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MEASURING THE VOLATILITY OF THE RELATIONSHIP BETWEEN THE US DOLLAR EXCHANGE RATE AND GOLD PRICES BY USING ARDL (1990–2026)

Dhurgham Muhammad Abdul Wahab
University of Maysan / College of Administration and Economics / Department of Economics
Email: dhurgammhmad@gmail.com
Phone: +9647722058234
ORCID: Dhurgham Mohammed Alkhalidi

Abstract

Gold prices have been on the increase since 1793, even though the US dollar still holds the leading position. The economic and financial crises that have hit the global economy have continually strengthened the position of gold as a safe haven, keeping it intact and intact even in the face of financial and economic instabilities. In the 2008 subprime mortgage crisis that is still affecting the world economy, gold peaked in September 2011 with its highest price of 1920 per ounce in history. This peak was also affected by the sovereign debt crises in the European Union. Gold has recently become in high demand again by investors as well as central banks especially in Europe, but there is also a growing demand by the emerging markets in an effort to diversify against the unstable dollar. This, combined with changes in the US dollar over the euro and more intense movements in the global gold markets have created significant interest amongst researchers. The causal relationship between the exchange rate of the US dollar and the price of gold has been studied in many economic studies with inconclusive findings. Based on the assumption of causal relationships between

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the dollar value against other currencies to global gold prices in the period of 1999-2010, the study questions: To what extent do fluctuations in the US dollar affect international gold prices? This study aims to investigate the nature of the dollar's impact on global gold prices through both theoretical and empirical approaches, utilizing the EViews software for econometric analysis.

Keywords: Gold prices, Dollar prices, ARDL, Divergence, Cointegration, Hedging

Introduction:

Gold is regarded as one of the most significant financial assets as it is the last and the safest haven to which people, businesspeople, and investors run to particularly at times of uncertainty and economic volatility caused by negative shocks in the macroeconomy. There are many factors that determine gold prices globally, including the global price of the US dollar. International studies have demonstrated the existence of an inverse relationship between gold and the dollar, and at times a direct one, as this relationship is volatile due to the presence of other factors influencing gold prices. This is what will be examined using the EVIEWS program.

Research Problem:

The research problem lies in questioning the impact of the US dollar price on gold globally, what is the magnitude of this effect, and what is the causal relationship: is it positive or direct?

Research Hypothesis:

There exists a competitive inverse relationship between the US dollar price and gold globally; however, it is volatile, alternating between inverse and direct

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relationships, using statistical and econometric methods through the ARDL approach.

Research Boundaries

- Temporal Boundaries: From 1990 to 2026.
- Spatial Boundaries: Since gold is priced globally, the global market constitutes the spatial boundary.

Research Importance

Studying the relationship between gold and the US dollar helps us understand:

- The effectiveness of gold as a hedging factor in economic crisis.
- How actions of the US Federal Reserve influence world gold prices.
- How knowing this relationship helps to explain global market trends, where gold is viewed as a safe haven to investors.

Research Methodology

The study employs descriptive, analytical, statistical, and econometric approaches using the EVIEWS statistical software.

Previous Studies:

The relationship between the US dollar, which is one of the reserve currencies in the world, and gold, which is an important part of the international reserves and a strategic commodity, is a safe haven, reliable store of value, and an investment asset is the focus of many studies. These studies include:

A) According to conventional research, there is an inverse correlation between global dollar prices and gold prices, which implies that the two variables are correlated in a linear way because gold is traded in dollars; therefore, the fall in the dollar price would result in the rise of the demand of gold (El-Masry and Badr, 2021).

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B) The non-traditional model underlines the existence of a positive interim correlation between the two, caused by uncertainty and geopolitical threats, because investors and entrepreneurs are more likely to prefer both assets as safe havens. Nevertheless, the reverse relationship is formed almost immediately when the risks are over (Sheikh et al., 2020).

C) According to other literature, the monetary policy of the US Federal Reserve, especially the contractionary policy in times of inflation by increasing interest rates, raises the opportunity cost of holding gold. Due to the returns on the dollar, which attracts demand, as opposed to gold that fails to earn income, interest rates become a determining, commanding variable (Singhal et al., 201).

D) Some studies focus on central bank policies aimed at reducing reliance on the US dollar by increasing gold reserves, as seen in countries such as Russia, China, and India (Sjaastad, 2008).

Theoretical Framework:

First: The Nature of Gold and Its Economic Importance:

Since ancient times, precious metals, especially gold, this relatively rare and non-perishable metal, have held great importance for humans due to their various uses, such as jewelry and ornamentation, as well as a means of saving across different fields, being a form of wealth (Al-Rifai, 2023). Gold is also considered a safe haven for investors against market fluctuations and represents wealth for both individuals and nations. It holds significant importance in the overall economy and has developed its own exchange market like other assets. Many regard it as a secure investment (Abdelmalek & Benlagha, 2023). Dr. Nasser Qalaoun, Professor of Political Economy and an energy and metals expert based in London, states that gold is “a safe investment for companies; however, when stock, bond, and real estate markets are thriving and stable, investors tend to shift from gold as a safe haven to investments in high-yield stocks, as Silicon valley companies in the US or oil companies in the Gulf. Gold maintains the wealth but does not

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contribute to the increase of it considerably when the economic performance of a country is high (Maazouz and Zarrouqi, 2015).

Determinants of Gold:

A) **Supply and Demand**: Gold being a commodity is enforced by the forces of supply and demand; the higher the demand, the higher its value, and vice versa (Ahmed, Kashif, and Feroz, 2017).

B) **Interest rates, Inflation, and Currencies**: Economic decisions are very important, in case the inflation rates and interest rates are high, the prices of gold are likely to increase. On the issue of currencies, when they become weak in value, prices of gold automatically rise.

C) **Geopolitical Changes**: Wars, political instability, conflicts and crises cause the increase of the global gold prices, which occurred in the case of the Russia-Ukraine crisis. In such conditions, investors avoid high-risk assets and prefer holding gold bullion (Akbar, Iqbal, & Noor, 2019).

The renowned Irish writer George Bernard Shaw recognized the importance of gold in the economy. In his book The Intelligent Woman's Guide to Socialism and Capitalism, he stated: "You must choose between trusting the natural stability of gold and the natural stability of the honesty and intelligence of government officials. With all due respect to those gentlemen, I advise you to vote for gold as long as the capitalist system remains in place" (Algebaly & Aldin, 2025).

Economic Importance of Gold:

1. A Safe and Excellent Saving Option: Gold is considered a safe haven for both individuals and companies during times of war, as it is distinguished from other commodities by its high value and ease of portability, especially if people are forced to move from unstable to safe areas. For governments, gold plays a crucial role during wars and crises in mitigating the effects of conflicts and sanctions, as seen in Russia's increase in gold reserves to reduce the impact of

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economic sanctions resulting from the Russia–Ukraine war (Rashad Abdul Qadir & Mahmoud Alam, 2024).

2. A Safe and Reliable Investment: Gold is regarded as a secure investment for individuals and companies, particularly during wars and crises. However, in times of economic and political stability, investment shifts toward financial markets and business sectors. In these instances, gold is more of a store of wealth and not a way of multiplying the same (Maazouz and Zarrouqi, 2015). Moreover, gold has other applications; in developed nations, it is applied in high-technological and space industries, whereas in developing nations, it is mostly employed in jewelry and adornment (Arouri, Lahiani, and Nguyen, 2015).

Second: What the US Dollar Is and What Economic role it plays:

The significance of the US dollar is explained by its position as the most important currency in terms of funding the international trade and investment. It is strong in that it is the primary reserve currency in the world, which gives it unmatched global stability. The majority of the central banks in the world store most of their reserves in US dollars to sustain their economies and increase their credibility (Arshad, 2025).

The US economy is highly diversified, has a high portion of the global economy, and is the foundation of the strength of the dollar. It is also backed by well organized and powerful financial and investment markets and the strength of the monetary institutions like Federal Reserve which enhances trust in the dollar and political stability (Algebaly & Aldin, 2025).

Factors Affecting the Global Position of the Dollar:

A) Economic Stability: Stable economies are usually the ones with moderate levels of inflation, acceptable unemployment levels, and almost full employment. With these stable conditions, capital flows are encouraged by positive

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expectations by investors that have optimistic views on the currency, a factor that reflects well on the currency strength and position (Jain and Biswal, 2016).

B) Balance of Payments. Excess supply will give rise to a strong currency because high exports will demand high currency supply. On the other hand, deficit undermines the currency because of the necessity of the inflow of foreign currency to finance imports (Jaffe, 1989).

C) Interest Rates: Since the Fleming model shows, the high interest rates encourage foreign capital inflow that demand higher returns, thus, increasing the demand on the currency and raising its value, and the opposite (Manzli et al., 2025).

D) Political Stability: Economic stability, uncertainty reduction, and optimistic expectations among investors and businesspeople are all outcomes of political stability through the provision of a safe environment. This increases the value of the currency, and political instability results in the investors moving to safer spaces and resources and depreciates the currency (Singhal et al., 2019; Kumar, 2017).

E) Reserve Status: the status of the US dollar as an internationally accepted reserve currency makes the currency more in demand, hence enhancing its international value. The popularity of its application in the financing of international transactions makes it robust, influential, and credible in the international economy (Reboredo and Rivera-Castro, 2014).

Economic Importance of US-Dollar (Thakolsri, 2021):

A. Its effect on international trade.
B. Its effect on domestic industries

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C. Its role in tourism and services
D. Its impact on foreign investments.
E. Its relevance in macroeconomic aspects.

Third: The correlation between the US Dollar and the price of gold:

It is necessary to take into account the history of the US dollar and gold to determine the connection between them. The Bretton Woods system was instituted in 1944, according to which gold was pegged to the US dollar by a fixed rate of 35Pounds per ounce, and other currencies were pegged to the dollar since they could be converted to gold. This system contributed to the dollar being the major reserve currency in the world. But as a result of the Nixon shock and the economic issues that followed especially inflation and stagnation, this connection was eventually dropped, and the Bretton Woods system dissolved, giving way to floating exchange rates. This relationship has been evolving throughout history, which may be characterized by several stages (Maazouz & Zarrouqi, 2015):

A) The Period from 1943 to 1972 (Gold Standard). During this period, the relationship was clearly inverse due to the direct linkage between the dollar and gold.

B) The 1973-1997 (Post-Gold Link): With the abandonment of the gold standard the relationship was more complex, it was even inverting (19831987) and at other times direct (19881992). This was oscillating due to the monetary policies and geopolitical risks. Therefore, the assumption of a strictly negative correlation is a simplistic view of the economic facts (Branson, 1981). Overall, the correlation between the dollar and gold is competitive and usually negative, according to the principles of the market. Given that gold is traded internationally in US dollars, the stronger the dollar the less dollars are required to buy gold and vice versa. Besides, in cases where the dollar performs well, it becomes more appealing as an investment asset since other assets with dollar-related returns are more attractive, and thus it is more attractive than gold (Gokmenoglu and Fazlollahi,

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2015). Meanwhile, gold is also a safe haven whenever the dollar is being volatile, since it is likely to maintain its value even in times of crisis, particularly in inflationary periods, when other dollar-denominated assets are being devalued. The association between the gold and the dollar has been compared to a dance, as one increases, the other tends to decline showing a reciprocal and an overall negative relationship (Ingalhalli and Reddy, 2016). Thus, the dynamics of gold prices cannot be studied without paying close attention to the developments in the dollar, although other factors affecting the price also need to be considered due to the complexity of the world markets (Phylaktis and Ravazzolo, 2005). Nevertheless, the relationship becomes positive at times, and this can be seen in 2023 and 2024, when both the dollar and gold were strong. Gold was at record highs and the dollar index also exhibited strength. This concurrent increase can be explained by a number of facts, among which are the increased geopolitical risks, including the conflict of Russia and Ukraine, as well as the situation in the Middle East, which made investors uncertain. Moreover, purchases by the central banks, especially in China, Russia, and emerging markets, led to an increased demand in gold. In spite of the contractionary measures by the Federal Reserve, the investors feared the chronic inflation and thus invest more in gold. Although increasing interest rates generally have a negative effect on gold, the market anticipations of persistent inflation strengthened the status of the gold as a safe haven (Capie, Mills, and Wood, 2005).

Practical Section:

A) Phase of Statistical Data Collection:

Table (1): Data on the Impact of US Dollar Prices on Global Gold Prices from 1990 to 2026. Gold price is considered the dependent variable, influenced by changes in the US dollar index on an annual basis.

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Table (1): Gold Data and US Dollar Index

Year	Average Gold Price (USD/oz)	Dollar Index	Geopolitical Risks & Crises (Dummy Variable)	Direction of Relationship	Notes
1990	383	91.0	1	Direct	Gulf War II increased uncertainty
1991	362	87.0	1	Direct	Gulf War II and the collapse of the Soviet Union
1992	344	85.5	1	Direct	European monetary crisis reduced investor confidence
1993	359	93.0	1	Direct	Strong demand from China, India, and emerging markets
1994	384	90.0	1	Direct	Federal Reserve raised interest rates
1995	384	84.5	1	Direct	Bosnia and Herzegovina war and transition in Russia
1996	387	87.8	0	Inverse	Stability and dominance of the traditional relationship
1997	331	94.0	0	Inverse	Stability and dominance of the traditional relationship
1998	294	98.2	0	Inverse	Stability and dominance of the traditional relationship
1999	278	101.5	0	Inverse	Stability and dominance of the traditional relationship
2000	279	110.0	0	Inverse	Stability and dominance of the traditional relationship
2001	271	115.0	0	Inverse	Stability and dominance of the traditional relationship
2002	310	108.0	0	Inverse	Stability and dominance of the traditional relationship
2003	363	94.5	0	Inverse	Stability and dominance of the traditional relationship
2004	409	88.0	0	Inverse	Stability and dominance of the traditional relationship
2005	444	87.0	0	Inverse	Stability and dominance of the traditional relationship
2006	603	85.5	0	Inverse	Stability and dominance of the traditional relationship
2007	695	80.0	0	Inverse	Stability and dominance of the traditional relationship

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2008	871	77.0	1	Direct	Global financial (mortgage) crisis increased uncertainty
2009	972	80.5	1	Direct	Global financial crisis increased uncertainty
2010	1224	81.0	1	Direct	Continued impact of the financial crisis
2011	1571	76.5	0	Inverse	Stability and dominance of the traditional relationship
2012	1668	80.0	0	Inverse	Stability and dominance of the traditional relationship
2013	1411	81.5	0	Inverse	Stability and dominance of the traditional relationship
2014	1266	85.0	0	Inverse	Stability and dominance of the traditional relationship
2015	1160	96.0	0	Inverse	Stability and dominance of the traditional relationship
2016	1248	98.0	0	Inverse	Stability and dominance of the traditional relationship
2017	1257	96.5	0	Inverse	Stability and dominance of the traditional relationship
2018	1268	95.0	0	Inverse	Stability and dominance of the traditional relationship
2019	1392	97.5	0	Inverse	Stability and dominance of the traditional relationship
2020	1770	93.0	1	Direct	COVID-19 crisis
2021	1799	92.5	1	Direct	COVID-19 caused recession and investor concerns
2022	1800	104.0	1	Direct	Russia–Ukraine war
2023	1940	103.5	0	Inverse	Stability and dominance of the traditional relationship
2024	2350	104.5	0	Inverse	Stability and dominance of the traditional relationship
2025	2750	102.0	0	Inverse	Stability and dominance of the traditional relationship
2026	2900	101.5	1	Direct	Geopolitical risks due to Middle East conflict

Source: Prepared by the researcher based on:

1. OPEC
2. World Gold Council

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B)A. D. F. for Stationarity:

- US Dollar Index as an Independent Variable: It is considered the influencing and causal factor in changes in gold prices, since gold is priced in US dollars. Therefore, any strengthening or weakening of the dollar directly affects gold prices.

Table (2): Shows the stationarity test at level (before differencing) for the independent variable, which is the US dollar index.

			statistics	Prob.
A D.F FOR USA I(0)			-2.330247	0.1686

Based on the data in the above table, it is evident that the time series is non-stationary at level according to the Augmented Dickey-Fuller (ADF) test. Relying on the statistical analysis results at significance levels of 1% and 5%, all calculated values are smaller than the critical values, indicating non-stationarity of the time series. Since the calculated t-values are less than the critical values, the first difference of the time series was taken. Accordingly, the researcher concluded that the absolute calculated values became greater than the critical values at the 5% significance level, leading to the acceptance of the alternative hypothesis, which indicates that the time series has become stationary.

Table (3) shows how stationarity was achieved after taking the first difference.

			t-Statistic	Prob.
A D F FOR US A I(1)			-4.224540	0.0021

(Source: Outputs from EViews, Version 10)

Results of the Dependent Variable Test (Gold Price), since it is affected by the strength or weakness of the US dollar, before differencing:

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Table (4): Non-stationarity at level.

			t-Statistic	Prob..
A D F FOR THE GOLD I(0)			1.189204	0.9972

(Source: Outputs from EViews, Version 10)

Based on the data in the above table, it is clear that the time series is non-stationary at level according to the Augmented Dickey-Fuller (ADF) test. Relying on the statistical analysis results at 1% and 5% significance levels, all calculated values are smaller than the critical values, indicating non-stationarity of the time series. Since the calculated t-values were less than the critical values, the first difference of the time series was taken. The researcher found that the absolute calculated values became greater than the critical values at the 5% significance level, leading to acceptance of the alternative hypothesis, indicating that the time series had achieved stationarity.

Table (5) shows how stationarity was achieved after taking the first difference.

			t-Statistic	Prob.
A D F FORR GOLD I(1)			-3.724009	0.0081

(Source: Outputs from EViews, Version 10)

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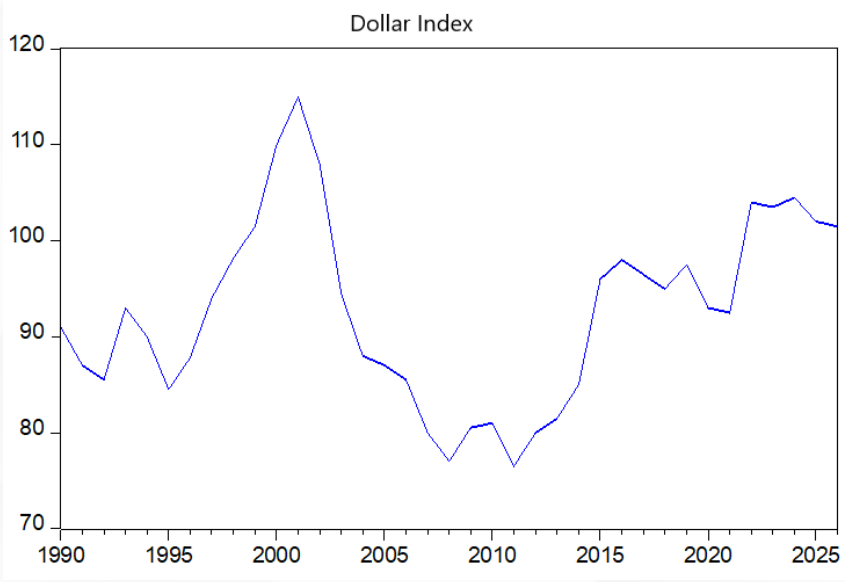

C) Graphs: Figure 2: Global US Dollar Index Data.

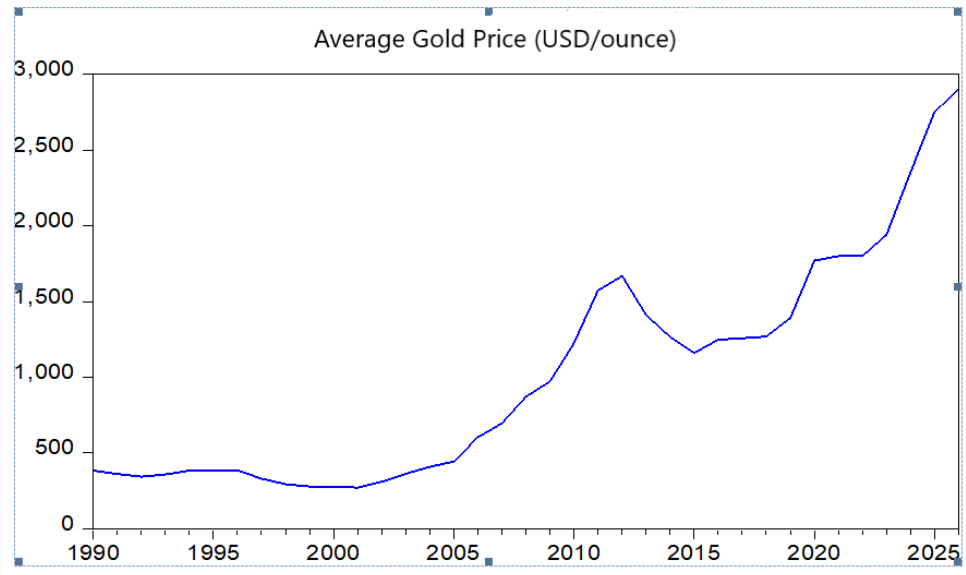

Figure 3: Movement of Gold Price Data.

(Source: Outputs from EViews, Version 10)

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Fifth: Estimation Using the ARDL Model

Table (6) shows that the ARDL model indicates an inverse relationship between gold prices and the US dollar over the period 1990–2026, as evidenced by the negative coefficient consistent with economic theory. The short-term effect of the dollar is not statistically significant in this sample, reflecting the lack of immediate gold response to changes in the dollar. Moreover, gold is influenced by its own past values, indicating persistence and stability in gold price increases (Wang et al., 2011).

Variab.le	Coefficient	Std-. Error	t-Statistic	P.
GOLD(-1)	1.581134	0.186298	8.487102	0.0000
GOLD(-2)	-0.900978	0.332523	-2.709518	0.0114
GOLD(-3)	0.377613	0.204882	1.843080	0.0759
USD	-6.275234	4.593690	-1.366055	0.1828
USD(-1)	6.671593	4.491067	1.485525	0.1486
C	-30.98123	216.0208	-0.143418	0.8870
R2	0.977523	Mean d. v>		1070.824
Adjusted R2	0.973509	S.D. de.t v.		746.5595
S.E.	121.5112	A I C		12.59667
Sum squared resid	413419.1	S.C		12.86603
Log l	-208.1435	H.Q		12.68853
F-statistic	243.5382	D-W		1.919235
P (F..statistic)	0			

(Source EViews, Version 10)

Statistical Evaluation of the Model:

- **R-squared Explanation:** The coefficient of determination indicates the explanatory power of the independent variable, the US Dollar Index, as it explains 97% of the total variation in the dependent variable, gold price. The remaining variation is attributed to other factors (Reboredo & Rivera-Castro, 2014).

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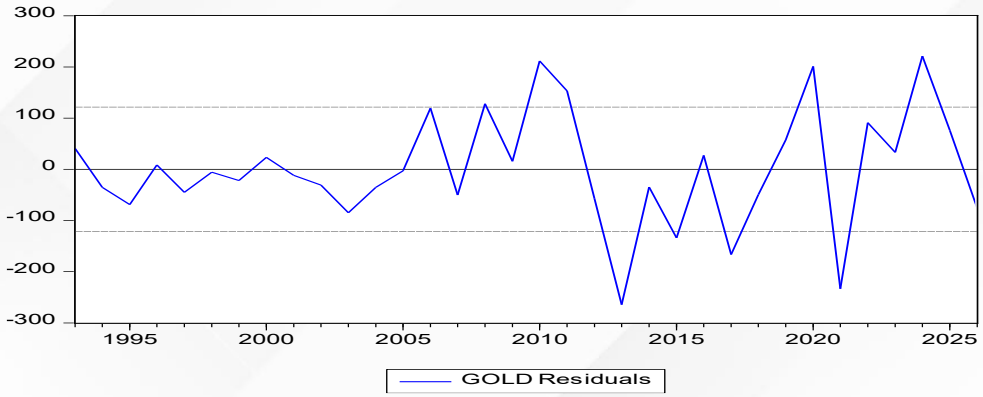
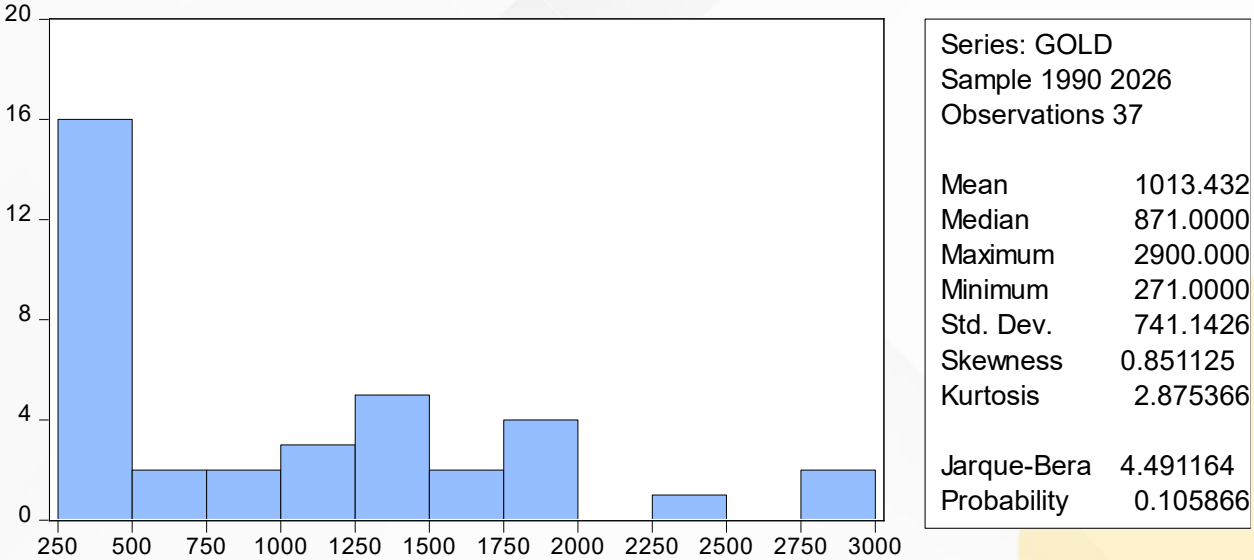
- **Adjusted R-squared Explanation:** The adjusted R-squared indicates a high predictive ability of the model, as it is very close to the R-squared value of 97% (Manzli et al., 2025).
- **Diagnostic Tests:** A) **Normality Test:**

Figure 4 shows the normality test for the residuals, indicating that some observations fall outside the confidence bounds.



(Source: Outputs from EViews)

Table (7) shows the normal distribution of the data.



(Source: Outputs from EViews)

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To assess how closely the data follow a normal distribution, the program (EViews) used the normality criterion. The decision rule for accepting the null hypothesis is based on the p-value: if it is greater than 0.05, the variable follows a normal distribution. Based on the above tables, all variables follow a normal distribution, as all p-values are greater than 0.05. Therefore, there is no problem with normality.

- **Variance Stability (Homoscedasticity):**

Table (8) confirms that the random errors in the study have a constant variance over time.

- Null hypothesis: No variance exists; the model is valid if $p > 0.05$.
- Alternative hypothesis: Variance exists; the problem must be addressed if $p < 0.05$.

Test: Breusch-Pagan-Godfrey			
F-statistic	1.750089	Prob. F(5,28)	0.1560
ObSSSsR-squared	8.095553	Prob. Chi-Square(5)	0.1510
Scaled explAained SS	6.132848	Prob. Chi-Square(5)	0.2935

(Source: Outputs from EViews, Version 10)

Since the p-value is greater than 0.05, there is no problem with variance stability; the null hypothesis is accepted, and the alternative hypothesis is rejected.

- **Autocorrelation Test:**

Table (9) shows the correlation or relationship between the random errors, with two hypotheses:

- Null hypothesis: No autocorrelation exists between the random errors if $p > 0.05$.
- Alternative hypothesis: Autocorrelation exists between the random errors and must be addressed if $p < 0.05$.

Breusch-Godfrey Serial Correlation LM Test:	

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F-statistic	0.495019	Prob. F(2,26)	0.6152
ObsR-squared	1.247175	Prob. Chi-Square(2)	0.5360

(Source: Outputs from EViews, Version 10)

Since the p-values are greater than 0.05, there is no problem of autocorrelation, indicating the model's coefficients are efficient in measuring the relationship between the US dollar and gold.

- **F-Test:**

Table (10) shows the F-test, which determines whether the independent variables affect the dependent variable, gold. The interpretation is as follows:

- Null hypothesis: All coefficient values equal zero, meaning they have no effect on the dependent variable.
- If F-prob < 0.05, the relationship is statistically significant, indicating an effect of the independent variables on gold. The opposite applies for the alternative hypothesis.

Variable	Coefficient	Std. Error	t-Statistic	P.
C	-30.98123	216.0208	-0.143418	0.8870
GOLD(-1)	0.057769	0.041351	1.397027	0.1734
USD(-1)	0.396359	2.348764	0.168752	0.8672
D(GOLD(-1))	0.523365	0.199663	2.621233	0.0140
D(GOLD(-2))	-0.377613	0.204882	-1.843080	0.0759
D(USD)	-6.275234	4.593690	-1.366055	0.1828
p-value incompatible with t-Bounds distribution.				
Levels Equation				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
USD	-6.861102	42.08609	-0.163025	0.8717
C	536.2957	3795.033	0.141315	0.8886

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EC = GOLD - (-6.8611USD + 536.2957)				
F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-.sTtatistic	2.197364	10 %	3.02	3.512
k	1	5 %	3.62	4.1
		2.5 %	4.18	4.7129
		1 %	4.94	5.5228
Actual Sample Size	3 4		Finite Sample: n=35	
		10 %	3.21	3.337
		5 %	3.911	4.33
		1 %	5.7	6.334
			Fin1ite Sa1mple: n=30	
		10 %	3.3	3.7
		5 %	4.1	4.6
		1 %	6.02	6.7

(Source: Outputs from EViews, Version 10)

Since the calculated F-value is smaller than both the lower and upper bounds, this indicates that there is no long-term equilibrium relationship.

- **Error Correction Model (ECM):**

Table (11) shows whether a long-term relationship exists between gold and the US dollar, representing the outcome of the researcher's effort.

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Variable	C.nt	Std. Errrror	t-Sstatistic	p.
DLOG(GOLD(-1))	0.386151	0.150879	2.559349	0.0158
DLOG(USD)	-0.735963	0.326101	-2.256854	0.0315
CointEq(-1)*	0.007406	0.003217	2.301729	0.0285
R2	0.415168	Mean dependent var		0.059452
Adjusted R2	0.378616	S.D. dependent var		0.118455
S.E.	0.093376	A IC		-1.822554
A asfefef	0.279009	S C		-1.689238
Logg	34.89469	H Q C.		-1.776533
D W	1.993066			
* p-value incompatible with t-Bounds distribution.				
F-BoundsS TeSSst		Null Hypothesis: No levels relationship		
Test StatisticS	Value	Signif.	I(0)	I(1)
F-statisticS	1.655612	10%	3.02	3.51
k.	1	5%	3.62	4.16
		2.5%	4.18	4.79
		1%	4.94	5.58

(Source: Outputs from EViews)

It was concluded that the CointEq(-1) value shows that the US dollar has a significant and inverse effect on gold prices globally in the short term. This reflects gold's high sensitivity to other global variables, whose effects are greater than that of the dollar, resulting in a fluctuating long-term relationship.

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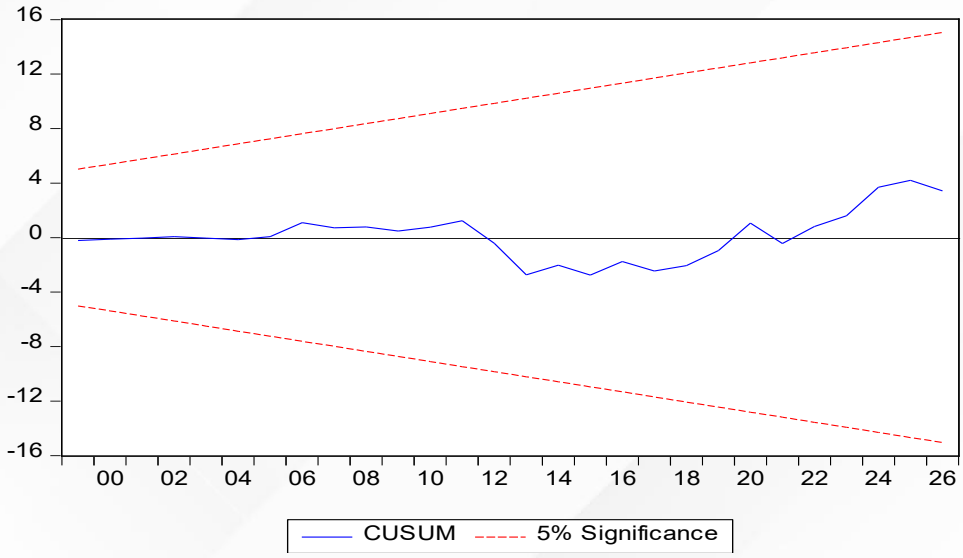
- **CUSUM Test:**

Figure 5 shows the confidence bounds.



(Source: Outputs from EViews)

Since the data did not exit the confidence bounds, this indicates that the model's parameters are statistically significant.

- **Johansen Co-integration Test:**

Table (12) shows the Johansen test, which examines the existence of a long-term equilibrium relationship between the two variables.

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.
None	0.261333	10.71641	15.49471	0.2295
At most 1	0.003270	0.114653	3.841466	0.7349
Trace test indicates no cointegration at the 0.05 level				
denotes rejection of the hypothesis at the 0.05 level				
MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				

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Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.
None	0.261333	10.60176	14.26460	0.1753
At most 1	0.003270	0.114653	3.841466	0.7349
Max 0.05 level				
denotes rejection of the hypothesis at the 0.05 level				
MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegrating Coefficients (normalized by b'S11b=I):				
LOG(GOLD)	LOG(USD)			
-0.774473	7.911222			
1.259175	6.366618			
Unrestricted Adjustment Coefficients (alpha):				
D(LOG(GOLD))	0.020110	0.005039		
D(LOG(USD))	-0.024439	8.16E-05		
1 Cointegrating Equation(s):		Log likelihood	96.95582	
Normalized cointegrating coefficients (standard error in parentheses)				
LOG(GOLD)	LOG(USD)			
1.000000	-10.21498			
	(3.92777)			
Adjustment coefficients (standard error in parentheses)				
D(LOG(GOLD))	-0.015575			
	(0.01313)			
D(LOG(USD))	0.018927			
	(0.00572)			

(Source: Outputs from EViews, Version 10)

The Johansen cointegration test showed a negative coefficient for the US dollar, consistent with the research hypothesis of an inverse relationship, even though this relationship is unstable in the long term due to other structural factors affecting gold prices, weakening the dollar's strong influence and resulting in long-term disequilibrium.

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Results:

1. There is an inverse relationship between the US Dollar Index and global gold prices, but it fluctuates in the long term, consistent with the research hypothesis.
2. Converting the data to logarithmic form highlighted its importance in achieving longterm equilibrium and cointegration.
3. The effect of the US Dollar Index on gold prices is strong, explaining 97 per cent of the variation according to the R-squared coefficient, which is an excellent value.
4. Evidence of longterm cointegration exists.
5. The longterm relationship may fluctuate and even become positive due to geopolitical risks or major economic crises, as investors view both gold and the dollar as safe havens.
6. Although the formal gold-dollar link ended with the Nixon crisis in 1972, the relationship persists informally.
7. Investors turn to gold as a safe haven during crises and economic or political uncertainty.
8. Gold remains a successful form of saving for individuals and companies, yielding profits in prosperous times and preserving wealth during crises.

Recommendations:

1. Businesspeople and investment firms should monitor the gold index as a strong indicator of global gold price movements, while considering other influential factors. Diversification of investment portfolios is mandatory to reduce the risks due to the variability of the relationship and hedging.
2. The monetary authorities are expected to make their choices work in line with the gold prices since the local currency strength is pegged on the dollar as the most widespread reserve currency across the globe as well as the gold reserves with US having the highest world reserve of the same.

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3. Oil-producing countries, especially Iraq, should establish sovereign wealth funds using financial surpluses from oil sales to build substantial gold reserves as a safeguard against economic crises and geopolitical risks.
4. It is recommended to use gold and currencies linked to gold to reduce economic dependence on the dollar.
5. To prevent local currency depreciation, an adequate gold backing for the currency is necessary.
6. Authors should conduct further studies to monitor the impact of gold price volatility on local economies and its negative effects on citizen welfare.
7. In cases of worsening crises, high inflation, or financial market instability, gold should be prioritized as a wealth preserving safe haven.
8. The economies which aspire to become economically self reliant and less reliant on the external world have to accumulate their reserves of gold as it was demonstrated in China, India and Russia.

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