Analyzing the Interplay Between China's Stock Market Performance and Gold Valuation Across Macroeconomic Environments in History

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Abstract: The paper aims to examine the relationship between the gold and stock market in China for the recent rate hike. The paper considers the influence of the recent federal rate hike in the performance of two assets, and other economic factors are also considered in the multifactor regression to check the detailed changes and effects from each factor. The performance of two assets is testes under situation of rate hike and cut, the result indicates that gold could not act as well hedge to the Chinese stock market during the rate hike. The gold shows some features of a hedge in rate cut, but this feature is not clear and stable.

Keywords: Gold and Stock Market Relationship; Federal Rate Hike; Hedge

1. Introduction

Gold is a special asset that is frequently deployed in the market, it is generally thought to have the function to hedge various types of risks. One typical case is using gold to hedge the purchasing power risk in the history of many economies. On the market of equity, gold still performs a hedging role. The stock market in China is a stock market that reflects the economic and business activities of this emerging economic power. At the same time, gold also acts as an important asset in China, many relative assets are developed such as futures and equity of gold. As a hedging asset, gold may have a special relationship with the equity market. The general theory suggests that gold could hedge unsystematic risks in the stock market, thus gold is often expected to bring an outstanding performance in a bearish market. However, this feature of gold does not show a stable situation. Sometimes, the performance of both gold and general equity markets in China is consistent, and gold loses the hedging asset feature under this situation. In the recent situation of the Chinese stock market, this situation also occurs, it breaks the previous findings from our research, our previous paper found that gold acts as a hedging tool for the equity in the bear market. (Zhu et al., 2024) However, many studies bring more complex results and the recent performance of both gold and the Chinese stock market is not consistent with the previous study.

2. Literature Review

In my previous research, the results indicated that considering multiple macroeconomic factors and noise traders, gold could act as a hedge in a bear market.[1] Currently, numerous studies have explored the correlation between the gold and equity markets in different regions and time periods. By comparing these two assets, Dr. Yunita found through econometric models that gold sometimes provides a better return, especially in extreme market conditions.[2] Somsuggests that gold can function as a hedging asset during certain periods. This hedging feature becomes more prominent as more assets are introduced into the market and the stock market becomes more efficient.[3]

However, other studies have shown that gold does not exhibit an effective hedging function in some regional stock markets.[4] In the US and UK markets, for example, the hedging function of gold has not been observed. The Chinese market, though, shows a different situation. It was found that the hedging function of gold did not exist in China for a short period, but it reappeared after 2005. These findings are consistent with the results of reference,[1] indicating that the hedging function of gold exists but is not as stable as general financial theory implies. Both studies also suggest that changes in other factors, such as equity market regulations and policies, may

contribute to the instability of gold's hedging function. Similar results were found in Malaysia, where gold can act as a short-term hedge.[5] Research in India reveals a complex relationship between local stocks and gold prices, taking into account macroeconomic factors such as the repo rate, inflation, and exchange rate.[7]

Mohamed El's research[7] tested the impact of adding gold to a portfolio when investing in the Chinese stock market. It proved that gold can hedge some risks and demonstrated its value-preservation function during the financial crisis. Tests in various developing countries also show that gold can mitigate stock risks, and this effect is more significant during a financial crisis.[8] This result is consistent with a study in India, which confirmed a long-term relationship between the Indian stock market and gold.[9] Moreover, research conducted in many Asian countries' markets shows that although gold cannot hedge against currency risks in China, it still has a hedging function in the Chinese stock market.[10] Research on traders' behavior also supports the hedging function of gold against equities.[11]

2.1 Summarize the Gap

Therefore, there is no consensus on whether gold can be used as a hedge for equities. This paper will focus on the Chinese stock market and explore this relationship in different periods. Compared with my previous paper[1], this study will consider more macroeconomic factors to investigate what causes the instability of gold's hedging feature in the Chinese market. In addition, this research will use recent data to reveal the relationship between assets during the recent rate hike.

2.2Empirical Methodology and Data

For this study, data from Yahoo Finance and the Federal Reserve Bank are used as independent and dependent variables. All data are monthly, covering the period from July 2013 to May 2024.

2.3 Data

Unlike the previous paper[1] that directly used the closing price of the "Fullgoal Composite SSE Index ETF" (510210). This exchange-traded fund tracks the performance of the Shanghai Composite Index. Different from the index itself, this fund not only reflects the overall market performance but is also a tradable asset like a stock. Thus, it can better represent the trading situation and is used as the dependent variable. Its trading volume is also selected as an independent variable. Regarding the performance of gold, instead of using the commonly-used commodity price in other research, we choose the closing price of the "Huann Gold ETF" (51880.SS). This gold-exchange-traded fund tracks the Au99.99 contracts traded on the Shanghai Gold Exchange and is also tradable in the stock market. Moreover, it is not included in the SSE index, making it suitable for testing the relationship between the two asset categories. Additionally, the sizes of the gold and equity ETFs are not significantly different. The performance of these two assets is shown in Figure 1.

Figure 1. The Closed Price of both Gold ETF and SSE ETF

Other important factors include the consumer price index (CPI). Some research indicates that the CPI can, to some extent, represent the recovery of China's economy.[12] The CPI of China used in this study is the year-on-year growth rate. The exchange rate between the US dollar and the Chinese Yuan also affects the inflation levels in the two countries.[13] The economic policy uncertainty index, which quantifies the uncertainty of economic policies, is another key independent variable influencing the equity market performance. This index is measured based on data from two major Chinese newspapers, the Guangming Daily and the Renmin Daily.[14] The CPI data is sourced from the OECD.[15] These macroeconomic data are also used in the study of the Indian market [7]. All these data are retrieved from the data sources of the Federal Reserve Bank. The details of the data are shown in Figure 2.

Another independent factor is the 13-week US Treasury bill rate. The general media believes that significant rate hikes can affect the performance of Chinese equities and the

valuation of gold.[18] This factor is different from the local repo rate used in the Indian study.[17] The data on the exchange rate, the 13-week US Treasury bill rate, and the ETFs are obtained from Yahoo Finance.

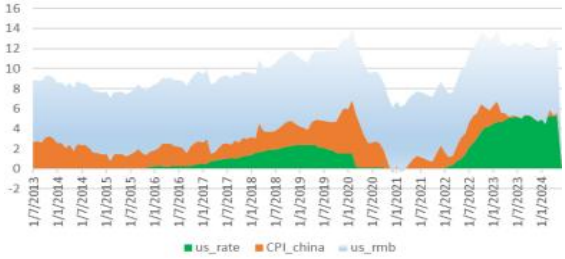

Figure 2. The change of CPI in China and the Exchange Rate between US Dollars and RMB and US Interest Rates.

2.4 Descriptive Statistics

There are 131 sample sizes. As shown in Table 1, almost all factors are similar in scale. All data are from the same time range and have a monthly frequency. Compared with the real SSE index, the SSE ETF is not as large. The uncertainty index is relatively large, but it mainly measures the abstract concept of uncertainty in newspapers. The "period" variable is a binary variable. It is set to 1 when the US interest rate hike starts and 0 when the rate hike stops and a rate cut begins.

Table 1.The detail ofAll Variables

Variable	Observation	Mean	Std. dev.	Min	Max
close_gold	131	3.213976	0.742982	2.230261	5.35905
close_SSE	131	0.5967984	0.1189435	0.3218365	0.9133248
Volume_SSE	131	4.90e+07	1.04e+08	29071.43	6.82e+08
Uncertain_index	132	236.6267	125.1187	58.89924	661.828
US_exchange_rate	131	1.360034	1.723687	0.0067	5.322455
CPI_China	132	1.758333	1.10184	-0.8	5.4
dollar_rmb	131	6.648359	0.3479099	6.0509	7.3071
period	131	0.7709924	0.4218072	0	1

2.5 Empirical Model

A regression model is used to test the influence of different economic and independent variables on the closing price of the SSE ETF. A binary variable is employed in the conditional regression to explore the effects of rate cuts and rate hikes. All economic and financial factors are included in the multifactor regression to analyze the recent relationship between the two assets.

2.6 Results

Firstly, the regression is conducted under the scenario of a rate cut. Initially, considering only the gold and stock market variables, there is a positive relationship. However, this relationship changes when more factors are taken into account. This may imply that the gold ETF has a potential hedging function during a rate cut.

The hedging function of gold is affected by changes in other market factors. As shown in Table 2, variations in the exchange rate between the two countries and the US Federal rate can change the relationship. This might be because when borrowing costs decrease, concerns about value preservation and the demand for gold may increase, making gold more popular. However, this negative relationship is not statistically significant, possibly due to the small sample size during the rate-cut period. Thus, more data and factors over time are needed to support this relationship.

Table 2. The Results of Conditional Regression when Rate Hike Stopped

VARIABLES	(1) close_sse	(2) close_sse	(3) close_sse	(4) close_sse
CPI_china			0.00820	0.0285
			(0.0322)	(0.0380)
us_rmb				0.404
				(0.258)
Close_goldetf	0.143**	0.135**	0.0544	-0.265
	(0.0537)	(0.0637)	(0.0989)	(0.217)
Voume_sse		5.47e-10	3.80e-10	5.61e-10
		(2.02e-09)	(2.05e-09)	(2.03e-09)
Uncertain_index			0.000224	4.23e-05
			(0.000184)	(0.000275)
us_rate				-0.0418
				(0.0595)
Constant	0.0786	0.101	0.256	-1.444
	(0.149)	(0.172)	(0.217)	(1.148)
Observations	30	30	30	30
Adjusted R-squared	0.175	0.146	0.130	0.154

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

This test is not highly reliable or explanatory because the adjusted R-square values are not large enough to prove the relationship changes. For the test during the rate-hike period, the results are more conclusive. Gold loses its hedging function for the equity market, and the results are more significant given the larger sample size during this period. Table 3 shows that a rate hike by the Federal Reserve has a negative impact on the stock market performance. This may indicate that a rate hike makes gold and equity assets exhibit similar characteristics. According to many financial studies, when investors generally seek higher returns, a higher Federal rate attracts most funds. At the same time, some research points out that a higher Federal rate can appreciate the dollar, [17] which further strengthens the negative impact on other assets like gold. [18] When the Federal rate is considered, the adjusted R-square can reach 0.552, making this test during the rate-hike period more reliable and explanatory compared to the rate-cut test.

Table 3. The Results of Conditional Regression when Rate Hike Started

VARIABLES	close_sse	close_sse	close_sse	close_sse
CPI_china	-0.0353***(0.00726)			-0.0256*** (0.00787)
us_rmb				-0.0764**
				(0.0355)
Close_goldetf	0.0802*** (0.00961)	0.0877*** (0.0139)	0.0976***(0.0165) -3.00e-	0.107*** (0.0162)
Voume_sse	-7.02e-11	10***		-9.59e-11
	(9.35e-11)	(1.04e-10)		(1.22e-10)
Uncertain_index	-4.44e-05 (7.64e-05)			-1.05e-05 (7.43e-05)
us_rate				-0.00667
				(0.00636)
Constant	0.365*** (0.0330)	0.344*** (0.0431)	0.391*** (0.0430)	0.844*** (0.218)
Observations	101	101	101	101
Adjusted R-squared	0.407	0.405	0.515	0.552

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

For the result covering the entire dataset and time range, the hedging function of gold against the stock market is still not evident, even in a regression with only the closing price of gold as the independent variable. When more factors are incorporated, the test becomes more interpretable, as presented in Table 4. After considering the federal rate, the adjusted R-squared ultimately reaches 0.517.

Table 4. The Results for All Time Ranges.

VARIABLES	(1) close_sse	(2) close_sse	(3) close_sse	(4) close_sse	(5) close_sse	(6) close_sse
Close_goldetf	0.104***	0.0874***	0.0894***	0.0894***	0.112***	0.105***
	(0.0107)	(0.0109)	(0.0150)	(0.0150)	(0.0163)	(0.0188)
CPI_china		-0.0299***	-0.0295***	-0.0295***	-0.0421***	-0.0429***
		(0.00739)	(0.00767)	(0.00767)	(0.00845)	(0.00841)
us_rmb			-0.00566	-0.00566	0.0176	0.0466
			(0.0298)	(0.0298)	(0.0298) -3.65e-	(0.0359)
Voume_sse					10***	-2.03e-10
					(1.17e-10)	(1.48e-10)
Uncertain_index						4.57e-05(8.08e-05)
us_rate						-0.0152*
						(0.00773)
Constant	0.263***	0.369***	0.399**	0.399**	0.212	0.0433
	(0.0353)	(0.0425)	(0.167)	(0.167)	(0.173)	(0.216)
Observations	131	131	131	131	131	131
Adjusted R-squared	0.418	0.479	0.475	0.475	0.509	0.517

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Combining all these results, gold loses its hedging function in the Chinese stock market, particularly during the rate-hike period. This finding is consistent with the research by Ming and others. One possible reason is that most of the data used in this study are from the period of Federal Reserve interest rate hikes, while less data are from the rate-cut period. As a result, the performance during the rate-cut period may be less reliable. However, it still indicates that gold may act as a hedge during rate cuts, although it is difficult to determine whether this is distorted by other factors.

3. Conclusion

This essay examines the relationship between the performance of gold and the Chinese stock market under the influence of the Federal Reserve's interest rate. By testing the performance of the two assets during rate cuts and rate hikes, it is found that gold cannot effectively hedge against the Chinese stock market, especially during rate hikes. This may be because a rate increase makes gold similar to Chinese stocks, which are less attractive compared to Treasury bills or notes. This is consistent with other studies showing that gold only serves as a short-term hedge in the Chinese stock market. Therefore, when investing in the Chinese stock market under a high Federal interest rate, other assets should be considered as hedging tools. Nevertheless, gold remains a suitable hedging asset for market uncertainties, and its performance during many political conflicts has proven its value (Kayral et al., 2023). Thus, it can still be used as an asset to hedge against risks or exposures arising from political conflicts when combined with assets in the Chinese stock market. Even though gold appears to have a hedging effect when the rate hike stops, more data from the rate-cut period are needed to verify this phenomenon.

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