounting standards or derivatives regulations.

Adapting to these changes and ensuring compliance with relevant laws and regulations is crucial for effective risk management. Additionally, it's important for companies to regularly assess and modify their hedging strategies in response to evolving market conditions. This could include adjusting their portfolio of financial derivatives or exploring new hedging instruments that better align with their specific risk exposures.

Overall, successful engagement in hedging activities requires ongoing vigilance, adaptability, and a willingness to seek out innovative solutions to effectively mitigate risks.

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