

Comparison of the Price Determination Mechanisms of Gold and Bitcoin under the Expectation of Interest Rate Cuts: A Theoretical Analysis based on Monetary Attributes and Risk-aversion Demands

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ABSTRACT

Both gold and Bitcoin have received valuation support under the expectation of interest rate cuts, but there are fundamental differences in their price determination mechanisms. Gold relies on the real interest rate and the credit framework of the US dollar, and the interest rate cut conveys its effect by lowering the real interest rate and stimulating the demand for risk aversion. Bitcoin, on the other hand, depends on the liquidity expectations and risk appetite channels, and its price reaction is more nonlinear and self-reinforcing. The two fundamentally differ in their institutional basis of monetary attributes, hedging functions, and expected reaction patterns. Gold is more stable, while Bitcoin is closer to high-beta assets.

Keywords: Interest rate cut expectations; Gold price; Bitcoin price; Monetary attribute; Risk aversion demand; Real interest rate.

1. INTRODUCTION

The price determination mechanism is the core issue of asset pricing theory. For gold, its price determination logic has undergone multiple stages of paradigm evolution, from commodity supply and demand dominance to dollar exchange rate dominance, and then to the dual drive of real interest rates and risk aversion demand. The analytical framework has become relatively mature ^[1]. For Bitcoin, this crypto digital asset that emerged only in the past decade, what forces determine its price and what kind of relationship exists between it and macroeconomic variables, is still a topic of intense debate in the academic and practical circles. When the expectation of interest rate cuts acts as a clear macro shock on both assets, understanding the intrinsic logical differences in the price responses of the two assets not only has theoretical value but also has reference significance for investment practice.

The reason why the expectation of interest rate cuts deserves special attention is that it affects asset prices through multiple channels. The expectation of interest rate cuts means a downward trend in nominal interest rates, which will lower real interest rates when inflation expectations are relatively stable, thereby increasing the theoretical valuation of gold. At the same time, the expectation of interest rate cuts is often accompanied by a loose liquidity environment and an improvement in risk appetite, which supports Bitcoin, an asset that is highly sensitive to liquidity. However, the same macro expectation may have completely different meanings for the two assets. The upward logic of gold is based on thousands of years of monetary credit history and physical scarcity, while the upward logic of Bitcoin is based on the narrative of decentralized belief, absolute scarcity of algorithms, and the reconstruction of the future monetary system ^[2]. The two scarcities, the two credit bases, when facing the same external shock of interest rate cuts, present a complex picture of both similarity and difference in their price determination mechanisms.

This paper attempts to complete the following work at the theoretical level. First, it will review the monetary attribute basis and price determination framework of gold and Bitcoin respectively, then analyze the mechanism and path of the transmission of the expectation of interest rate cuts to the prices of the two assets, on this basis, compare the similarities and differences in the price determination mechanisms of the two assets under the expectation of interest rate cuts, and finally discuss the theoretical and practical implications of this comparison.

2. THE THEORETICAL FOUNDATION OF THE GOLD PRICE DETERMINATION MECHANISM

2.1 The Dual Structure of Gold's Monetary and Commodity Attributes

The gold price determination mechanism is inherently embedded within its dual attribute structure. As a commodity, gold has industrial uses and jewelry consumption demands, which constitute the bottom support for the gold price. However, the forces that truly drive the long-term fluctuations of the gold price come from its monetary attribute. Gold has long played the role of a currency in human economic history, although after the collapse of the Bretton Woods system, gold is no longer the institutional foundation of the international monetary system, its status as a value storage medium and ultimate payment means has never completely disappeared. Central banks of various countries still regard gold as an important component of reserve assets, and this fact itself is a systematic confirmation of the monetary attribute of gold [3]. The monetary attribute of gold makes its price no longer determined by the equilibrium of supply and demand in the commodity market, but more reflects the internal contradictions of the global monetary system. When the fiat currency system faces the risk of credit weakening, the monetary attribute of gold will be reactivated, driving the price upward. This attribute transformation constitutes the most core theoretical logic of the gold price determination mechanism.

2.2 The Dual Pricing Anchor of Real Interest Rate and US Dollar Credit

In the modern financial analysis framework, the most widely accepted pricing anchor for the gold price is the real interest rate [4]. Gold is an interest-free asset, and the opportunity cost of holding gold is determined by the yield of interest-bearing assets. When the real interest rate decreases, the opportunity cost of holding gold decreases, which will motivate investors to increase their holdings of gold and push up the price. More generally, the negative relationship between the gold price and the real interest rate has become an empirical consensus. The yield of the 10-year US inflation-protected Treasury bond is regarded as the core indicator representing the real interest rate, and it has maintained a stable negative correlation with the gold price over the long term. The real interest rate essentially measures the credit status of the US dollar. The composition of the real interest rate includes the nominal interest rate and inflation expectations, but more deeply, the level of the real interest rate reflects the market's judgment on the medium-term growth potential and fiscal sustainability of the US economy. Therefore, the response of the gold price to the real interest rate, from a theoretical perspective, can be understood as a function of market confidence in the US dollar credit system. When the real interest rate drops to extremely low or negative values, the foundation of the US dollar credit is eroded, and the value of gold as a substitute for the US dollar credit becomes prominent.

2.3 The Hedging Function of Gold and Macroeconomic Uncertainty

The hedging demand for gold constitutes the third important dimension of the gold price determination [5]. In extreme scenarios such as geopolitical conflicts, financial crises, and hyperinflation, the gold price often shows upward momentum independent of the real interest rate pricing framework. This does not mean that the real interest rate framework is ineffective, but rather indicates that in certain conditions, the hedging demand can temporarily dominate the direction of price movement. From a theoretical perspective, the hedging function of gold is inherent in its highly inelastic supply. The annual output of gold accounts for only about 1% of the stock, this supply rigidity means that any positive shock in the demand side will be transformed into a significant adjustment in the price. When macroeconomic uncertainty rises, the demand for safe assets by investors increases, and the core characteristic of safe assets is that their real value can be maintained in extreme scenarios. Gold has this trait because it does not rely on any specific government or institution's commitment to repayment, which is the fundamental difference between it and nominal safe assets such as sovereign bonds.

3. THE THEORETICAL FOUNDATION OF BITCOIN'S PRICE DETERMINATION MECHANISM

3.1 The Digital Scarcity and Decentralized Credit Foundation of Bitcoin

The price determination mechanism of Bitcoin must be understood first from its most fundamental supply characteristics. The Bitcoin protocol stipulates a total supply limit of 21 million coins, and the production rate of new coins is controlled by an algorithm-based difficulty adjustment mechanism. No individual or institution can unilaterally change this supply rule [6]. This algorithm-generated absolute scarcity is different from the natural scarcity of gold, which is subject to geological reserves and mining technology. The scarcity of the former is mathematically determined and unchangeable. However, mere scarcity does not confer asset value; scarcity must be based on a certain credit foundation to be transformed into a value storage function. The credit foundation of Bitcoin does not come from any endorsement by a central

government, but from the consensus mechanism in the distributed network, relying on multiple technical architectures such as cryptography, distributed systems, and game theory. The effectiveness of this credit foundation has been preliminarily proven over the course of more than ten years of operation, but its long-term stability remains an open theoretical issue.

3.2 Supply Elasticity and Market Microstructure Characteristics

The supply mechanism of Bitcoin determines that its price has extremely high elasticity to demand. The proportion of new supply in the total circulating supply decreases year by year, and the supply shock is almost zero. Price discovery is driven entirely by the demand side, and any marginal change in the demand side will be amplified into a significant price fluctuation [7]. The microstructure of the Bitcoin market further reinforces this price amplification effect. The market operates 24/7, is highly fragmented globally, lacks a unified market maker and circuit breaker mechanism, and there may be significant differences in prices between different trading platforms. Market depth is relatively insufficient, and large orders have a more obvious impact on prices. More importantly, the Bitcoin market lacks an inherent valuation anchor, neither having a cash flow discount model applicable nor a physical demand bottom support like gold. This lack of a valuation anchor makes the Bitcoin price more dependent on the expectations of market participants for future adoption rates and network effects.

3.3 Risk Preference Channels and Liquidity Transmission

The price movement of Bitcoin exhibits distinct cyclical characteristics. It rises significantly during periods of loose liquidity and falls sharply during periods of tight liquidity. This price behavior indicates that Bitcoin is closer to high-risk, high-beta assets in the current asset classification rather than a safe-haven asset [8]. The correlation between Bitcoin and risk assets such as the S&P 500 index is positive in most periods, and it often declines in tandem with risk assets when economic recession expectations rise, which contrasts sharply with the hedging attribute of gold. From the transmission logic, the impact of interest rate cuts on Bitcoin prices occurs through two channels. The first is the liquidity expectation channel, where the expectation of future financial market liquidity being more abundant means that investors have a more optimistic expectation for asset prices in the future, and this sentiment will be transmitted to the Bitcoin market. The second is the risk preference channel, where a loose monetary environment is usually accompanied by an increase in risk appetite, and investors are more willing to allocate high-volatility and high-flexibility assets in pursuit of excess returns. Bitcoin, as one of the asset categories with the greatest elasticity in recent years, naturally becomes the focus of such funds.

4. THE TRANSMISSION MECHANISM OF INTEREST RATE CUT EXPECTATIONS TO ASSET PRICES

4.1 Formation of Interest Rate Cut Expectations and Cross-period Adjustment of Asset Pricing

Interest rate cut expectations are different from the event itself. Asset prices are forward-looking, and the current price already incorporates the collective expectations of market participants regarding future interest rate paths [9]. Therefore, what truly affects asset prices is the formation process of interest rate cut expectations and its difference from existing market expectations, rather than the timing of the interest rate cut announcement. When economic data indicate a slowdown or policymakers release dovish remarks, the market will quickly adjust its expectations for the future interest rate path. This expectation adjustment will affect the current valuation of all assets through the discount rate channel. For assets with highly uncertain future cash flows, the marginal change in the discount rate has a particularly significant impact on the current valuation. Bitcoin, as an asset that does not generate current income, all of its value comes from future disposal expectations. Therefore, it is highly sensitive to changes in the discount rate. Gold, which does not generate current income either, but has a value consensus formed over thousands of years as the basis for pricing, has relatively mild sensitivity to the discount rate.

4.2 Repricing of the Real Interest Rate Path and Reconstruction of Gold Valuation

The most direct impact channel of interest rate cut expectations on gold prices is the re-pricing of the real interest rate path [10]. Market expectations of the extent of interest rate cut will drive the nominal interest rate curve to shift downward. In the case of sticky inflation expectations or a relatively small downward movement, the real interest rate will subsequently decline. The real interest rate pricing framework for gold implies that during the formation of interest rate cut expectations, the price of gold should receive upward revaluation momentum. It is particularly important to note that the degree and pace of realization of interest rate cut expectations are also significant. If market expectations of a large interest rate cut magnitude are met but the actual interest rate cut is less than expected, the gold price may face reverse correction.

Conversely, if the actual interest rate cut exceeds expectations, the gold price will receive further support. Therefore, the performance of the gold price during the interest rate cut cycle depends on the dynamic game between expectations and reality rather than the directionality of the interest rate cut itself.

4.3 Dollar Liquidity Expectations and Bitcoin Valuation Elasticity

The impact of interest rate cut expectations on Bitcoin prices is more realized through the channels of dollar liquidity and risk appetite^[11]. Interest rate cut expectations are usually accompanied by expectations of a weakening of the dollar index. Since Bitcoin is priced in US dollars, a weakening of the dollar means that the price of Bitcoin priced in US dollars tends to rise under the same conditions. More importantly, interest rate cut expectations will change investors' judgment on the future returns of overall risky assets. Bitcoin, as the asset with the highest elasticity in the risk asset spectrum, will often attract trend-following funds and directional speculative funds under such expectations. The reaction of Bitcoin prices to interest rate cut expectations is also influenced by market narratives. In a loose monetary environment, the narratives of "digital gold" and "hedging against the depreciation of fiat currencies" are more likely to be accepted by the market. Although the establishment of such narratives at the empirical level is still uncertain, the narrative itself will enhance the bullish sentiment of market participants during the formation of interest rate cut expectations, forming a self-reinforcing price increase momentum.

5. COMPARATIVE ANALYSIS OF TWO ASSET PRICE DETERMINATION MECHANISMS UNDER THE EXPECTATION OF INTEREST RATE CUT

5.1 Overlapping and Diversion of Transmission Channels

The transmission of the expectation of interest rate cut to the prices of gold and Bitcoin exists both in common channels and diversion paths^[12]. The common point lies in that both assets do not generate cash flows, rely on capital gains as investment returns, and are highly sensitive to interest rate changes. Therefore, the downward movement of the discount rate brought about by the expectation of interest rate cut is theoretically beneficial to both. In addition, both assets carry the narrative of "alternative currency". Under the expectation of weakened credit of the legal currency, both may receive an increase in allocation demand. However, the diversion path is more fundamental. The transmission of the expectation of interest rate cut to gold mainly occurs through real interest rates and the credit of the US dollar, and the price reaction has a relatively clear theoretical framework for explanation. The transmission of the expectation of interest rate cut to Bitcoin is more through liquidity and risk preference channels. The price reaction reflects changes in market sentiment and capital flow, lacking a stable valuation reference system. This difference determines that the price behaviors of the two assets under the expectation of interest rate cut present different characteristics.

5.2 Asymmetric Responses during the Expectation Correction Process

There are significant differences in the response patterns of gold and Bitcoin to the correction of the expectation of interest rate cut^[13]. The participants in the gold market are mainly institutional investors and central banks, and the price discovery process is relatively rational. The price adjustment triggered by the expectation correction usually completes within a relatively orderly range. Even if the expectation shows a large deviation, the price correction of gold is relatively mild, thanks to the extremely deep liquidity and diversified participant structure of the gold market. The transmission of the expectation of interest rate cut to Bitcoin is more through liquidity and risk preference channels. The price reaction reflects changes in market sentiment and capital flow, lacking a stable valuation reference system. This asymmetry response means that Bitcoin presents high volatility characteristics during the interest rate cut cycle. Its price trend reflects the cyclical swings of market sentiment rather than the trend changes of the fundamentals.

5.3 Institutional Foundation of Monetary Attributes and Its Determining Impact on the Sensitivity to Interest Rate Cut

Although both gold and Bitcoin have been discussed with the attribute of currency, their monetary attributes are based on completely different institutional foundations^[14]. The monetary attribute of gold is rooted in thousands of years of monetary history practice and the institutional arrangement of the international monetary system. The reserve-holding behavior of central banks provides institutional support for gold. This institutional foundation enables the gold price to still receive support from risk aversion demand even in the extreme deterioration of risk preference, showing relatively stable characteristics in the market driven by the expectation of interest rate cut. The monetary attribute of Bitcoin is based on technological belief and community consensus, and has not yet received widespread institutional recognition from sovereign states and international financial institutions. Its functions as a currency are still highly restricted, with slow

expansion of payment scenarios and value storage function constrained by the severe price fluctuations. Under this institutional foundation constraint, Bitcoin is difficult to play the role of a safe asset during systemic risks rising periods. Although the expectation of interest rate cut can promote the price increase of Bitcoin in the stage of improving risk preference, when the expectation turns to the logic of risk aversion, Bitcoin often fails to maintain its so-called safe asset attribute.

6. CONCLUSION

This paper, from the two theoretical dimensions of monetary attributes and hedging demands, conducts a comparative analysis of the price determination mechanisms of gold and Bitcoin under the expectation of interest rate cuts. The core finding of the study is that although the two assets share some superficially similar pricing languages, their internal logical frameworks for price determination are fundamentally different. Gold has a mature pricing framework based on real interest rates and the credit of the US dollar, and the expectation of interest rate cuts drives up the gold price by lowering real interest rates and weakening the credit of the US dollar. At the same time, in the scenario of economic recession, the hedging function of gold will be further activated. Bitcoin lacks similar valuation anchors, and its response to the expectation of interest rate cuts mainly occurs through liquidity expectations and risk preference channels. The price response has nonlinear, high elasticity, and narrative-driven characteristics.

The performance differences of the two assets under the expectation of interest rate cuts stem from the differences in their institutional foundations of monetary attributes. The monetary attribute of gold is supported by thousands of years of monetary history and the institutional arrangements of the contemporary international monetary system, and its hedging function can be fully demonstrated during systemic risk periods. The monetary attribute of Bitcoin is based on technological consensus and future narratives, and has not yet formed a stable institutionalized demand foundation. Its price behavior is closer to high-beta risky assets rather than hedging assets at the current stage. This theoretical judgment is of reference significance for understanding the asset allocation logic in a loose monetary environment. In a macro environment dominated by the expectation of interest rate cuts, gold and Bitcoin may move in the same direction, but their internal logical and risk characteristics are completely different. Investors need to have a clear understanding of this.

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