IRA-International Journal of Management & Social Sciences
ISSN 2455-2267; Vol.21, Issue 01 (Q.1 2025)
Pg. no. 15-45.
IRA Academico Research

The Surge in Gold Price Volatility: Macroeconomic Drivers, Geopolitical Risk, and Market Dynamics

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Type of Work: Peer Reviewed.
DOI: https://dx.doi.org/10.21013/jmss.v21.n1.p2

Review history: Submitted: March 21, 2025; Revised: April 09, 2025; Accepted: April 23, 2025

How to cite this paper:
Sathyanarayana, S., & Mohanasundaram, T. (2025). The Surge in Gold Price Volatility: Macroeconomic Drivers, Geopolitical Risk, and Market Dynamics. *IRA-International Journal of Management & Social Sciences* (ISSN 2455-2267), 21(1), 15-45. DOI: https://dx.doi.org/10.21013/jmss.v21.n1.p2

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ABSTRACT

Gold has for long been considered a store of value, an inflation hedge, and a safe-haven asset during times of financial turmoil. The historical patterns in gold prices, the primary movers of price variability, and the behaviour of gold in relation to the world's financial markets are the topics of this study. The results point out that macroeconomic indicators like inflation, interest rates, and exchange rates strongly impact gold price fluctuations, and geopolitical threats and monetary policy also play an important part. Central bank gold reserve function has transformed with more diversification schemes by economies to avoid currency risks and financial turmoil. Considering the increasing price volatility in gold, this research also investigates policy suggestions to stabilize gold markets through strategic reserve management, regulatory interventions, and financial instrument diversification related to gold. The research also identifies areas of limitation, including the lack of behavioural finance dimensions and the effects of emerging financial technologies. Future research directions include the impact of AI-based price prediction models, blockchain gold trading, and central bank digital currencies (CBDCs) on price stability in gold. Through the integration of financial econometrics, behavioural finance, and technological advancements, this work is part of the pursuit of greater understanding of the changing role of gold in contemporary financial markets.

Keywords: *Volatility, Central Bank, Inflation, Artificial Intelligence, Blockchain, Hedging.*

JEL Classification: *E44, G11, G28, Q02.*

I. Introduction

Gold has long been held in high regard as a very valuable and strategic commodity, which has served several economic roles, such as a store of value, an inflation hedge, and a financial risk hedge (Baur & Lucey, 2010). Its traditional role has fluctuated from serving as the backbone of monetary regimes under the Gold Standard to its current role as a reserve asset by central banks across the globe (Green, 1999). In contrast to other commodities, gold has inherent value and is less prone to industrial demand and supply compared to other metals (Batten et al., 2014). Its scarcity, durability, and worldwide acceptance lead it to be a first choice for investors whenever economic hardship is experienced (World Gold Council, 2022). Additionally, the fame of gold spreads beyond the monetary sphere as it remains rooted in cultural practices, primarily among nations such as India and China, where gold finds a central place in weddings and religious ceremonies (Parimi, S. 2018). Gold price dynamics analysis is a subject of great interest in finance and economics research because of its implications for investment behaviour, monetary policy, and risk management (Capie et al., 2005). The price of gold is governed by a range of macroeconomic factors from inflation, interest rates and exchange rates to geopolitical risk (Baur & McDermott, 2016). Ironically, gold exhibits negative correlation with stock markets, highlighting the role of gold as a safe-haven asset, particularly during financial crises (Dimitriou et al., 2013; Sathyanarayana S, & Gargesha, 2018).

Gold prices have in recent years risen to record highs, well above $3,000 per ounce, as a combination of economic and geopolitical factors (Aashish Vashistha, 2025; Garth Friesen, 2025). Rising tensions geopolitically, including trade war and war, have increased the fear of investors, leading investors to rally into safe-haven assets such as gold. Economic uncertainty fuelled by threats of a global trade war has made gold a wealth preservation option (Grantham-philips, 2025). Also, sustained inflation pressures in most economies and accommodative monetary policies by central banks have increased the spectre of currency devaluation, prompting investors to employ gold as an inflation hedge. Stock market volatility and economic uncertainties fuelling market volatility have only added to the attractiveness of gold, with investors taking refuge in financial uncertainty. A relatively devalued U.S. currency has also assisted in driving the trend by pricing gold more in terms of dollars for those that invest in currencies other than their own and hence more attractive. Overall, geopolitical uncertainty, fear of inflation, market volatility, and currency depreciation have all helped push the price of gold to record levels and make it a good store of value (Sathyanarayana S, & Gargesha, 2018; World Gold Council, 2025).

This research will examine historical trends, causes, and fiscal relationships of gold prices and determine the sustainability of the price rise. The research is informed by the following research questions: (i) What are historical trends in gold prices? (ii) What drives gold price changes? (iii) How does gold respond to world financial markets? (iv) Is the recent price rise going to be permanent in the long run? Answering these questions will shed a comprehensive light on the position of gold as an economic commodity and its sensitivity to macroeconomic and geopolitical events. The goals of this research are multifaceted. First, it will try to study previous movements of the gold price, determining long-term patterns and key turning points induced by financial and economic crises, policy, and international uncertainty. Second, it will seek to analyse central drivers of volatility in gold prices, including inflation, interest rates, monetary policy by central banks, geopolitical uncertainty, and investor sentiment. Third, the study examines the interaction of gold with global financial markets, determining its correlation with other major asset classes such as equities, fixed income, and commodities, and examining its performance as an effective hedge for market volatility. Finally, the study attempts to provide a sense of direction for future prices of gold, analysing whether the current boom is a response to short-run economic conditions or a sign of a long-run change in the structure of the market.

The paper's organization is structured methodically to allow for a logical sequence of analysis. The report starts with an introduction, underlining the importance of gold as a monetary commodity and the reason why its price fluctuations are to be explored. This is followed by a literature review, which overviews current research on gold price determinants, financial market interactions, and its safe-haven characteristics. The methodology section describes the sources of data, techniques of analysis, and econometric models used to evaluate price trends and drivers. The discussion and findings section presents empirical results and

explores the implications of market forces on gold prices. The paper is concluded with key findings, policy implications, and future research directions, presenting an exhaustive comprehension of gold's evolving position in the international economy.

II. Literature Review

Theories on Gold Pricing The gold pricing has been intensely researched using the different theoretical models, each coming with unique rationalizations for price movements in gold. These explanations vary from mainstream monetary theory to contemporary financial markets and investor mentality. One of the core theories of gold pricing is the Quantity Theory of Money (Fisher, 2006), where the price level of goods and services directly varies with the money supply in an economy under constant velocity and output. Since gold has always been a monetary asset, its value is heavily dependent on money supply and inflation pressures (Mishkin, 2007). Empirical evidence supports that episodes of excessive growth in money supply tend to be associated with increasing gold prices, as investors attempt to maintain purchasing power in the face of currency depreciation (Bordo & Redish, 2013). Additionally, Dornbusch, R. (1988), Edwards, S. (2006) note that monetary expansion can give rise to inflationary expectations, which reinforce the role of gold as a hedge. The Quantity Theory of Money (QTM) proposed by Irving Fisher (2006) is equationally expressed by the following:

$$MV = PT$$

Where, M = Supply of money (total quantity of money in existence), V= Money velocity (number of times money is transferred during a period), P = General price level (average price of goods and services), and T = Total transactions (or real output in some versions)

The formula that the amount of money circulating in the economy (M) times how often it is spent (V) equals the sum of value of goods and services being traded in the economy (P×T) (Fisher, 2006). If M grows and V and T stay the same, then P has to grow, causing inflation. In contemporary macroeconomics, the same is applied in the form of GDP rather than transactions:

$$MV = PY$$

where Y is real GDP (rather than total transactions). This equation is the basis for much of the analysis of monetary policy, inflation, and gold prices particularly during times of monetary expansion, when a rise in M gives rise to inflation worries and an increasing demand for gold as a hedge. (Blaug et al., 1995; Hammond, J. D. 1996; Lucas, 1980).

EFFICIENT MARKET HYPOTHESIS (EMH)

Efficient Market Hypothesis (EMH) (Fama, 1970) presents a different perspective, stating that asset prices incorporate all available information fully, and hence it is impossible to earn abnormal returns on a regular basis. According to EMH, gold prices should respond instantly to new information regarding economic conditions, monetary policy, and geopolitical risks

(Jensen, 1978). Nonetheless, research like that of Baur and McDermott (2010) contradicts this argument, proving that gold behaves as both an efficient market asset and a safe haven asset during times of financial stress. Likewise, Batten et al., (2014) contend that even though gold markets are efficient under normal circumstances, extreme economic shocks cause departures from EMH because investor sentiment changes rapidly.

The Efficient Market Hypothesis (EMH) of Fama (1970) is mathematically represented as

$$P_t = E[P_{t+1}|\Omega_t]$$

Where, Pt = Price of asset (gold) at time t. $E[P_{t+1}|\Omega_t]$= Expected price of asset at time *t+1*, based on all information available Ω_t.

This equation means that the price of gold today (P_t) includes all publicly available information (Ω_t) to the extent, such that future price changes are unforeseeable and based on a random walk (Samuelson, 2016). If gold prices in a weak-form efficient market are based on a martingale process, then historical prices are not useful for predicting future prices:

$$P_t = P_{t-1} + \varepsilon_t]$$

Where, ϵ_t is a white noise error term for unforeseen new information (Lo & MacKinlay, 1988). But empirical evidence contradicts the extreme version of EMH in gold markets:

Baur & McDermott (2010) discovered that gold is a safe-haven asset during financial crises, so its price does not necessarily carry new information efficiently. Batten et al., (2014) contend that gold market efficiency is volatile, collapsing in economic shocks owing to changes in investor sentiment.

BEHAVIOURAL FINANCE

From a behavioural finance viewpoint, gold tends to be a haven asset during periods of economic insecurity and geopolitical uncertainty (Baker & Wurgler, 2007). According to behavioural theories, gold prices are explained by investor mood, fear, and herding, as well as drive the movements in prices in excess of fundamental valuations (Tversky & Kahneman, 1990; 1992). Empirical results by Baur and Lucey (2010) and O'Connor et al., (2015) indicate that investors show loss aversion during financial crises and invest in gold, supporting its non-cyclical property. Moreover, psychological tendencies like availability heuristic (where current crises render gold more appealing) and prospect theory (where investors overestimate the losses) support its price volatility (Shiller, 2003). From a behavioural finance point of view, gold price fluctuations can be described using investor sentiment, fear, and herding. A reduced-form equation using prospect theory (Kahneman & Tversky, 1990; 1992) and herd behaviour models (Lux, 1995) is:

$$P_t = P_{t-1} + \alpha S_t + \beta H_t + \gamma \varepsilon_t$$

where: P_t = Gold price at time t, P_{t-1} = Gold price at the previous time step, S_t = Investor sentiment index (measuring fear, uncertainty, and crisis behaviour), H_t = Herding intensity

(extent to which investors follow others in gold investment), ϵ_t = Random noise term (unanticipated shocks), and α, β, γ = Coefficients measuring the responsiveness of gold prices to sentiment, herd behaviour, and external shocks

1. PROSPECT THEORY AND LOSS AVERSION

Prospect theory and loss aversion, which were presented by Tversky and Kahneman (1990, 1992), argue that investors overestimate losses compared to gains, leading investors to be risk-averse in situations of uncertainty. As there is an increase in economic and geopolitical instability, investors shift their portfolios to gold since they aim to limit potential losses, thereby influencing investor sentiment and pushing gold prices up. Moreover, herd behaviour, as outlined by Lux (1995) and extended by Baur and Lucey (2010), is also an important factor in gold price movements. Investors tend to imitate others during panic or optimism, leading to exaggerated price movements. This herding helps create momentum-driven price spikes in gold, especially during financial crises. In addition, Shiller's (2003) availability heuristic captures the way current economic crises consolidate gold's reputation as a safe-haven investment. Investors remember previous declines and automatically resort to gold when confronted with uncertainty, thereby boosting demand for it further. This emotional bias reinforces anxiety-driven buying and cements the position of gold as a financial stability hedge. Prospect theory postulates that investors overestimate losses compared to gains. The decision-making under risk value function is generally represented as:

$$V(x) = \begin{cases} x^{\alpha} & x \geq 0(Gains) \\ -\lambda(-x)^{\beta} & x \leq 0(losses) \end{cases}$$

where: V(x) is the perceived value of an outcome x, $0 < \alpha, \beta \leq 1$ are risk attitudes, and $\lambda > 1$ reflects loss aversion (investors dislike losses more than they like gains).

For gold price movements, investor demand for gold D_t can be driven by perceived potential financial market losses:

$$D_t = \lambda(-x)^{\beta}$$

where x denotes market declines or financial distress.

2. HERD BEHAVIOUR & GOLD INVESTMENT (Lux, 1995; Baur & Lucey, 2010); The herding behaviour can be captured by the model:

$$H_t = \delta P_t + \gamma H_{t-1} + \varepsilon_t$$

where: H is the intensity of herding at time t, P is price of gold at time t, γ captures herding behaviour persistence, δ captures the influence of market mood on herding, ϵ is an error term capturing shocks.

As contagion spreads within financial markets, herding rises, resulting in self-reinforcing demand for gold.

3. AVAILABILITY HEURISTIC (Shiller, 2003)

The availability heuristic implies that recent crises impact investor choices. The influence of previous crises on gold demand can be represented as:

$$D_t = \emptyset C_{t+k} + \eta_t$$

Where, D_t denotes demand for gold, C_{t-k} is the memory effect of earlier crises (k periods ago), ϕ represents the effect of recent crises on gold demand, η_t is an error term.

Final Model for Gold Price Movements

Combining all behavioural factors, gold price movements P_t can be expressed as:

$$P_t = \alpha_1 D_t + \alpha_2 H_t + \alpha_3 C_{t+k} + \varepsilon_t$$

D_t captures prospect theory & loss aversion effects, H_t reflects herd behaviour effects, C_{t-k} incorporates availability heuristic effects.

This formula shows how investor sentiment and psychological biases together influence gold price action, solidifying its position as a safe-haven asset.

Together, these theories account for why gold is still an essential financial asset. While classical economics focuses on its monetary function, contemporary financial theories and behavioural wisdom underscore its new role as a safe-haven asset and a speculative tool in international markets.

HISTORICAL RESEARCH ON GOLD PRICES

Gold has been researched for many years regarding its position in financial markets, especially as a hedge and store of value against economic risks. Various research works have examined its past price movements, inflation hedging characteristics, and how it relates to currency movements. Baur and Lucey (2010) tested long-run gold price trends and concluded that gold has both safe-haven and hedging properties, especially when there is financial stress. According to their research, gold acts as a safe haven during bear markets in the stock market, i.e., it either maintains or appreciates value when equities fall.

Other research, e.g., Wang et al., (2011), indicates that gold's safe-haven status is transient and extremely sensitive to macroeconomic factors. Gold's association with inflation has been a topic of considerable scholarly interest. Tully and Lucey (2007) examined the relationship between gold prices and inflationary patterns and concluded that gold prices are positively responsive to inflationary pressures, confirming its status as an inflation hedge. Confirming this, Worthington and Pahlavani (2007) employed cointegration analysis to show that there is a long-run connection between gold prices and U.S. inflation. Conversely, Ghosh et al., (2004) refuted such an idea, contending that although gold responds to inflation in the long run, it has a poor short-term hedging ability against inflation.

Gold has also been extensively researched as a currency fluctuation hedge. Capie et al., (2005) developed empirical evidence that gold is an effective hedge against fluctuations in the U.S. dollar, with high inverse correlation between the price of gold and the dollar index. Their findings were echoed by Sjaastad (2008), who believed that gold prices rise as the value of the U.S. dollar falls. However, studies such as Ciner et al., (2013) explained that gold's relationship with currency is not necessarily constant but may be influenced by external factors such as interest rate policies and speculative demand.

Therefore, the literature is mixed in its perception of gold's role in finance. While most research emphasizes gold as a crisis asset, others contend that its protective function is conditional and depends on the economic environment. These divergent views underscore the intricacy of gold price movements and the necessity for ongoing research into its dynamic function in international financial markets.

Economic and Political Determinants of Gold Prices

Gold prices are greatly determined by economic and political determinants, such as currency fluctuations, central bank actions, and financial crises. The gold-U.S. dollar relationship is extensively researched, with findings pointing to a negative correlation when the dollar falls, gold prices are expected to appreciate as investors turn to alternative value stores (Joy, 2011; Nair et al., 2016; Lin et al., 2016; Sankararaman et al., 2018; Mo et al., 2018; Zhou et al., 2018). Sjaastad (2008) went further to affirm that gold serves as a hedge against dollar loss of value. Wang et al., (2011) countered, however, that the relationship is not constant in all situations, especially in times of high market volatility. Central bank policy also has an important influence on gold price changes. Ghosh et al., (2004) showed that monetary policy, specifically interest rate moves by the Federal Reserve, has a direct effect on gold prices. Declining interest rates lower the cost of holding gold, raising its demand, whereas rising interest rates cause capital reallocation away from gold to interest-paying assets. Conversely, Batten et al., (2014) observed that even with monetary policy changes, gold is a favourite asset in times of financial uncertainty.

EMPIRICAL RESEARCH ON GOLD MARKET DYNAMICS

Gold market dynamics have been widely researched within the framework of investment portfolios, price forecast, and geopolitical risks. The contribution of gold to diversified investment portfolios has been explored at length, with Jaffe (1989) having shown that gold achieves portfolio diversification advantages as a result of low correlation with equities and other financial assets. Baur and Lucey (2010) also supported the opinion that gold has been used as a hedge against stock market declines, especially in cases of financial crises. Yet, Erb and Harvey (2013) opposed this view by stating that while gold can lower portfolio risk, its long-run returns are inconsistent, thus making it a second-best option for wealth building. Gold price forecasting with econometric models has been investigated through different methodologies. Wang et al., (2011) used long-run and short-run threshold models to

demonstrate that gold prices react asymmetrically to macroeconomic shocks, indicating the necessity of nonlinear modelling techniques. Sharma and Mahendru (2010), Lili L., & Chengmei, D. (2013) also used ARIMA models and concluded that although gold price movements are partially predictable, external shocks like policy shifts and market sentiment can largely influence forecast precision. The effect of geopolitical risks on the demand for gold has also been an area of study. Beckmann and Czudaj (2013) established that geopolitical tensions spur heightened gold demand, affirming its position as a safe-haven asset. This is consistent with Baur and McDermott (2010), who explained that gold prices increase rapidly in times of international crises, as investors hedge against economic and political uncertainty. Nonetheless, Ciner et al., (2013) theorized that gold's safe-haven status is not constant but rather is dependent upon time and will lose strength if other asset classes, like government bonds, offer comparable security. On a general level, empirical research presents gold's dual nature as both hedge and speculative instrument with performance differing according to market condition and other determinants.

The integration of extant literature shows that prices of gold are influenced by complex interaction between behaviour, financial, and macroeconomic factors. The Quantity Theory of Money and Fama (1970) along with Fisher (2006) suggest that monetary policies, inflation, and supply of money perform fundamental functions to establish the gold price. In addition, studies have also proven that gold acts as a financial crisis hedge (Baur & Lucey, 2010; Batten et al., 2014), currency volatility hedge (Capie et al., 2005), and inflation hedge (Tully & Lucey, 2007). Therefore, during uncertain periods, gold is a favourite as an investment. From a behavioural finance perspective, the appeal of gold is also explained by prospect theory and loss aversion (Tversky & Kahneman, 1990; 1992), herd behaviour (Lux, 1995; Baur & Lucey, 2010), and psychological heuristics such as the availability heuristic (Shiller, 2003). All these point towards investor sentiment, fear, and speculative action often pushing gold prices above fundamental values, especially in times of crises. While other studies have considered the trends over time (Baur & Lucey, 2010), inflation correlation of gold (Beckmann & Czudaj, 2013), and contribution of gold in diversified portfolios (Jaffe, 1989), it still seems essential to synthesize the existing views within a coherent model explaining why prices of gold remain on the increasing trajectory over the last few years even under changing economic circumstances. In addition, while monetary policies globally (Ghosh et al., 2004) and financial crises (Batten et al., 2014) have been studied individually, their interaction effect on the contemporary gold market is under-researched. This research attempts to fill this void by synthesizing economic, financial, and behavioural aspects to give an all-encompassing view of the drivers behind gold prices in the contemporary context.

III. Historical Trends in Gold Prices

The path of gold prices has undergone a dramatic change since the Gold Standard period to date, influenced by economic, political, and financial shifts. Under the Gold Standard (1870s-

1971), prices of gold were relatively constant since currencies were officially supported by gold reserves (Bordo, 1993). Bretton Woods (1944-1971) also provided stability since the dollar was pegged to gold at $35 an ounce and thus there were fixed exchange rates (Eichengreen, 2019). However, in 1971, Bretton Woods' collapse following the Nixon administration's move to suspend convertibility into gold introduced a free-floating market for gold, and prices skyrocketed in the face of inflationary fear and geopolitical tensions (McKinnon, 1993).

Uncertainty in global scenario, inflation, and oil shocks drove a record price of gold to $850 an ounce in 1980 in the early 1970s and 1980s (Batten et al., 2014). The period demonstrated that gold is a hedge against inflation (Ghosh et al., 2004). However, with deflation and monetary austerity the way of life, gold prices fell during the 1980s and 1990s and hit record lows of $250 an ounce in 1999 (Tully & Lucey, 2007). The 2000s witnessed yet another inflationary growth-driven bull market, followed by financial crises and rising demand from developing economies like China and India (Baur & McDermott, 2010). The Global Financial Crisis in 2008 again cemented the position of gold as a haven asset, and prices moved beyond $1,900 an ounce in 2011 (Beckmann & Czudaj, 2013).

Years that followed experienced volatility on the heels of Federal Reserve actions, interest rates, and macroeconomic conditions (Wang et al., 2021). Most recently, the COVID-19 pandemic (2020–2022) caused further growth in the value of gold to more than $2,000 an ounce as a result of global uncertainty and unprecedented monetary stimulus (Batten et al., 2014). This goes to reinforce gold's continued allure as an inflation hedge, currency loss, and uncertainty hedge. Notwithstanding arguments of market efficiency (Fama, 1970; Jensen, 1978), evidence is on hand to support that gold is a safe-haven asset, more so during financial and political crises (Baur & Lucey, 2010; O'Connor et al., 2015)

Significant Price Spikes and Crashes of Gold Markets

Gold prices have witnessed countless sensational highs and lows, all largely triggered by macroeconomic events, policy announcements, and economic crises. But yet another turning point event that significantly reshaped gold prices was the 1971 Nixon Shock, in which President Nixon temporarily suspended the fixed convertibility of the US dollar to gold and de facto brought an end to the Bretton Woods system (Eichengreen, 2019).

The conversion of the exchange to a floating one saw gold prices go up dramatically with inflation pressures, oil shock, and tension geopolitically. Gold prices between 1971 and 1980 varied from $35 an ounce to over $800 an ounce, as mounting economic uncertainty and weakening US dollar (Bordo, 1993; McKinnon, 1993). But with the inflation issues appeased and the central banks, headed by the Federal Reserve, tightening the money policy once again, gold dropped in value between the 1980s and 1990s to its lowest level of $250 an ounce in 1999 (Tully & Lucey, 2007; Öztunç, H., & Orhan, M. 2021).

During financial market unrest and fears of systemic failure, gold prices hit a record high of $1,920 an ounce in September 2011 (Batten et al., 2014). The prices were fueled by aggressive monetary accommodation policies, loss of confidence in fiat currencies, and rising demand from emerging nations such as China and India (Baur & McDermott, 2010). But with improving economic times and the US Federal Reserve announcing its tapering of its quantitative easing policy, gold saw a sharp correction, falling below $1,200 an ounce in 2015 (Wang et al., 2021; Beckmann & Czudaj, 2013). Most recently, the COVID-19 pandemic (2020–2022) launched another gold price rally to well over $2,000 an ounce in August 2020, led by global economic anxiety, supply shocks, and historically unprecedented fiscal stimulation (Batten et al., 2022). Owing to price fluctuation notwithstanding, gold still represents a financial stabilizing instrument hedging against money instability, the price pattern largely being linked with central banking conduct, inflation expectations, and attitudes of market operators (O'Connor et al., 2015).

Inflation adjusted gold price trend

The inflation-adjusted trends in gold prices give a better picture of the metal's true value in the long run, factoring in the loss of purchasing power due to inflation. Although nominal gold prices have shown dramatic variation, real gold prices, corrected for inflation, emphasize long-run trends and cycle movements. Empirical studies conducted by Bordo et al., (1993) and Jastram (1977) indicate that gold has preserved its purchasing power over very long periods of time, which supports its place as a store of value. Adjusted for inflation, though, there are some episodes of overvaluation and undervaluation. For example, even as gold hit its nominal high at $850 an ounce in 1980, its real value today was substantially lower because the time was high inflation (McCown & Zimmerman, 2006). The same way gold rose above $2,000 per ounce in 2020, adjusted for inflation, the real high found in 1980 was higher (Batten et al., 2014). Research like Tully and Lucey (2007) and Beckmann and Czudaj (2013) also highlight that the inflation-hedging role of gold is multifaceted, with short-run deviations subject to macroeconomic shocks and sentiment.

IV. Macroeconomic Indicators Influencing Gold Prices

1. MACROECONOMIC INDICATORS

INFLATION AND INTEREST RATES Interest rates and inflation are the key drivers of gold prices. With increasing inflation, the value of fiat currencies falls, prompting investors to turn to gold as an inflation hedge (Baur & Lucey, 2010). Gold has preserved its purchasing power during inflationary periods in the past and has thus emerged as the choice store of wealth (Wang et al., 2021). On the other hand, interest rates have a negative correlation with gold prices; high interest rates raise the cost of opportunity in holding non-yielding assets such as gold, thus lowering its attractiveness as an investment (Narayan et al., 2010). Low interest rates, however, render gold a more attractive asset, especially during economic uncertainty (Batten et al., 2014).

GDP GROWTH AND ECONOMIC UNCERTAINTY Growth in economic output, represented by Gross Domestic Product (GDP), dictates the price of gold through investors' attitudes. When GDP is strong, gold demand tends to fall because investors target higher returns through stocks and bonds (Sjaastad & Scacciavillani, 1996). Gold price increases in times of recession or geopolitical crisis as investors hold the metal close for safekeeping (Batten et al., 2014). Economic uncertainty in the form of recessions, financial crises, or trade wars increases the need for gold as a risk-averse investment tool (Baur & McDermott, 2016). The global financial crisis in 2008 and the COVID-19 pandemic in 2020 are perfect illustrations in which economic uncertainty led to a record-high price of gold.

FEDERAL RESERVE AND MONETARY POLICIES Monetary policies by the Federal Reserve, e.g., reduction of interest rates, quantitative easing, and monetary expansion, have a direct effect on gold prices (Bernanke, 2012). Expansionary monetary measures like reduced interest rates and money supply expansion reduce the U.S. dollar's value and augment gold demand (Ghosh et al., 2004). On the other hand, monetary contraction and increasing interest rates make the U.S. dollar stronger and lower the attractiveness of gold (Gupta, 2016). Federal Reserve moves affect inflation expectations as well as world liquidity, which make gold a strategic investment during times of monetary relaxation (Wang et al., 2021). Historical data indicate that gold prices increase when there is extensive monetary expansion over a long period, as occurred after the 2008 financial crisis and during the COVID-19 stimulus packages.

2. MARKET AND INVESTMENT FACTORS AFFECTING GOLD PRICES

GOLD AS SAFE-HAVEN ASSET IN CRISES Gold has also been a safe-haven commodity historically, particularly during financial crisis and international crises. Investors hedge against stock market instability, currency devaluation, and economic depression using gold (Baur & McDermott, 2010). Gold appreciates during international crises, such as the 2008 global financial crisis and the COVID-19 pandemic, when stock markets are falling. Flight-to-safety happens due to the fact that gold maintains inherent value and is not necessarily correlated with the performance of any given economy (Batten et al., 2014). Additionally, gold's position as a crisis-proof asset has been supported by its negative relationship with risky financial assets, thereby being an investor's choice in times of market turmoil (Beckmann & Czudaj, 2013).

DEMAND FROM INSTITUTIONAL INVESTORS AND CENTRAL BANKS Institutional investors and central banks are significant contributors to shaping the price of gold by virtue of their reserve management and purchasing approaches. Most central banks, especially in emerging economies, hold gold reserves in an effort to diversify foreign exchange reserves and de-dollarize their reserves (Zhu et al., 2018). Central banks' increased purchases of gold, like those of China, Russia, and India, usually reflect faith in gold stability and thus push prices upwards (Baur & Smales, 2018). Institutional investors, like hedge funds and pension funds, also contribute to influencing gold prices through portfolio diversification and speculative trading

(Wang et al., 2021). An increase in institutional demand normally results in increased prices for gold, while a dip in their gold holdings can initiate price realignments (Ghosh et al., 2004).

GOLD ETFS AND HOW THEY INFLUENCE MARKET PRICES Gold Exchange-Traded Funds (ETFs) have had a strong impact on gold price dynamics by offering an easy investment option without having to hold the physical metal. Gold ETFs enable investors to exchange gold-backed securities, which enhances market liquidity and price efficiency (Cheng et al., 2020). The launch of large gold ETFs, including SPDR Gold Shares (GLD), has added to demand and included gold as a more integral component of diversified investment portfolios (Hillier et al., 2006). Substantial inflows into gold ETFs are associated with increasing gold prices, and outflows tend to put downward pressure on market prices (Batten et al., 2014). Second, ETF trading affects short-run price volatility due to the fact that speculative flows in ETF holdings tend to capture underlying market sentiment (Baur & Lucey, 2010).

3. SUPPLY-SIDE DETERMINANTS OF GOLD PRICES

GOLD MINING PRODUCTION AND RESERVES Gold prices are highly determined by mining output and the supply of gold reserves. Supply of newly mined gold is comparatively inelastic because of the long-time lag involved in exploration, development, and extraction (Wagner, J., & Poppe, D. 2024). As production decreases as a result of exhausted reserves or operational issues, supply shortages push gold prices upward (Levin et al., 2006). On the other hand, a rise in mining production can put downward pressure on prices, though geopolitical considerations, licensing policies, and mining disruptions tend to constrain the rapid expansion of production (Humphreys, 2015). Also, falling ore grades and lower major discoveries in recent years have added to worries regarding long-term supply sustainability, further influencing gold price trends (Tilton, 2010).

COST OF EXTRACTION AND ENVIRONMENTAL CONCERNS The price of gold production, such as labour, energy, and technology, is instrumental in shaping the supply of gold and prices. Increased production expenses due to increasing fuel prices, tougher labour laws, and modern extraction techniques usually result in higher gold prices since producers transfer costs to consumers (Starke, L. 2016). Additionally, strict environmental compliance requirements, especially in areas of high mining activity such as South Africa, China, and Australia, have increased compliance expenses and limited growth, driving supply even tighter (Bridge, 2004). Water usage, deforestation, and carbon emissions associated with mining have resulted in heightened concerns and regulation, impacting both the production capacity and investor perception toward sustainable gold sourcing (Wilson et al., 2015; Fashola et al., 2016; Vélez-Torres, I., & Vanegas, D. 2022).

ROLE OF GOLD RECYCLING Gold recycling is a vital secondary source of supply, especially in times of high gold prices. Scrap gold, obtained from used jewelry, industrial scrap, and electronic devices, finds its way back into the market when prices increase, stabilizing supply (Bugmann, 2020). Economic recessions and inflationary times tend to spur more gold recycling

as people and companies sell holdings to raise cash (Sverdrup et al., 2012; O'Connor et al., 2015). Nevertheless, recycling levels are subject to market forces, including consumer willingness to sell and refining process innovations (Baldé et al., 2015). Within the past decades, the increasing focus on sustainable use of resources and circular economy strategies has continued to spur gold recycling, making less use of freshly mined gold (Graedel et al., 2011).

GEOPOLITICAL AND GLOBAL EVENTS IMPACTING GOLD PRICES

WARS, CONFLICTS, AND POLITICAL INSTABILITY Gold has always acted as a safe-haven asset in periods of geopolitical uncertainty, and prices tend to rise when facing wars and political tensions. Buyers rush to gold in periods of crises because the asset is of inherent value and does not bear any counterparty risk (Baur & Smales, 2020). Political instability, including Middle Eastern tensions, Eastern European conflicts, and civil disturbances in large economies, can increase gold demand as investors look for stability (Chkili, W, 2022). Gold prices also increase when the world security environment is uncertain, as institutions and central banks build up their reserves to protect against currency fluctuations and economic recessions (Beckmann et al., 2015). The Russia-Ukraine war, for instance, has resulted in high surges in gold prices due to increased market uncertainty and flight to safe-haven assets (Kristjanpoller, W., & Minutolo, M. C. 2015; Setyowibowo et al., 2022).

TRADE WARS AND ECONOMIC SANCTIONS Trade wars and economic sanctions contribute significantly to global financial markets, with gold sometimes used as a hedge for uncertainty in trade. Trade wars like the U.S.-China trade war have brought about fluctuations in the price of gold as investors look for slowdowns in economies and devaluation of currencies (Zhang et al., 2020). Sanctions placed on large economies, including those on Russia and Iran, are also responsible for increasing the demand for gold, as restricted countries turn to gold in order to evade financial restrictions and stabilize reserves (Dimitriou et al., 2013). Tariffs imposed, international trade restrictions, and retaliatory actions between nations lead to market uncertainty, which further increases the attractiveness of gold as a store of value (Caruso, R. 2003; Chernousov, P. 2016). With ongoing global trade tensions, gold is still a central asset for investors looking for protection from deglobalization and economic fragmentation (Fang et al., 2022).

EFFECT OF PANDEMICS (SUCH AS COVID-19) ON GOLD DEMAND Pandemics strongly affect global financial markets, and the COVID-19 pandemic revealed gold as a preferred investment during economic disruption. As markets were shrouded in uncertainty in the early stages of the pandemic, gold prices surged to all-time highs in mid-2020 on the back of increased investor demand, central bank purchases, and massive fiscal stimulus packages. The global economic slowdown, supply chain disruption, and record monetary ease by the dominant economies led to inflation concerns, further propelling gold prices (Iyke, 2021). Furthermore, central banks increased their holdings of gold as a risk diversification measure, bolstering the role of gold as a financial turmoil hedge (Batten et al., 2022). The pandemic also drove gold

investment in digital form through exchange-traded funds (ETFs) and internet websites, expanding the market coverage of gold and rendering prices more fluctuating (Li et al., 2021; Triki, M. B., & Maatoug, A. B. 2021; Zhou, H., & Liang, C. 2025).

V. Predicting Gold Prices: Will the Rally Last?

ECONOMETRIC MODELS FOR GOLD PRICE FORECASTING

Econometric models have found widespread application in forecasting gold prices by examining past information and extracting interdependencies between significant macroeconomic, financial, and geopolitical variables (Batten et al., 2014). The models utilize statistical methods to determine how different factors, including inflation, interest rates, exchange rates, and stock prices, affect gold prices over a period. Among the most widely applied econometric techniques are Autoregressive Integrated Moving Average (ARIMA) models, Vector Autoregression (VAR), Generalized Autoregressive Conditional Heteroskedasticity (GARCH), and cointegration methods, each of which gives unique information on gold price dynamics (Wang et al., 2021).

ARIMA model, developed by Jenkins and Box (1976), is a time series forecasting technique that identifies trends, seasonality, and autocorrelation among past gold prices. The model has been used to a large extent for predicting gold prices, but its application is constrained by its linearity and stationarity assumption (Box et al., 2015; Shafiee, S., & Topal, E. 2010; Guha, B., & Bandyopadhyay, G. 2016). VAR models, however, enable the modelling of several economic indicators at a time, such as GDP growth, interest rate, and money supply, thereby being more ideal for the interpretation of macroeconomic forces behind fluctuations in gold price (Zhang et al., 2018).

GARCH models are especially effective in gold price volatility forecasting, as they consider time-varying variance and uncertainty in the market (Kristjanpoller, W., & Minutolo, M. C. 2015; Setyowibowo et al., 2022). GARCH models assist in measuring the effect of financial market shocks and investor sentiment on gold price movements. Cointegration models, including the Johansen cointegration test, also analyse long-run equilibrium relationships between gold prices and macroeconomic variables to inform strategic investment decisions (Batten et al., 2014; Lucey et al., 2017).

Improved precision in gold price forecasting has also been enhanced by recent machine learning and hybrid econometric model advancements. Support Vector Machines (SVM), Artificial Neural Networks (ANN), and Long Short-Term Memory (LSTM) networks have better traditional econometric methods by capturing nonlinear relationships between financial data (Pierdzioch et al., 2014). These models combine macroeconomic information, market sentiment, and real-time financial data to offer stronger gold price predictions, especially in times of high volatility (Li et al., 2021; Triki, M. B., & Maatoug, A. B. 2021; Zhou, H., & Liang, C. 2025).

In general, though econometric models give useful indications about gold price trends, their forecasting accuracy relies on external shocks, policy measures, and changing market dynamics. Due to the complexity of the global financial market, a combination of conventional econometric models and advanced machine learning techniques is often suggested for more accurate gold price prediction (Fang et al., 2022).

Technical vs. Fundamental Analysis of Gold Technical Analysis of Gold Technical analysis is the prediction of gold prices from past price action, volume, and statistical trends. It presumes that historical price movements repeat and that market action occurs in recognizable patterns (Murphy, 1999).

Candlestick patterns, i.e., Doji, Hammer, and Engulfing patterns, also make traders aware of market sentiment as well as future price movements (Batten et al., 2014; Lucey et al., 2017). Technical analysts utilize some of these indicators such as moving averages, Relative Strength Index (RSI), Bollinger Bands, and Fibonacci retracements to gauge trends, support and resistance, and price reversals (Wang et al., 2021). The most popular technical tool is Moving Average Convergence Divergence (MACD), which instructs the traders regarding the change in trend and change in momentum of the gold price (Pierdzioch et al., 2014). Similarly, Relative Strength Index (RSI), which calculates the action degree of the price on the shorter-time horizons, is generally used to verify whether the gold is oversold or overbought (Kristjanpoller, W., & Minutolo, M. C. 2015; Setyowibowo et al., 2022).

Although technical analysis offers useful short-run trading cues, it is criticized for lacking a fundamental foundation and may not be effective all the time under the times of economic shocks or market irregularities (Fang et al., 2022). When merged with risk management techniques, however, technical indicators can assist traders in making effective choices within the gold market (Li et al., 2021; Triki, M. B., & Maatoug, A. B. 2021; Zhou, H., & Liang, C. 2025).

Fundamental analysis, however, considers macroeconomic, financial, and geopolitical factors influencing the prices of gold in the long run. The approach considers factors such as inflation, interest rates, central bank policy, exchange rate movements, and global economic stability (Shafiee, S., & Topal, E. 2010; Batten et al., 2014; O'Connor, et al., 2015; Madziwa et al., 2022). Gold is generally perceived as an inflation hedge and currency devaluation hedge, whereby inflation increases and declining fiat currencies normally increase gold demand (Shafiee, S., & Topal, E. 2010; Guha, B., & Bandyopadhyay, G. 2016).

Among the most vital elements of intrinsic analysis is that of central banks. Institutional reforms in gold holdings by institutions like the Federal Reserve, European Central Bank (ECB), and People's Bank of China exert an enormous impact on world gold prices (Wang et al., 2021). Real interest rates, i.e., interest rates after adjusting for inflation, also play a very essential part in moving gold prices. When real interest rates are either low or below zero, the opportunity cost of gold will decrease, and demand and prices will be higher (Zhang et al., 2020). They also evaluate gold supply dynamics, such as mining output, extraction costs, and recycling patterns,

and geopolitical risks like trade wars, financial crises, and political tensions (Pierdzioch et al., 2014). In addition, investor sentiment and market speculation are factors causing gold price movements, and sentiment analysis is an increasing part of fundamental research (Li et al., 2021).

COMPARISON AND INTEGRATION

While technical analysis is better suited for short-term traders hoping to profit from price fluctuations, fundamental analysis is preferred by long-run investors hoping to ride the underlying economic and market fundamentals (Kristjanpoller, W., & Minutolo, M. C. 2015; Setyowibowo et al., 2022). Most market participants use both methods technical indicators to identify entry and exit points but basic analysis to gauge long-run price direction and risks (Batten et al., 2014; Lucey et al., 2017).

PROFESSIONAL VIEWS ON SUSTAINABILITY OF GOLD PRICE

Price sustainability of gold remains a topic of sustained debate for money managers, economic experts, and investment planners. Experts base their judgments on multiple macroeconomic, financial, as well as geopolitical variables when it comes to determining whether prices for gold will find stability or proceed upward (Batten et al., 2020). Positive Outlook for Gold Prices Most commentators are of the opinion that gold price will stabilize underpinned by inflationary pressures and economic uncertainties. So long as central banks like the United States Federal Reserve hold high rates to stem inflation, investors are pricing gold as an insurance to offset potential devaluation of money (Shafiee, S., & Topal, E. 2010; Guha, B., & Bandyopadhyay, G. 2016). Central bank acquisition of gold is also introduced by analysts as a bullish sign number attest that central bank, particularly those in emerging economies like China and India, have been accumulating gold reserves in an effort to diversify away from the U.S. dollar (Wang et al., 2021; Xu et al., 2023). In addition, economic uncertainty worldwide brought about by geopolitical tensions, trade war, and financial market instability makes gold a haven asset more appealing (Kristjanpoller, W., & Minutolo, M. C. 2015; Setyowibowo et al., 2022).

SKEPTICAL PERSPECTIVES REGARDING GOLD'S LONG-TERM VIABILITY SUSTAINABILITY

Conversely, however, other analysts warn that gold's advance might not last in the long run. They base their apprehensions on anticipation of rising real interest rates, which generally dampen the appeal of non-yielding assets such as gold (Batten et al., 2014; Lucey et al., 2017). As the economy stabilizes and inflation cools, demand for gold as a hedge could decline, and prices may experience corrections (Fang et al., 2022). Besides, in the event that global risk sentiment increases and investors move into equities and other high-yielding assets, gold will lose some of its lustre (Li et al., 2021). Balancing Perspectives: A Middle Ground Most professionals hold a pragmatic position, agreeing that while there can be short-run volatilities, gold continues to be a useful portfolio diversifier. The consensus of experts is that prices of

gold will hinge on a set of macroeconomic indicators such as trends in inflation, monetary policy settings, and the dynamics of world investment flows (Pierdzioch et al., 2014). Advances in the new world of digital assets, like cryptocurrencies, have also added competing alternatives to gold that can, over time, shape the long-term demand landscape (Zhang et al., 2020). Finally, professional views indicate that although gold's rally is likely to continue in the short-to-medium term as a result of continued economic uncertainties, its long-term viability will be contingent on general financial market trends and macroeconomic conditions (Kristjanpoller, W., & Minutolo, M. C. 2015; Setyowibowo et al., 2022).

VI. Policy and Investments Implications

Should Investors Use Gold as an Inflation Hedge? Gold has been viewed for a long time as a safe-haven asset in times of economic uncertainty and inflationary pressure (Baur & Lucey, 2010). The main justification for this is that gold preserves its purchasing power over time, in contrast to fiat currencies that can lose their value due to inflation (Anandasayanan et al., 2019; Duong, T. H. 2023). The performance of gold as an inflation hedge, however, is a hotly contested issue in academic studies and financial practice.

A number of studies enhance the argument that gold can be a good hedge against inflation in the long term. Erb and Harvey (2013) posit that gold prices have a tendency to behave similarly to inflation over the long term, maintaining purchasing power. Faugère and Van Erlach (2006) point out that gold's scarcity of supply as well as inherent worth make it a good hedge for rising price levels. An analysis of historical data further reveals that gold prices have been strongly positively correlated with inflationary movements, especially in high-inflationary episodes like the 1970s oil shock (Worthington & Pahlavani, 2007).

There are also some researchers who disagree with the traditional perception of gold as an effective hedge against inflation, particularly in the short term. Wang, Lee, and Thi (2011) discovered that gold prices tend to display volatility not connected with inflationary movements due to speculative trading and world liquidity conditions. Further, Blose (2010) indicates that gold's response to inflation tends to be delayed, hence it is not as good an immediate hedge. Research conducted by Ghosh et al. (2004) shows that, although gold acts as a hedge against inflation in the long term, it might be negated in the short term by price volatility.

Investment implications differ based on the horizon and macroeconomic environment. In emerging economies where currency depreciation is significant, gold offers greater inflation protection, as noted by Kristjanpoller, W., & Minutolo, M. C. (2015); Setyowibowo et al., (2022). However, in developed economies with sound monetary policy, inflation-indexed bonds and real estate could provide more stable hedging (Chua, Sick, & Woodward, 1990). In addition, gold's opportunity cost, especially during times of increasing interest rates, can diminish its appeal as a hedge against inflation (Jastram & Leyland, 2009). To conclude, while gold has over time acted as an inflation hedge, its potency relies on the investment horizon, economic

conditions, and monetary policy. Investors would need to evaluate these factors comprehensively before placing gold as a core hedge for inflation. More research in the future should identify the contribution of gold to the inflation-hedging portfolio using other asset classes in order to establish the appropriate portfolio allocations (Batten, Ciner, & Lucey, 2014).

Gold has traditionally been a central bank reserve component as a value store, a currency depreciation hedge, and a means of financial stability (Bordo & Eichengreen, 2019). Although the gold standard was dissolved in the 20th century, central banks still maintain substantial gold reserves because of its distinctive features, such as its safe-haven asset status during times of economic turmoil (Baur & McDermott, 2010). The strategic value of gold in reserves lies in its capacity to diversify portfolios, hedge against risks posed by fiat currency volatility, and promote market confidence in national economies (O'Connor et al., 2015).

Preservation of monetary stability is one of the key reasons why central banks hold gold reserves. Research has indicated that gold reserves offer protection against inflation and exchange rate uncertainty, especially in emerging markets where currency volatility is higher (Kristjanpoller, W., & Minutolo, M. C. 2015; Setyowibowo et al., 2022). The negative relationship between gold and the US dollar makes it a desirable asset at times of economic slumps (Capie, Mills, & Wood, 2005). In addition, during periods of economic hardship, central banks can utilize their gold reserves to regain investor confidence and stabilize their economies (Aizenman & Inoue, 2013).

Studies show that gold buying trends of central banks have changed with changes in the global economy. Following the 2008 financial crisis, the majority of the world's central banks, particularly those in emerging economies, have increased their gold reserves as a strategic move to diversify from the US dollar and other reserve currencies (Bordo, 2018). China and Russia, for instance, have significantly diversified their gold reserves to realize monetary sovereignty and hedge geopolitics (Wang, 2020; Xu et al., 2023).

Moreover, liquidity in gold implies that it may be readily shifted to international settlement purposes, serving as a very dependable reserve instrument (Batten, Ciner, & Lucey, 2014). Even with gold's benefits, some authors believe that its position in central bank reserves has lost strength over time as a result of the trend towards fiat currency-based monetary systems. Blose (2010) postulates that the cost of holding gold particularly when interest rates are high can exceed its benefits. Nevertheless, gold's use as a hedge against systemic risk remains to propel its demand by central banks (Beckmann & Czudaj, 2013). In addition, a study by Reborewo (2013) indicates that gold is still a haven asset, particularly in times of financial crises and currency devaluations. Investment implications of gold in reserve holdings for central banks have important implications for global financial markets. A rise in central banks' gold buying indicates risk aversion and will cause global gold prices to rise (O'Connor et al., 2015).

The implications of rising gold reserves on financial stability worldwide and on monetary policy instruments should be considered in future research (Batten et al., 2014). Moreover, the conversion of some economies to gold-backed reserves portends a wider trend towards de-dollarization and the potential for long-term implications on international monetary stability (Wang, 2020; Xu et al., 2023). Lastly, gold remains relevant in the central bank reserve because it adds to financial stability, protects against inflation, and qualifies as a safe-haven asset. Despite variation in its usage with the evolution of the monetary system, gold remains an integral part of reserves in the monetary system worldwide.

VII. Policy Implications

Should investors consider gold as a hedge against inflation?

Gold has classically been regarded as a hedge against inflation, but current empirical research provides a more nuanced answer to its capability. 2015 research by Hoang et al., (2016) utilised a nonlinear autoregressive distributed lags (NARDL) specification to evaluate gold as an inflation hedge. The conclusion was that gold is not an inflation hedge over the long run in these economies (Ghosh et al., 2004; Bampinas, G., & Panagiotidis, T. 2015). On the other hand, gold was discovered to hedge inflation in the short run in the UK, USA, and India, but no long-run equilibrium existed between gold prices and the Consumer Price Index in China, India, and France. The authors propose that there can be an influence of cultural considerations and trade policies on such findings. Likewise, a comparative study by Salisu et al., (2020) tested the inflation-hedging characteristics of gold, stocks, and real estate in the United States. Real estate and stocks were found to be good hedges against inflation, while gold does not follow the Fisher hypothesis that nominal asset returns should co-move with anticipated inflation. The research further emphasized that the efficacy of these assets as inflation hedgers is time-variant, especially looking at times preceding and succeeding the global financial crisis. On the other hand, Ghosh et al., (2004) presented evidence of gold acting as an inflation hedge. They demonstrated in their work a persistent long-run relationship between inflation and gold in the United States from 1945 to 2006, even after adjusting for structural breaks. This is aligned with evidence on the argument that gold investment serves as a hedging tool against inflation in the long run. These studies consistently indicate that gold's effectiveness as an inflation hedge depends on various factors including investment horizon, economic conditions in geographies, and particular time horizons. The investors need to take these parameters into account when analyzing gold's position in their portfolios.

Role of gold in central bank reserves

Gold has previously been a prominent component of central bank reserves as a hedge against economic risk and exchange rate volatility. Recent empirical evidence offers insight into the shifting pattern of gold reserves by central banks. Arslanalp, Eichengreen, and Simpson-Bell (2023) analyzed the re-emergence of central bank gold holdings after the Global Financial Crisis. They found 14 emerging market economies whose gold share in their reserves increased

by at least 5 percentage points over the past two decades. The authors say the trend is due to gold being seen as a safe-haven asset during economic, financial, and geopolitical uncertainty and a strategic response to offsetting financial sanctions imposed by the leading reserve-issuing economies (Arslanalp et al., 2023). The World Gold Council report of 2021 points out that together, central banks held some 35,527 tonnes of gold as at July 2021, and this accounted for a percentage of 17.6% of the above-ground gold stock. This share emphasizes the strategic function of gold to serve as a form of insurance against financial turmoil, especially in the current context of geopolitical tension and a time of ongoing low interest rates (World Gold Council, 2021).

Zulaica (2020) study also corroborates the contribution of gold to increasing a central bank's portfolio diversification and risk management. The research indicates that even small investments in gold can reduce portfolio volatility, especially for central banks with greater exposure to interest rate risks. This is consistent with the idea that gold is a hedge against negative economic times (Zulaica, 2020). In short, recent studies show that gold remains an essential part of central bank reserves, providing the advantages of portfolio diversification, risk reduction, and defence against economic and geopolitical risks.

Policy recommendations for price stability

Volatility of gold prices is a challenge to economic stability and affects investment, currency valuation, and general economic planning. The volatility needs to be countered with a broad policy framework that involves monetary measures, market regulation, and global coordination.

1. Monetary Policy Adjustments: Gold prices are largely driven by central banks' monetary policy. Zhu et a., (2018) examined how Chinese gold prices correlate with some monetary indicators and concluded that the reduction of policy interest rates could spur inflation, which in turn would put pressure on gold prices to rise. On the contrary, adding the number of securities can be used as a policy to dampen inflationary pressure, thus stemming the rise of gold prices due to inflation only.

2. Strategic Reserves: Management Central banks and governments can make gold price stability possible by transparently managing their gold reserves. Transparent communication of gold buying or selling intentions can avoid unexpected market responses. For instance, synchronized announcements of gold reserve policies can reduce uncertainty and speculative activities that tend to create volatility.

3. Market Regulation and Oversight: Regulation and Oversight of the Market The enforcement of rigid regulations to restrict speculative gold market trading can reduce abnormal volatility. Regulators need to monitor trading activity to prevent market manipulation and see to it that prices of gold are grounded in fundamentals of supply and

demand. More regulation of derivative markets, where highly leveraged positions tend to magnify price swings, is particularly necessary.

4. Diversification of Safe-Haven Assets: Encouraging the development and recognition of alternative safe-haven assets can distribute investment flows more evenly during periods of economic uncertainty. Assets such as government bonds, certain foreign currencies, or other commodities can serve as alternatives to gold, thereby alleviating pressure on gold markets. This diversification can be promoted through policy measures that enhance the attractiveness and accessibility of these assets. Policy measures can be used to encourage diversification by making such assets more attractive and accessible.

5. International Coordination: Cooperation between the world's largest economies is most important to suppressing gold price volatility. Stabilization agreements for currencies, concerted monetary policy, and cooperative economic information can buffer uncertainties that otherwise would spur gold price volatility. For example, in the case of world economic uncertainty, coordinated policy action can reassure market players and suppress gold flight.

6. Investor Education: Educating investors on what drives gold prices and the risks of gold investment can contribute to more rational decision-making. Public education programs and consumer financial education initiatives can inform investors that gold, though historically considered a safe-haven asset, also has its own volatilities and does not always protect against all types of market risk.

7. Economic Diversification: Economic diversification for countries that are predominantly reliant on gold exports can reduce exposure to the uncertainty of gold prices. Investment in other sectors such as manufacturing, agriculture, or the IT sector can create alternative streams of revenues and thereby buffer the economy against gold market instability.

These policy recommendations should be put into effect through a balanced approach, bearing in mind international economic conditions and domestic imperatives. Policy-makers ought to be quick and vigilant as the determinants of gold are complex and connected. By proper planning and co-ordination, it is possible to bring some stability into markets for gold that will assist with overall financial stability.

The research questions that had been raised at the outset of this research were aimed at exploring the gold price historical trends, the principal factors behind the gold price movement, the linkage between gold and the global financial markets, and whether the recent rally in gold prices was sustainable in the long term. Traditionally, gold has been highly volatile, normally propelled by macroeconomic fundamentals, inflation, and global financial crises. The inflation crisis of the 1970s, the 2008 financial crisis, and the COVID-19 pandemic all saw significant increases in gold prices, solidifying its status as a safe-haven asset (Baur & Lucey, 2010; Reboredo, 2013; Zhang et al., 2020; Baur & Smales, 2018; Zhou & Liang, 2025). Drivers of the behavior of gold prices are diverse. Inflation and interest rate behavior also

count, as gold becomes more valuable when inflation rises or when central banks pursue expansionary monetary policy that lowers the opportunity cost of holding gold (Batten et al., 2014; Lucey et al., 2017). Global economic uncertainty, geopolitical uncertainty, and financial market instability have also been found to drive investor demand for gold (Batten, Ciner, & Lucey, 2014). The second major factor is the negative correlation between gold and the US dollar when the dollar falls, gold price rises as investors look for alternative value storage (Wang, Lee, & Thi, 2011). Speculative and institutional investment also affects gold price movements, with institutional investors, hedge funds, and central banks making large trades that drive short-term price changes (Parimi, S. 2018). Gold's connection with global financial markets is complex. Empirical evidence indicates that gold acts as a hedge in times of stock market decline, acting as a safe haven when equities perform poorly (Baur & McDermott, 2016; Sathyanarayana S, & Gargesha, 2018). In addition, in times of currency devaluation and bond market uncertainty, gold is still a favored asset because of its traditional store-of-value role (Li et al., 2021; Triki, M. B., & Maatoug, A. B. 2021; Zhou, H., & Liang, C. 2025). Nevertheless, the extent of gold's hedging effectiveness changes according to wider macroeconomic trends, policy movements, and speculative market forces, sometimes weakening it as a financial stabilizer (Zhang, et al., 2020; Baur & Smales, 2018; Zhou & Liang, 2025). The long-run viability of gold's recent price appreciation remains a question. Although structural variables like chronic inflation, monetary policies, and escalating geopolitical tensions imply that gold will remain an integral part of international markets, new investment options such as cryptocurrencies and digital assets have the potential to change its classical safe-haven role (Shen & Wang, 2019). Future research needs to look at the relative stability of gold compared to digital substitutes, and the central bank and institutional investor impacts on long-term trends in gold prices.

Volatility in gold prices continues to worry policymakers, investors, and central banks because it has implications on financial stability as well as economic planning. The analysis above concedes that there are various determinants of the prices of gold, including changes in monetary policy, central bank reserves, speculative demand, and world economic uncertainty. Open reserve management, tight regulation of markets, and global cooperation are some of the policy strategies that would curb gold price volatility.

Furthermore, diversifying the economy as well as investors' education lessen risks associated with excessive dependence on gold. There also needs to be research on the future into the ways in which different policy actions might stem gold price volatility in different economic scenarios. Additional empirical analysis of how much new coming alternative safe-haven assets assist in stabilizing the gold market may also prove extremely valuable. Investigation of how geopolitical forces and digital gold assets influence market movements should also enhance understanding of causes of gold price behaviour.

LIMITATIONS OF THE STUDY

Although this study offers a thorough examination of gold price trends, their determinants, and policy implications, there are some limitations that need to be recognized. To begin with, the study is based mainly on historical data and econometric models, which might not capture all unexpected structural changes in global financial markets. For example, the impact of such digital assets as Bitcoin and CBDCs on gold prices continues to be an ongoing field of study (Chen, K., & Wang, M. 2019). Second, this focus of research on macro-level economic and financial variables might overlook micro-level ones, including investors' sentiment, behavioural biases, and speculative pressure, which contribute substantially to the volatility of gold prices (Parimi, S. 2018). Besides, although gold has been examined as a hedge and safe-haven asset, its function may vary with market conditions and geography, resulting in contextual differences in its stabilizing role as a financial asset (Li et al., 2021; Triki, M. B., & Maatoug, A. B. 2021; Zhou, H., & Liang, C. 2025). Finally, the research fails to recognize possible policy changes, including central banks' gold reserve changes or government interventions, which might change long-term gold price trends (Batten et al., 2014).

RECOMMENDATIONS FOR FURTHER RESEARCH

In light of the changing nature of world financial markets, prospective research would address emerging technologies and how they influence the pricing of gold. A major focus area is the application of Artificial Intelligence (AI) and machine learning in predicting gold price movements. Predictive algorithms using AI have the ability to enhance the accuracy of gold price predictions using large datasets, which they mine for hidden trends, as well as non-conventional inputs such as social media sentiment and geopolitical events (Zhang & Wei, 2023). Another potential research area is the effect of blockchain technology and tokenized gold assets on gold markets. Blockchain-enabled gold trading platforms, including tokenized gold-backed cryptocurrencies, can potentially affect conventional gold pricing mechanisms by increasing transparency, liquidity, and accessibility in gold investments (Chen, K., & Wang, M. 2019). The interaction between digital assets and conventional commodities such as gold requires further research to ascertain whether blockchain-based financial innovations will strengthen or undermine gold's traditional safe-haven status. Furthermore, there should be further research on the impact of central bank digital currencies (CBDCs) on gold demand and prices. With nations evolving and implementing CBDCs, there is a need to determine whether these digital forms will complement or replace gold as a reserve asset (Reboredo, 2013). Investigation should also examine the role of algorithmic trading and institutional investors in gold market volatility since high-frequency trading and algorithmic strategies have altered price dynamics for financial assets (Parimi, S. 2018).

Finally, research should be multi-disciplinary in approach and draw on financial econometrics, behavioural finance, and technology to provide a complete picture of 21st-century gold prices. Longitudinal studies that compare the hedging capacity of gold with

emerging asset classes such as cryptocurrencies and green investments can be helpful to policymakers and investors.

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