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BOCI FUTURES

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A New Chapter After Great Challenges

Abstract

◆ Crude Oil

This year, driven by the high pressure of the Russia-Ukraine War, the crude oil price rose repeatedly, and then gradually corrected due to the tightening of epidemic prevention measures in China and the multi-dimensional pressure from the United States. However, the deadlock between Russia and Ukraine and the hawkish statement of OPEC+ continued to support the oil price in the high territory with high volatility.

The crude oil price in the first quarter of next year is expected to be neutral. In the domestic market, we expect SC crude to average between $600 and $650 per barrel and Brent crude between $85 and $90 per barrel.If the geopolitical conflict is resolved, the number of confirmed cases of COVID-19 increases sharply, or the negotiations on the Iranian nuclear deal make a breakthrough, the price of SC crude oil could temporarily drop to 550-600 yuan/barrel, and the price of Brent crude oil to $80-85 / barrel.

◆ Fuel Oil

This year, the absolute price of high and low sulfur fuel oil rose along with crude oil, but the trend of the two differentiated, depending on their supply side. Compared with the same period of previous years, the supply of high sulfur fuel oil was high, while the supply of low sulfur fuel was low, and the price spread widened to a high level.

The expectation of two fuel oils' absolute prices in the first quarter of next year is divided. The average price of FU high sulfur fuel oil may be in the range of 2500-3000 yuan/ton, and the average price of LU low sulfur fuel oil may be in the range of 4000-4500 yuan/ton. High and low sulfur fuel oil may continue differentiating, and the average spread in the first quarter next year may be in the range of 1500-2000 yuan/ton.

Risk Warning:

Russia-Ukraine War, Epidemic situation, OPEC+ production increase, Iran negotiation, Global economic recession

Directory

Crude Oil

1.1 Review • Russia & Ukraine War Push Up Oil Price, which Remains High with Excessive Volatility

Crude oil strengthened due to the aggravated geopolitical tensions between Ukraine and Russia earlier this year and then slowly retraced due to the tightened COVID-19 containment measures in China and multi-dimensional pressure from the US. However, the deadlock between Russia and Ukraine and the strong statement of OPEC+ continued to support the price. In general, the price remains high with excessive volatility.

As of Nov 28, 2022, the most active contract of domestic SC crude oil futures closed at 548.2 yuan/barrel, among which in early March SC hit 800 yuan for the first time since its listing. From January to November this year, the price of the most active SC contract increased by 9.86%, the average daily price of 661.6 yuan/barrel. For overseas market, the most active Brent futures contract closed at $83.84/barrel. It once touched $140 in early March. From January to November this year, its cumulative increase was 7.57% and its average price of $100.4/barrel. The most active WTI futures contract closed at $76.55/barrel. It also hit the highest price $130 this March，which is the highest level since mid-2008, and up 1.46 percent in value since the beginning this year, with its average daily price $96.20/barrel.

Graph 1：SC Price

Source: Wind, BOCI Futures

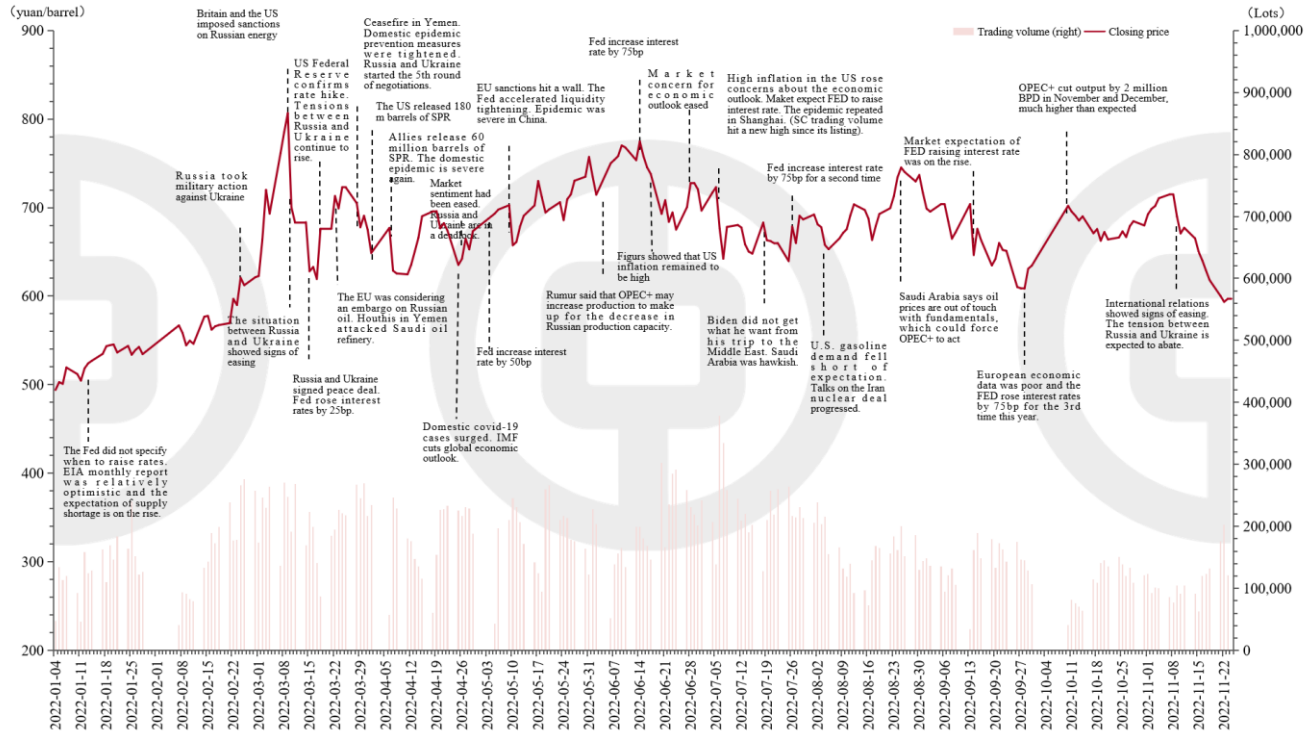
Graph 2：Brent Price

Source: Wind, BOCI Futures

Graph 3：WTI Price

Source: Wind, BOCI Futures

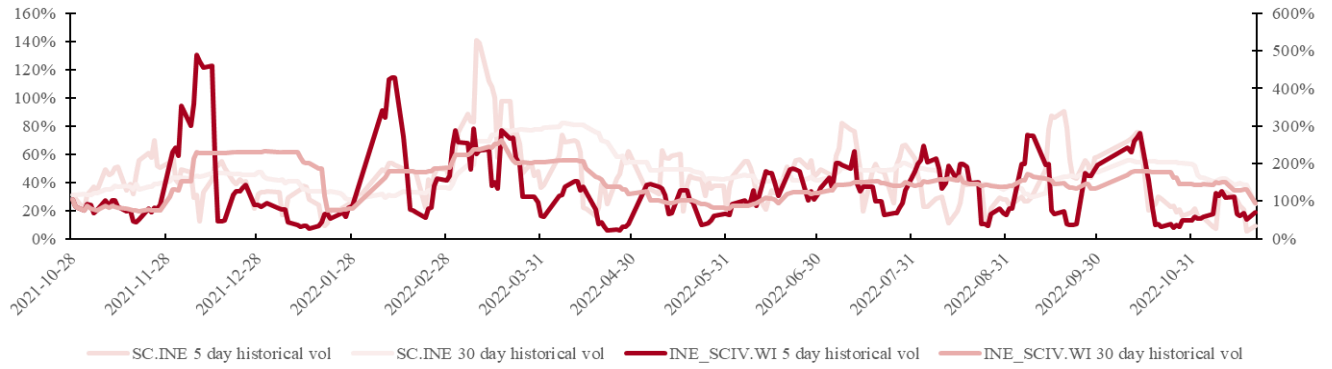
Graph 4：Major Events for Crude Oil 2022（SC Price）



Source: BOCI Futures

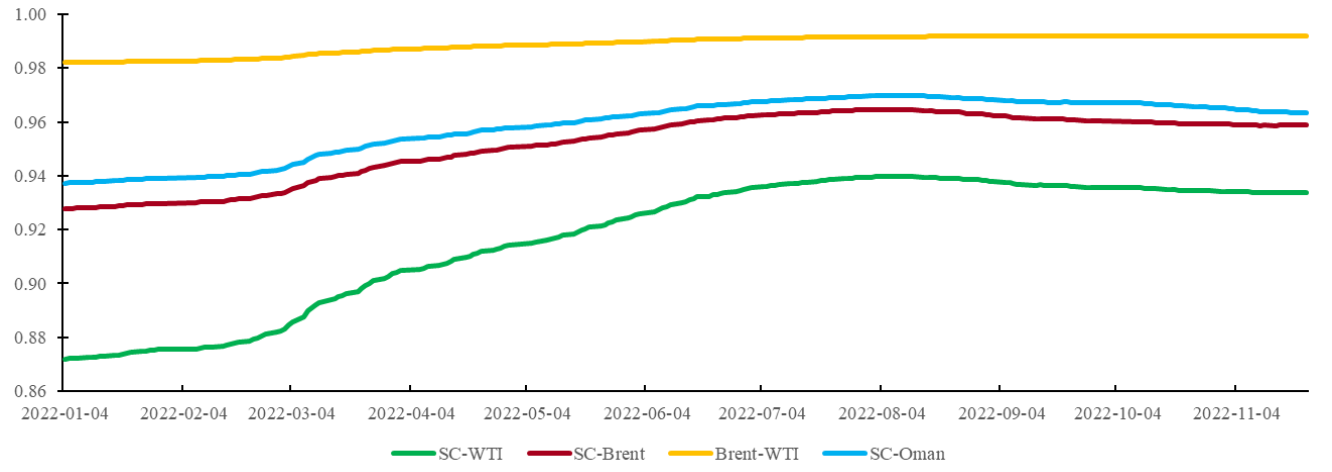
So far, the average intraday amplitude of SC crude oil futures is 3.29. For the week ending November 28, 2022, the average intraday amplitude of the SC active contract was 2.97, at the 51.10% fraction of the historical amplitude. Since 2018, the average intraday amplitude of Brent's active contract was 3.26 while the figure for WTI was 4.01. Since listing, the correlation between SC and Brent crude oil futures is 98.35%, while that between SC and WTI is 97.46% and the correlation for Brent and WTI is 99.19%.

Graph 5：SC Volatility



Source: Wind, BOCI Futures

Graph 6：SC-Brent-WTI Correlation

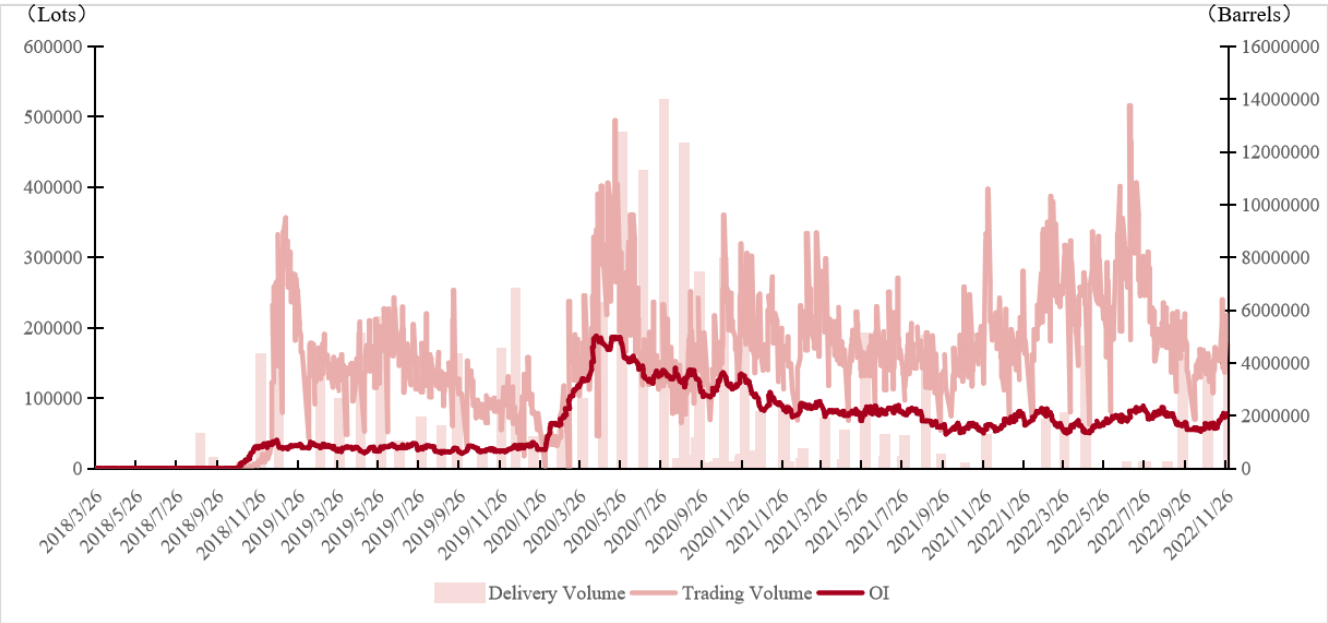


Source: Wind, BOCI Futures

1.2 Market Operation:Trading Volume Hit Record High since Its Listing

In terms of operation, as of November 28, 2022, the total daily trading volume of SC crude oil futures reached 515,900 lots on July 6, a new high since the listing. The average daily volume was 224,200 lots, up 30.84% year-on-year. From January to November this year, the total holding volume of SC peaked at 89,200 hands, and average around 68,900 hands, down 10.34% from the same period last year. From January to November this year, SC absorbed an average of 4.554 billion yuan per day, an increase of 38.86 percent year-on-year.

Graph 7：SC Market Operation



Source: Wind, BOCI Futures

In terms of physical delivery, the monthly average delivery of SC contract from January to November in 2022 was 1.9361 million barrels, of which there was no

physical delivery of SC 2202 in January, and the highest delivery of SC 2212 in November was 4.566 million barrels. In terms of SC warrant inventory, there was no record of in-and-out in the first quarter, and the inventory remained at the low level of 1.97 million barrels after a large amount of net load-out of 4.113 million barrels in July, which played a positive role in the strong trend of SC in recent months. After that, the net load-in of SC warrants in was 1.921 million barrels in September and 2.281 million barrels in November , which put a certain pressure on the near-month contracts of SC in the fourth quarter. At present, the inventory of SC warehouse receipt is 6.172 million barrels.

Graph 8：SC Load-in and Load-out

Month	Net SC stock-in and stock-out volume (10,000 barrels)	SC expiration contract	Delivery volume (10,000 barrels)
January 2022	0	SC 2202	0
February 2022	0	SC 2203	173.0
March 2022	0	SC 2204	195.6
April, 2022	- 67.0	SC 2205	449.8
May 2022	+ 245.4	SC 2206	277.4
June 2022	- 198.8	SC 2207	5.2
July, 2022	- 411.3	SC 2208	11.3
August, 2022	0	SC 2209	3.9
September 2022	+ 228.1	SC 2210	414.9
October, 2022	0	SC 2211	416.2
November, 2022	+192.1	SC 2212	456.6

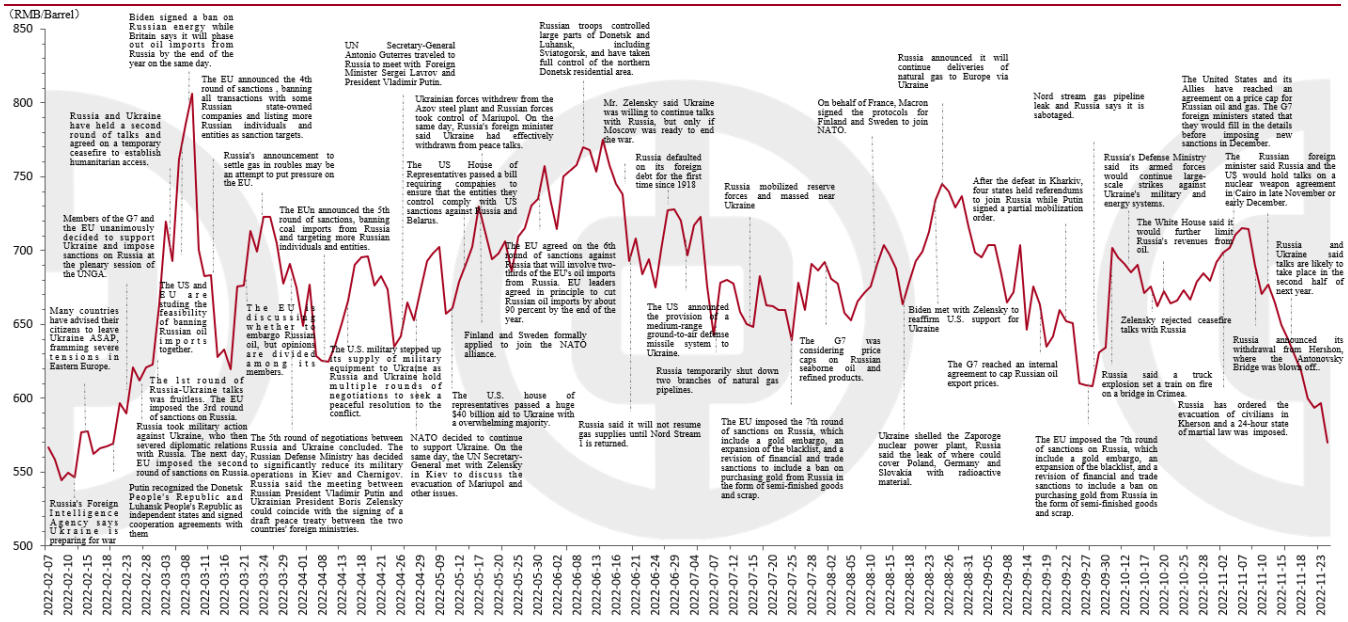
Source: INE, BOCI Futures

1.3 Geopolitical Situation Escalated, Energy Prices Fluctuated Significantly

1.3.1 Oil Price Remains High, tension between Russia and Ukraine Event provided Core Support

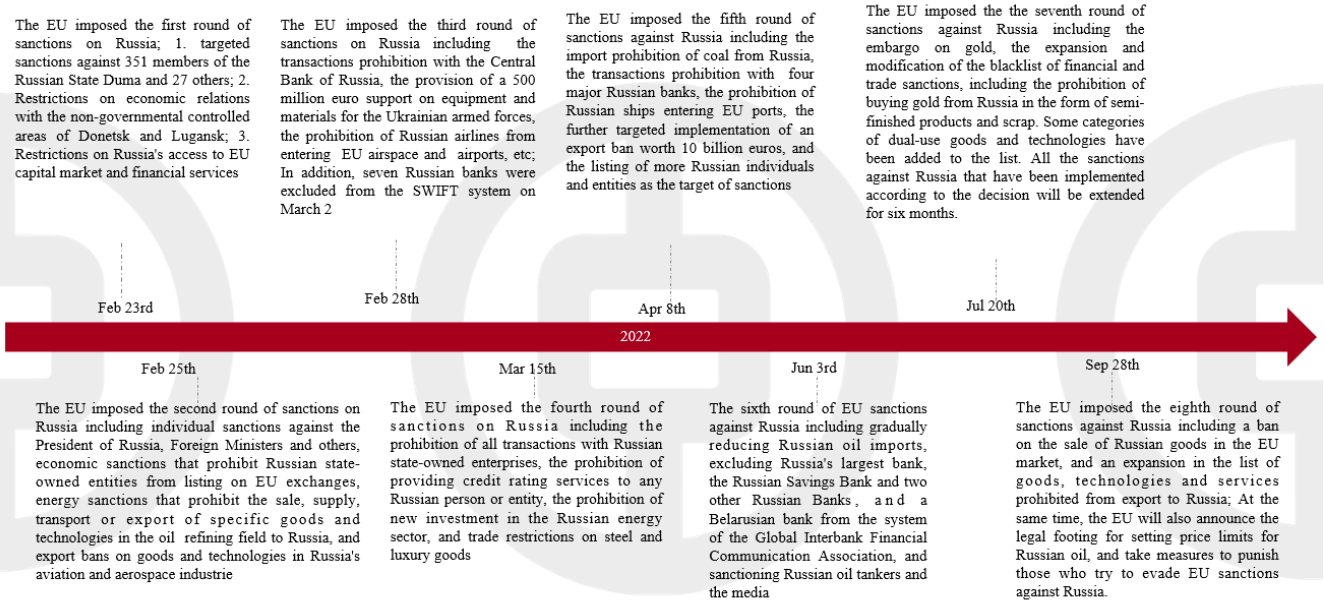
Geopolitical factors have a considerable impact on energy prices in 2022. The situation in Ukraine is increasingly severe since Russia took military action against Ukraine on February 24. Europe and US then imposed multi-dimensional sanctions against Russia, and the expectation of tighter supply pumped energy prices significantly.Then, the situation between Russia and Ukraine was deadlocked, and the game between Russia and Europe and the United States began in the energy industry. The global energy trade pattern was gradually reshaping, and energy prices remains in the high territory with excessive volatility.

Graph 9：Timeline for Russia-Ukraine War（SC Price for Active Contract）



Source: BOCI Futures

Graph 10：Timeline for EU's Sanctions on Russia



Source: BOCI Futures

Russia's crude oil production is around 10.944 mb/d, accounting for about 12% of global production. In 2021, Russia exported 5.293 million b/d of crude oil, accounting for about 12.8% of global crude oil exports. Russia's total crude oil imports ranked first in Europe, accounting for 45.88%, or 4.3 million b/d, in 2021.The substantive conflict between Russia and Ukraine blocked Russian crude oil exports, leading to the expectation of tightening global crude oil supply and crude oil prices soared in the short term. In the domestic market, for the first time since listing, SC crude oil futures dominant contract exceeded 800 yuan / barrel. In the foreign market, Brent crude oil futures once approached $140/ barrel.

UK and US imposed sanctions on Russian crude oil exports in March, following the escalation of the situation between Russia and Ukraine. In late March, EU initiated extensive consultations on whether to embargo Russian crude oil, but found it difficult to reach an agreement due to the significant difference of dependence on Russian energy between EU members. In late September, EU announced the eighth round of

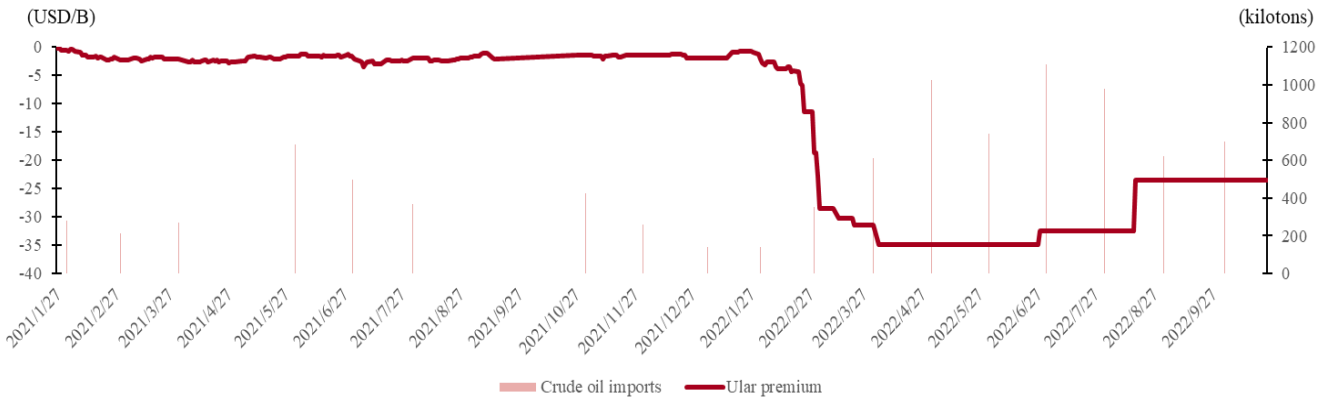
sanctions against Russia. The sanctions included a ban and price limit on Russian crude oil imports from December 5 this year, and on refined oil imports from February 5 next year. In addition, the G7 proposed a cap on Russian oil prices to reduce Russian oil export revenues in June, and came to an agreement in early September. In late November, the EU launched negotiations on the price limit of Russian oil, but the limit range of $65-70 per barrel was not approved. The impact of the price limit will be relatively limited and have little impact on export due to two main reasons.Firstly, the proposal was higher than the cost of Russian oil production, and secondly, since the escalation of the Russia-Ukraine conflict, Russian crude oil was sold at a discount. Moreover, the prcie limit will be difficult to implement as major oil-seeking countries such as China and India have not joined the sanction, and Russia will take countermeasures.

For spot prices, Russian Urals crude oil sales price felled significantly under the pressure of sanction. Its discount relative to Brent crude oil benchmark once reached $35, the highest level in 11 years, significantly wider than the previous number of $3.8 / barrel. The large discount rendered Ural crude oil popular. China's Urals crude oil imports increased sharply, especially through Shangdong. As the global energy trade flows reshapes, the discount of Urals crude oil in actual trading gradually stabilized and narrowed to around $10 per barrel. However, the obstruction of Russian crude oil exports pushed up crude oil price in the Middle East, and Oman's spot premium once reached more than $9/barrel, strengthened considerably compared with the previous premium of $2-3/barrel. The expectation of tighter market supply also supported the near-month price of crude oil futures, and the structure of the near-month difference between internal and external crude oil futures this year is generally stable. Under the influence of geopolitical factors, the May-June difference of Brent crude oil futures in the outer market once touched $5/barrel, and the difference between the inner SC April and May once exceeded 20 yuan / barrel.

At the moment, the tension between Russia and Ukraine is still deadlocked. Following

the defeat in the Battle of Kharkiv, Russia, the Zaporozhye region, the Kherson region, the Luhansk People's Republic and the Donetsk People's Republic held a referendum on joining the Russian Federation from September 23 to 27. Then, Putin signed a partial mobilization order and deployed troops on the Belarusian border. After the US midterm election, Russia withdrew its troops from Kherson, and the conflicts in Eastern Europe was expected to mitigate significantly, which was one of the factors influencing the overall sharp correction of oil prices in November. But at present, there is no any progress in the geopolitical conflicts. The game between Russia and Western countries is expected to persist, and continue to support the relatively high level of energy prices. However, it is necessary to be wary of short-term market fluctuations caused by public opinion such as Russian tactical nuclear weapons.

Graph 11: China's Ural Import Volume -Ural Premium



Source: Refinitiv, BOCI Futures

1.3.2 Natural Gas Fell Back after Rise, Long-Term Problems Have Not Been Eradicated

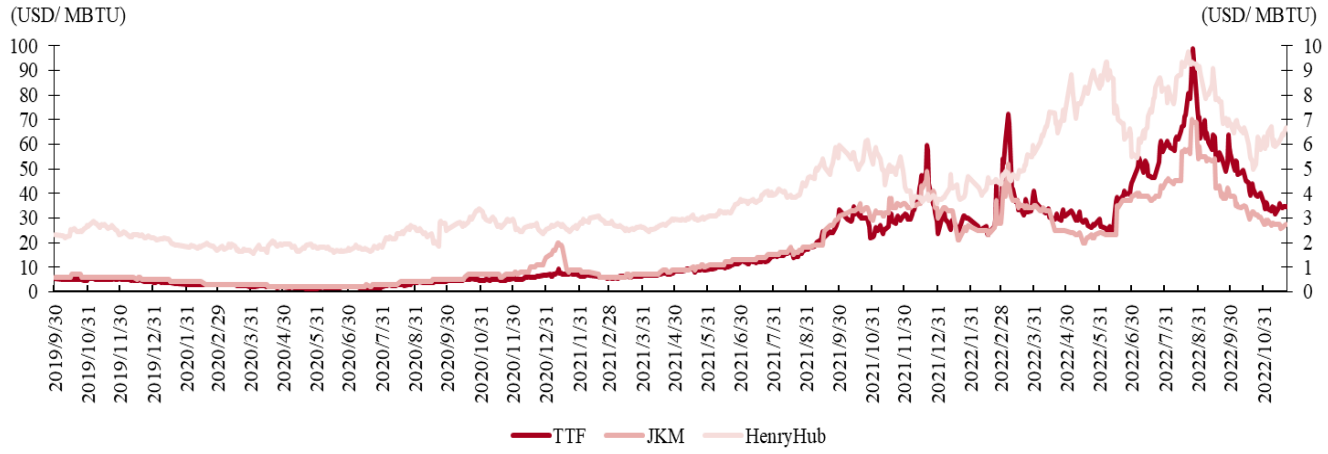
Since the escalation of Russia-Ukraine War this year, the Nord Stream pipeline has stopped transmission, bringing the European energy shortage to the spot light. Russia accounts for about 38.63% of Europe's total natural gas imports, 16.08% of total LNG imports and about 45.25% of total pipeline gas imports. Therefore, the tension has

strengthened the expectation of tightening natural gas supplies in Europe, pushing up natural gas prices to a high level. Late August, Gazprom announced that the Nord Stream gas pipeline would be for routine maintenance. The maintenance started in August 31 and would last for three days. According to data from the Intercontinental Exchange (ICE), the dominant contract price of the natural gas futures, the Netherlands TTF, which serves as the European natural gas price benchmark, soared to more than 345 euros/MWh in September, equivalent to $99/M Btu. Natural gas prices in the Asia-Pacific and the US also rose significantly. LNG Japanese and South Korean CIF price soared to $70/MBtu at the end of August. According to data from the NYMEX exchange, Henry Hub natural gas futures, U.S. natural gas prices benchmark, surged to $10/MBtu in mid-August.

In late September, Nord Stream AG, Russia Nord Stream gas pipeline operator, said that three feeders of its pipeline system had been damaged. Four leak points has been spotted and might be due to vandalism. The United States and Russia exchanged views on the incident, during which Russia demanded a full investigation. The impact of the incident is manifold. On the one hand, the obstruction of natural gas exports will reduce Russia energy export revenues. On the other hand, the damage to the Nord Stream pipeline will lead to a severe winter natural gas shortage in Europe. European countries have been forced to purchase natural gas from the United States and other places at a high price, and store gas in advance to meet gas demand this winter. According to data from the European Gas Infrastructure Company (GIE) released October 26, European natural gas inventories have reached 93.93% of total storage, much more than the average level of gas storage in the same period of previous years. Later on, expectation of a warm winter were on the rise. Coupled with the fact that the European natural gas storage was approaching its limits, natural gas shortage concerns have been eased to some extent in the market, resulting in an aggressive correction. In September and October, TTF futures price fell sharply to late June’s level and is now around 130 euros/MWh, equivalent to $40/MBtu.

However, TTF prices are still much higher than in the same period of previous years. And as it actually step into the winter, the subsequent demand for spot natural gas will increase, which will alleviate the current short-term oversupply. Moreover, the Russia-Ukraine tension is still intense, and might escalate following Russia's military actions. Russia's game with Western Europe and the US is likely to continue in many areas, among which energy issues will remain in the spot light. The natural gas shortage in Europe may persist, and natural gas prices are expected to remain relatively high.

Graph 12: US Henry Hub + European ICE TTF + JKM Price



Source：Refinitiv, BOCI Futures

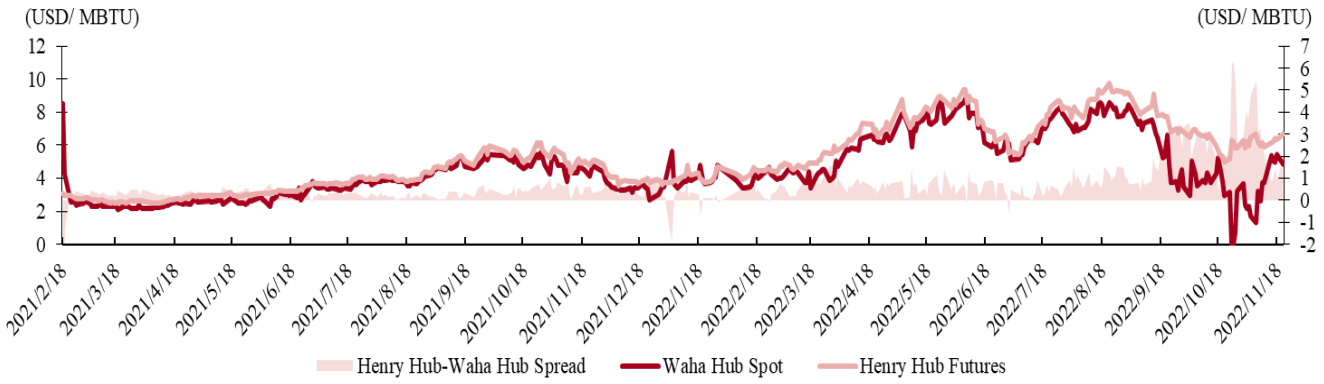
1.3.3 Negative Natural Gas Spot Has Little Impact on Futures

It is worth noting that the negative price events of Waha Hub natural gas spot price in the United States and TTF natural gas spot price in Europe in October attracted widespread attention in the market, but the actual impact on futures market was limited.

Natural gas prices at the Waha Hub in the Permian Basin in Texas, USA, plunged 85% on October 24, 2022, to as low as -$2/MMBtu and closed at $0.41/MMBtu. The Permian Basin in the United States is an important oil and gas production area, while the Waha Hub is the Permian natural gas transmission hub. The natural gas pipelines

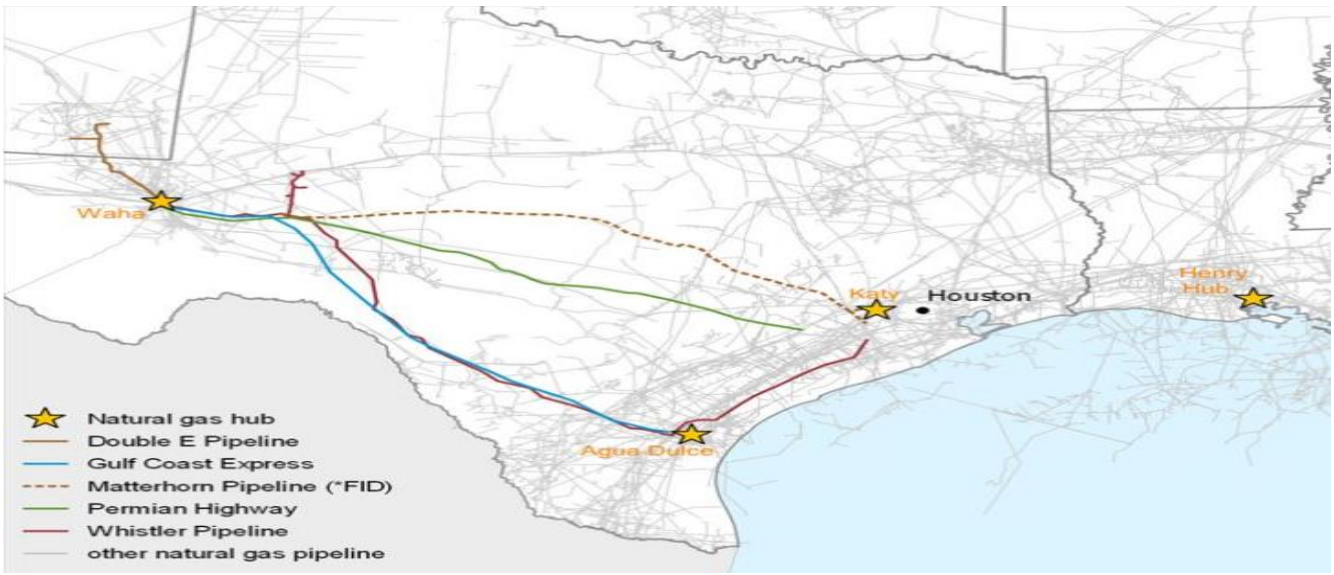
from Waha Hub to Agua Dulce, California, are mainly Gulf Coast Express and Double E Pipeline, both operated by Kinder Morgan Inc., North America's largest energy infrastructure company. As operators repaired the pipeline, Waha Hub's gas transmission capacity plummeted, resulting in a local natural gas overstock. If excess natural gas is burned directly, conflicts with environmental protection groups and regulators may intensify. In addition, the long-standing local practice of direct input into pipelines after gas production has led to a lack of natural gas storage facilities, and it is difficult to build new tanks in such a short period of time to cope with the short-term spot backlog. Waha Hub natural gas prices plummeted to negative territory under the influence of multiple factors. Insufficient gas transmission capacity has been a long-standing problem of the Waha Hub pipeline. Natural gas spot prices were negative for more than 20 times in 2019 and 8 times in 2020. Therefore, the main reason behind the negative price event is the shortage of spot storage facilities, which is less correlated with fundamentals and the situation in Russia and Ukraine.

Graph 13: Spread Between US Waha Hub Natural Gas Spot Price and Henry Hub Futures Price



Source：Refinitiv, BOCI Futures

Graph 14:US Waha Hub Transportation Pipelines



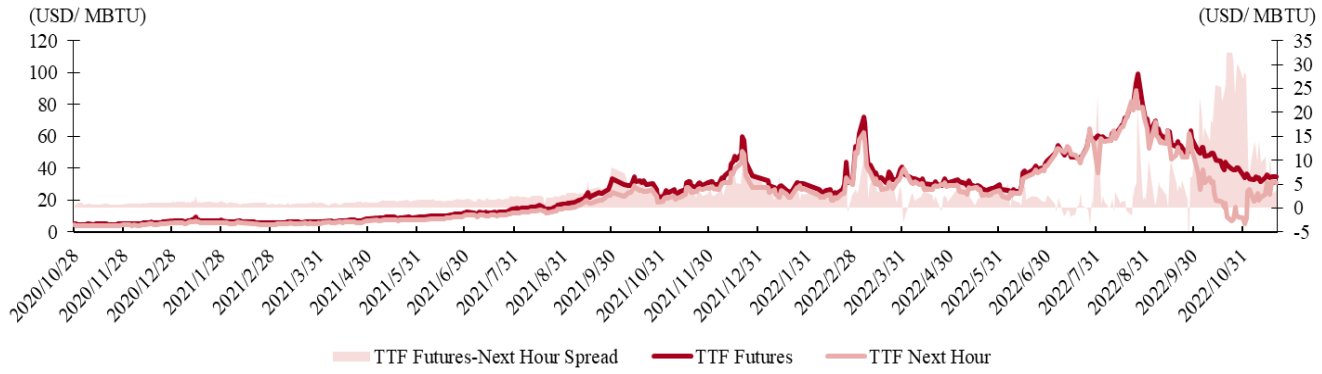
Source：EIA, BOCI Futures

The European Dutch TTF natural gas futures spot contract is traded OTC in ICE and settled hourly. Its Next Hour contract hit negative price on October 24, 2022, -15.78 EUR/MWh, a record low. This may be caused by a short-term squeeze of some spot due to limited European gas storage capacity. Since the contract price only partially reflects the spot trading situation, it has little impact on the overall benchmark.

The impact of the negative natural gas spot price event on China's energy industry is also relatively limited. From the perspective of spot, in recent years, China's dependence on natural gas imports has exceeded 40%, and the import methods include pipeline gas (PNG) and liquefied natural gas (LNG). Among them, PNG accounts for about 66%, and the main source countries are Turkmenistan, Kazakhstan and Russia while LNG accounts for the reminder, and the main source countries are Australia, Qatar, Russia and the United States. In terms of agreement signing methods, long-term agreement accounts for the large majority, and the proportion of spot trade is small. As for pricing, most of the prices are linked to international energy prices, mainly referring to European TTF natural gas futures prices, Japan and South Korea

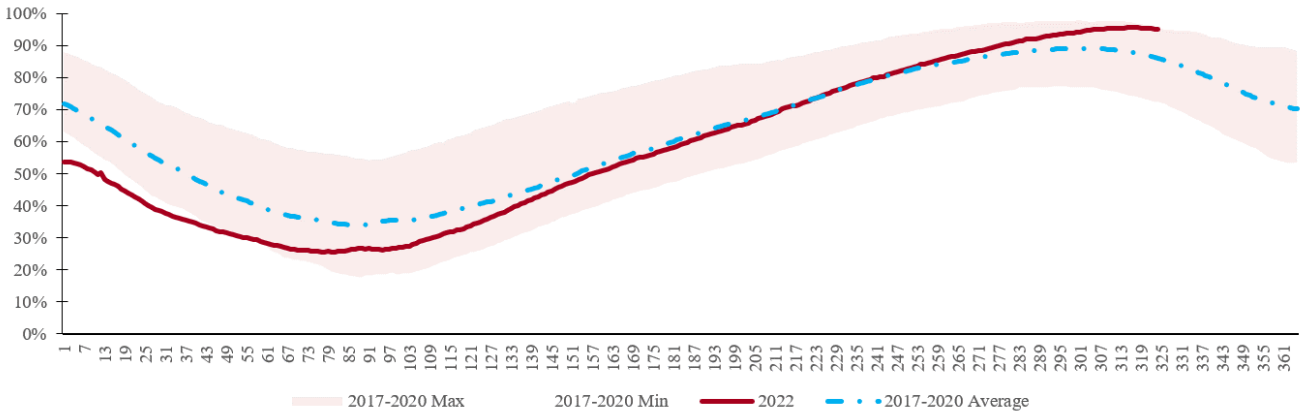
JKM natural gas price index or Brent crude oil futures prices. The negative spot price of Waha Hub natural gas in the United States is a temporary regional supply and demand imbalance and did not have a pervasive impact on the price of Henry Hub futures in the United States, coupled with the fact that the price of TTF natural gas futures in Europe has also maintained a positive value, it has limited impact on China's natural gas prices.

Graph 15: Spread between ICE TTF Futures Price and ICE TTF Next Hour Spot Price



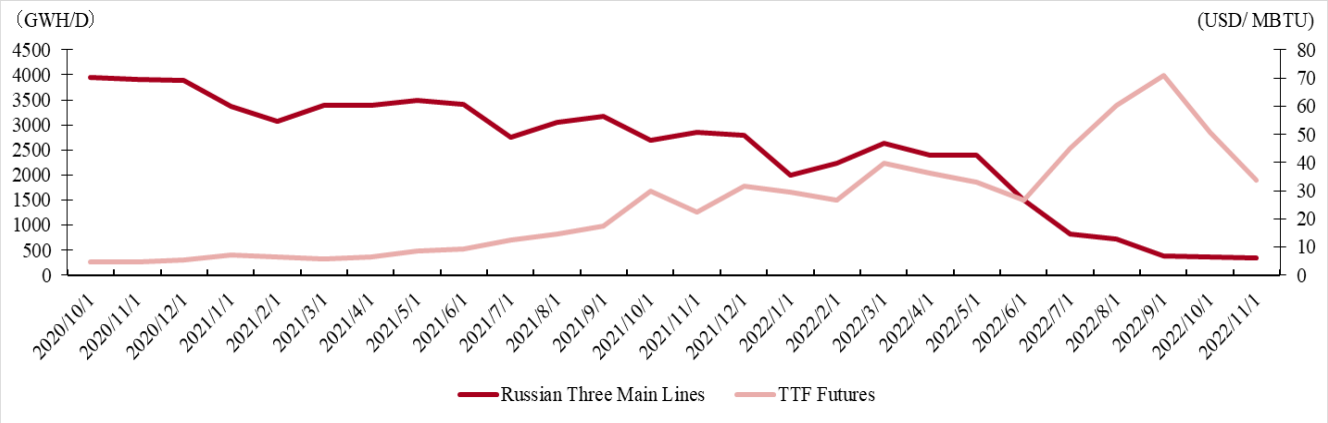
Source：Refinitiv, BOCI Futures

Graph 16: Natural Gas Storage Capacity Occupancy Ratio



Source：GIE, BOCI Futures

Graph 17: Gas Transmission Rate-Russia to EU



Source：Refinitiv, BOCI Futures

Graph 18: Russian-European Natural Gas Export and Import

	2015	2016	2017	2018	2019	2020
Russia's export of LNG to Europe (billion cubic meters)	0.0	0.0	0.0	6.8	20.5	17.2
Europe's total LNG imports (billion cubic meters)	56.0	56.4	64.7	71.3	119.1	114.8
Europe's LNG imports: Russia's share	0.00%	0.00%	0.00%	9.54%	17.21%	14.98%
Russia's export of pipeline gas to Europe (billion cubic meters)	133.2	143.0	161.7	171.1	173.4	152.1
Europe's total import of pipeline gas (billion cubic meters)	400.7	415.7	423.3	478.9	471.3	447.1
Europe's pipeline gas imports: Russia's share	33.24%	34.40%	38.20%	35.73%	36.79%	34.02%
Russia's natural gas exports to Europe (billion cubic meters)	133.2	143.0	161.7	177.9	193.9	169.3
Europe's total natural gas imports (billion cubic meters)	456.7	472.1	488.0	550.2	590.4	561.9
Europe's natural gas imports: Russia's share	29.17%	30.29%	33.14%	32.33%	32.84%	30.13%

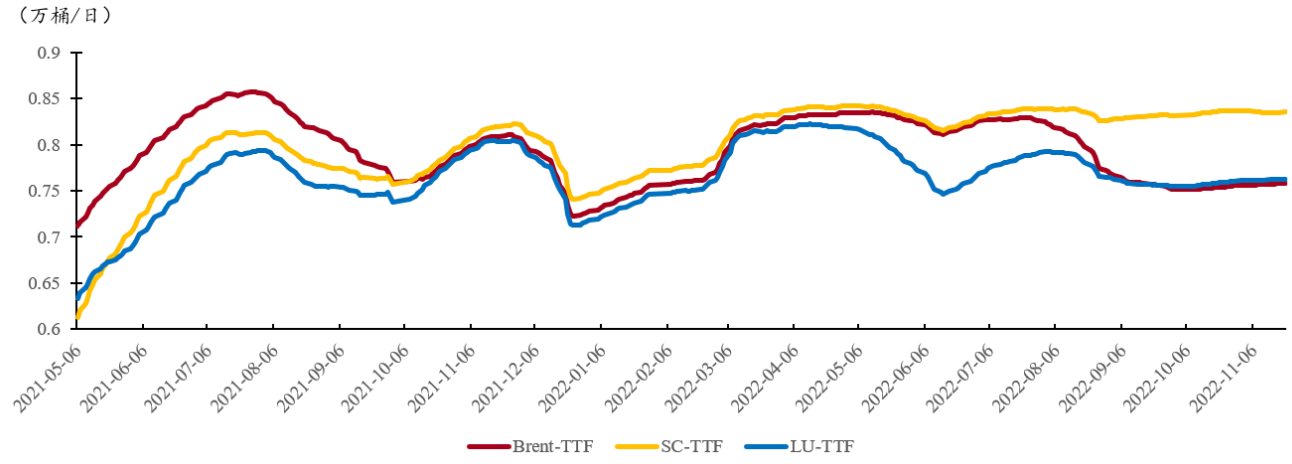
Source：BP, BOCI Futures

From the perspective of futures, although there is currently no listed natural gas future contract in China, the LNG futures project of Shanghai Energy Exchange (INE), a subsidiary of the Shanghai Futures Exchange (SHFE), has been officially approved, and the listing work is steadily progressing. The project attempts to establish a market-oriented price formation mechanism that reflects the Asia-Pacific LNG CIF fair value and meets the risk management needs of global natural gas enterprises. In 2020, the

WTI "negative oil price" event once caused severe fluctuations in the global crude oil market, INE timely adopted various measures such as adjusting the price limit and expanding the storage capacity according to market conditions to ensure the smooth operation of the domestic crude oil futures market, which fully reflects the superiority of the risk control system of the domestic futures market. LNG futures in the progress of getting established will also be equipped with a sound risk control system to avoid events like "negative gas price" events. We recommend investors to keep an eye on the preparation of LNG future's listing.

As for other energy products, the correlation between the demand for the substitution between crude oil and natural gas is low. Combined with the fact that the natural gas market is still regional now, the impact of the negative price event on the domestic INE SC crude oil futures and LU low-sulfur fuel oil futures prices is relatively limited. However, natural gas may have higher volatility than other energy products, so it is necessary to be wary of the short-term fluctuation transmission from foreign natural gas markets.

Graph 19: TTF Natural Gas Futures -Brent Crude Oil Futures-LU Fuel Oil Futures



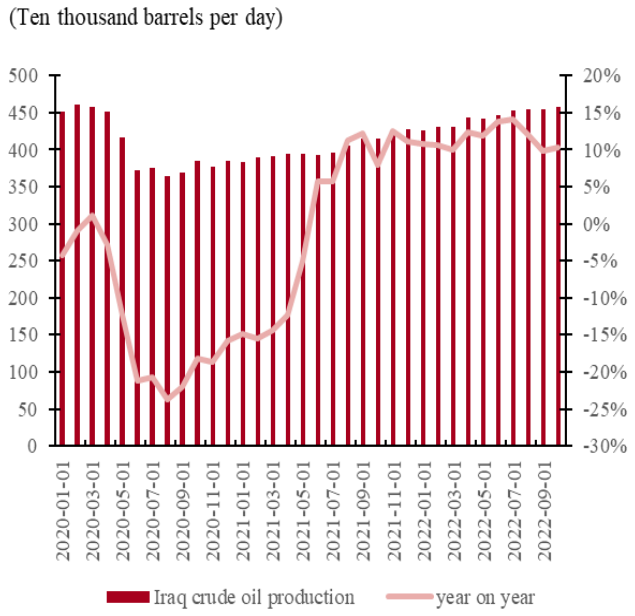
Source：Refinitiv, BOCI Futures

1.3.4 Civil War in Iraq in a Short Time, and Tension across the Taiwan Strait was High

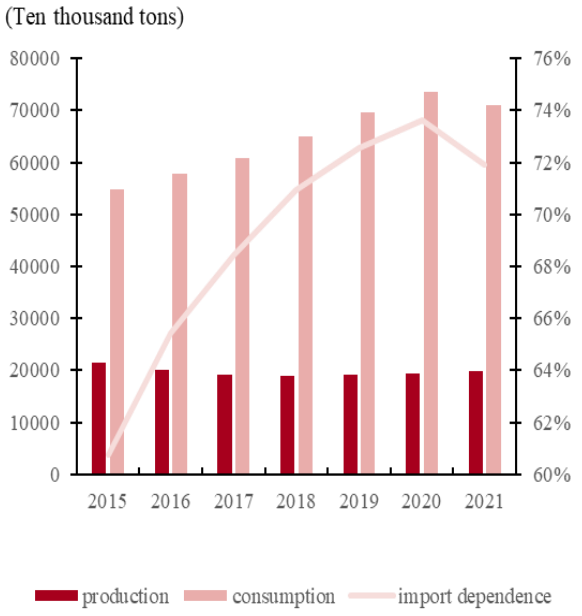
In late August, the situation in Iraq turned into chaos. On the evening of the 29th, the US Embassy in Baghdad, Iraq was attacked by rockets. Given Iraq's current crude oil production of about 4.5m b/d, civil unrest in Iraq once led to market expectations of tighter supply, pushing up international oil prices. The conflict was eased shortly after Iraq lifted the curfew, as the president proposed to hold early elections, while the prime minister said that he would resign if the status quo persists. The market sentiment soon cooled. The escalation of geopolitical conflict in the Middle East will lead to significant disturbance to market sentiment on the supply side. It is recommended to track the subsequent development.

In August, US House of Representatives Speaker Pelosi's visit to China's Taiwan region led to a high tension across the Taiwan Strait. China strongly condemned and firmly opposed it. Subsequently, five companies, PetroChina, Sinopec, Chinalco, China Life and Shanghai Petrochemical, applied for "voluntary delisting" of their American Depositary Shares (ADSs) from the New York Stock Exchange. At present, the possibility of actual conflict in the Taiwan Strait is low. However, if the situation escalates, the impact of the coastal blockade on the supply side is limited. Because China's dependence on crude oil imports is as high as 73% and the proportion of domestic supply is small. Even if shipping is disrupted, China is likely to turn to Russian for supplies. From the perspective of the demand side, in case of substantial conflict, regional blockades and transportation disruptions may have a great impact on market sentiment, putting domestic oil prices under pressure in the short term. However, considering that demand for jet fuel may grow, the actual demand decline may not be as much as expected, leaving space for price to rebound later. It is recommended to keep track of the situation in the Taiwan Strait and be alert to potential large fluctuations.

Graph 20: Iraq Crude Oil Production



Graph 21: China Dependence on Import



Source：Refinitiv, BOCI Futures

1.4 OPEC+ is the Core Support, Middle East is hawkish

1.4.1 OPEC+ Output is Stable and Supplt is Tight

Since the beginning of this year, the OPEC+ production policy has been focused on market supply and demand stabilization. From January to August, though the projected production increased slightly, the implementation rate of production cuts reached new highs. In the third quarter, as crude oil prices rallied under multiple pressures, OPEC+ policies gradually turned to production cuts to support the relative high level of prices.

OPEC increased production by 400,000 b/d from January to June, 648,000 b/d in July and August, and its compliance rate gradually climbed from 129% to 250% since the beginning of the year. According to IEA data, OPEC's July production cut compliance rate reached 546%, although this data may be overestimated, the actual production

reduction implementation rate is estimated to be around 235%. Since OPEC's output did not reach the projected production in previous months, the market grew to expect that OPEC's room for subsequent production increase may be relatively limited. OPEC production reached its highest level since April 2020 in September at 29.766 million b/d, leaving 2.45 million b/d idle production capacity compared to pre-pandemic levels.

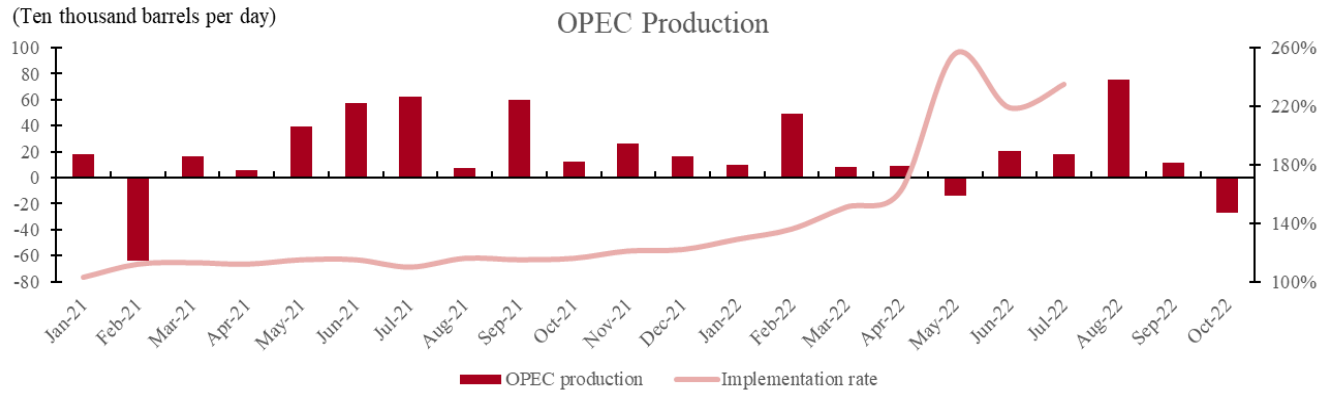
Biden visited Saudi Arabia in mid-July, but failed to agree on a significant increase in crude oil production. Shortly afterwards, OPEC+ decided to increase production by only 100,000 b/d in September, reflecting its hawkish attitude towards the US. However, under the continuous pressure from the US, international oil prices gradually fell from the previous high. Saudi Arabia maintained that the futures market was getting out of touch with fundamentals. In October, the OPEC+ production policy turned to a planned 100,000 b/d cut. Though small in scale, the production cut reflected their determination to stabilize the current supply-demand structure in the market. Moving on to October, OPEC+ decided to cut oil production quotas by 2 million b/d in November and December, and the actual scale of production reduction was about 1 million b/d. Moreover, frequency of subsequent OEPC+ Joint Ministerial Oversight Committee (JMMC) meetings may be adjusted to bi-monthly and ministerial meetings to every six months, which may amplify the impact of production policy adjustments. It is worth notice that the EU approved the eighth round of sanctions against Russia on the 6th, including setting a price cap on Russian crude oil and banning maritime imports since December 5, and embargoing Russian refined oil products since February 5 next year.

Graph 22: OPEC+ Output Policy

OPEC+JMMC meeting	Output policy (Ten thousand barrels per day)	Actual output (Ten thousand barrels per day)	OPEC+JMMC meeting	Output policy (Ten thousand barrels per day)	Actual output (Ten thousand barrels per day)
January	+ 40	2798.5	July	+ 64.8	2889.8
February	+ 40	2847.3	Auguest	+ 64.8	2965.3
Mar.	+ 40	2855.7	September	+ 10	2976.6
April	+ 40	2864.8	October	- 10	2949.4
May	+ 40	2850.9	November	-200	
June	+ 40	2871.6	December	-200	

Source：OPEC, BOCI Futures

Graph 23: OPEC Oil Production-Implementation Rate of Production Reduction



Source：OPEC, BOCI Futures

Graph 24: Production Improvement Potentials for OPEC Member Countries

OPEC member countries	Maximum output in 2022 (Ten thousand barrels per day)	Production space (Ten thousand barrels per day)	OPEC member countries	Maximum output in 2022 (Ten thousand barrels per day)	Production space (Ten thousand barrels per day)
Angola	118.7	21.5	Saudi Arabia	1099.1	55.9
Iraq	457.2	1.3	UAE	319.3	64.6
Kuwait	282.3	30.9	Congo (Brazzaville)	27.2	2.9
Nigeria	126.2	59.1	Equatorial Guinea	10.1	2.6
Total production space of OPEC member countries				238.8	

Source：OPEC, BOCI Futures

1.4.2 OPEC+ Internal and External Pressures Coexist

With high oil prices this year, OPEC is facing both internal and external pressure. Its external pressure mainly comes from the United States, where inflation pressure continues to amount. Biden administration has repeatedly asked OPEC+ to increase production to curb terminal gasoline prices through various channels, including calls between leaders, visit by high-powered U.S. delegation, and Biden's visit to Saudi Arabia in person in July. However, Middle East's attitude gradually turned hawkish, and there were signs of strengthening cooperation with Russia. Under the haze of the Russia-Ukraine War, Saudi Arabia may tend to maintain the OPEC+ organizational system, as high oil prices driven by the geopolitical tension helped to brings more fiscal revenues. The Middle East tends to maintain oil prices in the relatively high territory and stabilize the markets. OPEC+ production policy and actual production are expected to remain tight, continuing to provide strong support to crude oil prices.

As for internal pressure, high oil prices may attract some members to increase production to raise fiscal revenues. The UAE has repeatedly proposed to enlarge the scale of production increase, which lead to great disturbance to the market sentiment. Last July, the UAE objected to a resolution to increase production by 400,000 b/d per month and to extend the production cut agreement until 2022. The UAE also demanded an increase in the baseline the country uses to calculate the production cuts. In March, the UAE's ambassador to the US expressed his support for increasing production and encouraged other OPEC members to consider taking similar measures, becoming the first OPEC member to call for production increase since the escalation of Russia-Ukraine War. After consultations, the UAE said it would not act alone to increase production. Now, the OPEC+ organizational structure is temporarily stable, but it is necessary to be wary of the potential risk of individual countries increasing production despite the agreement.

1.5 Iran Nuclear Standoff Again, Relationship between the U.S. and Venezuel Once Briefly Eased

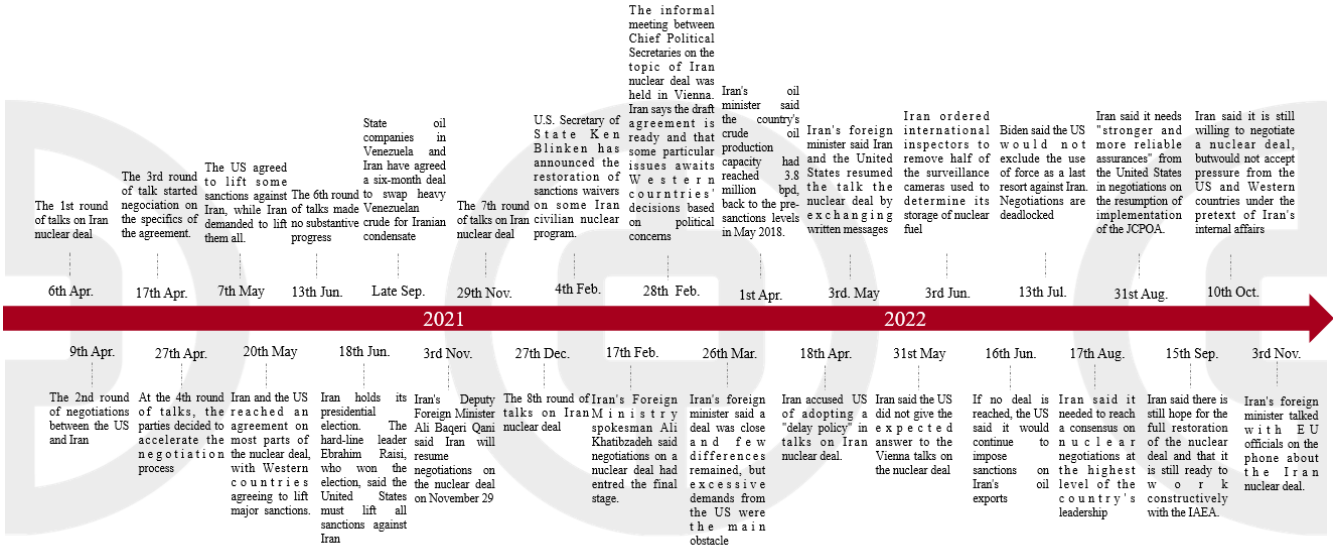
1.5.1 Iran Nuclear Talks Fell Short

Since the beginning of this year, the United States initiated several negotiations on the Iranian nuclear agreement to curb the rapid rise of oil prices. The two countries were once close to reaching a final agreement, but with Iran’s turn of attitude, the talks stalled once again.

The eighth round of talks on the JCPOA was held on December 27, 2021, but without results which Biden proposed to restart in July this year. On August 4, the White House announced that the negotiations were basically completed, and the EU submitted a "final agreement" to related parties, which led to a significant correction in oil prices in mid-August. But since then, no major breakthroughs were made in the following negotiations, and market sentiment has gradually stabilized. At the same time, Iran and Russia gradually strengthened cooperation. In addition to signs of collaboration on the Russian-Ukrainian issue, the two sides have also made progress in the energy field. Iran's National Oil Corporation (NIOC) announced in July that it had signed a $40 billion memorandum of understanding with Gazprom on collaborative development in oil and gas field, the largest foreign investment agreement ever signed by Iran. In the agreement, Russian agrees to help Iran develop gas fields in Kish and Northern Pars and other six oil fields, and will participate in the construction of liquefied natural gas projects and the construction of natural gas export pipelines. In addition, OPEC+ is going to consider Iran's proposal to join the JMMC at its December meeting. Now, the cooperation between Iran and Russia and the Middle East is strengthening, and the negotiations on the Iranian nuclear agreement with Europe and the United States have once again reached a stalemate, with low expectation of breakthroughs in the short term.

We recommend to track subsequent progress of the negotiation and do not rule out the possibility of the US advancing negotiations again. Investors should be vigilant about potential downward movement. If the United States relaxes sanctions on Iranian oil exports, on the one hand, the short-term dumping of Iranian inventories may have a impact on the spot market; On the other hand, with an idle production capacity of about 1-1.5m b/d, and the full release of it will have an impact on the supply side of the European and Japanese and Korean markets. Brent may go south, and its calendar spread for near-term contracts and the spread with Brent-WTI might narrow. However, given the small volume of Iran's entire market, the subsequent valuation is expected to return to fundamentals shortly.

Graph 25: Process of Iran Nuclear Negotiation



Source：BOCI Futures

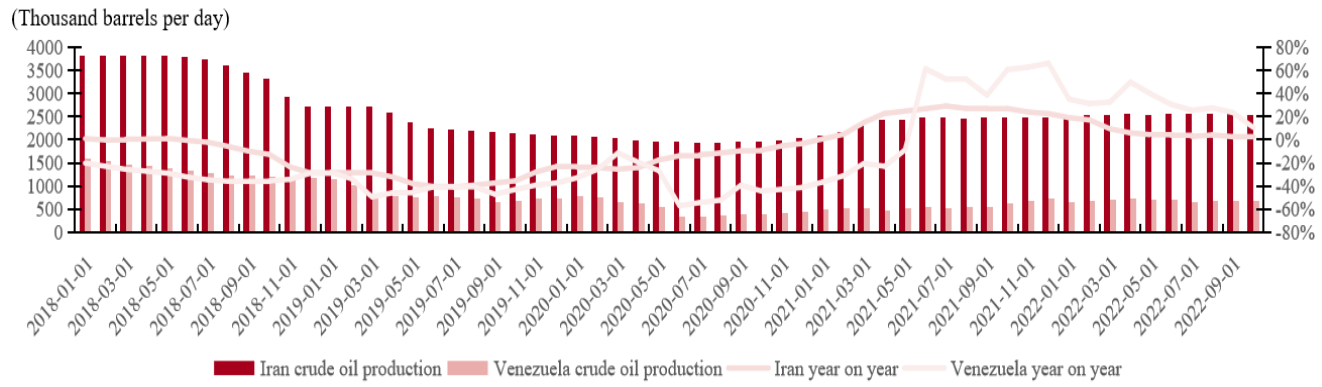
1.5.2 Relations between the United States and Venezuela Briefly Eased

In addition to advancing negotiations on the Iranian nuclear agreement, the United States also plans to ease sanctions on Venezuelan oil. Its main purpose may be to alleviate the energy shortage crisis in Europe. In May, the U.S. government authorized

U.S. and European oil companies to restart operations in Venezuela. Venezuelan used revenue from oil exports to repay its debts and overdue interest. Later, according to Refinitiv data released on June 17, Venezuela exported crude oil to Europe for the first time in two years and Italy's Eni Group sold part of its crude oil to Spain's Lepsor Company.

However, on August 12, Venezuela's state-run oil company PDVSA announced a moratorium on crude oil shipments to Europe in the hope of establishing a new oil deal that would require Italy and Spain to provide it with fuel in exchange for oil, rather than the previous "paying-debt-off-with-oil" model. Venezuela's move may aggravate the energy shortage in Europe in the short term, pushing up the price of Brent crude oil. Venezuelan crude oil production has rebounded to pre-pandemic levels this year, peaking at about 700,000 b/d during the year. The former chairman of Venezuela's state oil company said if sanctions were lifted, the country's output could increase by 200,000 b/d . Considering its low overall output, the room for production increase may be small, coupled with the fact that spot goods are still being exported, so the impact on oil prices may be relatively limited. We recommend investors to pay attention to the dynamics between the US and Venezuela.

Graph 26:Iran and Venezuela Crude Oil Output



Source：Wind, BOCI Futures

1.6 High inflation in EU and US and US Pressures Crude Oil

1.6.1 US Federal Reserve Raises Interest Rates Sharply to Cope with High Inflation

Since the escalation of Russia-Ukraine War this year, energy prices have risen to a high level, mounting further inflationary pressure in Europe and the US. High inflation in the US has had put Biden administration under pressure and the midterm elections in danger. Therefore, the US sought to suppress oil prices from multiple dimensions such as macro, demand, and supply, which poses a great negative disturbance to crude oil prices. In an effort to curb inflation, in addition to exerting pressure on OPEC+ to increase production volume, advancing Iranian nuclear negotiations, easing sanctions against Venezuela and implementing other external measures, the US has also adjusted monetary policy aggressively.

Inflation in the US remained high this year, with high energy prices being one of the main reasons. According to the data of the US Department of Labor, the US CPI reached its peak in June, up 9.1 percent yoy, the highest level since the end of 1981, among which the US energy CPI rose 41.6 percent yoy in June. In order to curb inflation, the Federal Reserve has raised interest rates by a large margin for several times to tighten currency liquidity. In the first half of this year, the Fed raised interest rates for three times by a total of 150 basis points, followed by three hikes of 75 basis points each in July, September and November. The range of federal funds rate now is 3.75% to 4.00%, the highest level since 2008. The Fed's continued tightening monetary liquidity pushed the dollar index high, approaching 115 in late September, the highest since mid-2002, and then remained moving around 110. As the Fed tightened liquidity, the US inflation level has fallen slightly from the previous high. The US CPI in October increased by 7.7% yoy, compared with the original expectation of 8.0%. However, the current inflation level is still quite high compared with the same

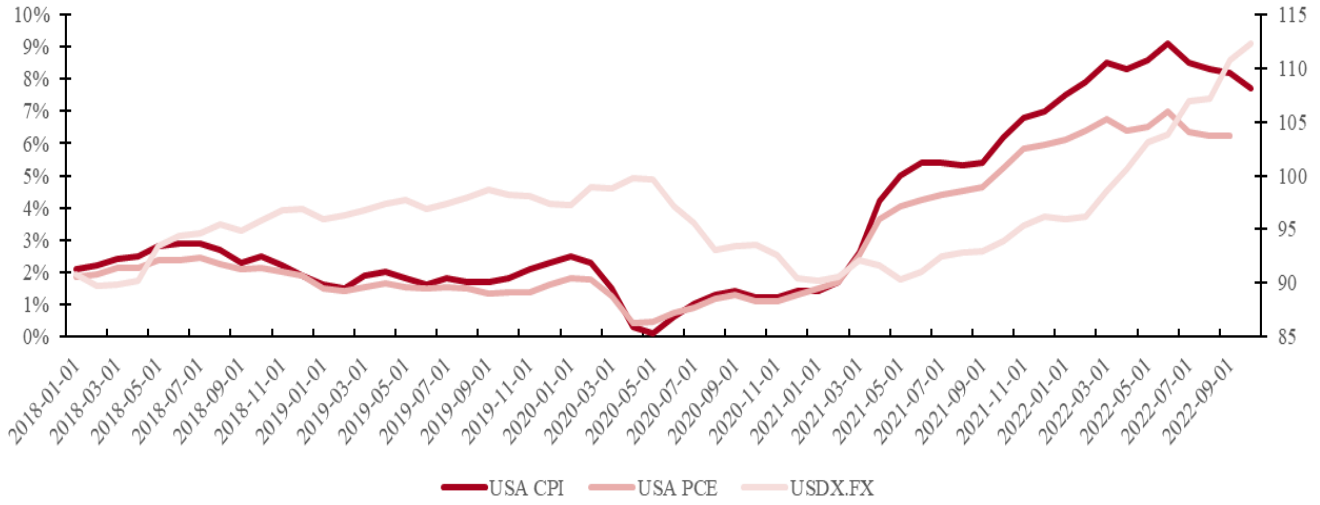
period of previous years, and the problem remains unsolved. The Fed is likely to continue to raise the federal funds rate, but may slow down in the future. The continued interest rate hike will put great pressure on the US government to repay its debt, which makes the Fed is in a dilemma.

Graph 27: FED's Schedule for Interest Rate Rise in 2022

Federal Reserve FOMC meeting date	Rate increase range	Federal benchmark interest rate target range
March 15th-16th	Raise interest rate by 25 basis points	0.23%-0.50%
May 3rd-4th	Raise interest rate by 50 basis points	0.75%-1.0%
June 14th-15th	Raise interest rate by 75 basis points	1.50%-1.75%
July 26th-27th	Raise interest rate by 75 basis points	2.25%-2.50%
September 20th-21st	Raise interest rate by 75 basis points	3.00%-3.25%
November 1st-2nd	Raise interest rate by 75 basis points	3.75%-4.00%

Source：BOCI Futures

Graph 28: US CPI-PCE-USDX



Source：Wind, BOCI Futures

Graph 29: US WTI Active Contract Price- USDX

Source：Wind, BOCI Futures

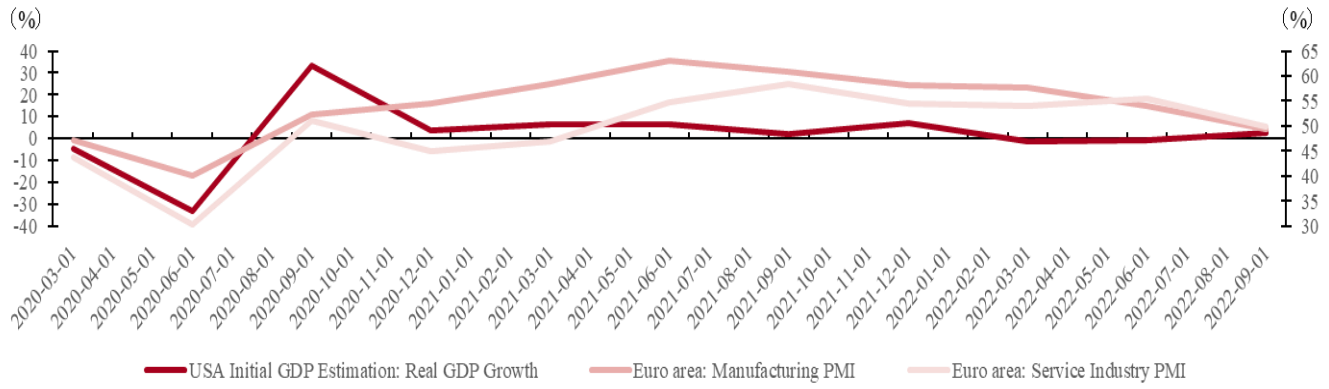
1.6.2 Pessimistic outlook of Europe and America Economy, Oil Price Remains High to Give Negative Feedback

Since the beginning of this year, many countries in Europe the US have officially lifted comprehensive epidemic prevention measures. Although the number of cases abroad fluctuated severely, the actual impact on terminal demand has gradually eased. The main concern of crude oil price on the demand side has shifted to inflation pressure and economic recovery from the epidemic. The market's pessimistic expectations for economic recovery in Europe and the United States are on the rise, which has added volatility to the global crude oil on the demand side. However, compared with the geopolitical situation and factors on the supply side, demand-side pressure has a limited effect.

According to data released by the Bureau of Economic Analysis at the end of July, after the US GDP was -1.6% in the first quarter, the initial value of US real GDP annualized quarterly growth rate in the second quarter was -0.9%, which was the second consecutive negative quarter growth, in line with the definition of "technical recession". As for Europe, in October, the final composite PMI of the Eurozone was 47.3, the final PMI of the services sector was 48.6, the lowest in 20 months, and the

final value of the manufacturing PMI was 46.4, the lowest value since the epidemic.

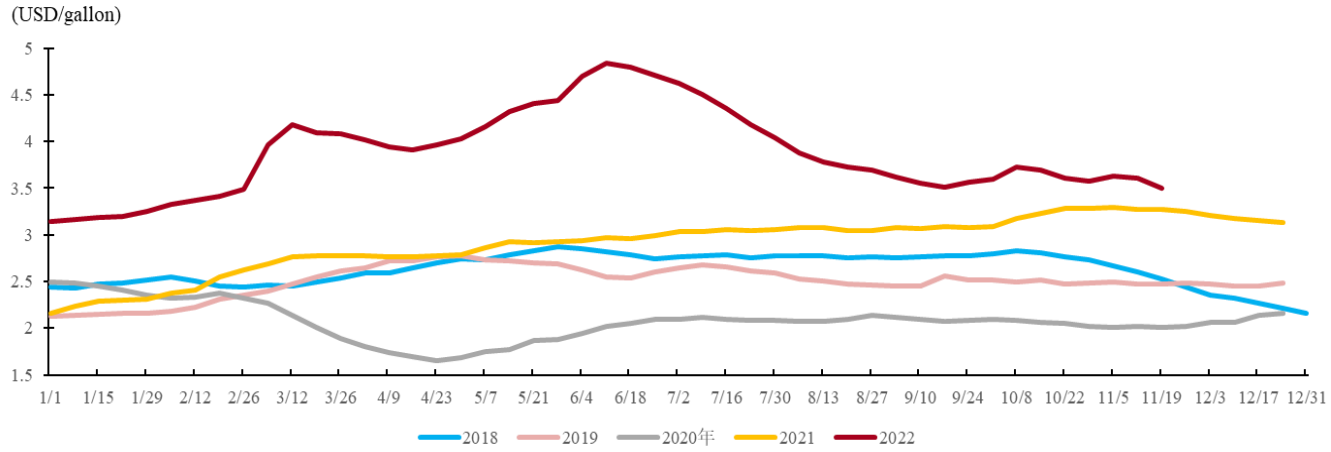
Graph 30: European and US Economic Performance



Source：Wind, BOCI Futures

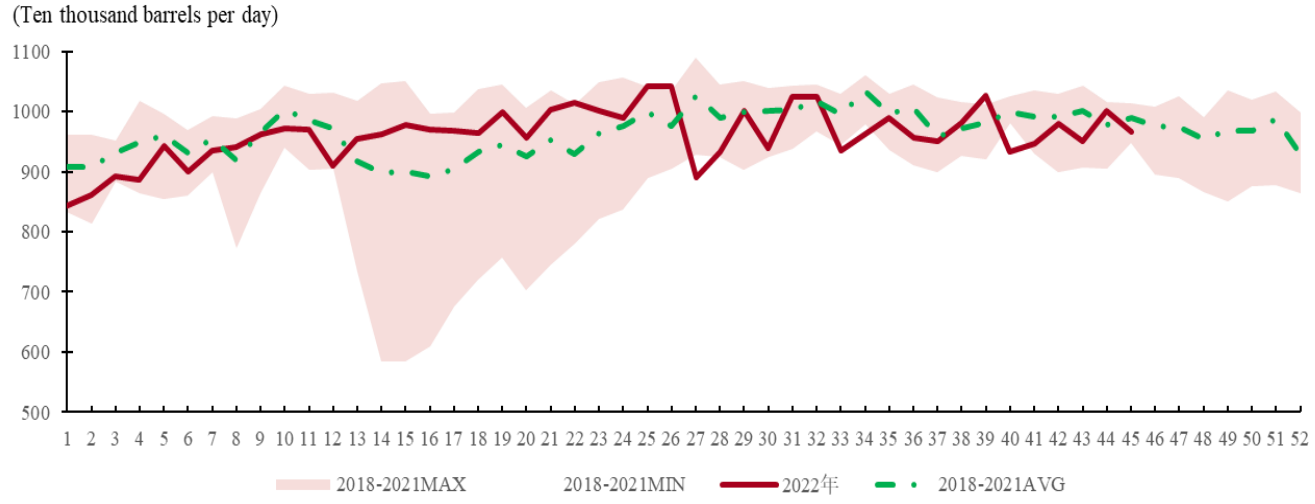
In addition to the recession risk in Europe and the US, the rise in crude oil prices pushed up the gasoline and diesel prices in the US. In terms of end consumer prices, the average retail price of gasoline in the US reached a historical high of $5.014 in June, according to the data from American Automobile Association (AAA). The rising price of gasoline and diesel has a negative effect on end-user consumption, and the failure to fulfill the demand in peak summer season caused disturbance to market sentiment from the demand side. According to EIA data, the average demand for gasoline in the United States in July was around 9.4 m b/d, down 8.52% yoy, and once fell below the same period in 2020. However, it is worth mentioning that some market analysts were doubtful about the number. They believe that the EIA may distorted the figures and conspired with government authorities to pressure oil prices. Overall, U.S. gasoline demand fluctuated widely around the four-year average this year, with an average demand of 9.59 million b/d from January to November, while end-user demand did not fall sharply. Pressure on oil prices is limited.

Graph 31: US Gasoline Retail Price



Source：EIA, BOCI Futures

Graph 32: Demand for US Gasoline

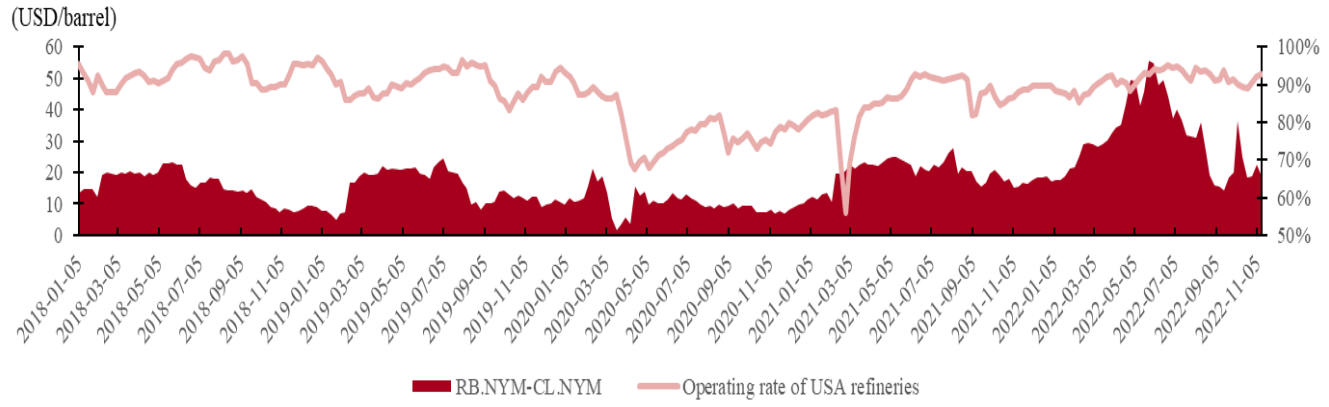


Source：EIA, BOCI Futures

The Biden administration's actions to pressure oil prices through multiple approaches proved to be effective to some extent. The average U.S. gasoline price fell from a previous high of $5/gallon to near $3.5/gallon in mid-September, the lowest since March. However, the current inflation and terminal energy price levels are still high compared with previous years, and the underlying crisis remain to be resolved. As for suppressing terminal prices, the US policy encourages new energy, while room for refinery capacity expansion is limited. According to EIA data, as of the week of July

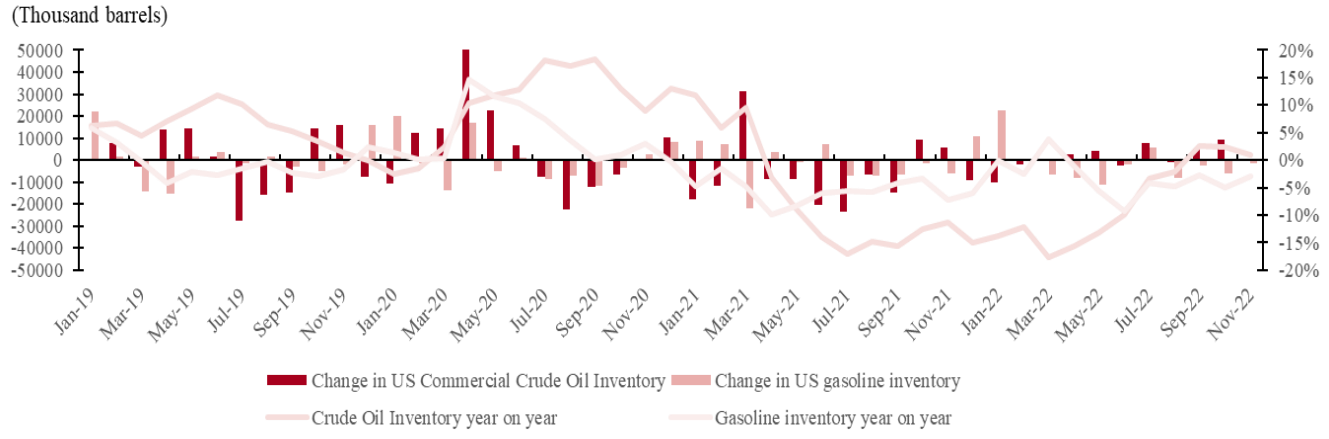
8, the utilization rate of US refineries is nearly 95%, and the overall shortage of terminal supply caused US gasoline and diesel prices to hit record highs. Therefore, it is difficult to reduce high terminal consumer prices by simply relying on putting pressure on the cost side. As for commercial oil inventories, this year, EIA crude oil inventories are accumulating, while gasoline inventories are destocking. EIA gasoline inventories in the week of August 5 recorded the largest decline since the week of October 15, 2021. Upstream accumulation and downstream destocking reflect another problem in US supply chain.

Graph 33:Operation rate for US Refineries-Gasoline Crack Spread



Source：Wind, BOCI Futures

Graph 34: US Commercial Crude Oil Inventory-Gasoline Inventory



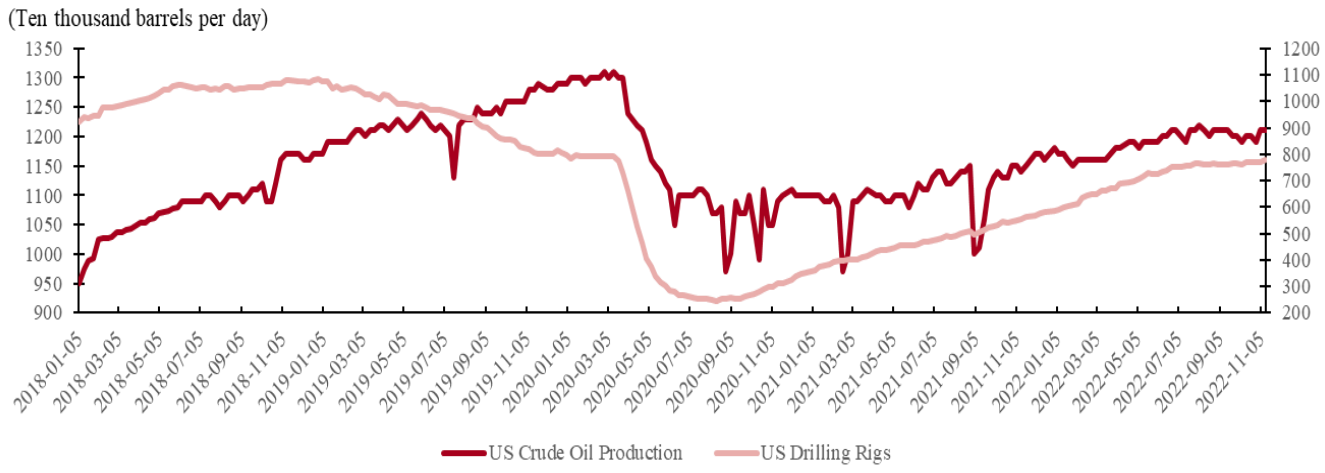
Source：EIA, BOCI Futures

1.6.3 With Limited Increase in Production, SPR Is Hard to Change Current Status

Since the beginning of this year, US crude oil production maintained a steady and slight growth, and did not rebounded sharply. The US government authorities have released oil Strategic Petroleum Reserves (SPR) to pressure crude oil prices, but only constituted some short-term bearish impact, which does not hinder the overall tight supply pattern.

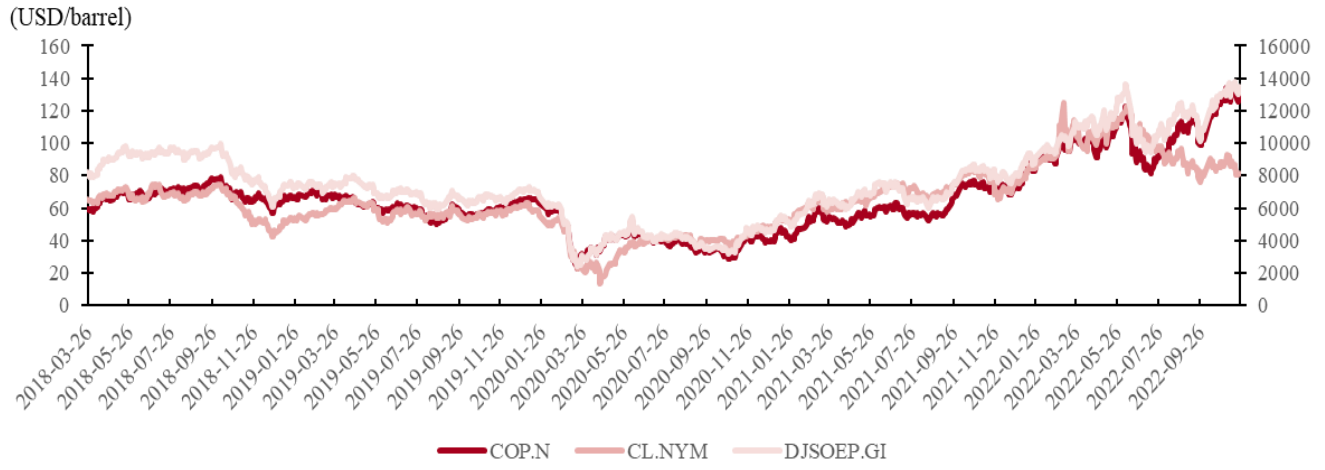
U.S. crude oil production averages around 11.9 million b/d this year, about 600,000-700,000 b/d short of pre-pandemic levels. However, the negative oil prices event in 2020 led to a contraction in upstream capital expenditure, and capital preferred cash flow to long-term investment; Coupled with the Biden administration's encouragement of new energy policies, it is less likely to promote the development of oil well and increase refinery capacity, so US crude oil production is expected to maintain a steady and slow growth.

Graph 35: US Crude Oil Production-Number of Baker Hughes Drilling Rigs



Source：Wind, BOCI Futures

Graph 36: Share Price for US Oil Company-WTI Futures Price-US Oil Development and Production



Source：Wind, BOCI Futures

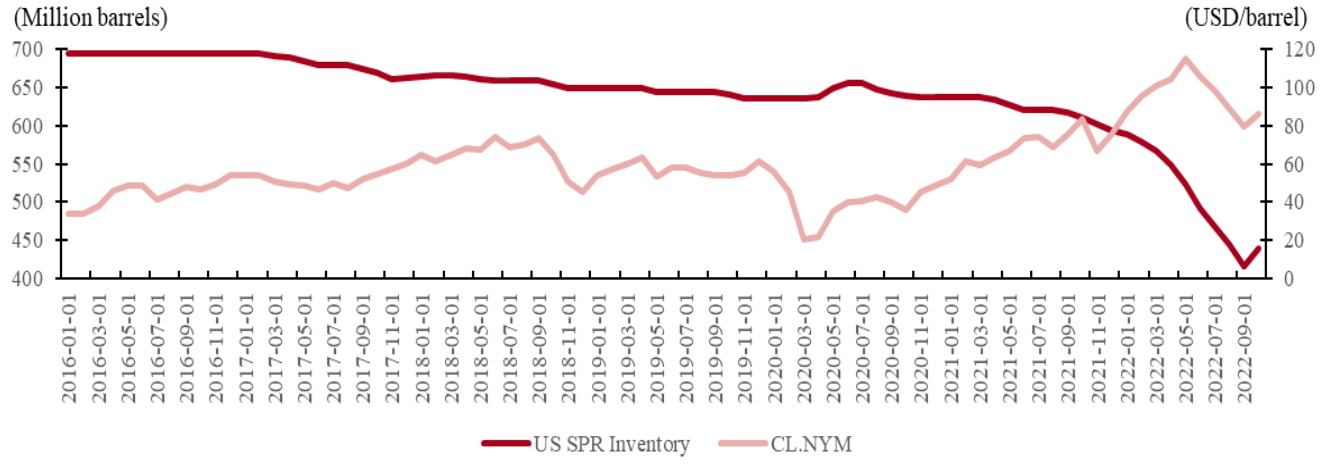
In addition to the difficulty of significantly increasing its own crude oil production capacity, US' repeated release of SPR had little impact. The US and its allies announced a joint release of 60 million barrels of SPR in March and about 240 million barrels in April, putting some bearish pressure on oil prices in the short term. The Biden administration said in October that it might consider additional releases this winter if necessary. However, multiple rounds of SPR releases failed to change the tight supply pattern and oil price remained to be high. According to EIA data, U.S. SPR inventories fell by 1.601 million barrels to 390.5 million barrels in the week ended 18th, Nov., the lowest level since the week ended 23th, Mar.,1984. U.S. SPR is expected to further destock, and as U.S. SPR stocks become low, it plans to buy back crude oil at a price of up to $67-72/b to replenish reserves.

Graph 37: Timetable for SPR Release

Announce time point	American SPR release	Allied SPR release	Total SPR release
November, 2021	5 million barrels	Japan 4.2 million barrels India 5 million barrels UK 1.5 million barrels	About 60 million barrels
At the beginning of March 2022	30 million barrels	30 million barrels	6 million barrels
At the beginning of April 2022	180 million barrels	60 million barrels	240 million barrels

Source：BOCI Futures

Graph 38: US SPR Inventory-WTI Futures Price



Source：Wind, BOCI Futures

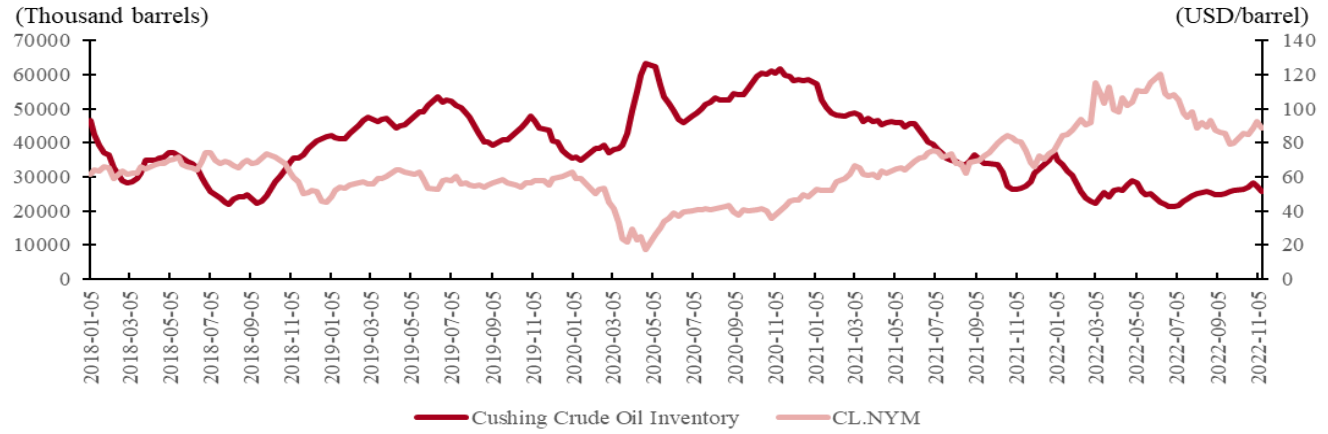
1.6.4 Cross-Region Spread between Brent-WTI Fluctuated Greatly

This year, under the pressure from multiple factors such as geopolitics and international macro, the Brent-WTI cross-regional price spread fluctuated greatly.

The Brent-WTI spread briefly shifted to a Brent discount structure in mid-May, possibly because high refined product prices in the US pushed up WTI prices. WTI Cushing crude oil inventories are at historical low levels, this year Cushing crude oil

inventories fell to about 20 million barrels, the lowest level since October 2014, once attracted widespread attention of the market. According to EIA data, as of March 31, 2022, the theoretical upper limit of crude oil inventory capacity in Cushing was 98.181 million barrels, and the actual available storage capacity was 78.449 million barrels. Estimated based on the minimum safe level of the tank, the total amount of bottom oil in the Cushing tank is about 4 million barrels. However, considering safe operation, the minimum liquid level requirement of the tank is generally set at about 0.3-0.5m, so the overall loss of Cushing capacity is about 8-10 million barrels. Therefore, at present, Cushing crude oil still has room to destock, and the risk of short squeeze is low at the moment.

Graph 39：US Cushing Inventory-WTI Futures Price

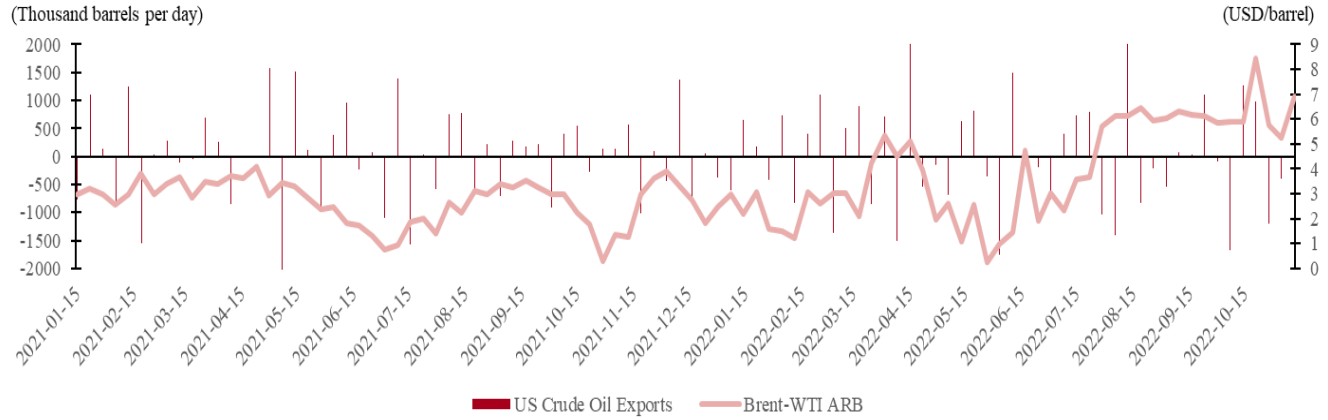


Source：EIA, BOCI Futures

Under the continuous pressure from the US, the WTI oil prices has weakened significantly since the third quarter of this year. The Brent-WTI spread has maintained the Brent premium structure and gradually widened, reaching a maximum of $7.98 per barrel. After the inter-period arbitrage window opens, it is possible that US crude oil will be exported to Europe, resulting in a smaller than expected increase in US domestic supply. U.S. crude exports hit a record high of 5.129 million b/d in the week of Oct. 21, according to EIA data. Considering that it is difficult to reverse the pressure

at the macro level in the United States in the short term, it is expected that the Brent-WTI spread will continue to widen, but if the Iranian nuclear agreement negotiation progress and a final agreement is reached, the pressure on Brent may be even greater, and the cross-regional spread may narrow.

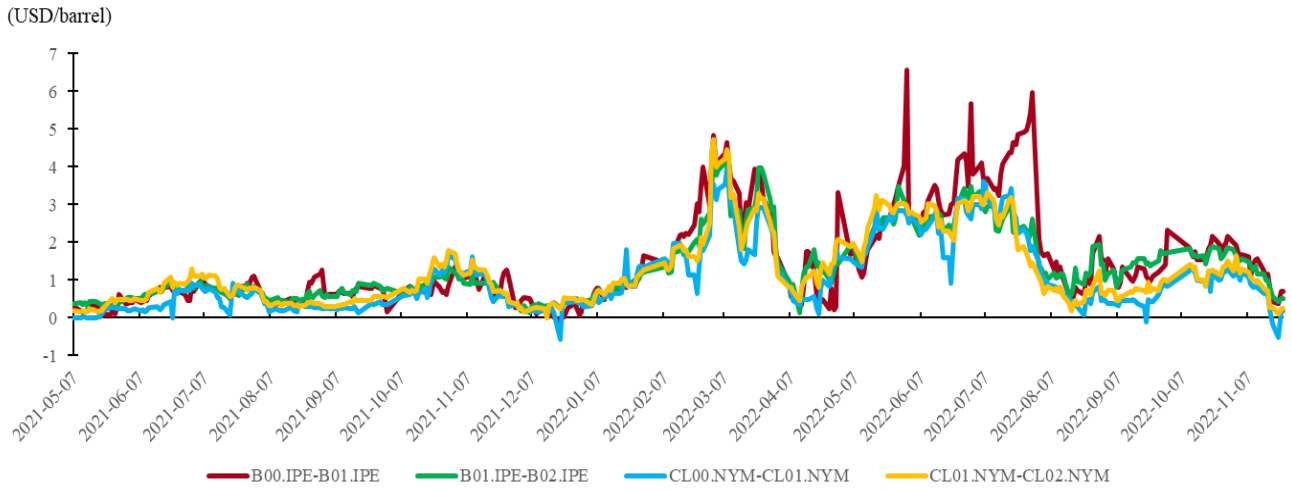
Graph 40: Brent-WTI Spread-US Crude Oil Exports



Source：EIA, Wind, BOCI Futures

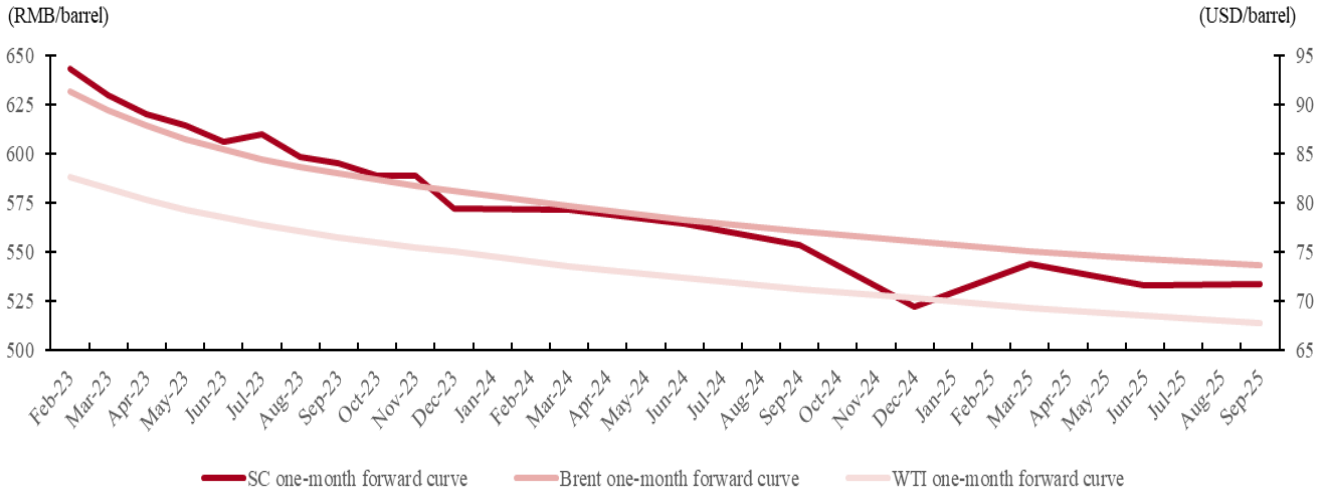
As for the calendar spread structure, the calendar spread for near month contracts between Brent and WTI maintained a backwardation structure in the first half of this year, but weakened significantly compared with the previous period since the third quarter, and the calendar spread for near month contracts once tended to be zero. As of November 25, 2022, the average daily value of the Brent monthly spread for the year was $2.12/b and the average daily value of the WTI monthly spread was $1.48/barrel.

Graph 41: Calendar Spread for Brent and WTI Near-term Contracts



Source：Wind, BOCI Futures

Graph 42: Forward Curve for SC, Brent and WTI



Source：Wind, BOCI Futures

1.7 Epidemic in China was Severe, Demand is Expected to Recover

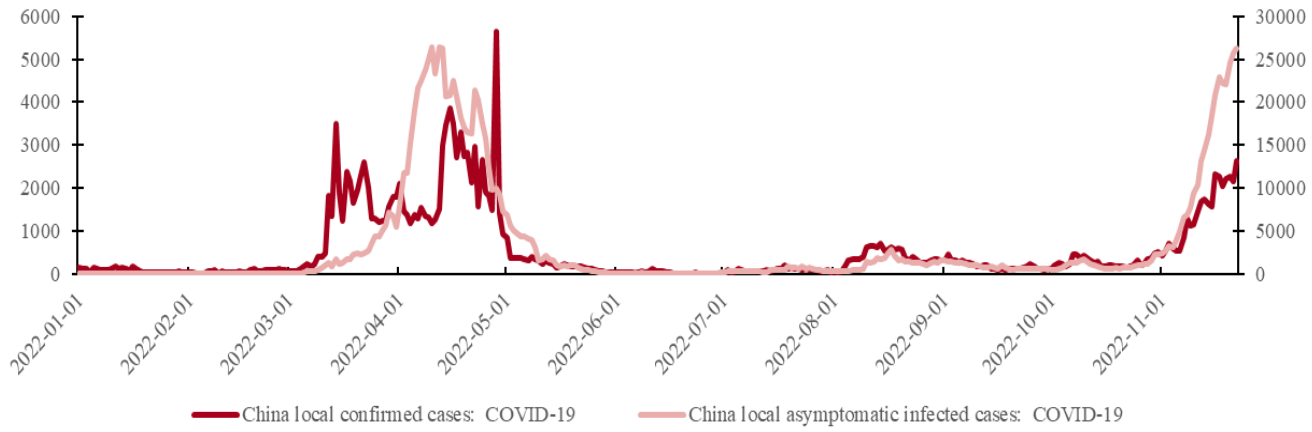
1.7.1 Epidemic in China was Severe, Operating Rate of Crude Oil Processing was at Historical Low

This year, the epidemic in many places in China was severe, and lockdown in Shanghai suppressed market expectation of demand greatly, putting pressure on SC price in the domestic market. This in line with the role of SC crude oil futures in effectively reflecting regional fundamentals. As the epidemic in Shanghai stabilized, although the number of cases in various regions of China was quite volatile, the overall impact on price is relatively limited. Coupled with the optimization and relaxation of China's epidemic prevention policies, demand for domestic crude oil is expected to gradually recover.

The epidemic in Shanghai was quite severe in March this year. In late march, Shanghai was divided into two parts by the Huangpu River and was under closed-loop management. Lockdown measures were implemented based on smaller units from early April to May, and production and routine life gradually recovered in June. The cumulative number of confirmed cases in this round of the epidemic exceeded 58,000, and the cumulative number of asymptomatic infections exceeded 590,000. The lockdown in Shanghai has caused certain suppressed expectations of terminal demand, putting pressure on the SC price and rendering SC06-Brent08 spread widen to -$6 / barrel in April.

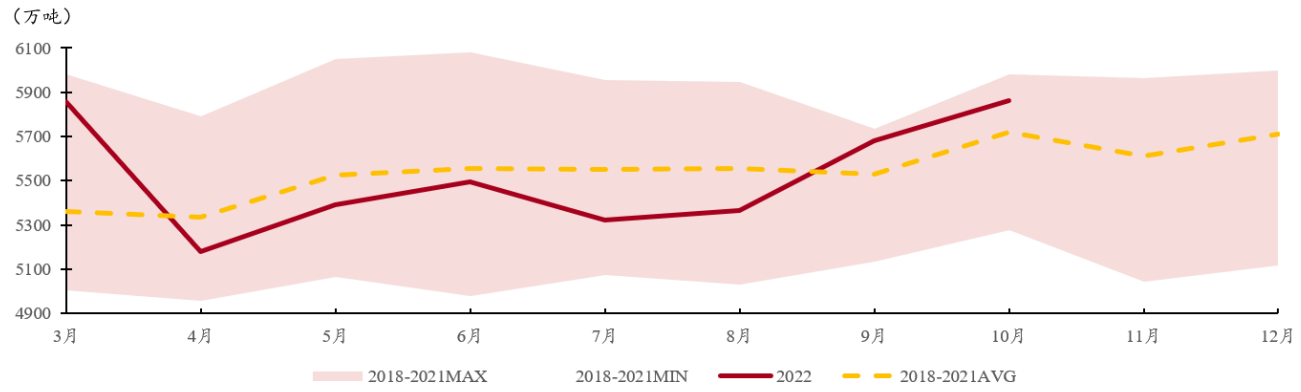
This year, China's crude oil processing amount and refined oil consumption declined. According to data from the National Bureau of Statistics, 555.88 million tons of crude oil were processed from January to October, down 4.5% yoy, among which, 53.92 million were processed in May, a sharp yoy decrease of 10.9%. This is mainly due to two reasons. Firstly, the epidemic put pressure on downstream consumption. Secondly, while crude oil prices rose since the beginning of this year, retail price of refined oil products was capped and refined oil exports contracted, squeezing refineries' profits. Therefore, the operating rate of major domestic refineries is at a historical low level.

Graph 43: Domestic epidemic situation



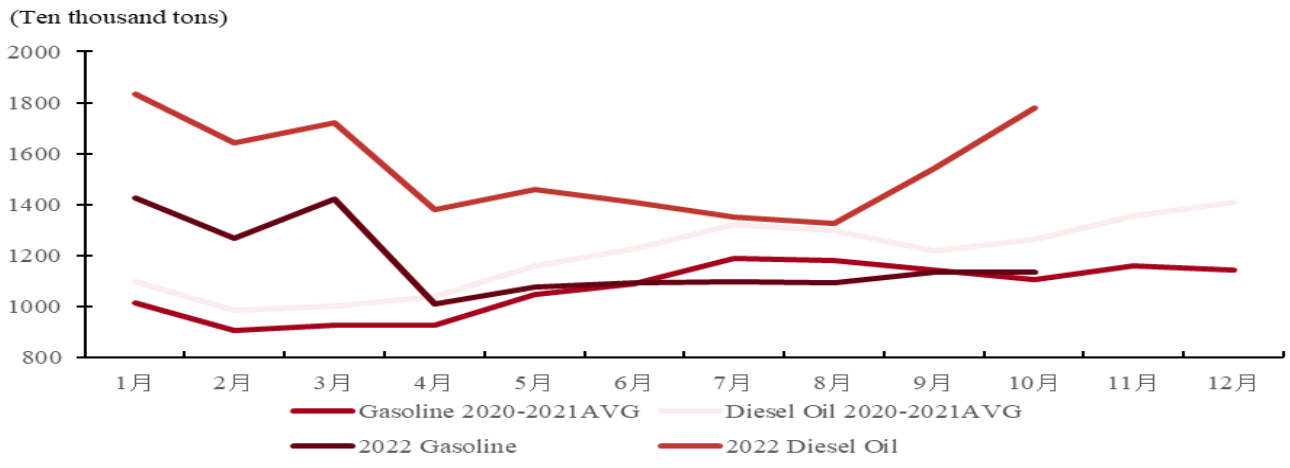
Source：Wind, BOCI Futures

Graph 44: Domestic Crude Oil Processing Capacity



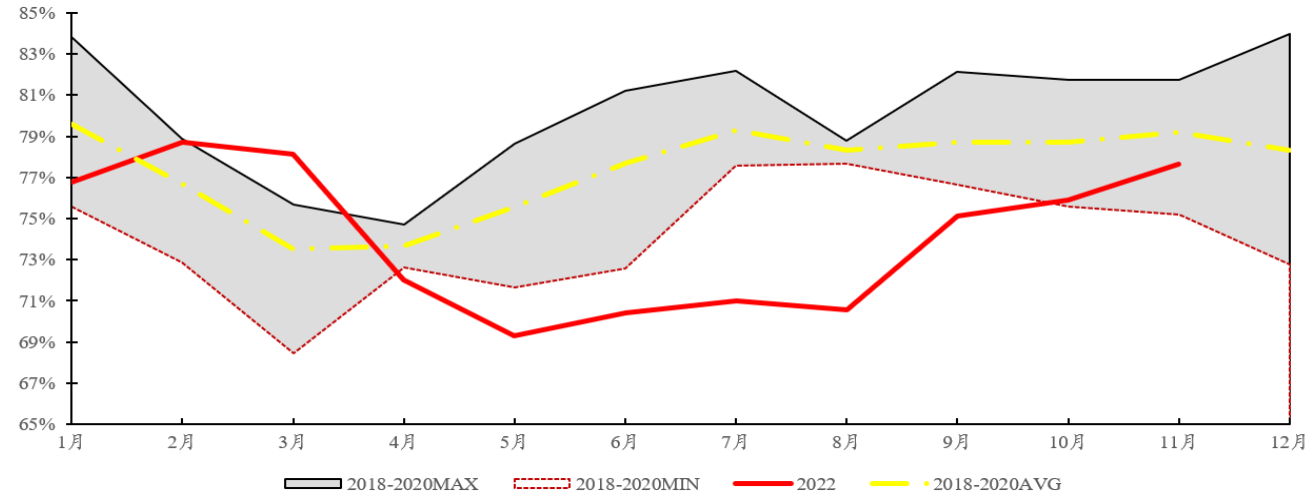
Source：Wind, BOCI Futures

Graph 45: Apparent Consumption for Domestic Refined Oil



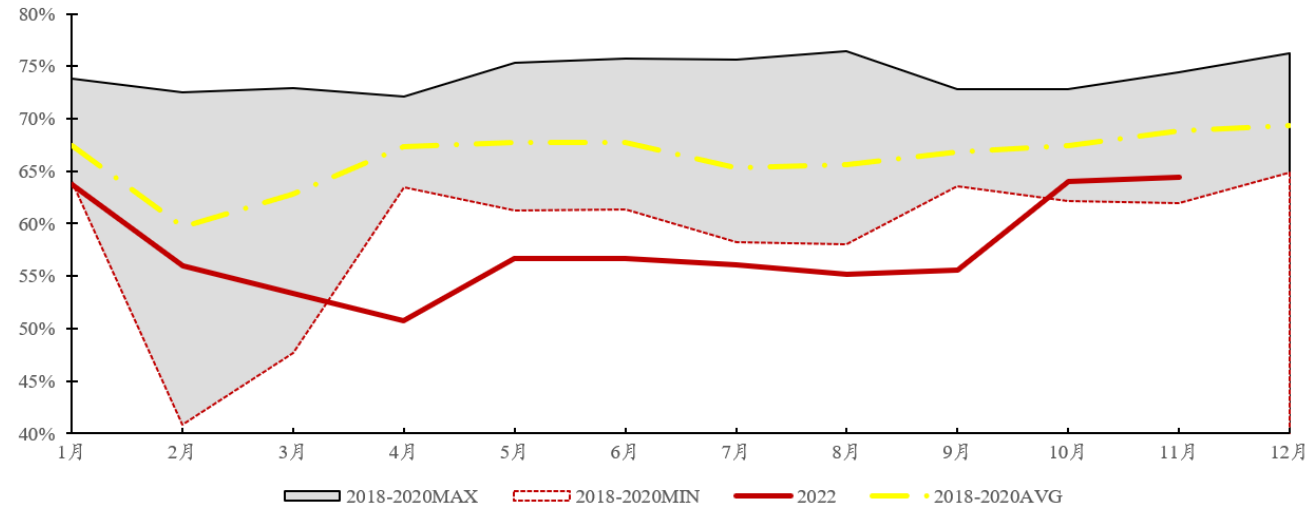
Source：State Statistics Bureau, BOCI Futures

Graph 46: Operation Rate for Main Refineries



Source：Oilchem, BOCI Futures

Graph 47: Operation Rate for Shandong Refineries



Source：Oilchem, BOCI Futures

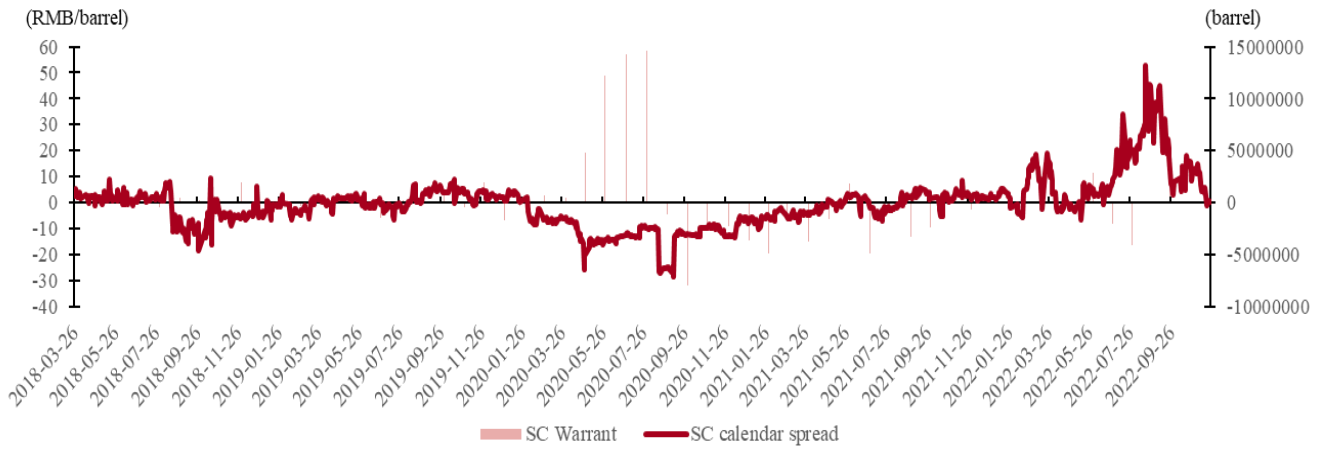
1.7.2 SC Calendar Spread Twisted, Crude Oil Import Fluctuated Greatly

From the beginning of this year, the calendar spread for near-month SC crude oil futures shifted between the negative and positive value frequently. Pushed up by the

escalation of the Russia-Ukraine War, the March calendar spread for near-month SC crude oil futures turned to a backwardation structure and widened significantly. Later, under the pressure of the epidemic, it returned to the contango structure in April. In the third quarter, the SC near-month contracts strengthened significantly. On the exit date of individual investors, the calendar spread between September and October contracts widened sharply to 52.5 yuan / barrel and October-November spread widened to more than 60 yuan / barrel, a record high.

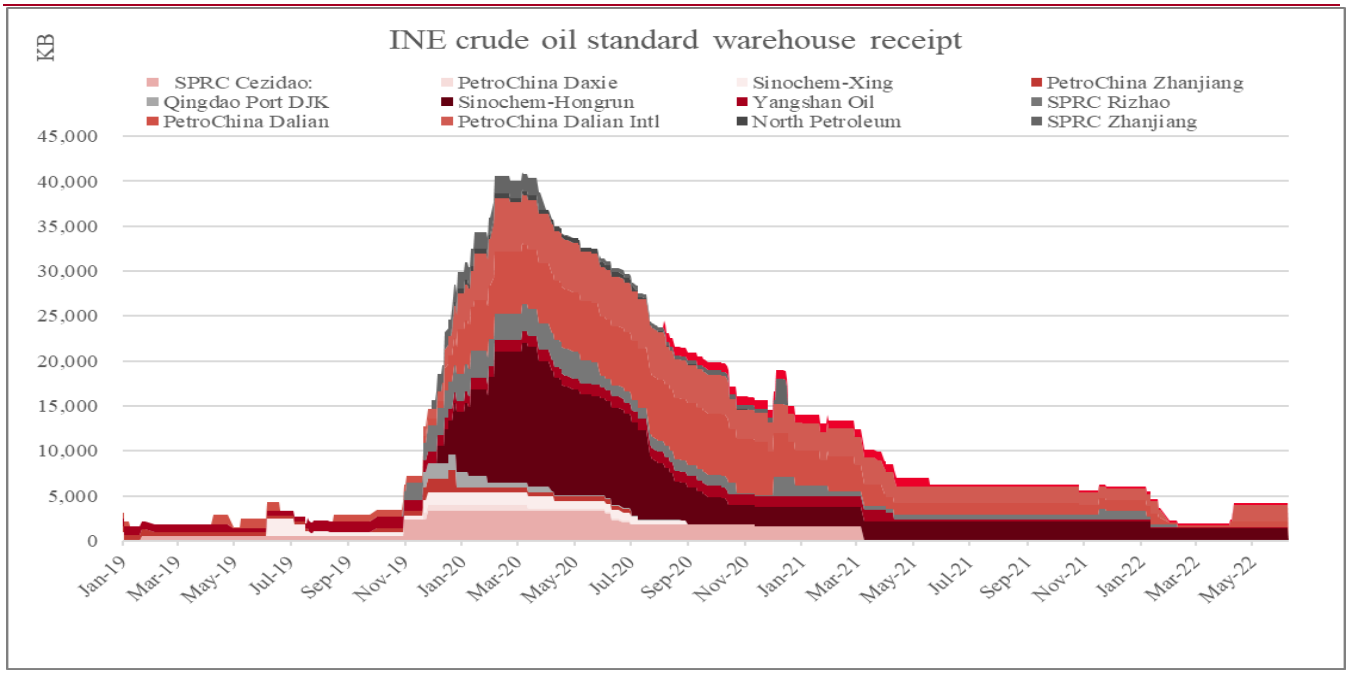
This is due to three main reasons. Firstly, from physical trading perspective, SC 2209 reflects CIF prices in August, which were affected by high freight rates in the third quarter. Secondly, August spot price is priced based on June futures price. Since the futures price was relatively high, resulted in a higher SC 2209 price. Thirdly, 4.113 million barrels of SC were delivered out of storage in July, resulting in low inventories and supporting SC's near-month prices. As subsequent SC warehouse receipts soared, the spread narrowed in the fourth quarter, but overall SC back structure remained to be stable, and the structure is expected to continue.

Graph 48: Calendar Spread for SC Near-term Contracts-SC Warrants Load-in and Load-out



Source：INE, Wind, BOCI Futures

Graph 49: Calendar Spread for SC Contracts-SC Warrants Inventory



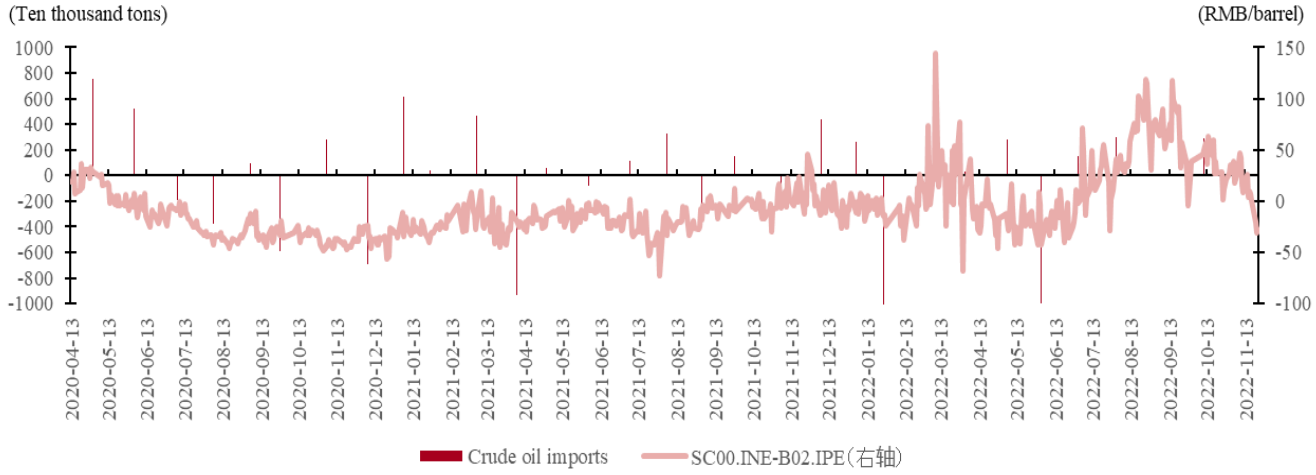
Source：INE, BOCI Futures

As for the spread between domestic and foreign market, the overall the SC-Brent price spread was in the negative territory in the first half of this year. This may be due to the tightened epidemic prevention policies in China, which suppressed market expectation of terminal demand, putting pressure on the SC price. In addition, factors such as a slightly slower domestic destocking speed and a lower spot price in Shandong also contribute to it. In the third quarter, divergence between domestic and foreign markets became more obvious. Domestic market strengthened while foreign market weakened. On the one hand, low SC inventory supported the price of near-month contracts in the domestic market. On the other hand, oil price in the foreign market continued to weaken under great international macro pressure. The SC09-Brent11 spread and SC10-Brent12 spread once widened to as high as $15/barrel. In the fourth quarter, the S11C-Brent01 spread narrowed to around zero and SC12-Brent02 spread turned to a discount structure. This is due to two main reasons. Firstly, the RMB-US dollar exchange rate fluctuates greatly. Secondly, in late September, SC

inventory increased to 6.172 million barrels, which may put some pressure on the SC near-month contracts.

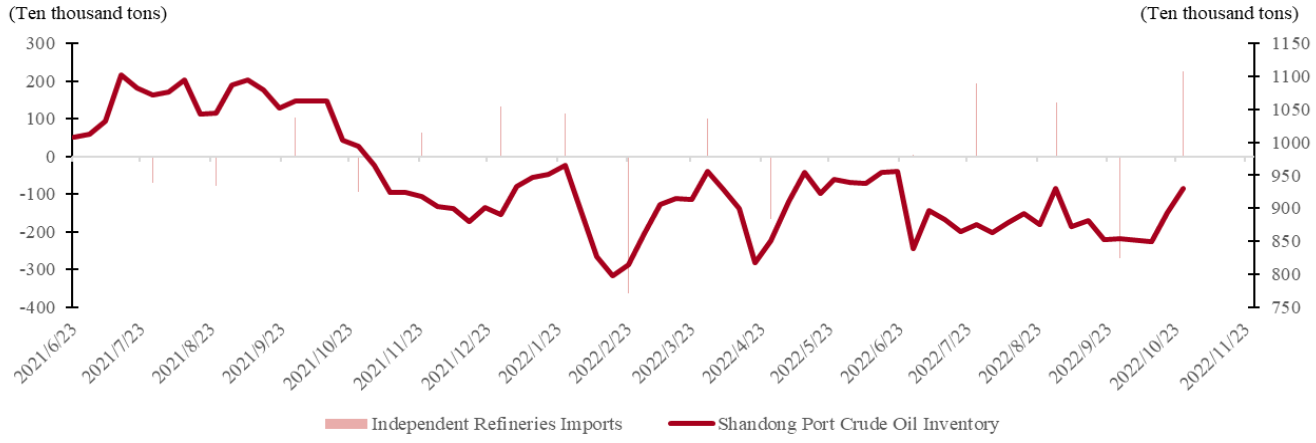
China's crude oil imports fluctuate greatly this year, which may be caused by several factors. According to data from the National Bureau of Statistics, domestic crude oil imports from January to October 2022 were 413.53 million tons, down 2.7% yoy, of which 42.71 million tons of crude oil were imported in March, a sharp yoy decrease of 14.0%. On the one hand, due to the escalation of the Russia-Ukraine War, oil prices rose sharply, and the willingness to import was curbed now. On the other hand, the capped retail price of domestic refined oil products, along with the high crude oil price squeezed profit of refineries. The willingness of Shandong refinery production weakened, and the operating rate declined significantly. In the second quarter, the relationship between Russia and Ukraine remained to be tense, combined with sanction by Western countries, Russian crude oil spot cargo was at significant discount, attracting Chinese buyers to purchase a large amount. China imported 45.82 million tons of crude oil in May, a significant yoy increase of 11.8%. The sharp increase in imports led to the accumulation of crude oil in domestic ports. In the second quarter, inventory in Shandong reached a new high since September last year. In the third quarter, China's crude oil imports gradually slipped. Firstly, it is necessary to drain the accumulated inventory in the previous period, and secondly, the discount of Russian crude oil is not that large compared with the previous period and the domestic crude oil price was lower than the previous high, rendered Russian Urals crude oil less attractive. In the third quarter, most of the ports destock crude oil to a historical low. In the fourth quarter, China's crude oil imports rose significantly, among which 43.14 million tons was imported in October, up 14.1% YoY. Crude oil inventories in Shandong ports also rose. The new batches of import quota of crude oil and export quota of refined oil in the fourth quarter is likely to lead to demand recovery and prices might correct along with international oil prices.

Graph 50: Spread between SC and Brent-Domestic Crude Oil Imports



Source：Wind, BOCI Futures

Graph 51: Domestic Crude Oil Inventory



Source：Oilchem, BOCI Futures

Graph 52: Crude Oil Import Quota

Company Name	1st batch in 2022 Crude Oil Import Permitted Quantity	2nd batch in 2022 Crude Oil Import Permitted Quantity	3rd batch in 2022 Crude Oil Import Permitted Quantity	4th batch in 2022 Crude Oil Import Permitted Quantity	2022 Cumulative Permitted Quantity	2021 Imported Crude Oil Usage Quantity	YoY	Issue ratio
Hengli Petrochemical (Dalian) Refining Co., Ltd	600	1400			2000	2000	0%	100%
Zhejiang Shiyou Chemical Industry Co., Ltd	1000	2000			3000	3200	-6%	94%
China National Chemical Co.,Ltd.	428	856			1284	1712	-25%	75%
North Huajin Chemical Industry Group Co., Ltd.	415	415			830	830	0%	100%
Shenghong Refining & Chemical (Lianyungang) Co., Ltd.		795			795	200	298%	398%
Shandong Dongming Petroleum & Chemical Group Co.,ltd.	225	525			750	750	0%	100%
Panjin North Asphalt Fuel Limited Company						525	-100%	0%
Sinochem Hongrun Petrochemical Co.,Ltd.	159	371			530	530	0%	100%
Shandong Tianhong Chemical Co., Ltd.	66	308	66		440	440	0%	100%
Shandong Huifeng Petroleum Chemical Co.,Ltd.						291	-100%	0%
Shandong Qingyuan Group Co., Ltd.						283	-100%	0%
Hebei Xinhai Chemical Group Co.,Ltd.	186	186			372	372	0%	100%
Shaanxi Yanchang Petroleum(Group)Co.,Ltd.	90	180			270	306	-12%	88%
Shandong Hengyuan Petrochemical Co.,Ltd.						350	-100%	0%
Lijin Petroleum Chemical Plant Co.,Ltd.	175	175			350	350	0%	100%
Dragon Aromatics(Zhangzhou)Co.,Ltd.	200	200			400	400	0%	100%
Shandong Chambroad Petrochemicals Co.,Ltd.	166	166			332	331	0%	100%
Shandong Sea Right Petrochemical Group Co., Ltd.						224	-100%	0%
Shandong Dongfang Hualong Industry&Trade Group Co.,Ltd.	90	210			300	300	0%	100%
Shandong Jincheng Petrochemical Group Co.,Ltd.	90	210			300	300	0%	100%
Shandong Qingyishan Petrochemical Co.,LTD						210	-100%	0%
Dongying United Petroleum Chemical Co., Ltd	42	196	42		280	280	0%	100%
Dongying Yatong Petrochemical CO.,LTD.	41	193	42		234	276	-15%	85%
Shandong Shouguang Luqing Petrochemical Co.,Ltd.	129	129			258	258	0%	100%
Shandong Shenchi Chemical Group Co.,Ltd.	76	176			252	252	0%	100%
Shandong Kenli Petrochemical Co.,ltd.	38	176	38		250	252	-1%	99%
Wudi Xinyue Fuel Chemical Co.,Ltd	120	120			240	240	0%	100%
Jiangsu Xinhai Petrochemical Co.,Ltd.	115	115			230	230	0%	100%
Jinao (Hubei) Science & Technology Chemical Industry Co., Ltd.	115	115			230	230	0%	100%
Henan Fengli Petrochemical Co., Ltd.	67	155			222	222	0%	100%
Dongying Qirun Chemical Industries Co.,Ltd	110	110			220	220	0%	100%
Shandong Shengxing Chemical Co., Ltd	66	154			220	220	0%	100%
Dongying Haike Ruilin chemical industry limited company	32	147	31		210	210	0%	100%
Shandong Chengda New Energy Technology CO.,LTD.	63	147			210	210	0%	100%
Zibo Xintai Chemical Co., Ltd.	60	140			200	200	0%	100%
Shandong Wantong Petro-chemical Group Co.,Ltd.	59	137			196	195	1%	101%
Shandong Zhonghai Fine Chemical Co.,Ltd.						130	-100%	0%
Shandong Province Landbridge Petrochemical Co., Ltd	45	90	45		180	180	0%	100%
Dongying Hualian Petroleum&Chemical Plant Co.,Ltd.	26	119	25		170	170	0%	100%
Shandong Fuyu Chemical Co.,Ltd.						140	-100%	0%
Shandong Jicheng Petrochemical Co.,LTD.	48	112			160	160	0%	100%
Guangrao Kelida Petrochemical Technology Co.,Ltd	45	105			150	150	0%	100%
Shandong Yuhuang Shengshi Chemical Co.,Ltd.								
Shandong Haike Petrochemical Limited Company	29	67			96	96	0%	100%
Sinopec Zhanjiang Dongxing Petrochemical Co.,Ltd.								
PetroChina International Co.,Ltd.		58			58	83	-30%	70%
Dalian Jinyuan Petroleum&Chemical Co.,Ltd	40	40			80	80	0%	100%
Sinochem Energy Co.,Ltd.						64	-100%	0%
Petrochina International Horgas Co., Ltd.		32			32	45	-29%	71%
Sinopec International Petroleum Exploration and Production Co., Ltd.						40	-100%	0%
Huayue Group Co., Ltd		25			25	36	-31%	69%
Petrochina International (Guangxi) Co., Ltd						35	-100%	0%
PetroChina International Alashankou Co.,Ltd.		22			22	32	-31%	69%
CNOOC (Beijing) Trading Co., Ltd.						22	-100%	0%
Erenhot Gaolu Foreign Trade and Economic Cooperation Co.,Ltd.		18			18	16	13%	113%
Petrochina Fuel Oil Company Limited								
China Synergy Energy Trading Co., Ltd.	13				13	13	0%	100%
Heilongjiang United Oil&Chemicals Co.,Ltd.						9	-100%	0%
Fujian Refining&Petrochemical Company Limited		8			8	10	-20%	80%
China Zhenhua Oil Company Limited						4	-100%	0%
Total	5269	10903	289		16461	20935	-21.37%	78.63%

Source：State Statistics Bureau, BOCI Futures

Graph 53: Crude Oil Export Quota

Company Name	area	The first three batches in 2022	The first three batches in 2021	The first three batches in 2020	YoY
teapot refinery	Shandong Province	7856	9269	9706	-15.24%
	Outside Shandong Province	1804	2441	3849	-26.10%
Private refining and chemical integration		5795	3400	3560	70.44%
other		1006	1115	1340	-9.78%
total		16461	16225	18455	1.45%

Source：State Statistics Bureau, BOCI Futures

As for the specifics about crude oil import quotas, the total amount of non-state crude oil import quotas in 2022 totaled 164.61 million tons, an increase of 1.45% over the total of the first three batches last year. The overall policy orientation remains Dovish.In late September, China's Ministry of Commerce announced that the export quota of the fifth batch of refined oil products in 2022 was 13.25 million tons, which is a large amount. Exporting units can arrange the export quantity in the fourth quarter according to the domestic and foreign market prices and the current operating conditions. The unused quota could continue to may be extended to the first quarter of next year. At the moment, the export quota of refined oil products in 2022 totals 37.25 million tons, basically the same as last year's number of 37.61 million tons. The increase in refined oil export quotas could increase the operating rate of China's main refineries and crude oil imports. As epidemic prevention measures optimize, it is expected that terminal demand will gradually recover and demand for crude oil will hereby improve, pushing up SC prices. The calendar spread of SC near-month contracts is likely to remain the Backwardation structure, and domestic market will continue to have a small premium over the foreign market, yet we do not rule out the possibility of the weakening of the domestic market.

Graph 54: Refined Oil Export Quota

Product oil export enterprise	022 the first batch quota	022 the second batch quota	022 the third batch quota	022 the fourth batch quota	022 the fifth batch quota	2022 total quota	2021 quota total capacity	Total year-on-year growth
CNPC	421	153	147	15	335	1071	1263	-15.20%
Sinopec	431	240	127	88	650	1536	1473	4.28%
China National Offshore Oil Corporation	118	42	46	13	117	336	355	-5.35%
Sinochem	177	15	84	14	114	404	343	17.78%
China Aviation Oil	4	0	2	7	2	15	7	114.29%
Zhejiang Petrochemical Company	134	0	84	13	97	328	290	13.10%
China weapon	15	0	10	0	10	35	30	16.67%
Sum up	1300	450	500	150	1325	3725	3761	-0.96%

Source：State Statistics Bureau, BOCI Futures

1.8 The Short Term Impact of Emergencies

1.8.1 Oil Pipeline Explosion in Turkey

On the evening of January 18, 2022 local time, an oil pipeline in Pazarczek County, Kahramanmaraş Province, Turkey, exploded without a clear reason at the moment, causing traffic disruption between Kahramanmaraş and Gaziantep provinces. The governor of Kahramanmaraš province, Cho Shikun, said that the pipeline oil transportation has been cut off and fire-fighting work is being carried out. The Iraqi Ministry of Oil issued a statement on the 19th, saying that the oil pipeline connecting Kirkuk in northern Iraq and the Turkish port of Ceyhan that was interrupted by the explosion has now resumed operation. He claimed that the incident did not affected the country's oil exports. The event has certain short-term positive effect on oil prices, but the impact is limited.

1.8.2 The Caspian Oil Pipeline (CPC) Damage

Due to local weather factors, the Caspian Oil Pipeline (CPC) was damaged in late March and oil delivery suspended. CPC is projected to deliver about 1.2 million b/d, accounting for 1.2% of global demand. It is an important pipeline between Kazakhstan and Russia, the damage of which will affect crude oil exports in both countries. The Caspian Pipeline Alliance estimates that its oil export prowess to Italy, France, the United States and Spain could decline by 66 to 80 percent while Russia's Ministry of Energy forecasts that CPC crude exports may fall by about 1 million barrels per day. Russian Deputy Prime Minister Alexander Novak said that CPC oil supplies could be completely shut down for up to two months. The CPC shutdown further boosted the expectation of global supply shortages and had a bullish effect on oil prices.

1.9 Market Policy

1.9.1 Preparation for the Listing of New Energy Futures Product

Wang Fenghai, general manager of the Shanghai Futures Exchange (SHFE), said at the 11th China International Petroleum Trade Conference that LNG futures have been officially approved by the CSRC in 2021, and the relevant rule design has been completed this year. At the same time, the Shanghai Futures Exchange will actively layout the development of energy and new energy products such as refined oil, and is committed to escorting the traditional energy industry and helping the development of new energy.

Shanghai International Energy Exchange (INE), a subsidiary of SHFE, signed a strategic cooperation agreement with ENN Natural Gas Co., Ltd. in November. ENN's total natural gas sales in 2021 were 37.2 billion cubic meters, accounting for about 10% of China's total natural gas consumption. Its Zhoushan LNG terminal is China's first

large-scale private LNG terminal. The agreement between the two parties is an important measure to accelerate the listing of liquefied natural gas futures.

1.9.2 Adjustment of SC Deliverable Oil

Shanghai International Energy Exchange (INE) announced on June 24, 2022 that Masira crude oil will no longer be on the list of deliverable oil type for SC. Basra Intermediate crude oil will be included, with Basra oil terminal or single-point mooring pontoon as the loading port, and Tupi crude oil also be include as SC deliverable crude stream, with Angra dos Reis, (Brazil), Port Acu, Brazil, STS Santos, Brazil, Sao Paolo, Sao Sebastian (Brazil), FPSO (Brazil), La Paloma, Uruguay, and other ports recognized by INE as loading ports. From November 1, 2022, newly added oil types can load-in and issue standard warehouse receipts and be used for physical delivery.

The exclusion of Yemeni Masira crude oil is reasonable. Yemeni Masira crude oil is a medium low-sulfur oil. The 2015 war in Yemen led to a standstill in production and exports was basically zero. From the perspective of imports, masilla crude oil only accounts for 0.82% of the total import volume of SC deliverable crude stream. From the perspective of delivery, according to INE data, since the listing of SC crude oil futures, masilla crude oil is the only deliverable oil that do not take part in the physical delivery other than Shengli crude oil.

Brazil Tupi crude oil is medium sulfur crude oil, with an API of about 30, a sulfur content of about 0.395%. It contends less paraffin, which is conducive to refinery blending. In addition, Tupi crude oil has less restrictions on destination and resale. Therefore, the import of Tupi crude oil of local refineries in China is large, which partially replaces the demand for crude oil in the Middle East. According to Platts data, China's Tupi crude oil imports in 2020 were about 200,000 barrels per day, accounting for about 32% of the Tupi's exports and about 20% of the total production. In addition

to China, the main exporting country of Tupi crude oil include Japan, South Korea, and Singapore and so on. Since the beginning of this year, China's refinery's imports of Tupi crude oil have declined, possibly because of the historical extremely large discount of Russian Ural crude oil spot price after the escalation of the Russian-Ukrainian War. We recommend paying attention to the impact of the subsequent evolution of the relationship between Russia and Ukraine and its impact on the import volume of Tupi crude oil. The inclusion of Tupi crude oil as an SC deliverable oil can ensure the safety of SC delivery at extreme risks after removing Marsila crude oil, and attract market buyers such as local refineries in China and refineries in Japan and South Korea to participate in the SC futures market as well as delivery.

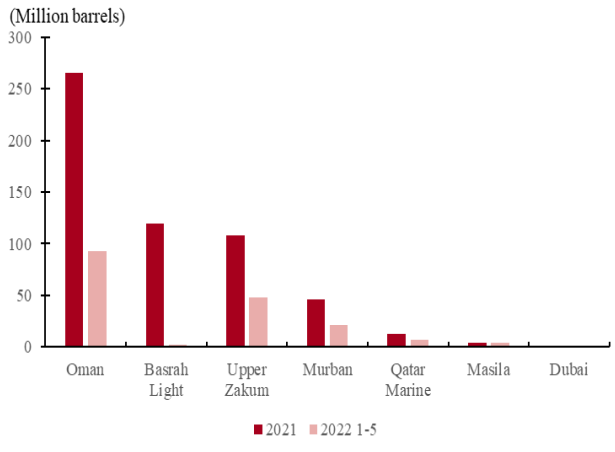
Basra crude oil accounts for the largest proportion of SC crude oil futures physical delivery, and the quantity of load-in and load-out storage alsoranked the first. SOMO stopped exporting Basrah Light from January 2022, so INE officially included Basrah medium to ensure the delivery of SC crude oil futures. The API degree in Basrah medium is ≥26, and the sulfur content is ≤4%. Considering that its overall quality is slightly lower than that of Basrah Light, its discount is set at 10 yuan / barrel. The inclusion of Basra medium as SC deliverable oil is conducive to ensuring the safety of SC delivery. Given the steady increase in production and export volume between Pakistan and China, it is expected that the SC crude oil futures market will operate smoothly.

Graph 55: Comparison Table for SC Deliverable Oil

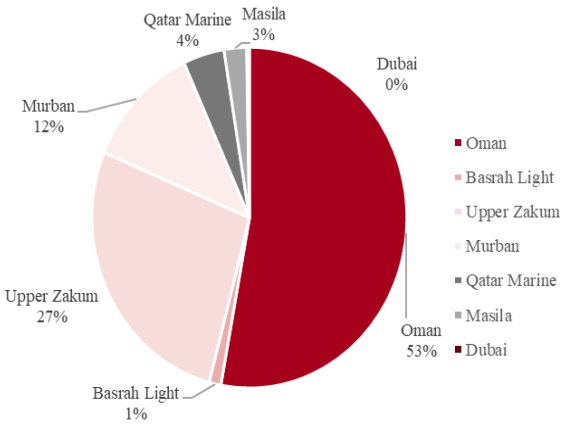
country	Crude oil variety	API°	sulfur content (%)	Promotion and discount (RMB/barrel)	Origin (port of shipment)
United Arab Emirates	Dubai	≥30	≤2.8	0	Fateh Terminal
United Arab Emirates	Upper Zakum	≥33	≤2.0	0	Zirku Island
United Arab Emirates	Murban	≥35	≤1.5	5	Fujairah Terminal or Jebel Dhanna Terminal
Sultanate of Oman	Oman	≥30	≤1.6	0	Mina Al Fahal
State of Qatar	Qatar Marine	≥31	≤2.2	0	Halul Island
The Federative Republic of Brazil	Tupi	≥28	≤0.8	10	Angra Dos Reis, Port Acu, STS Santos, STS Sao Paolo, Sao Sebastian, and FPSO of Brazil, La Paloma of Uruguay, and other loading ports recognized by INE
Republic of Iraq	Basra medium	≥26	≤4.0	-10	Basrah Oil Terminal or SPM
Republic of Iraq	Basra light oil	≥28	≤3.5	-5	Basrah Oil Terminal or SPM
People's Republic of China	Shengli	≥24	≤1.0	-5	Dongming Oil Terminal of Sinopec Shengli Oilfield Company
~~the Republic of Yemen~~	~~Masila crude oil~~	~~≥31~~	~~≤0.8~~	~~5~~	~~Ash Shihr~~

Source：INE, BOCI Futures

Graph 56: Import Data for SC Deliverable Oil

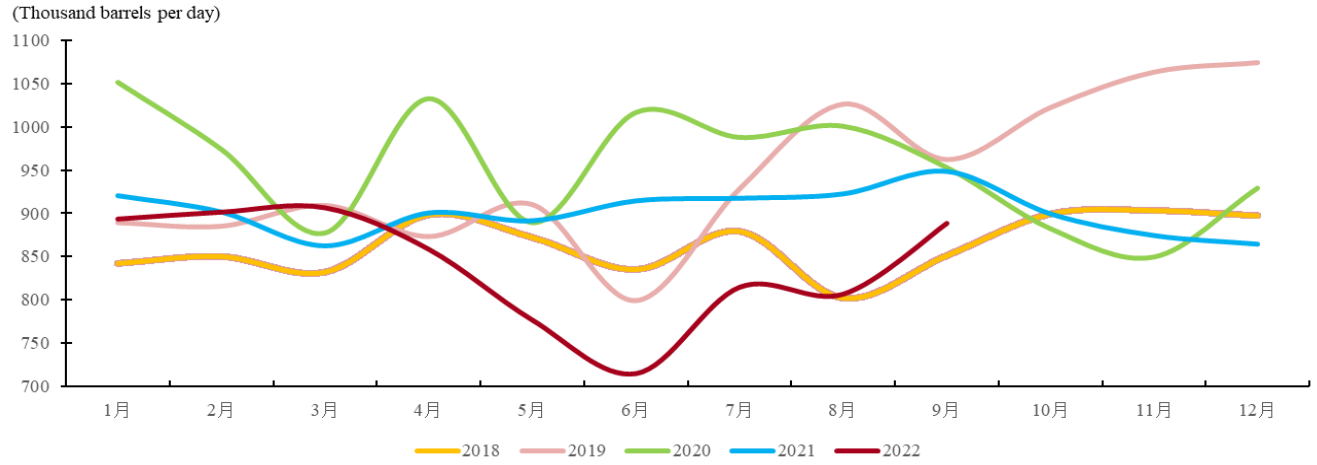


Graph 57: Import Percent for SC Deliverable oil (From Jan to May, 2021)



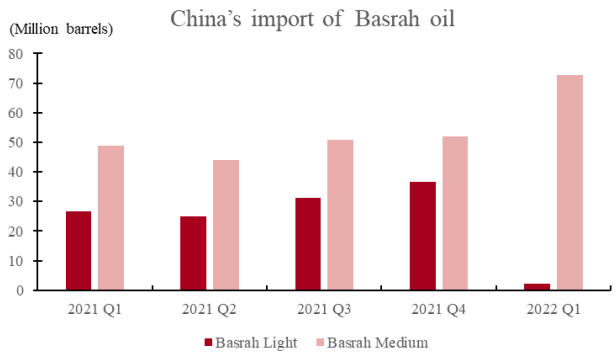
Source：Kpler, BOCI Futures

Graph 58: Tupi Output

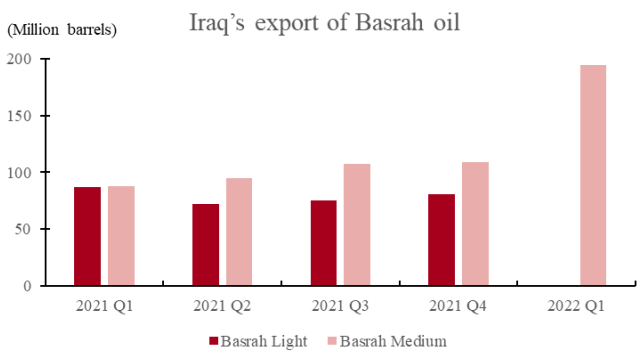


Source：Brail Energy Ministry, BOCI Futures

Graph 59: China's Import of Basra Oil



Graph 60: Iraq's Export of Basra Oil



Source：Kpler, INE, BOCI Futures

Graph 61: Revision Process for INE Basra Crude Oil

Time Period	Underlying Product	API	Sulfur Content (%)	Price Differential (RMB/Barrel)
March,2018 - May,2020	Basrah Light	≥ 28	≤3.5	-5
June,2020-September,2021	Basrah Grade 1	≥ 28	≤3.5	-5
	Basrah Grade 2	≥ 28	>3.5	-10
		≥ 26 and < 28	≤4.0	-10
October,2021-Present	Basrah Light	≥ 29	≤3.5	-5
Starting from June 24th,2022	**Basrah Medium**	**>26**	**<4.0**	-10

Source：INE, BOCI Futures

1.9.3 Adjustment of SC Zhanjiang Depot's Storage Capacity

INE issued an announcement on April 22 agreeing that Sinopec Petroleum Commercial Reserve Co., Ltd. to reduce the storage capacity in use of the SC crude oil futures designated delivery warehouse located in Xinggang Avenue, Lingang Industrial Park, Zhanjiang City, Guangdong Province from 800,000 cubic meters to 400,000 cubic meters. The approved capacity of the warehouse is 900,000 cubic meters.

1.9.4 Newly Added SC Depot

INE issued an announcement on June 21, agreeing that the oil depot of SDIC (Yangpu) Oil and Gas Storage and Transportation Co., Ltd. located on the north side of the yuanqu road of the chemical industrial park in Yangpu Economic Development Zone, Hainan Province will become a SC crude oil storage facility, with approved storage capacity of 400,000 cubic meters and 200,000 cubic meters in use.

1.9.5 Release of SC MASP

Starting from May 10, 2022, the Shanghai International Energy Exchange will release the Monthly Average Settlement Price (MASP) for the calendar month contracts and the active month contracts on crude oil futures each day after daily market close. The released contract includes contracts with delivery months covering the first to the sixth calendar months after the current calendar month and MASP is calculated from the first trading day of the current calendar month to the last trading day of the current calendar month.

1.9.6 SC Premium and Discount TAS Related Simulated Trading

INE issued an announcement on February 17, deciding to carry out crude oil futures premium and discount TAS related simulated trading from February 21, 2022 (Monday) to March 18, 2022 (Friday).

1.10 Market Outlook: Supply Supports While Multiple Factors Disturbed

This year, the crude oil price has risen due to the escalation of the Russia-Ukraine War. Considering that it is difficult to solve the geopolitical contradiction, the possibility of Europe and the United States completely relaxing sanctions against Russia in the short term is low. The attitude of maintaining a relatively high oil price by OPEC+ is apparent. It is expected that the crude oil price will continue to fluctuate in a high and with wide range in the first quarter of next year. However, there are many potential risks in the market, including repeated domestic epidemics, macro pressure in Europe and the United States and many other negative factors. They highly likely will have a suppression effect on oil prices.

The core logic of supporting high crude oil price lies in the intense geopolitical conflicts and OPEC+ production deals. The Russia-Ukraine War is at an impasse. After the mid-term elections in the United States, Sino-US-Russian relations show some easing signs wind down, but it is not yet clear. If the tension in Eastern Europe relieves significantly in the future, the possibility of a sharp short-term correction in crude oil prices cannot be ruled out. However, it is tough to completely eradicate the contradictions between Russia and European and American countries. It is expected that the multi-party game will last for a long time, and the trend of high energy prices will be difficult to reverse in the short term. Meanwhile, if Russia's military action against Ukraine is likely to further escalate, the price of crude oil may rise in a short

term. At the same time, it is necessary to be alert to the possibility of short-term market fluctuations caused by public opinions about Russia's military actions such as Russia's tactical nuclear weapons.

In addition to geopolitical factors affecting the supply, OPEC+ production policy may continue to focus on stabilizing the market. With the changing dynamics of multilateral relations, the attitude of the Middle East is becoming clearer, and they tend to maintain the OPEC+ organizational structure and discourse power. It is expected that the OPEC+ production policy and actual output will continue to be stable and tight in the first quarter of next year, providing strong support for crude oil prices. In addition, the decrease in the frequency of OPEC+ meetings may magnify the impact of any adjustments about its production policy. If this December meeting reports an exceeded output reduction, with the European and American shipping bans and price limits on Russian oil and refined oil are implemented in December and February next year, the tight supply may cause a rising price expectation again.

Since this year, the United States has repeatedly pressed OPEC+ to increase production without success, while Iran and Russia have also shown the strengthening cooperation. At present, the negotiation of the Iran nuclear agreement stalled again. The possibility of reaching a final agreement in the short term is low, and the US-Iran relations may continue to be deadlocked. From the perspective of America's own crude oil production, negative oil prices in 2020 led to the contraction of upstream capital expenditure. Compared with long-term investment return, cash flow is more favorable. In addition, the Biden government will promote green energy policies against increasing the investment in developing oil wells and refineries. Hence, it is expected that America's crude oil production will only grow steadily and slightly. In addition, the Biden government may continue to release SPR to curb oil prices. The U.S. SPR inventory is expected to continue to be destocked. However, given the small space availability given the present low SPR stocks, its short-term impact is still limited. Overall, the supply side of crude oil is expected to continue to be tight,

providing core support for oil prices. The backwardation structure of calendar spreads of Brent near-month futures contracts may be relatively stable.

From the macro perspective, high inflation pressure and economic recession are expected to become the main thesis of European and American countries and guide policy-making directions. The tendency of the United States to suppress oil prices may go on. This year's radical interest rate hike by the Federal Reserve has led to a significant strengthening of US dollar and a large fluctuation in the exchange rate market. The inflationary pressure in the United States has not yet been relieved. The Federal Reserve's subsequent interest rate hike may slow down, but the overall direction of tightening monetary liquidity remains unchanged, and it may cause a negative disturbance to the crude oil price. The continuous interest rate hike will lead to huge pressure on the US government debt. Therefore, the Federal Reserve's monetary policy is in a dilemma. We recommend to be alert to the transmission of fluctuations of the international financial market to oil prices. Considering that it is difficult to solve the macroeconomic pressure in the United States in a short term, which will repeatedly impact WTI price negatively. The Brent-WTI price difference is expected to be wider and the US crude oil exports may reach a new high. However, if the United States pushes forward the negotiation with Iran and reaches a final agreement, Brent will be under more pressure and the price difference across regions may narrow.

From the perspective of demand, the pessimistic expectation of the global economy may pose huge pressure on oil prices, but the overall impact is expected to be relatively limited. Domestically, China has issued excessive export quotas for refined oil and low sulfur fuel oil, and the operating rate of main refineries and crude oil imports may rise, which provides strong support for domestic crude oil demand. However, considering the increasing SC warrant inventory that may put pressure on near-month contracts, it is worth paying attention to the actual warehouse load-in volume. Calendar spread and backwardation structure of SC contracts, adding SC-Brent spread,

may have weakening performance. In addition, the continuous optimization of China's epidemic prevention measures will make domestic consumption gradually recover. It is expected that China's crude oil demand will generally improve, which will play a positive role for SC. The calendar spreads of near-month SC contracts may stay at a backwardation structure. However, considering that the statement of new deliverable oil of SC Basra Medium came into effect in November, subsequent warrant load-in worth noticing. SC may be under pressure in near months, and the price difference between SC and Brent may weaken compared with the previous period

The crude oil price in the first quarter of next year is expected to be neutral to strong in general. The global market is expected to maintain a tight supply and demand, and the support of the high oil price will continue to be strong. However, we need to be alert to potential risks, and do not rule out the possibility of short-term price correction. It is estimated that the average price of SC crude oil in the domestic market is 600-650 yuan/barrel, and the average price of Brent crude oil is between 85-90 dollars/barrel. If the geopolitical conflict is resolved, the epidemic situation is significantly worsened, or a breakthrough has taken place in negotiation of the Iran nuclear agreement, the price of SC crude oil may temporarily drop to 550-600 yuan/barrel; Brent crude oil price may temporarily dip to the range of USD 80-85/barrel, but it is expected that the price will return to reasonable range afterwards.

Fuel Oil

2.1 Review • High and Low Sulfur Price Rose Together, with Significant Differentiation

This year, the absolute value of high and low sulfur fuel oil has followed the upward trend of its cost end crude oil, but the divergence between them is significant, and it mainly depend on their supply sides. Compared with the same period in the previous year, high sulfur fuel oil supply is looser, while low sulfur fuel supply is tighter. Thus, the spread between high and low sulfur fuel oil widened to a new high level.

By Nov 28, 2022, the most active high-sulfur fuel oil FU contract in the domestic market closed at 2,547 yuan/ton, once approaching 4,500 yuan in the early March, with a cumulative increase of 11.93% from January to November this year and average daily price of 3,391 yuan/ton. The most active contract of domestic low sulfur fuel oil LU futures closed at 4,130 yuan/ton, which almost hit 6000 yuan in early March, with a cumulative increase of 11.56% from January to November this year and average daily price of 5,007 yuan/ton.

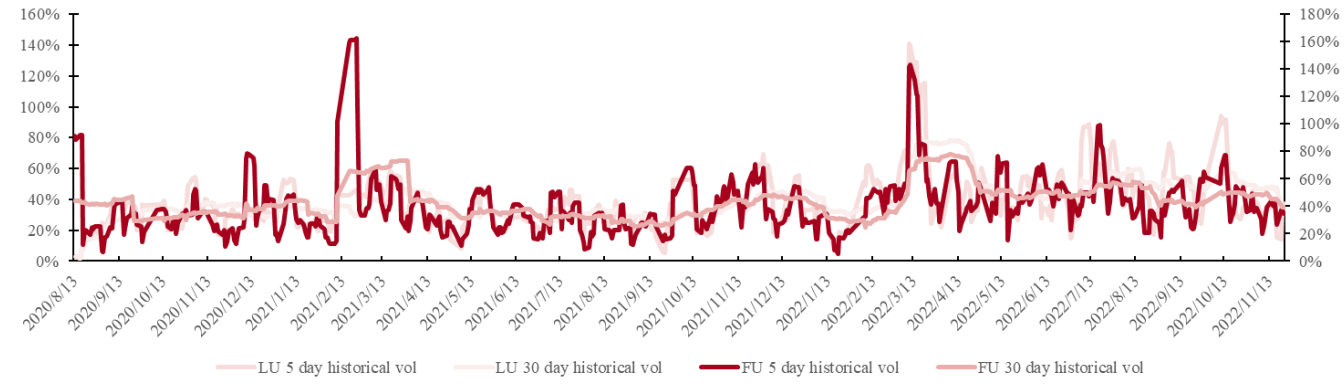
Graph 62: FU Price

Source：Wind, BOCI Futures

Graph 63: LU Price

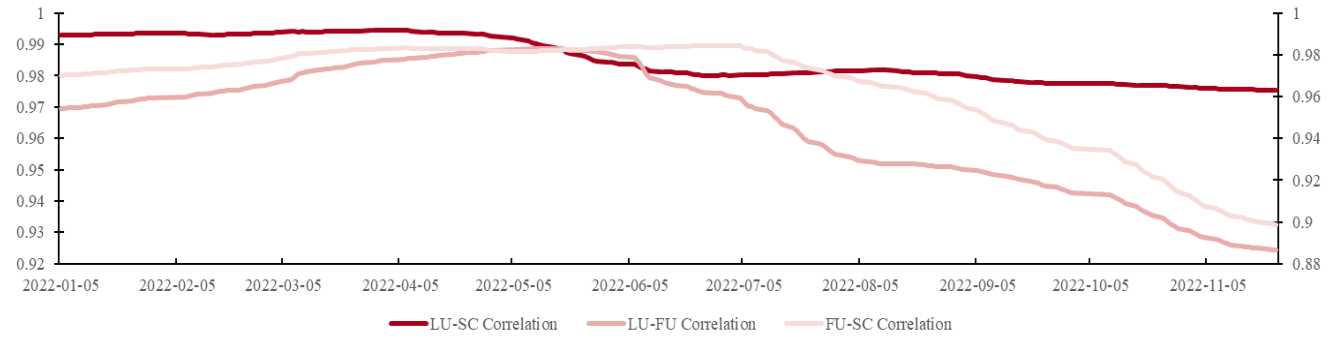
Source：Wind, BOCI Futures

Graph 64: FU and LU Volatility



Source：Wind, BOCI Futures

Graph 65: Correlation among SC, FU and LU Futures Price



Source：Wind, BOCI Futures

2.2 Market Operation

As for operation, as of November 28, 2022, the total daily trading volume of high-sulfur fuel oil FU futures from January to November 2022 was as high as 1,704,200 hands, and the average daily trading volume was 839,700 hands, a year-on-year decrease of 30.27%. The daily total position of FU reached 837,100 hands, and the average daily position was 551,900 hands, with a year-on-year growth of 42.41%. The maximum daily capital absorption of FU reached 2.410 billion yuan, and the average daily capital absorption reached 1.835 billion yuan, with a year-on-year growth of 85.59%.

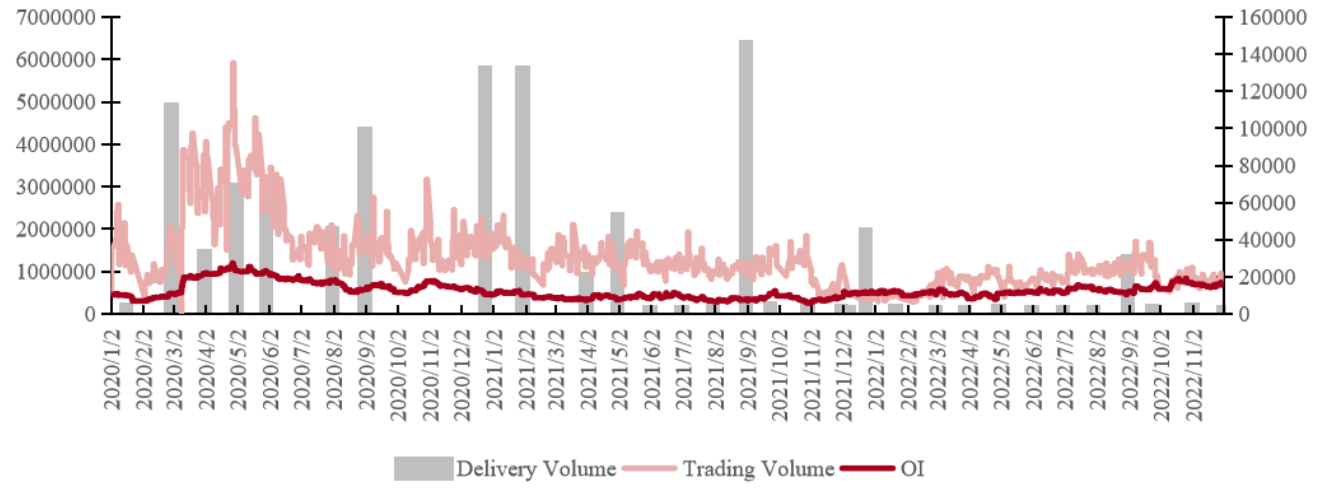
In terms of physical delivery, the monthly average delivery volume of FU from January to November 2022 is 3,450 tons, among which the highest delivery volume of FU 2209 in August is 28,760 tons. In terms of warrant, the warehouse receipt remained at a low level after 90,310 tons of FU load-in in January, and Load-in 24,900 tons of fuel oil may be use for FU 2209 physical delivery. At present, the inventory of FU warehouse receipt is 2680 tons.

As of November 28, 2022, the total daily trading volume of low-sulfur fuel oil LU futures was to 422,400 hands, the highest since its listing, and the average daily trading volume was 164,100 hands, a year-on-year increase of 114.24%. The daily total position of LU reached 174,000 hands, and the average daily position was 104, 000 hands, with a year-on-year growth of 7.9%. The maximum daily capital absorption of LU reached 906 million yuan, and the average daily capital absorption reached 521 million yuan, with a year-on-year growth of 64.29%.

In terms of physical delivery, the average monthly delivery volume of LU from January to November 2022 was 20,200 tons, among which the highest delivery volume of LU 2209 in August reached 73,330 tons. In terms of load-in and load-out, the arbitrage window was opened in August, and a large amount (77,970 tons) of LU

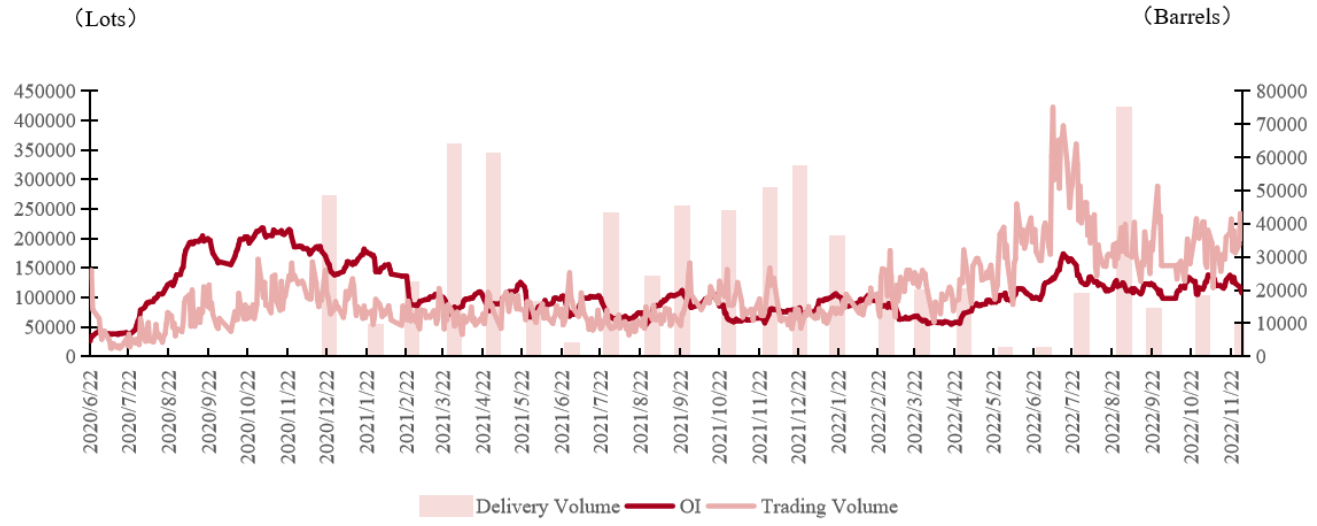
net load-in took place. At present, the inventory of LU warehouse receipt is 16,750 tons.

Graph 66: Market Condition of FU Contract



Source：Wind, BOCI Futures

Graph 67: Market Condition of LU Contract



Source：Wind, BOCI Futures

Graph 68: Physical Delivery for FU and LU, and Warrants Load-in and Load-out

Month	Net FU in/out volume (ton)	FU expiration contract	FU delivery volume (ton)	Month	LU net in/out volume (ton)	LU expiration contract	LU delivery volume (ton)
January,2022	- 90310	FU 2202	1960	January,2022	+ 14550	LU 2202	34400
February,2022	0	FU 2203	200	February,2022	- 790	LU 2203	22800
March,2022	- 4000	FU 2204	350	March,2022	- 15860	LU 2204	18000
April,2022	0	FU 2205	1970	April,2022	0	LU 2205	18580
May,2022	0	FU 2206	10	May,2022	- 19060	LU 2206	420
June,2022	0	FU 2207	10	June,2022	- 50	LU 2207	370
July,2022	0	FU 2208	30	July,2022	- 370	LU 2208	17000
August,2022	+ 24900	FU 2209	28760	August,2022	+ 77970	LU 2209	73330
September, 2022	- 26080	FU 2210	2090	September, 2022	- 3440	LU 2210	12710
October,2022	0	FU 2211	2490	October,2022	-7400	LU 2211	16350
November, 2022	0	FU 2212	80	November, 2022	-35380	LU 2212	8070

Source：INE, BOCI Futures

2.3 Domestic Low Sulfur Fuel Oil Supply Tightens and Ship Bunkering Market Grows

Since this year, the domestic low sulfur fuel oil market has been dominated by tight supply. After the escalation of the Russia-Ukraine War, Singapore was short of stocks. In addition, the crude side has pushed up the price of marine fuel oil. These multiple factors have led to large bulk of low sulfur fuel imports in China. Although the domestic bonded low sulfur fuel production has significantly increased, it was difficult

to fully fill the gap. The tight low sulfur fuel fundamentals provided a strong support for the backwardation structure of domestic LU. The monthly spreads between the active and secondary-active contracts maintained the backwardation structure. The daily average monthly spreads for 01/11 was 214 RMB/t.

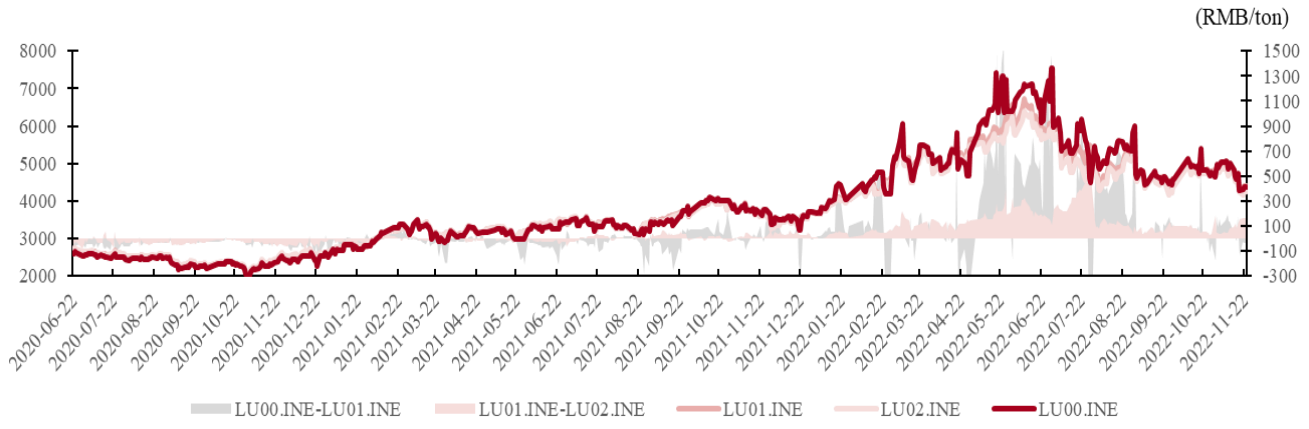
From January to October 2022, the import volume of bonded fuel oil was about 4.07 million tons, down more than 40% year on year; In August, the import volume of bonded bunker fuel oil was 306.3 thousand tons, down 62.19% year on year. In order to fill the demand gap caused by the decline in imports, China has increased the export quota of low sulfur fuel to increase the domestic bonded low sulfur fuel output. Up to now, China's low sulfur fuel export quota has reached 16.75 million tons in the year, a substantial increase of 47% compared with the total quota of 11.39 million tons issues in the last year. The increase of export quota of low sulfur fuel has promoted the increase of China's bonded low sulfur fuel output. From January to September 2022, China's bonded low sulfur fuel oil output was about 12.68 million tons, a year-on-year increase of 37.83%; The output of bonded low sulfur fuel in July was about 1.6 million tons, an YoY increase of 48.15%, making domestic market self-sufficient for the first time.

However, as the first three batches of low sulfur fuel export quotas of some refineries were used up, China's low sulfur fuel output fell to a certain extent in August and September, leading to a decreasing of domestic supply again, providing fundamental support for the strong price of LU2209. Besides, the warehouse warrant inventory was at a low level at that time, and the monthly spread of LU in near months was once close to the extreme high level of 700 yuan/ton at the end of August. At the same time, the low sulfur fuel oil domestic and Singapore’s price difference LU-VLSFO 09-AUG was significantly increased, leading to the opening of the arbitrage window from the oversea to China in early August. With the Ministry of Commerce successively issuing the fourth and fifth batch of export quotas of low sulfur fuel oil totaling 4.5 million tons in September, the domestic low sulfur fuel oil production rebounded to ease the

shortage of supply. Moreover, LU's large numbers of load-in warrants from the arbitrage window put pressure on the market in near-month contracts, the monthly spread between the active and the secondary-active LU contracts fell back to less than 100 yuan/ton.

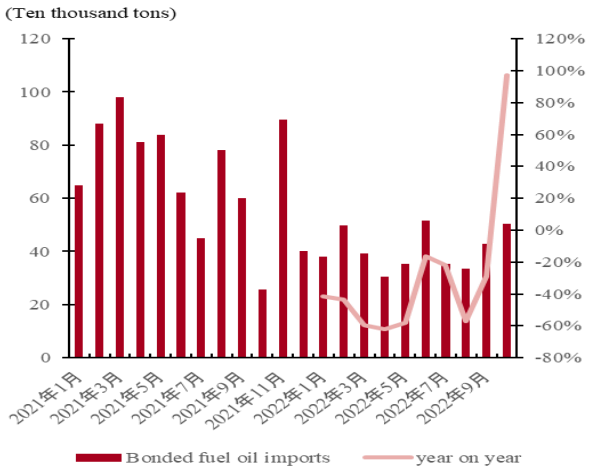
Considering that the changes in the supply and demand structure of the Singapore market caused by Russia-Ukraine War are difficult to relieve in the short term, it is expected that China's low sulfur fuel imports will remain relatively low, and the domestic bonded low sulfur fuel oil output will continue to grow steadily and slightly. However, it is difficult to completely reverse the tight supply of China's low sulfur fuel oil market compared with the same period in previous years, and it is expected that the LU calendar spread backwardation structure will be relatively stable.

Graph 69: Calendar Spread For LU Near-term Contracts

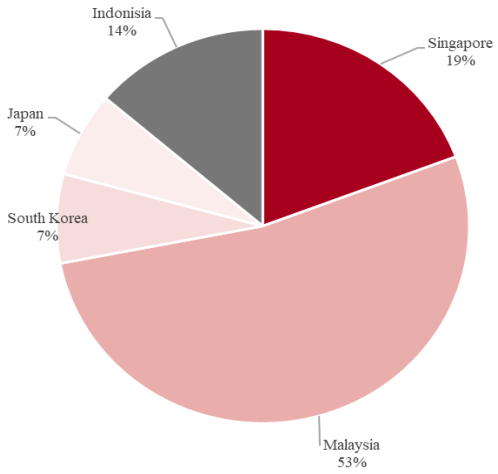


Source：Wind, BOCI Futures

Graph 70: Domestic Bonded Fuel Oil Imports



Graph 71: Source Countries of Fuel Oil Imports



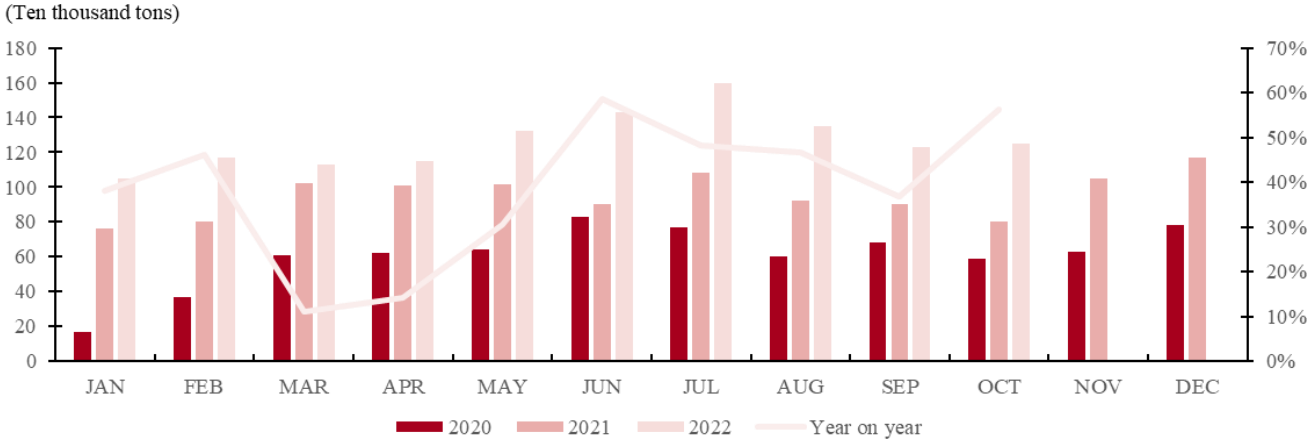
Source：Zhejiang Mercantile Exchange, Bloomberg, BOCI Futures

Graph 72: Domestic Bonded Low Sulfur Fuel Oil Export Quota

Low sulfur fuel oil export enterprise	2020 quota	2021 first batch quota	2021 additional first batch quota	2021 second batch quota	2021third batch quotas	2021 total quota	2022 first batch quota	2022 second batch quota	2022 third batch quota	2022 fourth batch quota	2022 fifth batch quota	2022 total quota
CNPC	295	149	73	83	33	338	203	116	90	132	160	541
Sinopec	429	240	205	193	58	696	384	181	137	119	0	821
CNOOC	86	40	22	24	9	95	50	25	20	21	15	131
Sinochem	90	32	0	0	-23	9	3	1	1	1	0	6
ZPC	100	39	0	0	-38	1	10	2	2	2	0	16
Total	1000	500	300	300	100(-61)	1139	650	325	250	275	175	1675

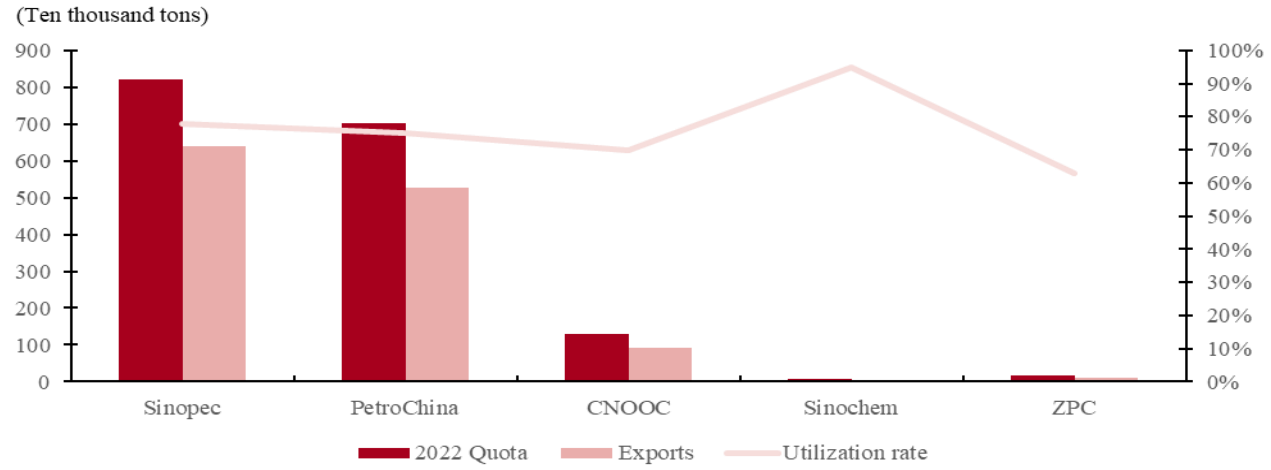
Source：Ministry of Commerce, BOCI Futures

Graph 73: Domestic Bonded Low Sulfur Fuel Oil Output



Source：Oilchem, BOCI Futures

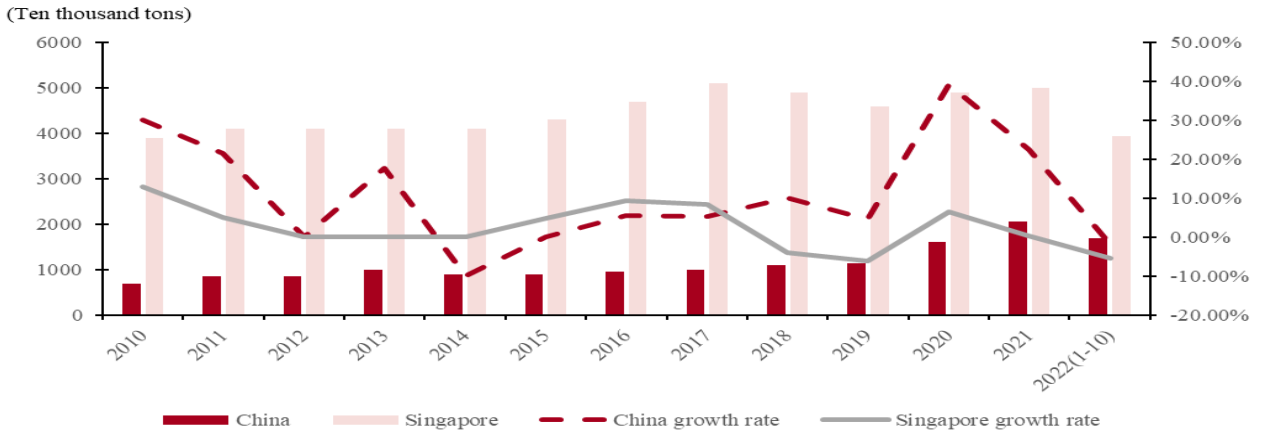
Graph 74: Utilization Rate of Domestic Bonded Low Sulfur Fuel Oil Export Quota



Source：Oilchem, BOCI Futures

From the perspective of demand, the development of China's ship bunkering market is relatively stable this year. From January to October, the bunkering volume of bonded ships was 16.95 million tons, down 1.91% year on year. The monthly average bunkering volume was 1.695 million tons, of which low sulfur fuel oil accounted for about 88% and high sulfur oil 6%, MGO 6%, baisically the same as last year. From the perspective of market share of domestic ship bunkering enterprises, Sinopec Zhejiang Zhoushan accounted for about 44.8% from January to July 2022, an yoy increase of about 2%; CHIMBUSCO accounted for about 36%, down 5% from the same period last year. Seen from a regional perspective, from January to October, the supply volume of bonded ship fuel in Zhoushan, Zhejiang Province reached 4.86 million tons, an yoy increase of about 11.3%, accounting for 28.7% of the national total. It is still the largest port for supply of bonded ship fuel in China. China's ship bunkering market will continue to grow steadily, and the demand for terminal ship fuel will remain stable.

Graph 75: Domestic Bunkering Volume of Bonded Ships

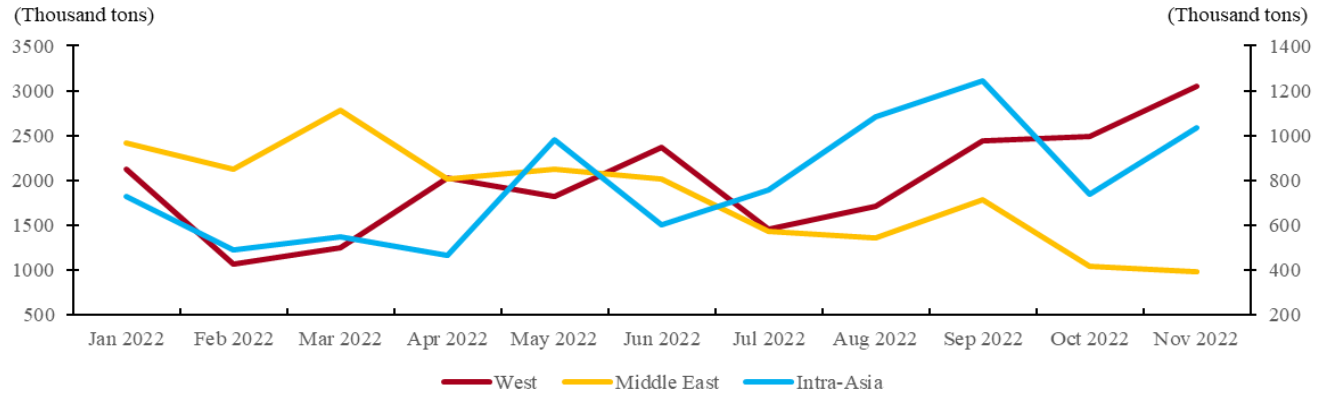


Source：Oilchem, BOCI Futures

2.4 Increasing Supply of Low Sulfur Fuel Oil in Singapore, Yet Arbitrage Opportunity May Exist

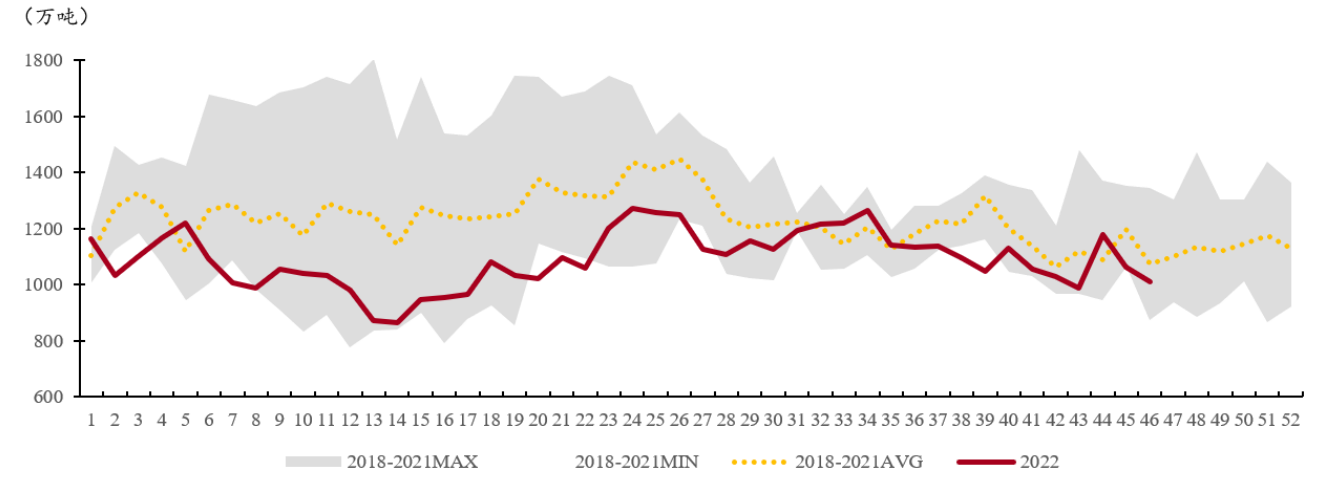
This year, the global low sulfur fuel oil market took tight supply as the main trendy logic, and the geographical conflicts and China's policy played key factors. In the first half of the year, Singapore's supply of low sulfur fuel oil was significantly decreased, and its price upside trend was also significantly smoother. First, the increased risk of trading Russian energy led to the expected tightening of fuel oil and diesel supply in Europe. The fuel oil storage in Amsterdam Rotterdam Antwerp (ARA) fell to a low level of below 900 thousand tons in April this year. The inflow of ships and cargoes from the western countries was once sharply reduced to around 1 million tons, and the shortage of fuel oil supply in Singapore was prominent.

Graph 76: Inflow of Asia Fuel Oil



Source：Refinitive, BOCI Futures

Graph 77：Fuel Oil Inventory of ARA



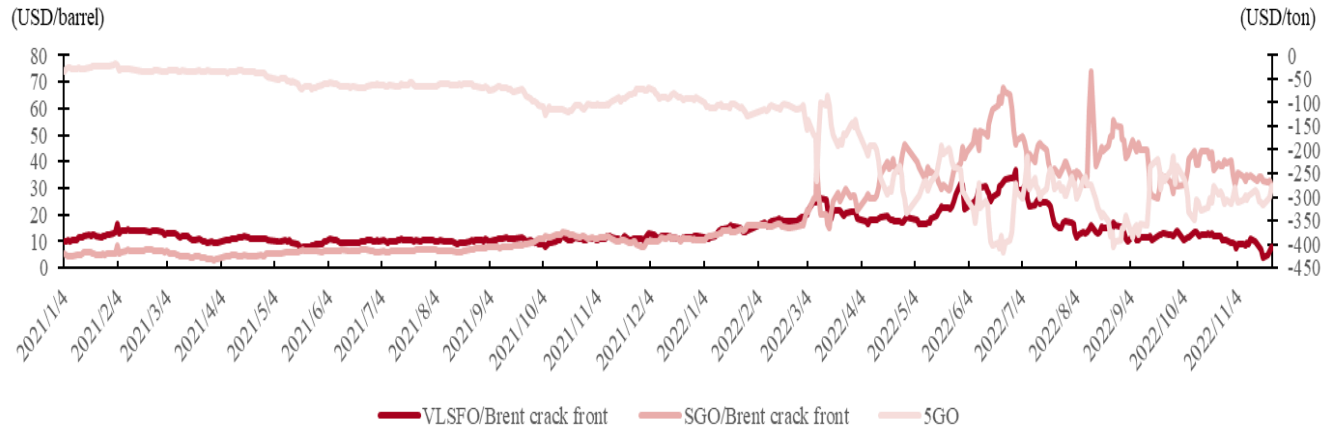
Source：Refinitive, BOCI Futures

Second, the overall decrease of China's refined oil export quota in the first three quarters of this year has led to a significant tightening of diesel supply in Singapore. The SGO-Brent diesel crack spread in the global market exceeded $65/barrel in mid-June, and the VLSFO-diesel price spread once widened to $- 400/ton in late August. However, the shortage of diesel in Singapore may aggravate the tight supply of low sulfur fuel oil from the perspective of substitution effect. For the inventory,

Singapore's fuel oil inventory has averaged 20.97 million barrels a week since this year, which was far lower than the average weekly inventory of 22.5 million barrels in 2021 and 23.8 million barrels in 2020. The short supply of low sulfur fuel oil spot goods in Singapore provides a strong support for VLSFO futures price in the Singaporean market. Its calendar spread in near month contract has a stable backwardation structure and once rose to a historical high of more than $65 /ton.

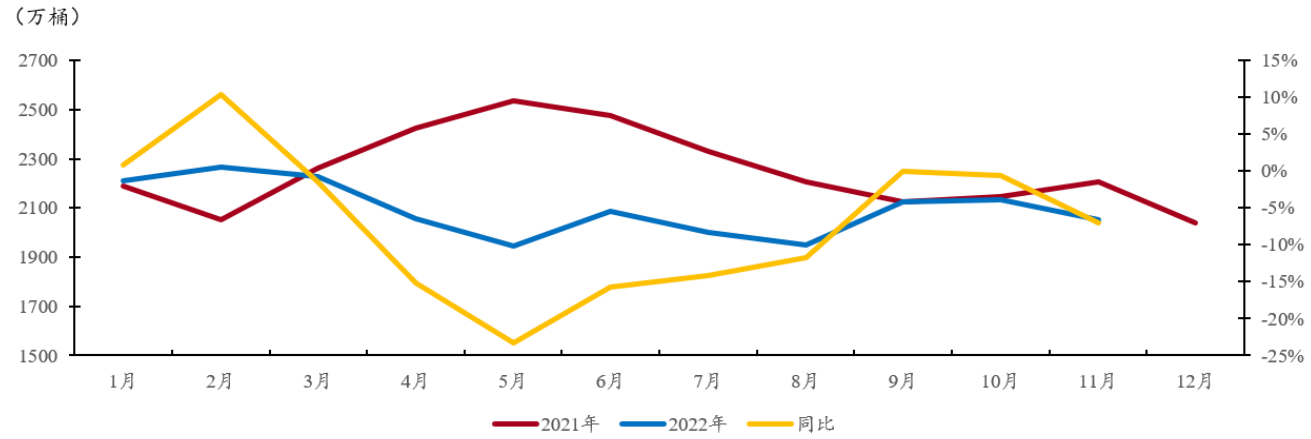
In the third quarter, the shortage of low sulfur fuel oil in Singapore eased. With the long-term impact of the Russia-Ukraine issue, the global pattern of trade in energy market has been gradually reshaping, and the European energy issue mitigated in the short term. The expected increase in arbitrage cargo inflows in the Western country grew, putting pressure on Singapore's low sulfur fuel oil prices from the supply side. In addition, the inflow of cargo from the Middle East also rose. Kuwait's Al Zour refinery was recently put into operation, with its production of about 615 thousand barrels per day. Its first batch of exports led to a notable relief of the low sulfur fuel supply tension in Singapore. The monthly spread of VLSFO in the Singaporean market was pressured and fell to around $15 /ton for the near month contracts. From the perspective of crack spread, Singapore VLSFO-Brent crack weakened from a high of $30/barrel in the first half of the year to around $10/barrel recently.

Graph 78: VLSFO-Brent - SGO-Brent Crack Spread +-5GO



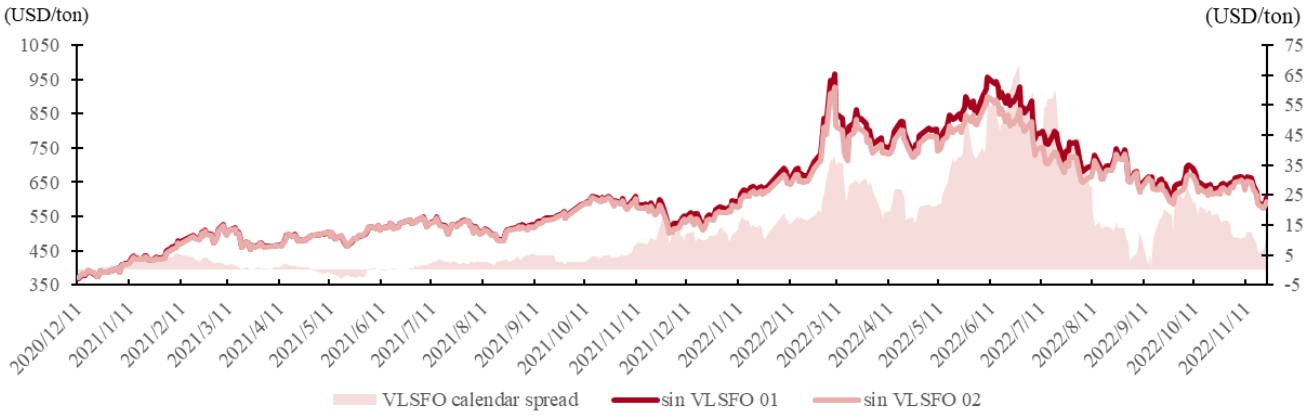
Source：Platts, BOCI Futures

Graph 79: Fuel Oil Inventory in Singapore



Source：ESG, BOCI Futures

Graph 80: Calendar Spread of Singapore VLSFO

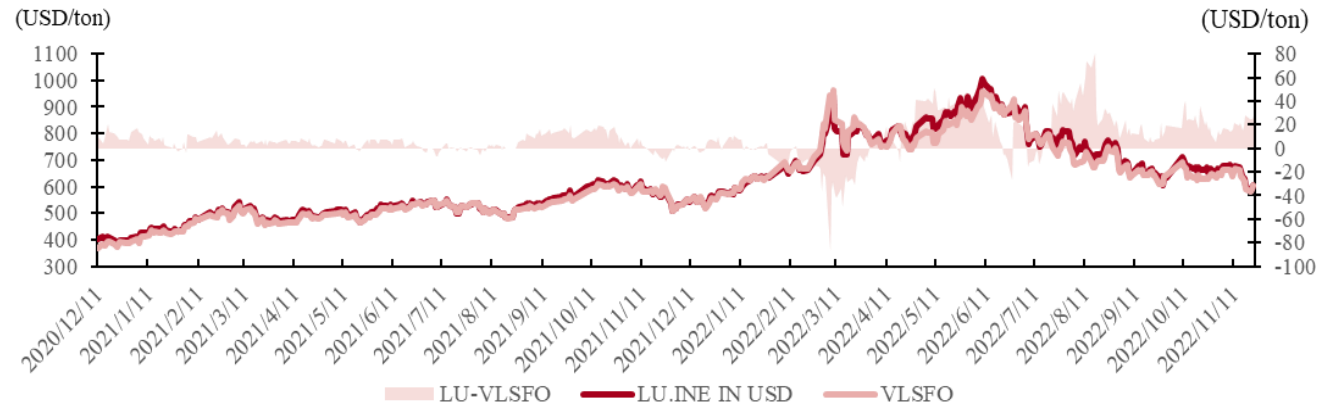


Source：Platts, BOCI Futures

On the other hand, the tight fundamentals of domestic low sulfur fuel oil continued in the third quarter, while the shortage of low sulfur fuel oil market in Singapore was eased. There was a significant difference in the fundamentals between the two. In addition, the low level of domestic warrant inventory pushed up the near-month prices, resulting in a widening premium value in the domestic market against the Singaporean market. In August, LU09-VLSFOAUG presented a premium value and widened

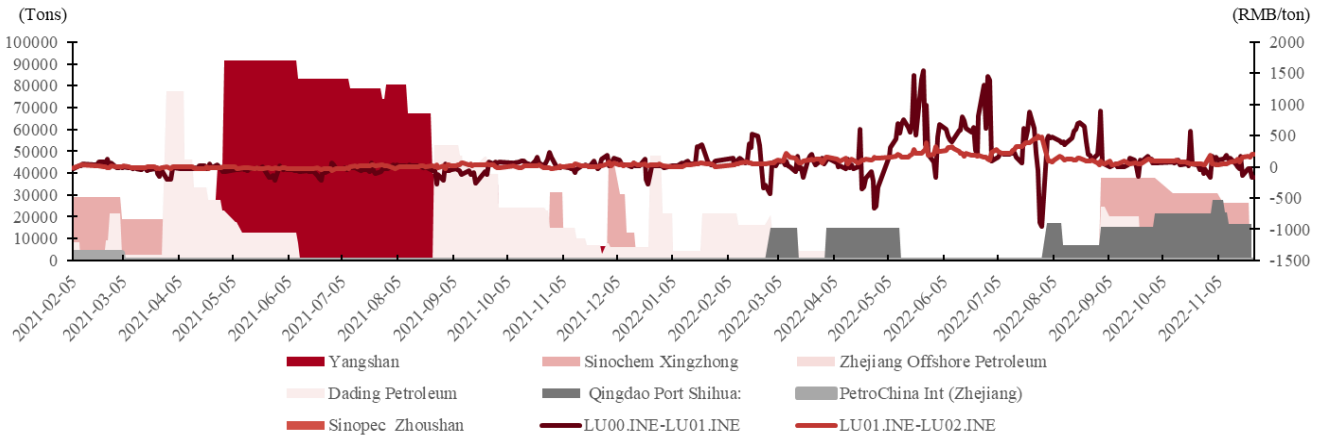
significantly to around $80/ton, the regional arbitrage opportunity led to a large increase in LU warehouse load-ins in the current month. Subsequently, the Ministry of Commerce issued the fourth and fifth batch of low sulfur fuel oil export quotas of 4.5 million tons in the year, and kept China's bonded low sulfur fuel oil production at a high level, thus creating a short-term pressure on the domestic LU price and the spared between domestic and Singaporean market recovered. The tight supply of domestic low sulfur fuel oil may be difficult to revise in the short term, and the domestic and Singaporean price difference LU-VLSFO is expected to show a premium structure still.

Graph 81: Cross-Region Spread between LU and Singapore VLSFO



Source：Platts, Wind, BOCI Futures

Graph 82: Domestic LU Warrants



Source：INE, BOCI Futures

2.5 China's Recently Released Refined Oil Export Quota Disturbed Singapore's Diesel Market

In the first half of this year, the tightening of China's refined oil exports supported the trend of Singapore's diesel prices, which was significantly stronger. However, the subsequent adjustment of the refined oil export quota policy led to large fluctuations in the overseas diesel market.

This year, China's first-batch export quota of refined oil products was 13 million tons, a year-on-year decrease of 56%. This continued the tightening trend of refined oil exports last year, which to some extent exacerbated the shortage of Singapore's diesel inventory. The SGO- Brent diesel crack spread continued to stay at a high level. In the middle of the year, China successively issued export quotas for the third and fourth batches of refined oil products totaling 9.5 million tons, which posed significant pressure on the price of diesel in the global market. The SGO-Brent diesel crack fell from a high near $65/barrel to around $30/barrel. However, the total quota is limited, so the effect is short term, and then the cracking spread rebounded. In the middle of September, the Ministry of Commerce issued the fourth batch of refined oil export quota of 1.5 million tons, which once again posed a short-term pressure on the price of diesel oil in the overseas market.

In late September, the Ministry of Commerce issued the fifth batch of refined oil export quotas for 2022, totaling 13.25 million tons, including 3.35 million tons for PetroChina, 6.5 million tons for Sinopec, 1.17 million tons for CNOOC, 1.14 million tons for Sinochem, 20 thousand tons for AVIC, 970 thousand tons for Zhejiang Petro & Chemical and 100 thousand tons for NORINCO Group. Due to the large quantity of the fifth batch of export quotas, considering the current situation, the quota granted companies in the fourth quarter can arrange export business according to the market conditions, and the unused quota could be extended to the first quarter of next year.

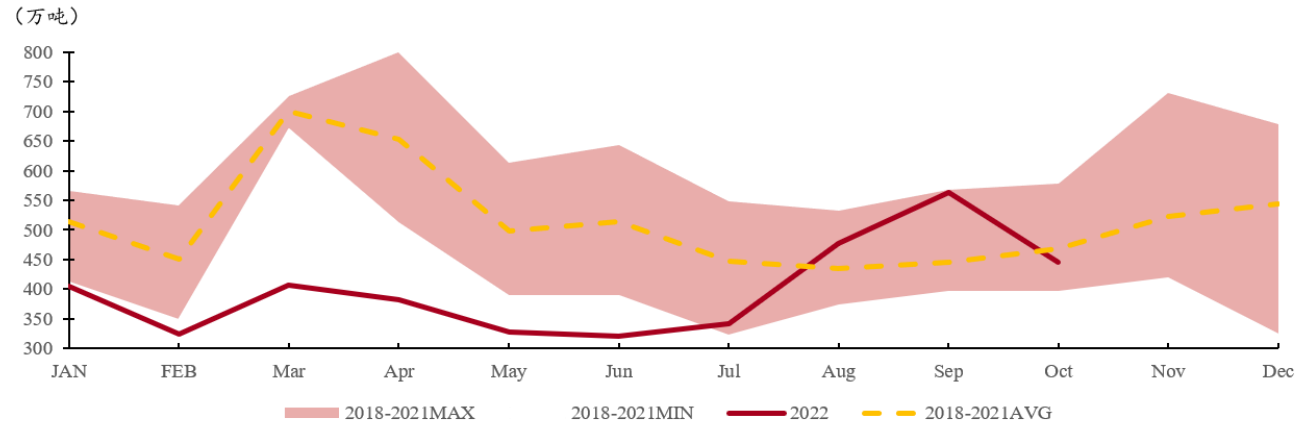
At present, the total export quota of refined oil products in 2022 will reach 37.25 million tons, basically equal to the quota of 37.61 million tons last year. The issuance of the refined oil export quota may be conducive to increase the operating rate of China's main refineries, thus forming a positive effect on the domestic SC price. For the Singapore market, the increase of China's diesel export quota may, to some extent, resolve the shortage of global supply and thus drive dwon diesel prices. However, considering the guaranteed supply of gasoline and diesel for domestic market from major state-owned refineries, it is expected that the actual diesel export will not increase significantly in the short term, so the impact on Singapore's diesel market is temporarily limited. At present, Singapore's diesel cracking spread of SGO-Brent remains above $30/barrel, which is expected to continue to run at a high level in the short term. However, it is necessary to be alert to the potential risk that Russian EN590 diesel may flow into Singapore after the EU's ban on Russian refined oil taking effect in February next year.

Graph 83: China's Refined Oil Export Quota

Product oil export enterprise	022 the first batch quota	022 the second batch quota	022 the third batch quota	022 the fourth batch quota	022 the fifth batch quota	2022 total quota	2021 quota total capacity	Total year-on-year growth
CNPC	421	153	147	15	335	1071	1263	-15.20%
Sinopec	431	240	127	88	650	1536	1473	4.28%
China National Offshore Oil Corporation	118	42	46	13	117	336	355	-5.35%
Sinochem	177	15	84	14	114	404	343	17.78%
China Aviation Oil	4	0	2	7	2	15	7	114.29%
Zhejiang Petrochemical Company	134	0	84	13	97	328	290	13.10%
China weapon	15	0	10	0	10	35	30	16.67%
Sum up	1300	450	500	150	1325	3725	3761	-0.96%

Source：Ministry of Commerce, BOCI Futures

Graph 84: China's Refined Oil Exports



Source：Wind, BOCI Futures

2.6 Sufficient Supply of High Sulfur Fuel Oil, Demand Declined as Temperature Decreased

After the escalation of the Russia-Ukraine War, the expectation of blocked Russia's high sulfur fuel oil export pushed up the price in the short term. After that, the global high sulfur fuel oil trade pattern will be reshaped and finally stabilized, and the overall trend of high sulfur fuel oil will remain weak.

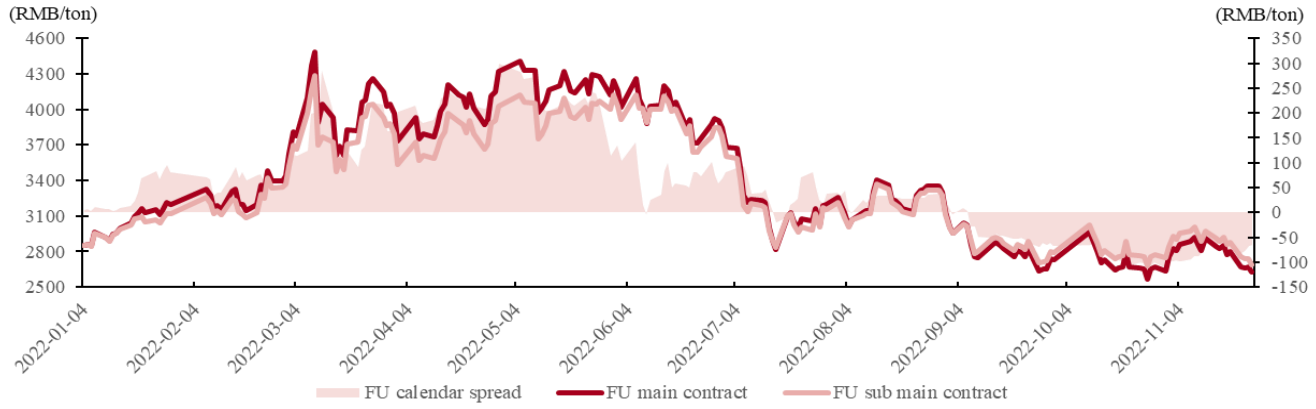
After the escalation of the Russia-Ukraine War, Europe and the United States imposed sanctions on Russia, which made it more difficult for Russia to export fuel oil. The fuel oil originally flowing to the United States, its largest export destination, was blocked, which pushed up the price expectation in the short term, and supported the monthly spread of the active and the secondary-active FU contracts and the calendar spread curve of the Singapore S380 in near month contracts to maintain backwardation structure. Among them, FU 5-9 once hit the extreme high level of 700 yuan/ton in late April, and the warehouse warrant inventory was at a historical low, which did good to the expiring contract FU 2205.

In late May, Russian fuel oil flowed into Singapore, and the supply of fuel oil increased。At the same time, the expectation of power-generation demand in the Middle East and South Asia due to the hot weather was not fully met, leading to the weakness of high sulfur fuel oil price. Since the escalation of the Russia-Ukraine War, Russian fuel oil originally exported to the United States has been forced to shift to the Middle East and Singapore, resulting in a sufficient supply of fuel oil in the Middle East. In addition, in July, the Fujairah traffic hub was once closed due to rainstorm and floods, resulting in a short-term inventory backlog. The inventory level of fuel oil in the Middle East in the third quarter was higher than the same period last year. As of the week of September 12, the inventory of fuel oil in the Fujairah Industrial Zone of the United Arab Emirates, including power-generation fuel oil and marine fuel oil, had reached 13.396 million barrels, the highest level since June 7, 2021, with a month on month growth of 12% and a year-on-year growth of 53.57%. Therefore, although the third quarter was the peak season for power-generation in hot summer, the Middle East's demand for Singapore high sulfur fuel oil did not improve significantly. In addition, some Russian fuel oil flowed into the Asia Pacific region, leading the high sulfur fuel oil market with a sufficient supply. The spread between the active and the secondary active FU contracts and the monthly spread of S380 in near months were remained at slight backwardation structure. It is worth mentioning that in August, the FU 2209 was about to expire and the warrant inventory was only 3860 tons, which led to the short-term rise of the FU 9-1 spread.

In fourth quarter, as the demand for power-generation in the Middle East and South Asia subsided, the fundamentals of high sulfur fuel oil presented weak supply and demand. From the perspective of calendar spreads, the FU 1-5 is in a contango structure, hovering around -100 yuan/ton, and the bullish arbitrage opportunity did not appear. Calendar spread curve of S380 was also changed to a discounted structure for the near-month contracts. In October, it was basically in the range of $-3 to $-3.5/ton. In November, the calendar spread of Singapore high sulfur fuel oil S380 rose in recent months, was mainly affected by international macro factors. The relief of the Russia-

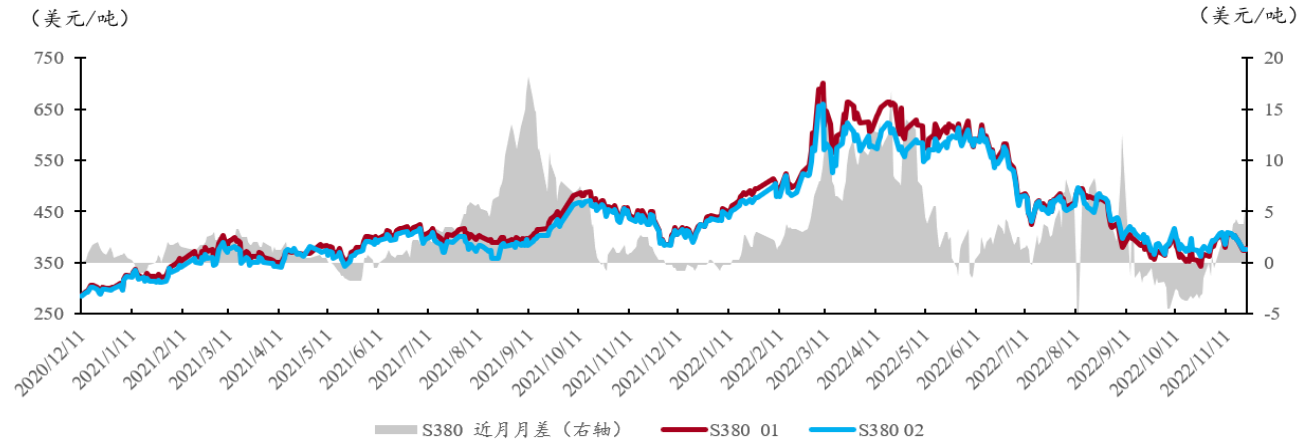
Ukraine War may lead to a slight increase in the expected high sulfur fuel oil supply in the Asia Pacific region.

Graph 85: Calendar Spread of FU Active Contract and Secondary Active Contract



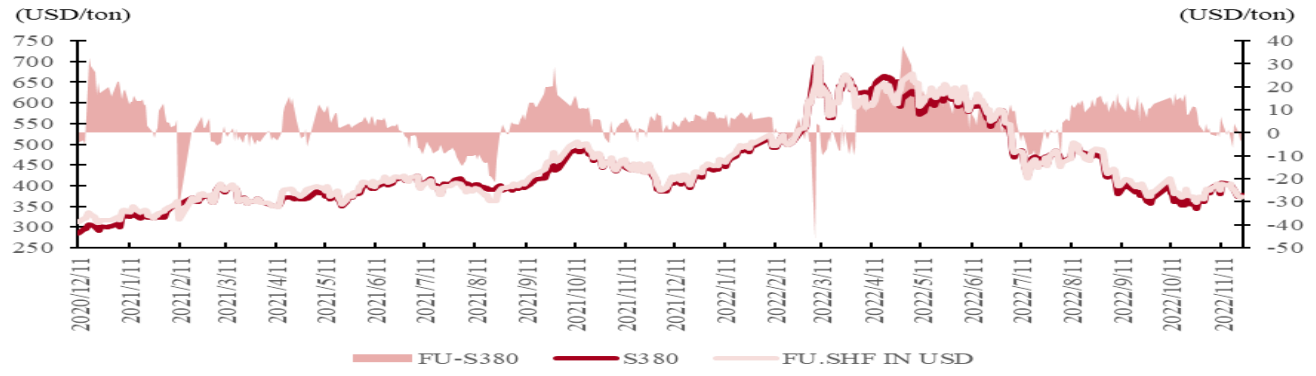
Source：Wind, BOCI Futures

Graph 86: Calendar Spread of Singapore S380 Fuel Oil Futures



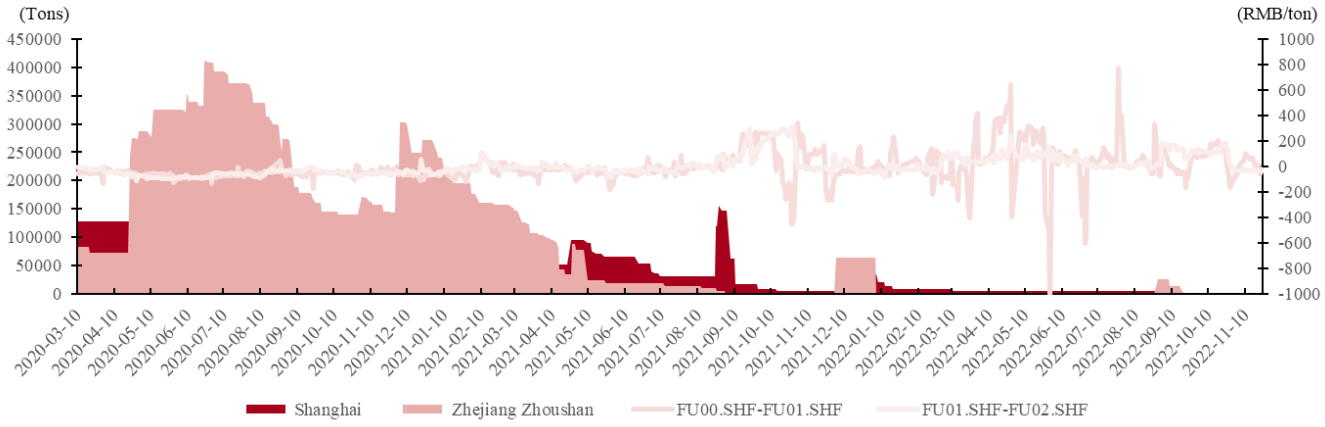
Source：Platts, BOCI Futures

Graph 87: Spread for FU- Singapore S380 Fuel Oil Futures



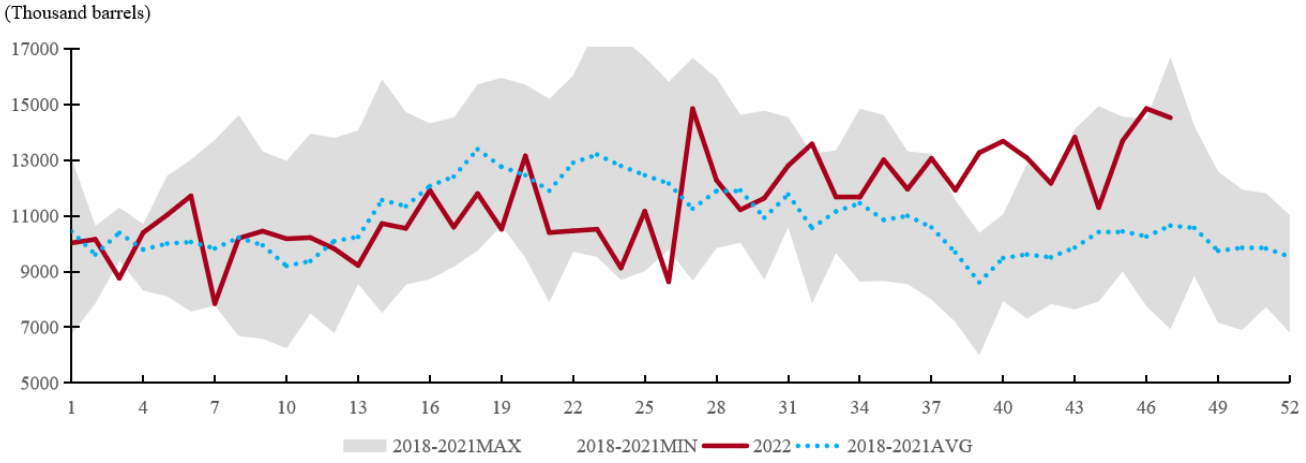
Source：Platts, Wind, BOCI Futures

Graph 88: Domestic FU Warrants



Source：INE, Wind, BOCI Futures

Graph 89: Fuel Oil Inventory in Middle East



Source：Refinitiv, BOCI Futures

2.7 Spread Between High and Low Sulfur Fuel Oil Reshaped

Since the escalation of the Russia-Ukraine this year, the trade flow of the global fuel oil market has changed. The supply side led high and low sulfur fuel oil prices direction. The differentials of the two has gradually formed a new balance. Previously, the price difference between high and low sulfur fuel oil was 600-800 yuan/ton. With the tight supply of low sulfur fuel oil and the sufficient supply of high sulfur fuel oil made a solid fact after the conflict between Russia and Ukraine, the price difference between the two has now run into the range of 1500-2000 yuan/ton.

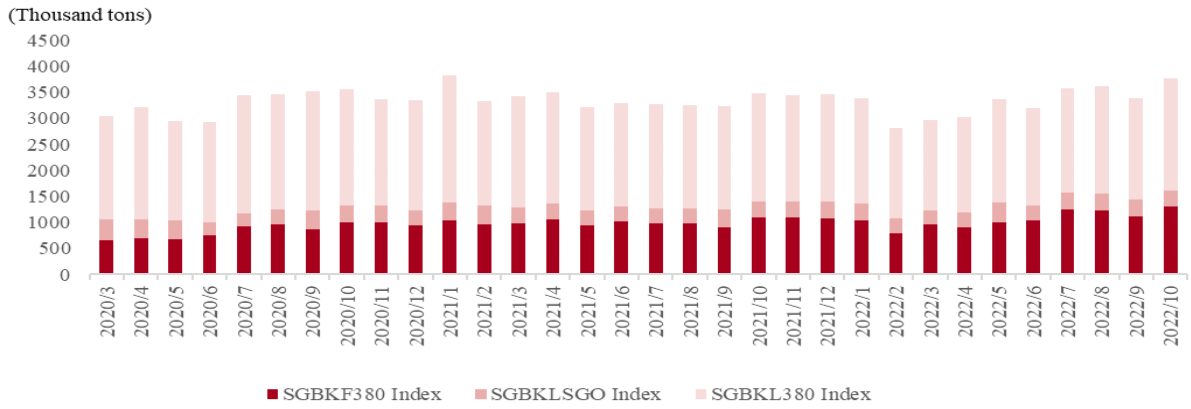
From January to November this year, the daily average price difference of LU-FU active contracts was 1617 yuan/ton, a significant year-on-year increase of 60.63%, up to 2509 yuan/ton; The daily average price difference of Hi-5 in the same period was $184.14/ton, a significant increase of 64.81% year on year, up to $323/ton. At the beginning of the year, the alternative demand for power-generation using low sulfur fuel oil in Japan and South Korea in winter was in the peak season, and LU-FU 05 was in the range of 1000-1100 yuan/ton; The spread of Hi-5 APR in Singapore was around $165-170/ton. After the escalation of Russia-Ukraine War, the global market of high and low sulfur fuel oil has been reshaped. The supply of both domestic and global low sulfur fuel oil has been tightened compared with the previous period. The supply of high sulfur fuel oil was mainly based on the logic of sufficient supply, and the fundamental between the two have been differentiating. In late May, affected by political sanctions, Russia's high sulfur fuel oil originally exported to the United States flowed into Singapore. The expected more supply of high sulfur fuel led to a significant pressure on its prices. The price difference between high and low sulfur fuel oils widened significantly to the extreme level. The LU-FU 09 once rose to more than 2500 yuan/ton, while the Singaporean Hi-5 AUG broke through $320 /ton, both hitting a new record high.

In the third quarter, the price difference between high and low sulfur fuels oils fell back from the previous peak, because the trend of low sulfur fuel oil weakened due to the relief of the shortage of supply. The LU-FU active month fell to below 1600 yuan/ton, while Hi-5 narrowed to around $220 /ton in the same period, but the overall level remained at a high compared with the same period in previous years. The price difference between high and low sulfur prices widened significantly in October. On the one hand, the overall trend of low sulfur fuel oil was stable and strong, and on the other hand, the demand for high sulfur fuel oil weakened seasonally. The price difference of LU-FU 01 rose to a high of more than 2100 yuan/ton, and Hi-5 DEC rose to more than $280/ton. Since then, due to the relief of the geographical conflicts, the difference between high and low sulfur fuel oil in Singapore returned. Hi-5 DEC once fell below $200/ton, and the price difference between domestic high and low sulfur fuel oil also reduced to around 1700 yuan/ton. Considering that it is difficult for Europe and the United States to fully liberalize the sanctions against Russia in the short term, and it is not likely to fundamentally reverse the supply side. It is expected that the high and low sulfur fuel oil price difference will maintain a high range with a strong trend, and the domestic LU-FU active month may fluctuate widely in the range of 1500-2000 yuan/ton.

The significant widening of the price spread between high and low sulfur fuel oil and the maintenance at a high-level range, to a certain extent, lead to lower costs of high sulfur fuel oil bunkering, that is, the high-low price difference is more than the cost of installing desulfurization towers on ships, thus causing some low sulfur fuel oil bunkering turn to high sulfur fuel oil bunkering. According to the data of Singapore Maritime Port Authority (MPA),the Singapore's Marine oil sales volume in the January-October period of 2022 was 39.3725 million tons, down about 5.33% from the same period last year. Among them, the sales volume of high-sulfur fuel was 11.166 million tons, a year-on-year increase of 5.86%, and its proportion in the bunkering market increased to 30.85% in October, the highest proportion since the implementation of IMO 2020 New Policy.; The sales volume of low sulfur fuel oil

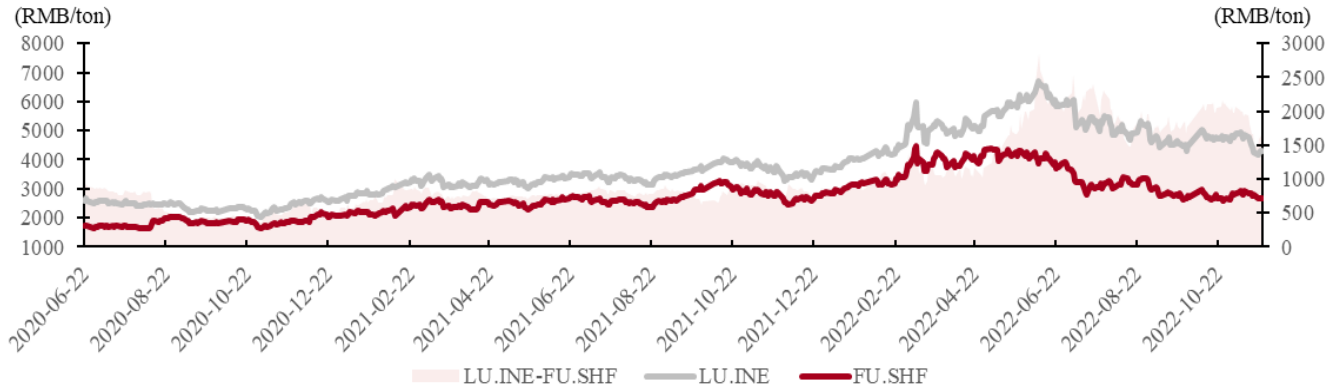
was 24.7918 million tons, down 10.02% year on year, and its proportion in the bunkering market fell to 62.97% .

Graph 90: Ship Refueling Capacity for Different Singapore Oil Products



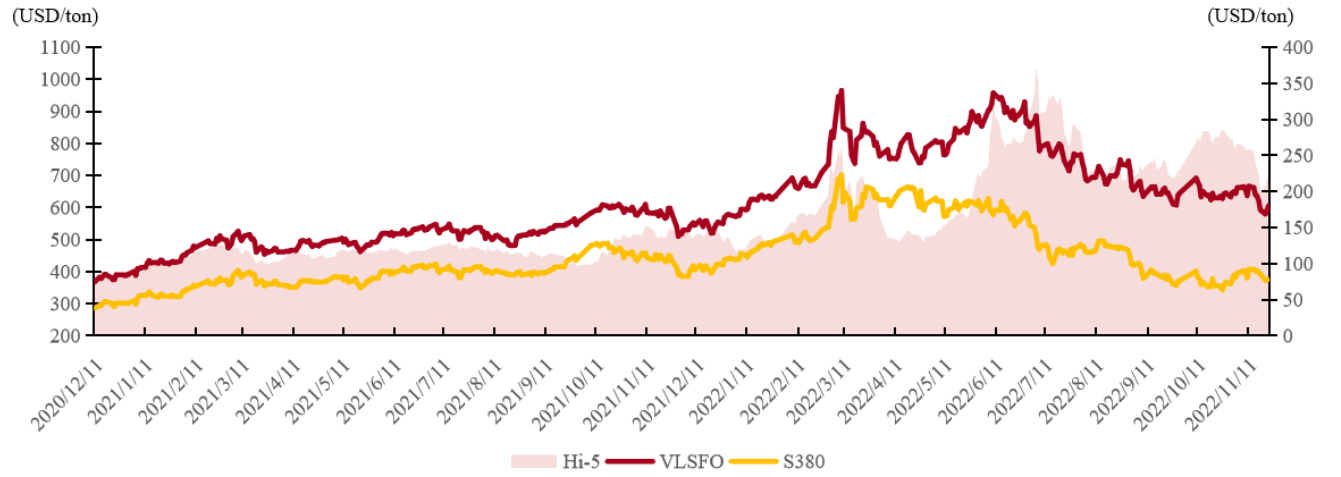
Source：Bloomberg, BOCI Futures

Graph 91: Spread Between LU and FU



Source：Wind, BOCI Futures

Graph 92: Spread Between Singapore High Sulfur and Low Sulfur Fuel Oil



Source：Platts, BOCI Futures

2.8 Frequent Marine Fuel Oil Pollution Incidents in Singapore

The Maritime and Port Authority of Singapore (MPA) issued a notice on August 3 that they completed the investigation of the marine fuel pollution incident at port in March 2022. Glencore intended to supply contaminated marine fuel to ships. Knowing that the COC concentration in its fuel samples was as high as 2000ppm to 15000ppm, Glencore continued to supply 24 ships in Singapore Port from March 22 to April 1, of which at least 3 ships reported problems with fuel pumps and engines. Therefore, since August 18, Glencore's supplier license was suspended for two months. CNPC International, another company involved, cancelled the delivery of contaminated fuel immediately after receiving the fuel test results, so it did not take punitive measures. MPA would cooperate with the shipping industry to enhance fuel oil quality inspection, and COC has been included in BQIS and IBQC quality inspection.

In addition, Intertek Lintec, a global inspection institution, issued an alarm in July that among VLSFO samples in Singapore, the flash point of fuel oil was between 51°C and 57 °C, which was lower than the minimum temperature of 60°C specified in ISO 8217, made the ship unseaworthy. Since this year, frequent incidents of marine fuel

oil pollution occurred in Singapore, while China's ship bunkering quality was relatively stable, and the inspection system was relatively thorough. We recommend to pay attention to the quality issues of high and low sulfur fuel oil.

2.9 Market Policy

2.9.1 Release of FU& BU Average Monthly Settlement Price

The Shanghai Futures Exchange has released the average monthly settlement price of fuel oil and petroleum bitumen futures contracts from September 8, 2022. The FU calendar month contract is the delivery month contract for the second to seventh calendar month after the current calendar month while BU calendar month contracts are delivery month contracts for the first to sixth calendar month after the current calendar month. FU and BU active month contracts are the contracts with the largest OI. If the contract is not included in the above six calendar month contracts, a supplemental release will be issued. The average monthly settlement price of FU and BU will be released through the exchange website after daily market close.

2.9.1 Low Sulfur Fuel Oil Group Delivery Warehouse

On the evening of January 28, INE issued an announcement agreeing that Sinopec Zhejiang Zhoushan Petroleum Co., Ltd. become the delivery warehouse (domestic) of the low-sulfur fuel oil futures group delivery center, and Sinopec Fuel Oil (Singapore) Co., Ltd. become the overseas storage warehouse of the group delivery factory, with an approved storage capacity of 80,000 tons, and the first phase storage capacity is 40,000 tons. The standard warehouse receipt of the low-sulfur fuel oil should be shipped out within one month after load-out.

2.9.3 Shandong Port Qingdao Port Shihua Company Loaded in Low Sulfur Oil for the First Time

According to the news of Shandong Port Group on February 25, under the supervision of Huangdao Customs, 15,000 tons of low-sulfur fuel oil was unloaded from "Dahai Oil 15" and stored in Shandong Port Qingdao Port Shihua Company, generating standard warehouse receipt for low-sulfur fuel oil futures. This marked the first designated delivery into the warehouse for low-sulfur fuel oil futures in northern China in Qingdao Port, Shandong Port. On February 28, INE announced that LU Qingdao Shihua received 14,800 tons of low-sulfur fuel oil.

SHFE and its subsidiaries INE, Qingdao Customs and Huangdao Hai formulated a series of convenient measures in 2021, such as the mixing of fuel oil futures and "Exchange for Physicals" in Qingdao, the mixing of export and import bonded fuel oil, the direct supply of futures out of the warehouse, and the integration of warehouse functions. In June of the same year, Shandong Port Qingdao Port Shihua Company became the first enterprise in northern China to successfully obtain the low-sulfur fuel oil futures storage qualification.

2.9.4 Establishment of China Zhoushan Bonded Fuel Oil Index System

The commercial storage capacity available for Zhoushan oil storage was officially released on May 5. The data is the sum of the ten major oil storage enterprises in Zhoushan that can lease commercial stores, covering six products such as crude oil and low-sulfur fuel oil. The commercial storage capacity of oil products is nearly 9 million cubic meters, accounting for about 70% of the commercial storage capacity of Zhoushan oil products. Available commercial storage capacity is released on the official website of Zhejiang International Oil and Gas Exchange Center on the first working day of each month.

On June 21, 2022, the 2022 Fuel Oil Industry Summit hosted by the Shanghai Futures Exchange was successfully held in Shanghai. INE and Zhejiang Mercantile Exchange jointly released the "China Zhoushan Low Sulfur Fuel Oil Bonded Bunker Bid Price " based on low-sulfur fuel oil futures. Zhejiang Mercantile Exchange said that the introduction of bid price provides a new way to enhance China's price influence in the international energy market, and improves the RMB pricing system combining with the bonded marine fuel industry, and the China Zhoushan bonded fuel oil index system composed of "offer price", "meteorological index", "storage comprehensive price" and "available commercial storage capacity" begun to take shape. At the moment, about 1,000 to 2,000 tons of fuel oil are traded daily through the INE Zhoushan anchorage oil price.

2.9.5 Zhejiang Mercantile Exchange Warehouse Receipt Started Listing in SHFE

On the basis of the early W area of Zhejiang Mercantile Exchange（ZME） on the comprehensive business platform of the Shanghai Futures Exchange, the Shanghai Futures Exchange (SHFE) and Zhejiang Mercantile Exchange jointly launched the business of "Zhejiang Oil warehouse receipt listed in SHFE" on August 31. The business realized the listing of duty-paid non-standard warehouse receipts and bonded non-standard warehouse receipts of diesel, gasoline, fuel oil, bitumen, natural rubber and crude oil of ZME on the comprehensive business platform of the SHFE. According to ZME, the specific business model is for Zhejiang Oil Center to put the warehouse receipt listing information to the SHFE comprehensive business platform "Zhejiang Oil Zone", and all transactions, clearing and settlement are completed in ZME.

At the same time, SFE and ZME held a signing ceremony for the "Cooperation Agreement on 'Futures Stable Price Order' for Energy Varieties". On the ceremony, SHFE and ZME signed the "Yangtze River Delta 'Futures Delivery Warehouse

Sharing' Cooperation Agreement" with Zhongchu Lingang,Sinochem Xingzhong and other delivery warehouses.

2.9.6 Shanghai License issued for Bonded Fuel Bunker of International Navigation Ship

PetroChina SIPG Energy Co., Ltd. and Shanghai Fuyuan Fuel Oil Co., Ltd. became the first batch of bonded oil refueling enterprises in Shanghai on August 23. Shanghai Fuyuan aims to achieve bonded oil filling capacity of 1 million tons/year, which is expected to bring 3.5 billion yuan of annual revenue.

The conference on promoting the high-quality development of Yangshan Special Comprehensive Bonded Zone clearly stated that 3 million tons of bonded oil, 5 million cubic meters of bonded LNG bunkering, and 10 billion yuan of bonded supplies will be achieved by 2025. It is reported that three enterprises will subsequently apply for the Shanghai license for bonded fuel bunker of international navigation ships. Baowu Resources Co., Ltd., a subsidiary of Baowu Group, established Shanghai Baochungran Energy Development Co., Ltd. in Yangshan Special Comprehensive Bonded Zone, and plans to gradually put more than 10 tankers into operation , aiming to achieve a bonded fuel filling capacity of 700,000 tons/year, which is 2.4 billion yuan of annual revenue. Xiamen XMXYG Group established XMXYG Petroleum (Shanghai) Co., Ltd. in Yangshan Special Comprehensive Bonded Zone, aiming to achieve a bonded oil filling volume of 700,000 tons/year, which is 2.4 billion yuan of annual revenue. Shanghai New Gaoying Energy Technology Co., Ltd. set up Shanghai Oil Nar Energy Co., Ltd. in Yangshan Special Comprehensive Bonded Zone, aiming to achieve a bonded oil filling capacity of 500,000 tons/year.

2.9.7 Shenzhen License Issued for Bonded Fuel Bunker of International Navigation Ships

On April 21, Shenzhen Municipal Party Committee and Municipal Government granted Shenzhen CNOOC Sales Shenzhen Co., Ltd. the Bonded Fuel Oil Operation Approval Certificate No. 003 for International Navigation Vessels, becoming the third enterprise certificated to carry out direct supply of bonded fuel oil to international navigation ships in Shenzhen.

2.9.8 Guangzhou License Issued for Bonded Fuel Bunker of International Navigation Ships

Guangzhou bonded ship bunkering business was launched on February 28. Guangzhou Yuanheng Warehousing Co., Ltd. and Guangzhou Development Bibi Oil Products Co., Ltd. were certificated to carry out bonded bunkering business for international sailing ships. South China PetroChina International Business Co., Ltd got the certificate from the Guangzhou Municipal Bureau of Commerce on August 23 this year, and successfully completed the first bonded fuel oil bunkering in September, marking the beginning of PetroChina's development of the bonded fuel oil market in South China. According to market news, PetroChina Fuel Oil Guangzhou entity is actively preparing for bonded fuel oil business, and is expected to complete the first refueling in the near future. The two entites are expected to take about 3 million tons/year of low-sulfur fuel oil resources in PetroChina's South China market to provide high-quality and cost-efficient marine fuel oil for ships on international routes.

Graph 93: China's License for Bonded Fuel Bunker

	Enterprise name	Approval time	License type
1	China Marine Fuel Co., Ltd.	1972	National license
2	Zhejiang Zhoushan Petroleum Company Limited	April 2009	
3	China Shipping Fuel Supply Co., Ltd.	April 2009	
4	Changjiang fuel Co., Ltd	April 2009	
5	Shenzhen Guanghui Petroleum Group Company Limited	April 2009	
6	Zhongtaifu Shipping Fuel Co., Ltd.	July 2006/June 2017	Zhoushan license
7	Huaxin International (Zhoushan) Petroleum Co., Ltd.	June 2017	
8	Zhejiang Petroleum Fuel Oil Sales Co., Ltd.	June 2017	
9	Zhoushan Port Comprehensive Bonded Zone Energy Chemical Co., Ltd.	June 2017 (cancelled)	
10	Zhejiang haigang international trading Co., Ltd	October 2017	
11	Li Petroleum (Zhoushan) Co., Ltd.	December 2018	
12	Zhoushan Yuantou Oils Trading Co., Ltd	December 2018	
13	Zhejiang Free Trade Zone PetroChina Fuel Oil Co., Ltd.	September 2019	
14	Sinopec (Zhoushan) Co., Ltd.	September 2019	
15	Shanggang (Zhoushan) Energy Co., Ltd.	November, 2020	
16	Zhejiang Free Trade Zone PetroChina International Enterprise Co., Ltd.	September 2020	
17	Tuoke Energy (Zhejiang) Co., Ltd.	January 2021	
18	Sinochem Oil (Zhoushan) Co., Ltd.	July, 2021	
19	Zhejiang shenzhou energy Co., Ltd	January 2022	
20	Shenzhen Yantian Port Group	June 2021	Shenzhen license
21	China Shipping Shenzhen Shipping Fuel Co., Ltd.	June 2021	
22	Sales CNOOC Shenzhen Co., Ltd.	April, 2022	
23	Guangdong Yantian Port Shihua Energy Development Co., Ltd.	September 2022	
24	Guangzhou Yuan Heng storage Co., Ltd	February 2022	Guangzhou license
25	Guangzhou Development Bibi Oils Co., Ltd.	February 2022	
26	Guangzhou fuel oil Co., Ltd	July, 2022	
27	China Petroleum International Enterprise South China Co., Ltd	August, 2022	
28	Sinopec fuel oil (Hainan) Co., Ltd	December 2021	Hainan license
29	China Shipping (Yangpu) Marine Fuel Supply Co., Ltd.	March 2022	
30	Shanggang energy Co., Ltd	August, 2022	Shanghai license plate
31	Shanghai Fuyuan fuel oil Co., Ltd	August, 2022	

Source: BOCI Futures

2.9.9 Sinopec Zhonghai (Yangpu) Carried out First Bonded Oil Bunkering Business

Sinopec China Shipping (Yangpu) Marine Fuel Supply Co., Ltd. supplied bonded oil at Yangpu International Container Terminal on April 2. This was the first bonded oil bunkering business carried out by Sinopec Zhonghai (Yangpu) after its approval for bonded oil operation qualification of Hainan Free Trade Port and the import permission of non-state trade of fuel oil specially approval by the Ministry of Commerce. It marked the official landing of the bonded oil operation license of

Hainan Free Trade Port to carry out domestic and foreign trade and ship bunkering business.

2.9.10 Sinopec Fuel Oil Gain Singapore Fuel Supplier Licenses

The Maritime and Port Authority of Singapore (MPA) announced its updated fuel supplier list in June. Sinopec Fuel Oil (Singapore) Pte Ltd is added to the list, which is approved to supply MDO/MGO/MFO. Sinopec Fuel Oil is the largest bonded ship bunkering enterprise in China, and has fuel supply capacity in more than 50 overseas key ports such as Singapore, Fujairah, ARA and Panama. At present, there are 42 suppliers holding Singapore fuel supplier licenses, including PetroChina International (Singapore) Limited and Sinopec Fuel Oil.

2.10 Market Outlook: New Balance between High and Low Sulfur Fuel Oil

This year, prices of high and low sulfur fuel oil moved up along with the crude oil cost side, and the difference between their supply factors led to significant differentiation in the trend. Considering that the Russia-Ukraine War and the sanctions posed by Europe and the United States are difficult to be resolved in the short term, the supply side will continue to play a key role of price movement, adding that the difference of seasonal demands between the two, so the trend of high and low sulfur fuel oil and domestic and global market in the first quarter of next year is expected to continue to differentiate.

In terms of low sulfur fuel oil, the overall development of China's ship bunkering market is stable. However, considering the negative effect of high ship fuel prices on demand, it is expected that the demand for ship fuel will be stable in the first quarter of next year. From the supply side, it is difficult to reverse the changes in the supply and demand structure of the Singapore market caused by the Russia-Ukraine War in

the short term. It is expected that China's low sulfur fuel oil import volume will remain relatively low. In order to fill up the supply gap, the domestic bonded low sulfur fuel oil output has been gradually increasing to a historical high. Next year, China's low sulfur fuel oil export quota may still be sufficient, and the domestic output is expected to grow steadily and slightly. However, considering the limited increment, it is difficult to completely reverse the tight supply of low sulfur fuel oil in China compared with the same period in previous years, and the LU monthly spread curve may stay at a backwardation structure steadily.

In the Singapore market, although the supply shortage of low sulfur fuel oil has eased significantly, the overall supply and demand structure is still intense compared with the same period in previous years. It is expected that the monthly spreads of VLSFO in the Singaporean market in near months will be at backwardation structure. On the one hand, if the progress of Russia- Ukraine War slows down significantly, the inflow of cargos to Singapore is expected to increase, which will put a certain pressure on the VLSFO. However, it is difficult for Europe and the United States to fully liberalize sanctions against Russia in the short term, and the possibility of actual increment in supply in Singapore is low. Second, if the Russia-Ukraine issue remains deadlocked or escalates again, and there is a multi-dimensional game between Russia and western countries, the problem of energy shortage in Europe will be difficult to eradicate in the short term. The low volume of cargo inflows from the western region will lead to a tightening of low sulfur fuel oil supply in Singapore, thus supporting VLSFO curve in near months. From the perspective of demand, in the first quarter of next year, the demand for electricity in Northeast Asia, including South Korea, Japan and other countries during the winter may increase. At present, the price of natural gas in the Asia Pacific region is still at a high level compared with the same period in previous years, may provide some support for low sulfur fuel oil prices in Singapore from the perspective of substitution.

From the perspective of diesel, more of the China's refined oil export quota was issued

to increase diesel supply in Singapore to a certain extent, thus exerting pressure on the SGO price. However, considering the guaranteed supply for gasoline and diesel in the domestic market, it is estimated that the actual diesel export will not increase significantly in the short term, so the impact on Singapore diesel price is temporarily limited, and the SGO-Brent cracking price remains relatively high. However, we need to be alert to the potential risks that Russian EN590 diesel may flow into Singapore after the EU's ban on the shipment of Russian refined oil taking effect in February next year. From the perspective of cross-regional arbitrage, compared with Singapore, the overall supply and demand structure of domestic low sulfur fuel oil is relatively intense, so the domestic low sulfur fuel oil is going to stay at a premium value against that in the Singaporean market, so price difference LU-VLSFO is relatively stable. However, if China's diesel exports are fully liberalized in the future, it is not ruled out that the pressure on the Singaporean diesel price will drop, leading to a rebound in the cross-reginal price difference.

In terms of high sulfur fuel oil, since the escalation of the Russia-Ukraine War, Russian fuel oil originally exported to the United States has been transported to the Middle East and Singapore. The Middle East fuel oil supply was sufficient and the inventory was higher than the same period last year. If the geographical conflicts relieve significantly, the expectation of Singapore's high sulfur fuel oil supply tightening may rise, leading to the short-term rebound of the S380 price. However, it is unlikely that the United States will completely waive the sanctions against Russia. The actual supply of high sulfur fuel oil in Singapore market is expected to remain relatively sufficient. In addition, the Middle East and South Asia are in the low season of power generation during the winter. The monthly spreads of S380 in far months and the FU05-09 is expected to be at the contango structure.

Since the escalation of the Russia-Ukraine War this year, the trade flow of the global fuel oil market has changed, and the difference between the fundamentals of high and low sulfur fuel oil has gradually formed a new balance. Previously, the price difference

between high and low sulfur fuel oil in China was 600-800 yuan/ton. After the conflicts between Russia and Ukraine, the tight supply of low sulfur fuel oil and sufficient supply of high sulfur fuel oil gradually solidified. The price difference between high and low sulfur fuel oil in the domestic market entered the range of 1500-2000 yuan/ton. Considering that the supply of high and low sulfur fuel oil is difficult to fundamentally reverse in the short term, it is expected that the price difference of LU-FU active month and the price difference of Hi-5 over the same period will still fluctuate in a high territory.

For the expected differentiation of the absolute price of high and low sulfur fuel oil in the first quarter of next year, the average price of FU may be in the range of 2500-3000 yuan/ton, and the average price of LU may be in the range of 4000-4500 yuan/ton. In terms of relative prices, it is expected that the differentials of high and low sulfur fuel oil fundamentals will continue, and the average price difference of high and low sulfur fuel oil in the first quarter of next year may be in the range of 1500-2000 yuan/ton.

Disclamer

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