

Impact of the Fed's Rate Hike Policy on the Prices of Commodities and Real Estate

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Abstract. The United States has experienced a long period of stubborn inflation since 2022, so the Federal Reserve began to raise interest rates in March 2022, which will cause asset price volatility and valuation changes. The purpose of this study is to explore the changes of some commodity and real estate prices under this background, and to put forward reasonable valuation forecast suggestions. This research mainly analyzes the price changes of crude oil, corn, and real estate under the background of the Fed's interest rate hike and analyzes the changes of asset prices by constructing the structure vector autoregressive (SVAR) model and the grid connectivity model. According to the analysis, the results show that the Fed can influence real asset prices through its monetary policy, and other factors inevitably interfere. The empirical data from March 2022 to March 2024 also show that with the Fed's multiple interest rate hikes, asset prices are affected by different degrees of decline.

Keywords: Monetary policy; Federal Reserve; commodity; oil; real estate.

1. Introduction

The United States has experienced a long period of stubborn inflation since 2022, and since then the Federal Reserve has continued to raise interest rates from March 2022, and the lower bound of the federal funds target rate has been gradually raised from zero to 5.25%. The causes of inflation in the United States are complex, one of which is the oil price [1]. Since December 2022, the global benchmark oil price has increased by 23% and recently reached its highest level in 2023. The main reason for the rise in oil prices is the change in the supply and demand relationship, on the one hand, the geopolitical conflict triggered the market's crude oil supply concerns, on the other hand, the optimistic expectation of the global economy to rise in demand [2]. Agricultural and real estate prices are also contributing to U.S. inflation. As an important index of CPI, the price of agricultural products will directly cause the change of CPI. Moreover, housing prices have always played a significant role in US inflation and remain a major obstacle to dealing with inflation. The unconventional monetary policy of the Federal Reserve has attracted wide attention around the world. Not only did it affect financial markets in the United States, but it also had a profound impact on the prices of physical assets (agricultural products and real estate) around the world.

In this context, the price volatility and valuation methods of real assets have also changed. First, the impact of Fed rate hikes on some commodity markets cannot be ignored. Higher interest rates could lead to a rise in the value of the dollar, which in turn affects the price of commodity exports denominated in dollars [3]. Secondly, as with oil, agricultural supply and demand are affected by the Fed's monetary policy, which affects agricultural prices. Real estate, as another major real asset, also faces new valuation problems in this context. Higher interest rates mean that residents and businesses bear higher borrowing costs, which affects property prices. In addition, when real estate is considered as a capital good, the interest rate hike policy may also affect the return on real estate investment, causing speculators to adjust their thinking and methods of real estate valuation [4]. Real estate investors need to be more cautious in assessing the risks and returns of real estate investment, and comprehensively analyze market supply and demand conditions and related policy impacts. The

purpose of this paper is to explore the changes of some commodity and real estate prices in this context, and to put forward reasonable valuation suggestions.

2. Oil Price

Kilian and Murphy's seminal study offers a comprehensive model that elucidates the specific information of the global oil market of crude [5], incorporating 1-year ex-ante real oil prices and 1-year ex-post real oil prices as illustrated in Fig. 1 of their research. Utilizing oil inventory data, they isolate the speculative component of real oil prices, providing insights into the drivers of price fluctuations that extend beyond mere supply and demand fundamentals. Their analysis challenges the prevailing explanations for the 2003-2008 oil price surge, often citing unexpected supply reductions or speculative trading as the primary causes. Instead, they attribute this surge to an unforeseen increase in global oil consumption, propelled by the global business cycle. Moreover, according to Kilian and Zhou [6], the methodological approach employed in their study is a dynamic simultaneous equation model structured as a structural vector autoregression (VAR), including endogenous variables such as changes in global crude oil stockpiles, the real price of crude oil, global economic activity indices, and the percentage change in world crude oil production. Monthly data covering the months of February 1973 to August 2009 are used. Seasonal influences are taken into consideration by adding seasonal dummy variables to the model.

Based on Fig. 2, Kilian's principal conclusion is that the escalation of real oil prices from 2003 to mid-2008 was predominantly influenced by demand-side shifts connected with the global business cycle. Notably, this finding is not merely an artefact of the model's design; the model's identification strategy differs significantly from previous research, potentially yielding empirical outcomes that are substantially distinct. The model demonstrates that the increase in real oil prices was the accumulated effect of several positive demand shocks over several years. While it may seem counterintuitive ex-ante that the model would predict less negative than positive demand shocks from 2003 to mid-2008, Kilian provides evidence that aligns with the underestimation of real GDP growth by professional forecasters during that period, particularly in emerging Asia. According to Arora and Tanner [7], academic research has focused on the US dollar's value and interest rates since the 1980s. The persistent increase in oil prices during the 2000s has been frequently attributed to the depreciation of the value of the U.S. dollar, the reduction in U.S. interest rates, and the surge in real global economic activity. Assessing the individual effects of these factors is challenging because of the intricate connection between interest rates and exchange rates, and the potential for supply and demand shocks in the oil market to influence the intrinsic value of the dollar and real interest rates. A novel identification technique is put forth by Kilian and Zhou to distinguish between the effects of exogenous changes in the real interest rate and value of the dollar in the United States and the usual causal effects of shocks to the supply and demand in oil market. This method combines narrative constraints drawn from exogenous facts and economic theory with signs and zero limitations.

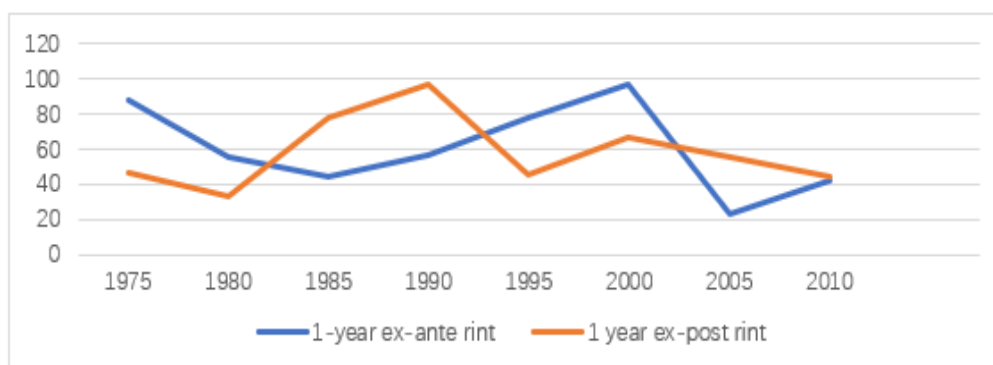


Fig. 1 The trend of international oil prices.

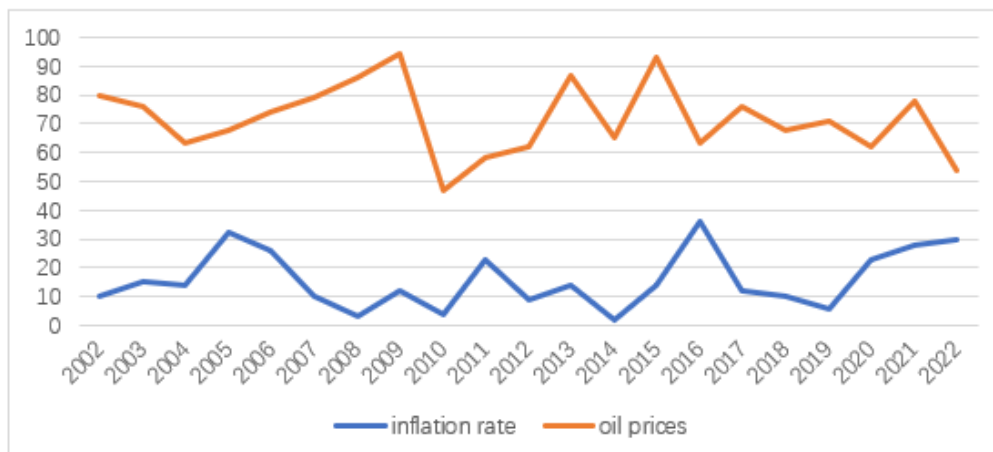


Fig. 2 Oil prices and US inflation rate.

3. Agricultural Products

Agricultural products occupy an important position in the global economy, especially in developing countries, and their price changes are important factors affecting the development and stability of many countries [8]. In addition, agricultural products provide raw materials for the production of many other products, and price fluctuations of agricultural products upstream in the product chain can spontaneously affect the prices of other products downstream through the law of cost-plus. Therefore, stable agricultural prices help ensure that other producers can set reasonable prices for other products based on this price, ensure the stable operation of the economy and reduce menu costs. The reasons for the Fed's inflation are complex. On the one hand, some internal factors such as labor shortages and the results of earlier quantitative easing policies contributed to the increase in the rate of inflation. Besides, exogenous factors such as the rise in international oil prices have themselves raised the inflation rate. At the same time, oil, as an important intermediate input for other goods and services, also affects the price of other goods. A statistical analysis by Carlotta Breman and Servaas storm on whether rising oil prices have an impact on the prices of major food commodities (corn and soybeans) suggests that rising oil prices may lead to higher corn and soybean futures prices. Further Granger causality tests using data from 2004 to 2023 confirmed this result [9].

However, Debhatta found that the rise in the reserve interest rate would lead to a decline in the futures prices of corn, sorghum, and cotton [10]. This may be because the rise in the nominal interest rate reduces the money supply, thereby increasing the real interest rate, which makes the capital goods such as bonds more profitable than agricultural products, thus depressing the prices of agricultural products. But the impact on wheat prices has been relatively muted. Therefore, this paper chooses corn as a representative of the reaction of agricultural prices to the Fed's rate hike. This finding suggests that it is possible for the government to tackle the inflation problem by raising the policy interest rate to restrain the rise in agricultural prices. In addition, Umar et al. studied the network connectivity approach of Diebold and Yilmaz's seminal paper and built on this to explore the links between monetary policy and the prices of several agricultural products [11]. They measure monetary-policy indicators by the shadow short-term interest rate (SSR). The agricultural prices they chose to study included futures contracts for major crops such as wheat, corn, canola and coffee. The results show that the Fed's monetary policy has had an impact on agricultural prices, especially the spillover effects on corn and live cattle. As for the quantitative impact of interest rates on agricultural prices, Florez analyzed the reasons for the significant rise of agricultural prices in the United States from 2008 to 2009, including tax benefits and speculative factors, using the structural vector autoregression (SVAR) model, and further concluded that for every 1% increase in interest rates, the price of agricultural products in the United States increased significantly. Agricultural prices will fall by 2.8% to 5.9% [12]. Fig. 3 shows the change in U.S. corn futures prices from March 2022, when

the Fed first raised rates, to March 2024. Obviously, as the Fed has raised interest rates several times, corn futures prices have shown a downward trend.

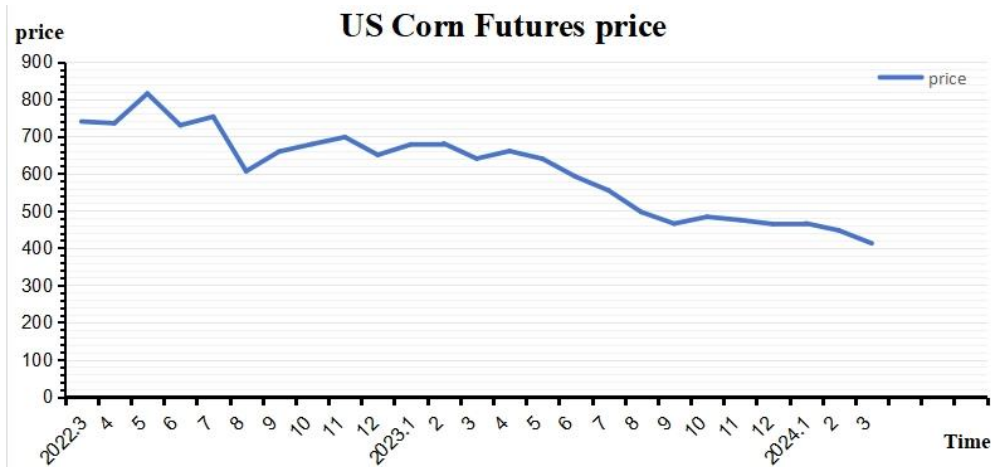


Fig. 3 US Corn Future price.

4. Real Estate

The Johansen cointegration test confirmed the presence of a durable connection between the variables. Two empirical models were employed, one to examine the impact of nominal interest rates on house prices and the other to investigate the influence of real interest rates on house prices. Several econometric approaches were employed, such as the Johansen cointegration test, VECM, Granger causality test, and shock response function. The findings of Johansen's cointegration test demonstrate the presence of a persistent connection between the variables [13]. The results from the VECM analysis indicate that implementing a stringent monetary policy is effective in managing home prices. This is because both nominal and real interest rates have a negative correlation with short-term and long-term house prices. However, there is no significant association observed between the exchange rate, GDP, and house prices. Furthermore, the study included Granger causality tests to examine the interconnections among the variables. The findings indicate a one-way connection between the money supply and both population and housing values. However, there is no correlation observed between real and nominal interest rates. Other authors employed consumer survey data and building permit data to create a housing sentiment index. They used the Wu-Xia shaded interest rate as a substitute for the federal funds rate and followed the methodology suggested by Primiceri as well as a time-varying SVAR model modified by Del Negro and Primiceri [14]. Research has discovered that implementing expansionary monetary policy has a substantial impact on increasing real house prices. Furthermore, it has been determined that monetary policy shocks play a key role in explaining a considerable portion of long-term real estate price undulations. The time factor is the main mechanism to amplify the impact of monetary policy on real estate prices.

Indeed, certain writers have examined the impact of many factors, such as housing supply shocks, demand shock for housing-related services, real estate credit changes and speculative demand changes. The study employs a structural vector autoregression model to examine the correlation between several factors in the housing market, such as housing permit quantity, fluctuation in rental prices, changes in housing prices, 30-year mortgage rates, housing sentiment index, and growth in industrial production. The model includes housing stock change shock, housing service demand change, credit scale change and speculative demand change, and Remainder values [15]. The empirical evidence suggests that loan shocks and real estate supply shocks are the main drivers of long-term variations in house prices (seen from Fig. 4). During the period of economic growth, the factors that have the greatest impact are the availability of credit and the supply of housing. However, the significance of financial conditions and speculative demand increased during the economic upswing, particularly during its later stages. In general, the implementation of stringent monetary

policies has effectively restrained the growth of housing prices, whilst the adoption of expansionary monetary policies has considerably elevated the actual value of houses. There is an inverse relationship between interest rates and both short- and long-term property values. Long-term fluctuations in real estate prices are influenced by various factors, including credit conditions, real estate supply etc.

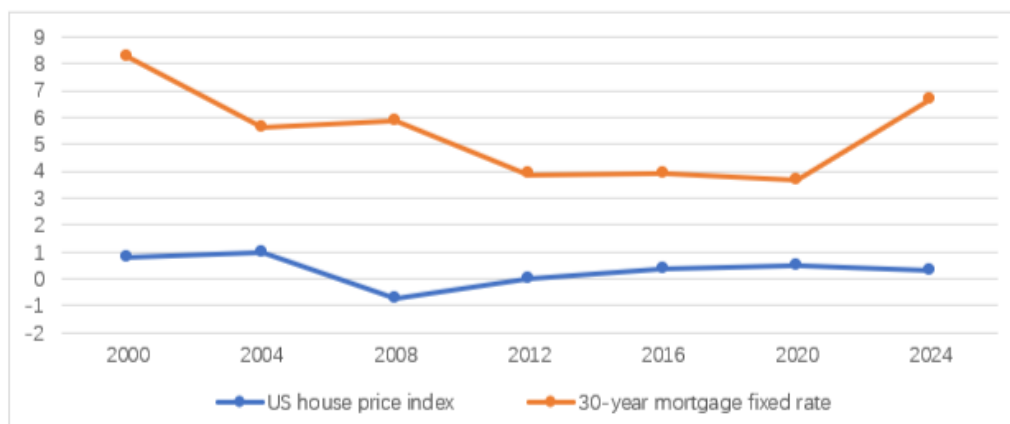


Fig. 4 US house price index and 30-year mortgage fixed rate.

5. Conclusion

According to the analysis, the impact of the Fed's interest rate hike policy on the oil market is a combination of factors involving supply and demand, speculation, and current global economic conditions. The current multiple rate hikes have come at a time when the U.S. economy is overheating and facing rising inflationary pressures after the recovery. Therefore, keeping a close eye on domestic economic data, such as GDP growth rate, employment rate, and CPI, to assess current economic conditions and infer the impact of interest rate hike policies on commodity prices is something that businesses and governments should consider. At the same time, while the policy of raising interest rates can affect international oil prices in many ways, the decisive factor is the fundamental supply and demand in the oil market. In addition, one should also consider oil production, such as the export policy of OPEC countries and geopolitical factors to reasonably estimate crude oil prices. In addition to this, investors should also pay close attention to portfolio exposure during this period, as crude oil prices can be more volatile in a rate hike cycle.

For the agricultural market, the price changes of agricultural products are mainly affected by supply and demand, but also by external factors, such as crude oil prices to drive costs. However, it is undeniable that the Fed can promote the decline of agricultural prices through its monetary policies, such as raising interest rates, so as to curb inflation. In this context, the valuation of agricultural products should pay more attention to the interest rate factor, as this may affect agricultural prices through a variety of mechanisms. For real estate prices, the impact of the Federal Reserve's interest rate hike on US housing prices is also affected by a variety of factors, and it is often necessary to comprehensively consider the short-term fluctuations of housing prices, long-term internal trends, and regional differences to forecast. After the Federal Reserve announces an interest rate increase, the housing market usually sees a short-term increase in prices. That's because as interest rates rise, buyers may rush to buy homes, causing prices to rise in the short term because of rising demand; after a period of market adjustment, house prices will show a downward trend. This is because demand falls as borrowing costs rise. In addition, a similar conclusion can be drawn if real estate is regarded as a capital good, that is, capital outflow from the real estate market will also lead to a decline in house prices. In the long run, the impact of the Fed's rate hike on house prices mainly depends on the state of the domestic economy, rental conditions and the supply and demand of real estate. House prices are likely to continue to rise if economic growth is strong and low unemployment creates high rental demand, meaning interest rate hikes can only have a short-term impact on current property

prices. Besides, housing markets in different regions may respond differently to the Fed's rate hike policy. Property prices in some areas may be more sensitive to interest rate changes, while others are more rigid. Therefore, regional differences should also be taken into account when assessing the trend of house price changes.

Author Contribution

All the authors contributed equally and their names were listed in alphabetical order.

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