

Research on Macro and Micro Factors Affecting Futures Market Prices

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Abstract. When the global economy is closely linked, the stability and development of the futures market is becoming more and more important. This study focuses on the factors affecting the futures market and divides them into macro and micro levels for in-depth analysis. The research adopts the method of theoretical analysis, data research, and case analysis to systematically explore the influence mechanism of each factor. It is found that in terms of macroeconomic policy, monetary policy and fiscal policy change the supply and demand relationship and price trend of futures market by influencing market capital flow, investment and consumption demand; The price fluctuation of the international commodity market is affected by many complicated factors and is interrelated with the futures market, and the foreign futures exchange has a great influence on the futures price of China. At the micro level, investor psychology and information flow significantly affect futures prices, in which noise trader behavior will exacerbate market volatility. The article establishes a relatively systematic and comprehensive analytical framework for the influencing factors of the futures market, thereby providing valuable references for the regulators, investors and related enterprises of the futures market, helping them make more scientific decisions in the complex market environment, and promoting the healthy and stable development of the futures market.

1 Introduction

In the context of the accelerating process of global economic integration, the futures market, as a key component of the huge derivatives market, has become increasingly important. The futures market not only provides enterprises with an effective tool for risk management, but also creates diversified investment opportunities for investors. However, the price fluctuation of the futures market is frequent and complex, which is affected by many factors. At the macro level, the government's economic policy adjustment, the dynamic changes of the international commodity market and the ups and downs of commodity prices all influence the trend of the futures market to varying degrees; At the micro level, investor psychology and information flow also play an important role in futures prices. In-depth analysis of these influencing factors is crucial to understanding the operation mechanism of the futures market, ensuring the stable development of the market and providing decision-making basis for market participants.

This paper aims to comprehensively explore the main factors affecting the futures market and their mechanisms. In the research method, by combining the macroeconomic theory and related policies, analyze its impact on the futures market path; Based on the actual transaction data of international commodity market, the linkage relationship between international commodity market and futures market is discussed. Using behavioral finance theory and related models, this paper studies the impact of micro factors on futures market. Finally, through the analysis of typical cases, the impact of complex factors such as geopolitics on the futures market is directly demonstrated.

The research goal is to clarify the impact degree and direction of macro and micro factors on the futures market, and build a systematic and comprehensive analysis framework for influencing factors in the futures market, so as to provide the basic principles of finance and economics for regulators, investors and related enterprises in the futures market, and trigger valuable references. Help them make more rational and scientific decisions in the complex and changeable futures market environment.

2 Factor analysis

2.1 Macro factors

2.1.1 Macroeconomical factor

At present, the futures market in many countries has an increasing impact on the macro economy, and the correlation between commodity futures prices and market price indicators and economic policy variables has increased[1].The government has many methods to actively influence the market economy, certainly including the futures market, such as the central bank varies the money supply, reducing the amount of money circulating in the market by raising taxes and enhancing government spending programs, or adjusting domestic interest rate to navigate the value of own monetary, which can led the fluctuation of futures volatility and makes domestic asset value upward, those operations's effect is obvious legible. The transmission dogma by uncertain economic policy acts on the futures is Oi-Hartman-Abel effect [2].Which refer to that When the uncertainty of total factor and commodity prices rises, investment eventually increases, and investment demand is more sensitive to price fluctuations. Economic policy uncertainty is unstable and capricious may lead the entrepreneurs' doubt on policy, this will make their financing and investing behaviors tend to conservative. Because of price sticky, they cannot adjust price of labor power in the short term, they may reduce investment including option. From a monetary policy perspective, if the interest rate is descending under policy intervention, then the lever ratio of futures may reduce because people return less money when they borrow money from commercial bank buy futures. So this may convert people's expectation, Traders increasingly trade derivatives such as futures to lock in the price of the underlying asset and make earning. In addition, from the perspective of fiscal policy, when the government raises taxes, the disposable income of enterprises and individuals will decrease, and investment and consumption demand may be inhibited, which will have a certain negative impact on the demand of the futures market. On the contrary, the government's increased fiscal expenditure, especially investment in infrastructure construction and people's livelihood, will stimulate the development of related industries, and then drive the price of related varieties in the futures market. For example, the government's increased investment in the real estate industry will increase the demand for construction materials such as steel and cement, which will push up the price of steel futures and cement futures. Studies have shown that the change of regulatory policy to market-led changes the price volatility of soybean and soybean meal futures market[3].

2.1.2 International bulk commodity market

The international bulk commodity market is a globalized place for trading bulk commodities. The market has significant price fluctuations, which are influenced by the combination of global macroeconomics, geopolitics, climate change, and unexpected events. For instance, the El Niño phenomenon may affect the output and prices of agricultural products. Meanwhile, it has a distinct financial attribute, bulk commodities has been increasingly becoming the underlying assets for derivatives trading. Through financial tools such as hedging and swap transactions, enterprises can better save costs and avoid risks. Bulk commodities are mostly located at the upstream of the real economy's industrial chain, and their price fluctuations can momentarily influence the closely related futures market.

If the price of a product is less affected by government supervision, such as tariffs, and the country imports abundant the product, then the product can be considered to be more market-oriented[4]. for example,Therefore, the performance of this product in the futures market are closely related to the international futures exchange. At the same time, if the foreign futures exchange has a higher guidance and influence on the quotation, then the domestic futures price will be more affected by it, and it will change as the variation of the foreign futures' price exchange to a certain extent, but it also depends on the import of domestic products. If the country imports and exports a large amount of this commodity, the domestic futures price will be higher and lower. Then the price of domestic futures exchange will also have a certain impact on the price of international futures trading, but the degree of impact is generally smaller than that of Western countries' futures exchange. In 2001, China produced 1.425 million tons of copper, imported 954,000 tons and consumed 2.83 million tons. For example, As shown in the text part, it can be seen from Figure 9 that CBOT (Chicago Board of Trade) futures price changes had a great impact on Dalian market in the first two trading days, and rapidly decreased in the third and fourth trading days. The DCE (Dalian Commodity Exchange) futures price changes had a relatively small impact on the Chicago market, and gradually declined within 5 trading days. This shows that the Dalian market is sensitive to the Chicago market futures price changes, while the Chicago market has a weak impact on the Dalian market futures price changes, which indicates that the soybean futures trading of the Chicago Board of Trade plays a dominant role. In Figure 10, the impact response of the DCE soybean futures price change on the CBOT soybean market starts at a relatively low level and gradually diminishes within five trading days. This indicates that the impact of the futures price changes in the Dalian market on the Chicago market is relatively weak, that is, the influence of the futures price changes in the Dalian market on the Chicago market is relatively small.

2.1.3 Commodity prices

Bulk commodities refer to large-scale materials that can be traded in the circulation field but not traded at the retail level. They possess the commodity attributes of industrial production, agriculture and consumption. Mainly including energy products such as crude oil, basic raw materials such as steel, and agricultural products such as wheat.

The promote in the prices of bulk commodities, momentous industrial raw materials like oil, has led enterprises to incur higher costs in purchasing raw materials. In traditional economics, this eventually conduct the rise of the products' price at the consumption end, that is, an increase in the CPI. Due to the pursuit of a moderate inflation rate as a macroeconomic goal, the central bank may enhance interest rates under inflationary pressure, thereby inhibiting social investment. Since people who need to borrow monetary from the commercial bank to buy futures, the rise in interest rates leads to a decline in investors' demand for futures, causing futures prices to fall and investors may increase their short positions. As financial

practitioners more and more enter the commodity market, and futures are increasingly used by corporation to lock short-term or long-term commodity prices in the future, for example, Southwest Airlines in the United States frequently used futures to anchor fuel prices in 2008 financial crisis and 2020 COVID-19 pandemic, and commodities themselves became financialized and strengthened their financial attributes. This provides a bigger market for hedging, speculation and so on in the market. According to the research[5], liquidity in agricultural futures markets has decreased and volatility has increased during the COVID-19 pandemic. Through principal component analysis, this paper concludes that the liquidity of different types of futures markets is different from the volatility, and the financialization of commodity markets will expand the volatility and the kurtosis, which represents the probability of extreme events, also rises.

2.2 Microeconomical factor

2.2.1 Investor behavior and sentiment

Firstly, People know that asset prices are highly correlated with investors' psychology. It is appropriate to incorporate public opinion and sentiment into the judgment of futures price forecasts[6]. As most investors follow the assemble mentality, driven by economic rationality and the investment principle that buying low and selling high, they tend to purchase assets when prices are rising and sell them out of panic when prices are falling. These behavior leads to fluctuations in market prices. Based on Baker and Wurgler, investor mood can be defined as a measure of investors' beliefs regarding future asset prices and investment risks. Therefore, mood can be reasonably defined as optimism or pessimism towards the market. According to the research, investors' behavior will guide the price tend towards to fundamental price, which is determined by the intrinsic value of the assets. On the otherside, noise traders who are lack of industry insider information even the fundamental financial consense, for instance, some investors might buy or sell stocks based on some unidentified rumors, ignoring important fundamental information such as the company's financial status and industry prospects. Their behaviors tend to non-rationality, while futures market will face higher volatility and kurnosis. So you know that these noise traders may destroy the stable deal of futures market. According to each type of investor, researchers quantitatively processing the emotions, to expand the EGARCH model. EGARCH model is usually used to measure the degree of asset price volatility, through the way take the logarithmic transformation of the conditional variance. The influence of investor emotions on the futures market was analyzed. The researchers ultimately found that the emotional changes of producers, merchants, processors, and users were positively correlated with the majority of futures market price fluctuations, which [7]. Monetary managers could reduce market fluctuations and stabilize the futures market. This indicates that the former are similar to irrational investors, while the latter are similar to rational traders.

2.2.2 Information

Besides, Other researchers Other scholars believe that information can also affect the futures market price. In fact, macro variable information helps currency and commodity futures investors optimize the global minimum investment portfolio risk[8]. Information is divided into public information and private information. Since the acquisition cost of public information can be considered zero, its impact on the price is very short-lived, and all public information can jointly affects the futures price at a certain moment. Private information, in addition to this, provides investors with adjustments to their investment strategies and

portfolios when prices change. For example, if I know in advance that a certain country has discovered a huge oil field, I may increase my investment in the OIL industry and its related field, and purchase futures that bet on rising fuel prices to better hedge against fuel price risks and reduce operation cost. The way of obtaining information has a significant impact on the cost of information, so the cost of information itself can be large or small. Back to the futures price itself, the price can also be regarded as a medium for information transmission. In the paper, the researchers used the Bayesian learning model to explain the process of private information entering the agricultural futures price, and then analyzed the Chinese futures market, whose market participants are divided into informed traders and uninformed traders. Informed traders trade based on the private information they possess, while uninformed traders observe the order flow and price changes, and continuously renew their expectations of the price using the Bayesian rule, gradually incorporating private information into the price. For example, when an uninformed trader sees an informed trader buying a large amount of a certain agricultural futures contract, they may infer that there is favorable private information and follow suit by buying, pushing the price up.

3 Case analysis: Brent crude oil price fluctuation

Academic consensus know that politics and finance are highly correlated. Including the futures market, it is increasingly affected by geopolitics. In this section, different researchers will illustrate the relationship between the two further with examples[9]. The Middle East region has huge oil reserves and production, and its geopolitical and military conflicts are frequent, which has a significant impact on the crude oil futures market.

3.1 The attack on the Saudi oil field and its consequence

In September 2019, Saudi Arabia's Aramco oil facilities were attacked by drones, a sudden incident that resulted in a sharp reduction in Saudi crude oil production of about 5.7 million barrels per day, about 50% of Saudi crude oil daily production and 5% of global crude oil daily supply. About 54 USD/barrel to 75 USD/barrel. In early 2020, Saudi Arabia and Russia failed to reach an agreement on oil production cuts. Subsequently, Saudi Arabia significantly increased its crude oil output and lowered export prices, triggering a price war. At the same time, the COVID-19 pandemic spread rapidly worldwide, causing a sharp decline in crude oil demand. The combination of a series of geopolitical and public health events dealt a heavy blow to the crude oil futures market.

3.2 Case implications

During that period, the price of Brent crude oil futures dropped sharply within a short period of time (figure 1), the January contract enhanced to \$71.8 per barrel due to the geopolitical conflict, for instance, the standoff between the US and Iran on January 6th. By the April contract Under the impact of the pandemic, it dropped to \$15.98 per barrel on April 21st. It rebounded to \$35 per barrel in May due to the OPEC+ agreement to cut production by 9.7 million barrels per day.

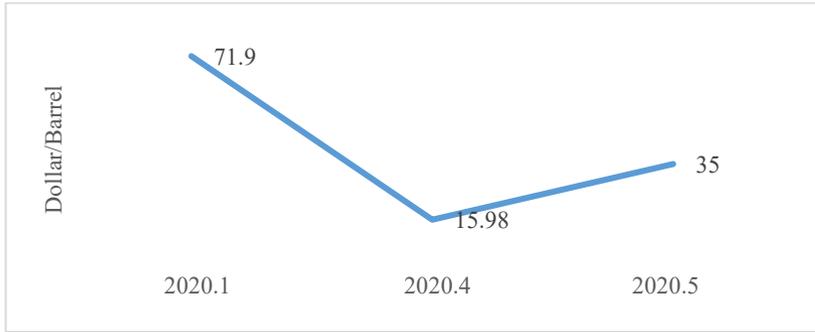


Fig.1 Brent oil futures price 2020.1-2020.5

It should be noted that different geopolitical conflicts have different impacts on the futures market[10]. One of the most prominent is war and terrorism. Conventional wisdom holds that the risk of geopolitical conflict is a significant driver of oil prices, but new research suggests otherwise. The researchers adopted the classified geopolitical risk (GPR) index constructed by Caldara and Iacoviello, A geopolitical risk index based on news. including eight categories such as military buildup and nuclear threat. The spot price of West Texas Intermediate crude oil (WTI) is selected to measure the oil price, and the actual price is obtained by deflating the U.S. Consumer Price index (CPI). Using global crude oil production and real economic activity indices to measure oil supply and aggregate demand respectively, most geopolitical conflicts fit the stereotype that they have driven up the price of oil and related derivatives, but there are plenty of counter-examples: the US-China trade war and terrorist events such as the 9/11 attacks, the escalation of ISIS and the Paris attacks have caused oil prices to fall rather than rise.

Therefore, this incident sufficiently demonstrates the combination of geopolitical conflicts and other major events can have a disruptive impact on oil futures prices, through the path changing the supply and demand of the oil market.

4 Conclusion

This study systematically analyzes the macro and micro factors that affect the futures market. At the macro level, the government's monetary policy and fiscal policy have a significant impact on the futures market. For example, the interest rate adjustment in monetary policy will change the leverage ratio of the futures market and investor expectations; Fiscal policy affects the demand of futures market by regulating the income and expenditure of enterprises and individuals. The price fluctuation of the international commodity market is affected by a variety of factors and is closely connected with the futures market. The major futures exchanges in Europe and America play a guiding role in domestic futures prices. Rising commodity prices affect futures markets through cost transmission, and their financialization changes the liquidity and volatility of futures markets. At the micro level, investor psychology has a prominent impact on the futures market, the irrational behavior of noisy traders exacerbates market volatility, and rational money managers help to stabilize the market. In terms of information, public information has a short impact on futures prices, while the gradual impact of private information gradually shows up in prices through investors' trading behaviors.

Due to the limited research conditions of the researchers themselves, they lack the quantitative construction of some factors such as macroeconomic factors related indicators, and their applicability and limitations in different economic environments have not been comprehensively analyzed such as the Oi-Hartman-Abel effect. But undoubtedly, This paper helps individual investors and enterprises enrich their financial knowledge and related

principles, help them make more scientific futures investment strategies, and provide theoretical support for relevant decisions. In the future, researchers should pay attention to the magnitude and direction of different models and dogmas in different environments. When studying macro factors, it is necessary to extend the scope of research and strengthen the research on the evolution of trading rules in international commodity market and the adjustment of strategies of market participants (such as large multinational enterprises and financial institutions). At the micro level, increasing the depth of research, which is necessary to investigate the speed and quality of information transmission, and improve the model of the impact of information on futures prices.

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