Research on the Impact of Oil Price Fluctuations on Financial Markets

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Abstract: In the context of petroleum financialization, oil price fluctuations significantly impact financial markets. Exploring their impact mechanism is crucial for mitigating adverse effects. By analysing influencing factors, this paper focuses on direct and indirect impact mechanisms. Research shows that rising oil prices increase money supply in importing countries, leading to inflation and decreased purchasing power. Short-term impacts include rising supply enterprise stock prices and falling demand enterprise prices, with importing country exchange rates decreasing. Long-term impacts include currency depreciation and overall stock price decline. Declining oil prices, combined with global economic downturns and shrinking consumer markets, affect currency, stock, and foreign exchange markets. The indirect impact mechanism highlights interactions between sub-markets. To prevent adverse effects on China's financial market, this paper proposes optimizing energy consumption, stabilizing oil prices, and formulating effective financial policies.

1. Introduction

Petroleum, a vital non-renewable resource, plays a crucial role in industrial development, national defence, and living standards. Enhanced financial attributes link oil closely with finance and economy, impacting a country's financial growth. During the economic downturn pandemic, oil consumption declined, causing sharp fluctuations in international crude oil prices, which triggered global financial market shocks and may lead to economic recession. China's oil imports have risen, with external dependence increasing from 53.7% in 2010 to 72.9% in 2023. This high dependence means international oil price fluctuations significantly impact China's development. This paper analyses oil price fluctuation factors in the context of petroleum financialization and explores their impact on financial markets, offering insights for mitigating adverse effects on China's financial market.

2. Analysis of Factors Influencing Oil Price Fluctuations

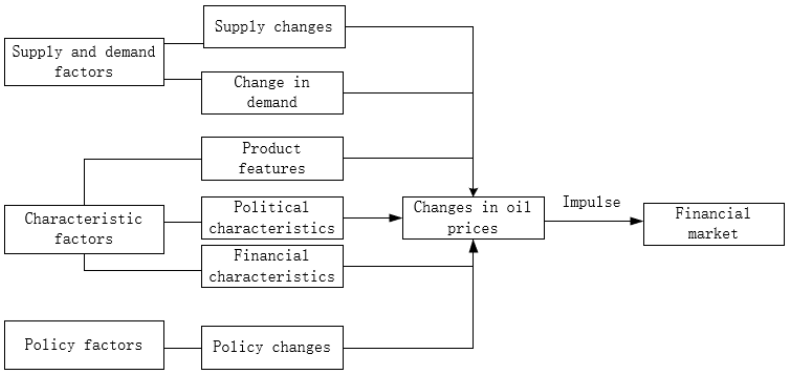

Figure 1 Factors influencing oil price fluctuations.

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The fluctuation of oil prices is influenced by a multitude of factors. Analysing the influencing factors of oil price fluctuations is beneficial for mitigating and averting the impact of such fluctuations on financial markets at their source, thereby maintaining the stability of the financial markets. In Figure 1, supply and demand dynamics, oil characteristics, governmental policies, and other pertinent factors collectively constitute the influencing factors of oil price fluctuations[1-2].

2.1. Supply and Demand Factors

The theory of supply and demand is crucial for determining commodity prices. At different times, the intersection of long- and short-term supply and demand curves establishes long- and short- term market equilibria, yielding respective equilibrium prices. Shifts in supply and demand influence these curves, leading to price fluctuations. Oil, a vital resource, follows normal market trading rules. An increase in supply or decrease in demand lowers oil prices, while the reverse raises them. Concurrent changes in supply and demand determine price movements based on their relative magnitudes. Greater and more frequent shifts in the oil supply and demand curve exacerbate price volatility. For instance, Saudi Arabia's March 2020 announcement of increased production and price cuts, following OPEC+ production reduction negotiation failures, caused international oil prices to plummet to $30 per barrel on March 9th, resulting in a 30% drop in global crude oil futures prices and global capital market disruptions.

2.2. Petroleum Characteristic Factors

Oil, a significant energy commodity, possesses both commodity and political characteristics. Its price is determined by value and influenced by supply and demand. Political factors, such as geopolitics and local conflicts, often significantly impact oil price fluctuations. For example, the impending US-Iran war in early 2003 led to a 15% increase in Brent crude oil spot prices from 30 to nearly 35 per barrel. In today's economically integrated and financially globalized world, the financial attributes of oil also influence price volatility. Narrowly, oil's financial attribute refers to its use in financial derivatives as a fundamental trading variable. Broadly, it encompasses the interaction between the financial derivatives and spot oil markets. This manifests in capital flows within petroleum and its derivatives. Large capital influxes or outflows in the oil futures market, for instance, push prices up or down, affecting spot market volatility[3]. For example, in September 2008, the bankruptcy of Lehman Brothers and Merrill Lynch's acquisition by Bank of America eroded investor confidence, causing significant fund withdrawals from the oil futures market and a steep price drop.

2.3. Policy Factors

Policy factors also influence oil price fluctuations. Policies encouraging oil production may lead to price decreases, while those promoting consumption may increase prices. When prices are too high, government intervention to curb increases can slow or reverse the upward trend. Conversely, when prices are too low, policies to prevent excessive declines can stabilize or raise them. For instance, on November 30, 2016, OPEC agreed to cut daily production by 1.2 million barrels from 2017, capping total output at 32.5 million barrels per day. This, the first OPEC production cap in 8 years, immediately elevated Brent crude oil prices to over $50.

3. Analysis of Oil Price Fluctuation's Impact on Financial Markets

Currently, oil prices are fluctuating downward after a rise, influenced by various factors. China's high dependence on oil imports means that price hikes significantly impact its finance and economy. Decreases in oil prices affect financial markets oppositely to increases. Given space constraints, this paper focuses on exploring the direct and indirect impacts of oil price rises on currency, stock, and foreign exchange markets, comprehensively examining their influence on financial markets[4].

Moreover, amidst the global economic downturn, overall growth is weak, reducing oil demand and causing overcapacity in the energy sector. Practical conditions limit oil price increases. Notably, the collapse of OPEC+ production reduction negotiations sparked a price war between Saudi Arabia

and Russia. In early March 2020, Saudi Arabia announced increased production and price cuts, leading to a surge in supply. Consequently, on March 9, 2020, international oil prices dropped to $30 per barrel, with crude oil futures falling 30%. Additionally, concerns about US economic recession, increased oil exports from Saudi Arabia and Libya, and potential US-Iran negotiations further pressured international crude oil prices. Thus, analysing the impact of falling oil prices on financial markets, based on the rising price impact, aids in comprehensively understanding oil price fluctuation mechanisms and provides valuable insights for addressing external emergencies affecting oil prices today.

3.1. The Direct Impact Mechanism of Rising Oil Prices on Financial Markets

3.1.1. Direct Impact of Rising Oil Prices on the Money Market

The money market, crucial for short-term capital circulation, is affected by oil price hikes. As shown in Figure 2. As oil-demanding countries expand their economies, oil imports rise. Increased oil prices elevate currency demand, prompting oil-importing firms to seek bank financing due to funding shortages. This boosts market interest rates due to heightened corporate funding needs and expands the money supply through increased bank lending. When monetary interest rates deviate, the central bank injects liquidity by purchasing securities, lowering rediscount rates, etc. Excessive money supply leads to inflation and reduced purchasing power. Data suggests a 10% rise in Brent oil prices increases China's PPI by 0.5% and CPI by 0.26%.

From 2010 to 2022, WTI crude oil spot prices fell from nearly 100to50 per barrel, with China's inflation rate declining from 4%-5% in 2011 to around 2%. Although inflation lags behind oil price changes, as a major oil importer, China's inflation rate positively correlates with oil prices. Higher oil prices elevate inflation rates. As China transitions to medium-to-low growth, its capacity to handle cost increases, scale effect reductions, and substitution effect weakening due to oil price fluctuations is less efficient than during rapid economic development. Thus, China must be vigilant about future international oil price changes impacting inflation and economic development, taking effective measures to respond[5].

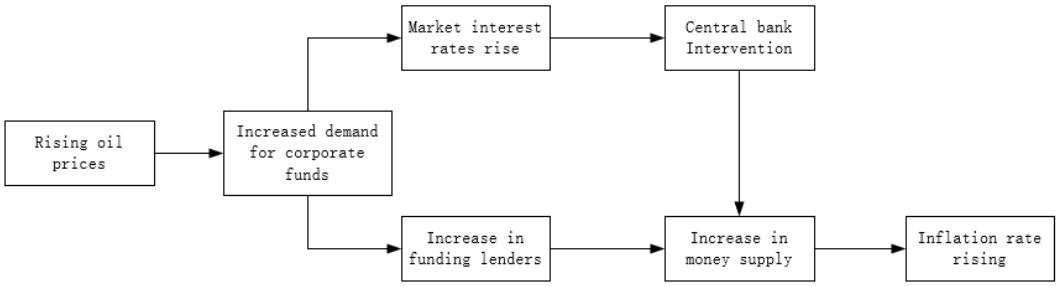

Figure 2 The direct impact mechanism of rising oil prices on the money market.

3.1.2. Direct Impact Mechanism of Rising Oil Prices on the Stock Market

The direct impact of rising oil prices on the stock market can be analyzed at both micro and macro levels. At the micro level, shifts in oil prices influence corporate production costs, subsequently affecting profitability. These changes in profitability alter investors' expectations of future cash flows, impacting stock prices. As Figure 3 illustrates, an increase in oil prices elevates the sales prices of oil and related products, boosting corporate profits and stock demand, thus elevating stock prices. Conversely, oil-dependent enterprises may face decreased operating income due to higher costs, prompting investors to reduce their demand for these stocks, potentially causing prices to decline. Notably, industries such as aviation, shipping, and road transportation face significant pressure from high oil prices, with aviation being particularly susceptible to fuel costs. Consequently, the transportation sector incurs increased costs, placing related stocks under negative pressure[6].

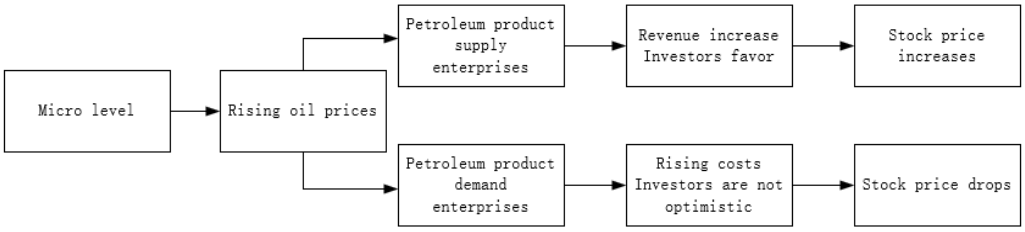

Figure 3 The direct impact mechanism of rising oil prices on the stock market (micro level).

In Figure 4, Sinopec's stock closing price serves as an illustrative example. As China's largest oil supplier, Sinopec's stock price is significantly influenced by fluctuations in international oil prices. The figure reveals a notable positive correlation between WTI crude oil spot price fluctuations and Sinopec's stock closing price during the periods of 2000-2010 and 2015-2022. Furthermore, oil price fluctuations exert an asymmetric impact on Sinopec's stock price, with rising oil prices having a more pronounced effect than falling prices. Specifically, increases in WTI crude oil spot prices tend to elevate Sinopec's stock price, indicating a direct influence of rising oil prices on the stock prices of petroleum product supply enterprises.

Figure 4 The relationship between WTI crude oil spot prices and the closing price of Sinopec.

Figure 5 Relationship between WTI crude oil spot price and airport shipping index.

Figure 5 depicts the evolution of the airport shipping index from 2010 to 2022, mirroring the overall stock price trends within the Chinese aviation industry. Oil prices, as a crucial raw material for the aviation sector, influence airline stock prices and consequently the airport shipping index.

By examining Figure 5 alongside the fluctuations in WTI crude oil prices discussed previously, it becomes evident that oil price hikes elevate airline raw material costs, reduce profits, and depress stock prices, ultimately causing a decline in the airport shipping index. Conversely, oil price decreases lower raw material costs, enhance profits, and elevate stock prices, leading to an increase in the airport shipping index. This underscores the direct negative impact of rising oil prices on the stock prices of oil-dependent companies.

At the macro level, as analysed in the prior section on oil price impacts on the money market, rising oil prices—a necessary production factor—increase production costs in oil-importing countries, triggering cost-push inflation. Typically, inflation escalates with oil price hikes, and prolonged inflation can adversely affect the economy, potentially causing overheating or crises, which in turn impacts domestic or global financial markets, resulting in an overall downward trend in stock prices. The second Middle East oil crisis led to cost-push inflation in the United States from November 1978 to April 1980, with the CPI surging from 3% in the early 1970s to 15% in the late 1970s. To quell high inflation, the Federal Reserve implemented a tight monetary policy, causing the GDP growth rate to plummet from 5.6% in 1978 to -0.2% in 1980. This period marked a classic stagflation era in U.S. history, where economic stagnation and inflation coexisted, producing dual negative effects: a declining stock market and rising bond yields[7-8].

3.1.3. Direct Impact Mechanism of Rising Oil Prices on the Foreign Exchange Market

The foreign exchange market facilitates the trading of foreign currencies and securities like bills. Rising oil prices can alter the balance of international payments, as illustrated in Figure 6. When oil prices increase, oil-importing countries must spend more foreign exchange to procure oil, potentially leading to a balance of payments deficit. This reduces the purchasing power of their currencies and depreciates their exchange rates. A widening deficit may even spark a domestic currency crisis. Although currency depreciation can boost exports to some extent, increased oil demand exacerbates currency depreciation and significantly lowers exchange rates. This undermines foreign exchange market stability and economic development in importing countries, potentially leading to economic recession[9-11].

Figure 6 depicts the correlation between oil prices and exchange rates, using the Chinese yuan as an exemplar. During specific periods, as oil prices rise, the average exchange rate of the US dollar against the Chinese yuan decreases, indicating yuan appreciation and an enhanced purchasing power. This phenomenon contradicts prior theoretical assertions and necessitates consideration of China's contemporary context. Analysis reveals that oil price fluctuations do influence the RMB exchange rate. However, China's rapid development over the past decade has significantly appreciated the RMB, overshadowing the impact of oil price fluctuations. Overall, China's GDP growth, technological advancements, and expanding import-export trade have progressively weakened the influence of oil price fluctuations.

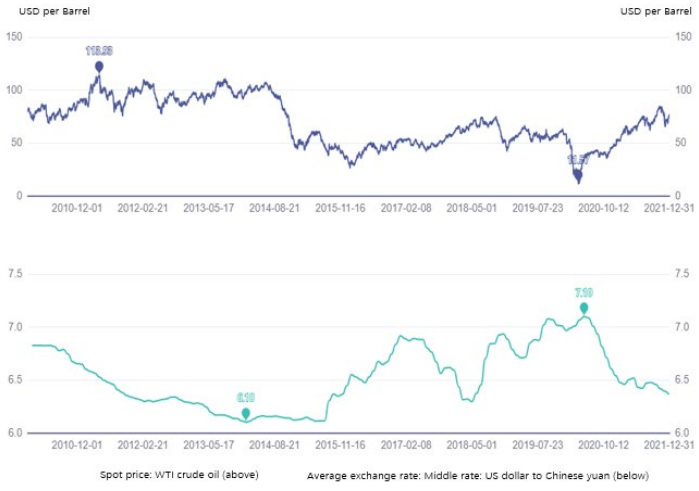

Figure 6 Relationship between WTI crude oil current price and the average exchange rate of USD/RMB.

3.2. The Impact Mechanism of the Current Period's Decline in Oil Prices on Financial Markets

In the money market, when oil prices decline, the financial burden on oil-importing nations and enterprises diminishes, reducing the demand for monetary funds. Consequently, market interest rates fall while maintaining an adequate money supply, leading to low inflation levels. However, vigilance is required regarding potential inflation post-oil price hikes. For instance, during OPEC+ production cuts and the global pandemic, oil prices remained low due to economic downturns. Yet, as the pandemic overs, crude oil price dynamics stabilize, and the global economy recovers, international oil prices may surge, increasing currency market interest rates in importing countries, boosting money supply, elevating inflation rates, and weakening currency purchasing power.

In the stock market, oil, as a strategic commodity with financial attributes, experiences short-term impacts from price declines, notably a market-wide stock price drop. Following OPEC+ production cut negotiations' collapse, international oil prices plummeted to $30 per barrel, shocking global capital markets. China's Shanghai and Shenzhen indices fell sharply by 3.01% and 4.09% respectively on March 8, 2020. Long-term oil price declines exhibit heterogeneous effects: oil-demand companies benefit from cost reductions, profit gains, and stock price hikes, while oil-supply enterprises, without cost adjustments, face compressed margins and stock price declines. Macro-level analysis shows that oil price declines enhance cost efficiency in importing countries, invigorating stock markets. For instance, China's stock prices initially declined due to international oil price falls but maintained an upward trend long-term[12-13].

In the foreign exchange market, lower international oil prices benefit oil-importing countries' balance of payments, stabilizing currency purchasing power but impacting oil-exporting countries. Short-term, oil-exporting nations face balance of payments deficits, currency purchasing power reductions, exchange rate declines, and economic growth disruptions. Post-OPEC+ production cut agreement negotiations' collapse, Russia's foreign exchange market experienced significant short-term shifts. The Chinese yuan appreciated rapidly against the Ruble, stabilizing later but remaining high compared to pre-pandemic oil price periods, evidenced by a closing price of about 11.44 on September 30, 2020.

3.3. The Interactive Indirect Impact Mechanism of Oil Price Fluctuations on Financial Markets

The indirect impact mechanism pertains to the influence of A on C via its effect on B, thereby indirectly impacting C. In this context, the mechanism focuses on how fluctuations in oil prices (A) indirectly affect currency, foreign exchange, or stock markets (B, C, D), which subsequently impact other financial sub-markets, potentially leading to increased oil prices. These indirect shocks exhibit interactive effects, where oil price hikes (A) directly impact the money market (B), stock market (C), and foreign exchange market (D), while also indirectly influencing them through interconnected pathways. This interactive, indirect impact of oil price fluctuations on financial markets is illustrated in Figure 7, with solid lines denoting direct impacts and dashed lines indicating indirect ones.

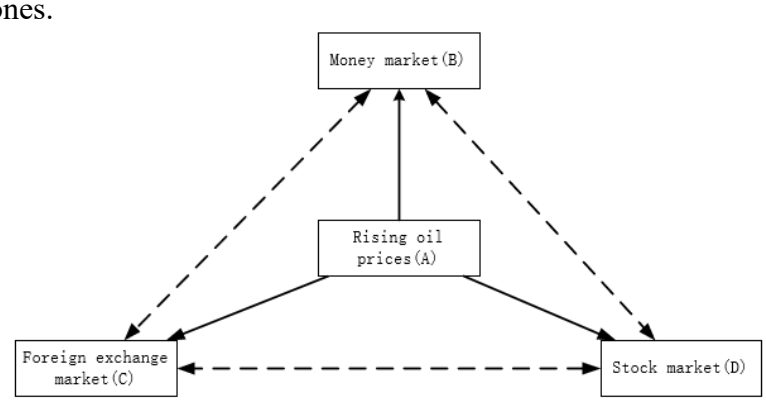

Figure 7 The interactive indirect impact mechanism of oil price fluctuations on financial markets.

3.3.1. The Indirect Impact Mechanism of Oil Price Fluctuations on the Interaction Between Currency and Stock Markets

When oil prices rise, they directly affect the money market, causing short-term interest rate hikes and funds influx, which subsequently dampens the stock market. In the long run, heightened inflation due to oil prices reduces currency purchasing power, prompting investors to shift funds into stocks for preservation, thereby pushing stock prices upward. Micro-level effects include increased enterprise book profits due to inflation, which, absent severe inflation and low investor expectations, boosts investment willingness and stock demand, elevating stock prices. Macroeconomically, persistent inflation due to oil prices leads to overheating, prompting governments to adopt contractionary fiscal and monetary policies, thereby reducing inflation and increasing interest rates. Hence, oil price fluctuations exert an interactive indirect influence on currency and stock markets.

3.3.2. The Indirect Impact Mechanism of Oil Price Fluctuations on the Interaction Between the Stock and Foreign Exchange Markets

The indirect impact mechanism of oil price fluctuations on the interplay between stock and foreign exchange markets involves complex interactions. In oil-importing countries experiencing rising oil prices, these fluctuations indirectly affect both markets. At the macro level, escalating oil prices may lead to persistent inflation, long-term economic overheating, and subsequent currency depreciation. This depreciation, driven by the foreign exchange market impact, exacerbates the balance of payments deficit in oil-importing nations.

From the stock market perspective, two contrasting effects emerge: first, export-oriented firms not using oil as a raw material experience profit gains and brighter prospects, boosting their stock prices. Conversely, firms using oil as a raw material suffer profit declines, pushing down their stock prices. Over time, the adverse foreign exchange market effects stemming from higher oil prices hinder economic growth in oil-importing countries, ultimately causing an overall decline in stock prices. Thus, oil price increases exert an interactive and indirect influence on both the stock and foreign exchange markets.

3.3.3. The Indirect Impact Mechanism of Oil Price Fluctuations on Foreign Exchange and Currency Markets

The indirect impact of oil prices on the foreign exchange and money markets is multifaceted. An increase in oil prices, for instance, affects the foreign exchange market by causing a balance of payments deficit in oil-importing countries, leading to currency depreciation. This, in turn, fuels inflation and prompts central banks to adopt contractionary monetary policies, reducing money supply and elevating money market interest rates.

Simultaneously, the immediate effect on the money market due to higher oil prices involves increased spending on oil, disrupting money supply and demand balance. In the long run, oil price-induced currency depreciation in importing countries reduces their currency's purchasing power, while the exporting countries' currency appreciates, causing a decline in the importing country's exchange rate. Thus, oil prices exert an intricate and indirect influence on both the foreign exchange and money markets.

4. Policy Suggestions for Promoting the Stable Development of China's Financial Market

Upon analysing the factors influencing oil price fluctuations, this paper delves into the direct and indirect mechanisms through which oil prices impact financial markets. Research reveals that oil price volatility affects financial markets as follows: (1) An increase in oil prices elevates the money supply of oil-importing countries, driving up inflation rates and reducing currency purchasing power. In the short term, stock prices of oil suppliers rise while those of demand-side companies fall; however, in the long term, global stock prices decline overall. Moreover, the currency exchange rate of oil-importing countries decreases, potentially leading to long-term currency

depreciation and hindering economic growth. (2) Conversely, a decline in oil prices results in lower market interest rates in oil-importing countries, maintaining low inflation levels, albeit with future inflation risks to consider. Notably, stock price fluctuations vary across markets and enterprises, particularly among those using oil as raw materials or intermediate products. (3) Sensitivity to oil price fluctuations differs among countries at various stages of development, particularly in foreign exchange rate movements. Theoretically, oil price hikes should depreciate oil-importing currencies; however, China's rapid economic growth over the past decade has overridden this effect, sustaining RMB appreciation despite oil price changes. (4) Oil prices indirectly influence the interplay among financial market sub-markets as a cohesive system.

To ensure China's financial market stability, this paper proposes policy recommendations based on current research and national conditions, focusing on improving oil supply-demand mechanisms, rationalizing oil use, and formulating effective financial market policies.

4.1. Optimizing China's Energy Consumption Structure

Reducing China's reliance on international oil can mitigate the impact of oil price fluctuations on money supply, inflation, and currency purchasing power. Given China's high dependence on foreign oil, which significantly influences the financial market, the following recommendations are proposed:(1) Efficient Utilization of Oil Resources: Strengthen innovation, research, and application of petroleum technology and equipment to ensure reasonable and efficient use of oil resources. Additionally, increase research into alternative energy sources such as coal-to-oil, power grids, wind energy, and hydrogen energy. (2)Promotion of Low-Carbon New Energy: Utilize low-carbon new energy to replace oil resources, thereby reducing oil demand and minimizing the adverse effects of oil price fluctuations on financial markets. The government should provide policy support, establish effective supervision and incentive mechanisms, and encourage the development and use of solar, wind, nuclear, geothermal, and biomass energy.

4.2. Policy Support for Petroleum-Related Enterprises

China's industry is highly dependent on international oil, and volatile oil prices affect the stability of stock prices and exchange rates, ultimately impacting enterprise and national production. Many Chinese enterprises, including freight, passenger transportation, aerospace, industry, and manufacturing, are related to oil supply and demand. Oil price changes influence these enterprises' profits and development. Therefore, specific policies should be implemented:(1) Subsidies for Oil Demand Industry during Price Rise: Provide subsidies to the oil demand industry during periods of oil price increases to reduce company costs, stabilize profits, and ensure stable enterprise development. (2) Subsidies for Oil Supply Industry during Price Decline: Maintain balanced oil supply prices to support balanced regional development and overall economic growth, particularly during periods of oil price decreases.

4.3. Stabilize or Mitigate Oil Price Fluctuations

Oil, influenced by policies, exhibits commodity, financial, and political characteristics. To mitigate adverse impacts of price fluctuations on the financial market, strategies include:(1) Leveraging Supply-Demand Dynamics: Enhance strategic petroleum reserve construction to pre-empt supply shortages and soften price volatility impacts.(2) Regulating the Oil Futures Market: Shanghai Futures Exchange should actively regulate this market to adjust prices and reduce fluctuations.(3) Assessing Political Risks: Use a scientific evaluation system to assess geopolitical impacts on oil expectations, providing risk warnings and preventive measures.(4) Expanding the International Oil Market: Encourage domestic investors and oil companies to venture into foreign markets with policy and financial support, acquiring foreign oil companies to enhance China's pricing initiative.

4.4. Enhance Domestic Oil Exploration, Extraction, and Utilization Efficiency

China's high oil dependency stems partly from developed industries and partly from inefficient domestic oil exploration, extraction, and utilization. Enhancing these efficiencies

benefits:(1)Currency Market Stability: Improved techniques and efficiency augment suppliers' profits and reduce demanders' costs, thereby mitigating inflation driven by oil price changes.(2)Stock Price Growth: A balanced oil supply-demand relationship ensures stable profits and rising stock prices for listed companies, reducing development risks and fostering industry growth.(3)Foreign Exchange Rate Sensitivity: Greater oil production and technology reduce the influence of oil on international exchange rates, fostering a stable international economic environment for China.

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