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Analyzing Trading Costs in the Crude Oil Futures Market: Focus on Explicit Costs and Global Influences

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Abstract:

Since the introduction of crude oil futures on the Shanghai International Energy Exchange (INE) on March 26, 2018, the influence on the international oil futures market has been increasingly notable. As essential tools for risk management and income stabilization for futures companies, the trading costs of crude oil futures are of considerable importance. Given that the INE-listed crude oil futures are relatively new, having only been established two years ago, there is a scarcity of literature and research on trading costs. Due to the limitations in available data and information, this paper concentrates on explicit trading costs, mainly margin requirements and transaction fees. This study examines the margin amounts and transaction fees since the start of crude oil futures trading in Shanghai, using data from the official INE website. It analyzes their relationship with international political and economic contexts and projects future trends. Furthermore, this paper provides a comparative analysis by introducing the fluctuations in margin amounts and transaction fees in the New York Mercantile Exchange Futures (NYMEX) market.

Keywords:

Crude oil futures; Trading cost; INE; NYME.

1. Introduction

1.1. Research background

China's current oil futures include Shanghai Futures Exchange fuel oil futures and Shanghai International Energy Center crude oil futures. China's crude oil futures were listed on the Shanghai International Energy Trading Center on March 26,2018, marking the first international futures listing in China. This move provided a good platform to increase China's voice in the international oil market, a tool for Chinese oil enterprises to actively participate in the crude oil market and hedge, and enriched the oil reserve system through the combination of physical inventory and futures reserves. In addition, foreign investors also help promote the internationalization of the yuan by RMB pricing and settlement of crude oil futures.

Demsetz divided the transaction cost of the securities market into two parts: the first part is called explicit transaction cost, which mainly includes entrustment fee, commission, and stamp duty; the second part is called implicit transaction cost, which is the risk compensation for investors to buy and sell securities when the information of the securities market is asymmetric and the market supply and demand are uneven, which is generally measured by the price difference of the offer. [1] According to the definition of Demsetz, this paper divides the transaction cost of the futures market into two parts: explicit transaction cost and implicit transaction cost. Among them, explicit transaction cost refers to the transaction handling fee,transaction margin, delivery cost, taxation and so on which can be reflected in book value; implicit transaction cost refers to those costs related to market liquidity, volatility characteristics caused by the trading behavior of investors, such as the impact cost of trading, the cost of fund reservation, etc.

1.2. Foreign and Domestic Research Background

Domestic research on the handling fee of futures trading began to draw some attention after China

reintroduced its futures trading mechanism on October 12,1990. For example, Li Qin analyzed the actual data and concluded that setting a higher standard of charging transaction fees can ensure that the futures intermediary in the early stage has a higher return. [2] In addition, Li Mid-Autumn's "futures fee" dark war "warming up again [3] and Ye Miao's " Shanghai futures industry brewing fee self-discipline " have also been published in important newspapers and magazines. [4] Liu Zhidong and Jiang Ling stipulated the connection between trading cost, liquidity and pricing in their article “Study on Transaction Cost, Liquidity and Asset Pricing of Futures Market Based on Bayesian Parameter Estimation”. [5] Juncong Jiang stipulated the range of margin amount that should be taken for the Chinese market in their article “An empirical study on the margin ratio of crude oil futures in China”.[6] Platts analyzed The Dated Brent benchmark at 30 years old and beyond.[7] Wang Yugang and Shi Yi stipulated the influence of the change of transaction fee on the function of futures price discovery. [8] Li Yan stipulated the calculation of settlement price and delivery of ICE Brent crude oil futures. In order to measure the transaction fee in the futures market, there must be corresponding methods and corresponding theories.

1.3. Purpose and Significance of this Subject

The purpose of this paper is to study the fluctuation of transaction fees and margin amounts in the explicit transaction cost of China's oil futures market in recent years, provide new insights about the connection between related factors and the change in trading costs .The research significance of this paper is that the study of transaction cost in financial market has always been one of the hot spots in the theory of the microstructure of financial and futures markets, while the income of futures companies mainly comprises the interest income of futures margin and the handling fee of futures trading. Therefore, it is very important to analyze the evolution of trading costs in futures market.

1.4. Research approach

This paper mainly uses literature survey and qualitative analysis by reading related literature on CNKI and analyzing related data from the official website of INE.

2. The Evolution of Trading Cost of Oil Futures of INE

2.1. Fluctuation of trading cost triggered by holidays

Because domestic futures are in line with international futures, international futures fluctuate sharply during the holiday period, the futures market of our country is not open in the holiday but foreign markets are open. As a result, how much risk in the middle and whether the domestic opening will appear a low opening or high opening is unknown, therefore, in order to avoid risk, exchanges increase the margin ratio, generally restoring to the original level after holiday.

Table 1 Settlement Parameters of INE before the adjustment (INE,2020)

Contract	Settle	Transaction fee (‰)	Transaction fee (RMB/lot)	Delivery fee	Long speculation (%)	Short Speculation (%)	Long hedging (%)	Short hedging (%)	Discount rate for closing out day's position(%)
sc1809	442.5	0	20	0.05	9	9	9	9	--
sc1810	442.2	0	20	0.05	9	9	9	9	--
sc1811	440.5	0	20	0.05	9	9	9	9	--
sc1812	437.2	0	20	0.05	9	9	9	9	--
sc1901	433.5	0	20	0.05	9	9	9	9	--
sc1902	435.9	0	20	0.05	9	9	9	9	--
sc1903	427.6	0	20	0.05	9	9	9	9	--
sc1904	441.7	0	20	0.05	9	9	9	9	--
sc1906	426.3	0	20	0.05	9	9	9	9	--
sc1909	423.6	0	20	0.05	9	9	9	9	--
sc1912	415.6	0	20	0.05	9	9	9	9	--
sc2003	416.1	0	20	0.05	9	9	9	9	--
sc2006	415.4	0	20	0.05	9	9	9	9	--
sc2009	415.1	0	20	0.05	9	9	9	9	--
sc2012	404.7	0	20	0.05	9	9	9	9	--

sc2103	405.9	0	20	0.05	9	9	9	9	--
Note :1. delivery fee quotation unit: yuan / barrel.									

Table 2 Settlement Parameters of INE after the adjustment (INE,2020)

Contract	Settle	Transaction fee (‰)	Transaction fee (RMB/lot)	Delivery fee	Long speculation (%)	Short Speculation (%)	Long hedging (%)	Short hedging (%)	Discount rate for closing out day's position(%)
sc1809	441.2	0	20	0.05	7	7	7	7	--
sc1810	438.4	0	20	0.05	7	7	7	7	--
sc1811	440.5	0	20	0.05	7	7	7	7	--
sc1812	434.6	0	20	0.05	7	7	7	7	--
sc1901	433.5	0	20	0.05	7	7	7	7	--
sc1902	435.9	0	20	0.05	7	7	7	7	--
sc1903	429	0	20	0.05	7	7	7	7	--
sc1904	443.1	0	20	0.05	7	7	7	7	--
sc1905	443.1	0	20	0.05	7	7	7	7	--
sc1906	426.3	0	20	0.05	7	7	7	7	--
sc1909	423.6	0	20	0.05	7	7	7	7	--
sc1912	415.6	0	20	0.05	7	7	7	7	--
sc2003	417.4	0	20	0.05	7	7	7	7	--
sc2006	416.7	0	20	0.05	7	7	7	7	--
sc2009	416.4	0	20	0.05	7	7	7	7	--
sc2012	406	0	20	0.05	7	7	7	7	--
sc2103	405.9	0	20	0.05	7	7	7	7	--
Note :1.delivery fee quotation unit: yuan / barrel.									

2.2. Fluctuation of trading cost triggered by introducing foreign capital

The Shanghai International Energy Trading Center's Department of Corporate Affairs issued a notice on adjusting the margin ratio of crude oil futures related contracts. After study, it was decided that from the closing date of July 11,2018: the trading margin ratio of crude oil SC1810 contracts was adjusted from 7% to 5.5%; and the trading margin ratio of crude oil SC1811 contracts was adjusted from 7% to 6%.This is based on the particularity of crude oil futures, first of all, crude oil is more strategic at the national level of futures varieties, if only closed to play by themselves, it is certainly not persuasive. Therefore, the internationalization of crude oil futures and the introduction of foreign investors are of great significance. At the same time, because the capital threshold of crude oil futures is relatively high, which limits some individual investors, in order to enhance the liquidity of the variety, it is also necessary to introduce foreign capital. This time, we will push down the crude oil futures margin again, increase the liquidity of non-mainstream contracts through double measures, reduce the transaction cost of investors, ensure the market participants move positions for monthly demand,so that crude oil traders, petrochemical production enterprises and large downstream consumer enterprises can fully participate in the cross-period arbitrage and cross-market arbitrage of crude oil futures. At the same time because our country has foreign exchange control, so pledging the dollar into RMB (with a certain discount rate of pledge) need to be done to carry out transactions. Formula: Source currency amount * exchange rate * currency pledge discount rate = target currency amount

Table 3 Settlement Parameters of INE before the adjustment (INE,2020)

Contract	Settle	Transaction fee (‰)	Transaction fee (RMB/lot)	Delivery fee	Long speculation (%)	Short Speculation (%)	Long hedging (%)	Short hedging (%)	Discount rate for closing out day's position(%)
sc1810	499.4	0	5	0.05	7	7	7	7	--
sc1811	507	0	10	0.05	7	7	7	7	--

Note :1. delivery fee quotation unit: yuan / barrel.

Table 4 Settlement Parameters of INE after the adjustment (INE,2020)

Contract	Settle	Transaction fee(‰)	Transaction fee (RMB/lot)	Delivery fee	Long speculation (%)	Short Speculation (%)	Long hedging (%)	Short hedging (%)	Discount rate for closing out day's position(%)
sc1810	507	0	5	0.05	5.5	5.5	5.5	5.5	--
sc1811	503.8	0	10	0.05	6	6	6	6	--
Note :1.delivery fee quotation unit: yuan / barrel.									

2.3. Fluctuation of trading cost triggered by avoiding international risks

On November 26, the Shanghai International Energy Trading Center issued a notice, deciding that from the closing of November 28, the trading margin ratio of crude oil futures contracts increase from 7% to 10%, the next trading day from the limit of 5% adjustment of 8%.

The price volatility of crude oil futures at home and abroad has increased significantly, with international oil prices at 6-7 percent in the past two weeks, which was triggered by concerns over sanctions against Iran and the global economic slowdown. At this time, the range of trading margin and trading margin will be increased by 3%, not only in line with the new environment so that domestic crude oil futures prices are aligned with international standards, but also help to guard against market risks and maintain the smooth operation of the market.

To adjust the range of crude oil futures trading, Huatai futures crude oil analyst Pan Xiang said the adjustment is at the right time, the recent foreign crude oil futures price volatility, affected by a variety of factors, WTI and ICE Brent in two weeks in more than 5% decline, and the recent oil market volatility is high, before the OPEC1 meeting in February will not rule out the possibility of large fluctuations.

Table 5 Settlement Parameters of INE before adjustment (INE,2020)

Contract	Settle	Transaction fee(‰)	Transaction fee (RMB/lot)	Delivery fee	Long speculation (%)	Short Speculation (%)	Long hedging (%)	Short hedging (%)	Discount rate for closing out day's position(%)
sc1812	430.5	0	20	0.05	10	10	10	10	--
sc1901	441	0	5	0.05	7	7	7	7	--
sc1902	445.9	0	5	0.05	5.5	5.5	5.5	5.5	--
sc1903	451.3	0	20	0.05	7	7	7	7	--
sc1904	455.5	0	20	0.05	7	7	7	7	--
sc1905	454.7	0	20	0.05	7	7	7	7	--
sc1906	450.7	0	20	0.05	7	7	7	7	--
sc1907	460.9	0	20	0.05	7	7	7	7	--
sc1908	457	0	20	0.05	7	7	7	7	--
sc1909	447.5	0	20	0.05	7	7	7	7	--
sc1910	453.5	0	20	0.05	7	7	7	7	--
sc1911	462.8	0	20	0.05	7	7	7	7	--
sc1912	452.6	0	20	0.05	7	7	7	7	--
sc2003	457	0	20	0.05	7	7	7	7	--
sc2006	449.7	0	20	0.05	7	7	7	7	--
sc2009	461.4	0	20	0.05	7	7	7	7	--
sc2012	449.6	0	20	0.05	7	7	7	7	--
sc2103	465.2	0	20	0.05	7	7	7	7	--
sc2106	455.1	0	20	0.05	7	7	7	7	--
sc2109	453.8	0	20	0.05	7	7	7	7	--
Note :1. delivery fee quotation unit: yuan / barrel.									

Table 6 Settlement Parameters of INE after the adjustment (INE,2020)

Contract	Settle	Transaction fee(‰)	Transaction fee(RMB/lot)	Delivery fee	Long speculation (%)	Short Speculation (%)	Long hedging (%)	Short hedging (%)	Discount rate for closing out day's position(%)
sc1812	402.4	0	20	0.05	20	20	20	20	--
sc1901	417.2	0	5	0.05	10	10	10	10	--
sc1902	422.5	0	5	0.05	10	10	10	10	--
sc1903	426	0	20	0.05	10	10	10	10	--
sc1904	426.5	0	20	0.05	10	10	10	10	--
sc1905	428.6	0	20	0.05	10	10	10	10	--
sc1906	430.5	0	20	0.05	10	10	10	10	--
sc1907	438.1	0	20	0.05	10	10	10	10	--
sc1908	434.4	0	20	0.05	10	10	10	10	--
sc1909	439.8	0	20	0.05	10	10	10	10	--
sc1910	445.9	0	20	0.05	10	10	10	10	--
sc1911	436.3	0	20	0.05	10	10	10	10	--
sc1912	442.2	0	20	0.05	10	10	10	10	--
sc2003	438.9	0	20	0.05	10	10	10	10	--
sc2006	432.1	0	20	0.05	10	10	10	10	--
sc2009	442.4	0	20	0.05	10	10	10	10	--
sc2012	449.4	0	20	0.05	10	10	10	10	--
sc2103	453.5	0	20	0.05	10	10	10	10	--
sc2106	446.8	0	20	0.05	10	10	10	10	--
sc2109	443	0	20	0.05	10	10	10	10	--
Note :1. delivery fee quotation unit: yuan / barrel.									

2.4. Fluctuation of trading cost triggered by time to maturity

Shanghai Futures Exchange (all varieties)stipulates 10% margin from the first trading day of the first month before the delivery month ,15% from the first trading day of the delivery month,and 20% from the two trading days before the last trading day. The closer the trading day, the greater the amount of loss is likely to be and the greater the risk. The exchange increases margin to avoid risk.

2.5. Project the future of trading costs in INE

Table 7 Settlement parameters adjustment in July, 2020 (INE, 2020)

Adjustment date / contract	July 1st (Monday)		July 28th (Tuesday)	
	Margin Rate	Transaction fee	Margin Rate	Transaction Fee
	%	RMB per lot	%	RMB per lot
sc2008	15	20	20	20
sc2009	15	20	15	20
sc2010	15	20	15	20
sc2011	15	20	15	20
sc2012	15	20	15	20
sc2101	15	20	15	20
sc2102	15	20	15	20
sc2103	15	20	15	20
sc2104	15	20	15	20
sc2105	15	20	15	20
sc2106	15	20	15	20
sc2107	15	20	15	20
sc2109	15	20	15	20
sc2112	15	20	15	20
sc2203	15	20	15	20
sc2206	15	20	15	20
sc2209	15	20	15	20
sc2212	15	20	15	20
sc2303	15	20	15	20
sc2306	15	20	15	20
Note	July 1st is the date of listing for contract sc2107.		July 29th is the second trading day prior to the last trading day for contract sc2008.	

Table 8 Settlement parameters adjustment in July, 2019 (INE, 2020)

Adjustment Date / contract	July 1st (Monday)		July 26th (Friday)	
	Margin Rate	Transaction fee	Margin Rate	Transaction Fee
	%	RMB per lot	%	RMB per lot
sc1908	10	20	20	20
sc1909	10	20	10	20
sc1910	10	20	10	20
sc1911	10	20	10	20
sc1912	10	20	10	20
sc2001	10	20	10	20
sc2002	10	20	10	20
sc2003	10	20	10	20
sc2004	10	20	10	20
sc2005	10	20	10	20
sc2006	10	20	10	20
sc2007	10	20	10	20
sc2009	10	20	10	20
sc2012	10	20	10	20
sc2103	10	20	10	20
sc2106	10	20	10	20
sc2109	10	20	10	20
sc2112	10	20	10	20
sc2203	10	20	10	20
sc2206	10	20	10	20
	July 1st is the date of listing for contract sc2107.		July 29th is the second trading day prior to the last trading day for contract sc2008.	

According to the data on the website of INE, the margin amount was increasing constantly during these three years. As the amount of trading cost is going to be affected by economic environment and international risk, under the present situation where the pandemic make oil prices appear to go down due to the lack of demand, the margin amount is likely to increase in the near future.

3. Trading costs of oil futures on the global market

3.1. Asian premium

When China's oil prices are in line with international standards, the "Asian premium" has become an unfair factor that cannot be ignored. In recent years, major oil importers in Asia have generally become more dependent on Middle East crude oil, but the oil sources of the United States and Europe are more diverse.

3.2. The evolution of trading costs of NYMEX

In April 2008, the New York Mercantile Exchange raised the May contract margin from $3,881 to $4,388 and the other monthly margins from $3,544 to $4,388. In July 2008, international oil prices began to fall, and the New York Mercantile Exchange lowered its margin ratio depending on market conditions, based on expectations of future volatility declines in crude futures and increased liquidity in futures trading.

Crude futures prices continued to decline in December 2014 as a result of a continuing oversupply in the crude oil market and the announcement by the Government of Iraq that more crude oil would continue to be sold to the oversupply market. The New York Mercantile Exchange increased the initial trading margin ratio for crude oil futures contracts by 16 per cent to $4450 and the speculative trading margin ratio by 16 per cent to $4,895 to avoid potential default risk caused by increasing volatility in the crude oil futures market.

To sum up, there are many factors affecting the price of crude oil futures, including the relationship between spot supply and demand of crude oil, international politics and economic environment. In order to prevent the risk of crude oil futures trading and restrain excessive speculation which leads to the occurrence of malignant events such as oil price bubbles, it is necessary for the exchange to take timely measures according to the market fluctuation, while adjusting the margin ratio of crude

oil futures trading is one of the most direct measures that the exchange will take.

4. Conclusion

As both a tool of avoiding risks and insuring the income of futures companies, the trading costs of crude oil futures play an important role on oil futures market. According to tha data on the official website of INE, this paper concludes that the amount of transaction fee and margin in Chinese oil futures market is related to holidays, international risk, foreign capital and time to maturity and the exchange increases the amount of margin during holidays and situaions with high volatility of economy to ensure the safety of transaction. This paper also gives a rough view of overseas markets by introducing the fluctuation of margin amount and transaction fees on the New York Mercantile Exchange Futures (NYMEX) market, suggestting that it is necessary for the exchange to take timely measures according to the market fluctuation by adjusting the margin ratio of crude oil futures trading.

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