International Research Journal of Multidisciplinary Scope (IRJMS), 2025; 6(1):1073-1082 IRJMS

Original Article | ISSN (O): 2582-631X DOI: 10.47857/irjms.2025.v06i01.02231

Research Model for Flow Fluctuations in Global Economy Trend: US Dollar, Gold, and Bitcoin

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Abstract

In the global economy, money and assets are essential. Currency market fluctuations significantly impact the global economy, gaining increasing attention worldwide. This study focused on the US dollar as a key currency, gold as a safe asset, and bitcoin as a virtual currency, which all have great value in money and assets. This study aims to model flow fluctuations among the US Dollar, gold, and bitcoin. The research objective is to analyze the interaction effects of the US Dollar, gold, and bitcoin through the volatility modeling. This study utilized two-way ANOVA to analyze the trend of market fluctuations in the US dollars, gold, and bitcoin and whether the fluctuations in their market price affect their interaction with each other using a research model for flow fluctuations. The study examined the market price fluctuation rate of the US dollar, gold, and bitcoin by setting dependent and independent variables for the interaction analysis. The between-subjects test effects revealed that in all three cases, the main effect and the interaction effect of the two variables appear. The points appear irregularly in the profile plots in all three cases, indicating a significant interactive effect. The study's findings show that the market price fluctuation rates of the US dollar, gold, and bitcoin interact and influence each other, implying the need for further studies on flow fluctuations analysis of the US dollar, gold, and bitcoin to this underexplored concept in global economy trend research.

Keywords: Bitcoin, Flow Fluctuations, Global Economy, Gold, Research Model, US Dollar.

Introduction

Since the 2008 global financial crisis, the growth of the global economy has declined, and its recovery has been slow. The current situation is no different, as the global economy encounters issues with economic stimulus measures and increased liquidity caused by the COVID-19 pandemic, resulting in an era of uncertainty and slow growth. Structurally, the globalization trend that has lasted more than a century is shrinking. Technical factors, such as the development of transportation and communication for the progress of globalization and open or liberal policies, are crucial to this trend. Globalization led to universal globalization and regional economic integration across the world at the same time. The worsening global economic downturn can be attributed to the concept that a global economic system based on multilateralism can be difficult to handle efficiently. Hence, economic integration and political instability are likely to occur due to the side effects of globalization and deepening economic inequality. Additionally, it is difficult to expect economic benefits from economic integration. The global debt-to-equity ratio could act as a cause of instability. It could continue to lead to a bubble burst. During the liquidity reduction and growth slowdown, companies and households will begin to reduce their debt ratios, and financial instability could arise as players with weak repayment capabilities fall into crisis. Globally, major international organizations, such as the IMF and the World Bank, recommend that monetary and fiscal policies be used together rather than relying on monetary policy as in the past as a macroeconomic adjustment policy. The recent global supply shock significantly impacts the global economy. Supply shock means that the price of goods and services changes as the supply of goods suddenly increases or decreases in terms of supply. This sudden change affects the equilibrium price change. The recent serious disruptions in the global supply chain lead to uncertainty as pressure on the supply chain continuously increases. The supply chain crisis immensely affects the global economy and has various ripple effects on related industries and

(Received 30th August 2024; Accepted 22nd January 2025; Published 31st January 2025)

regions. The U.S. dollar has been affected by the recent turmoil in financial markets (1). US dollar is the most widely held currency in the world (2). The proposal that a reformed international monetary system be designed around currency blocs has gained some popularity of late (3). In recent years, the economic determinants of international currency status have attracted growing attention among economists (4). Crude oil prices as well as US dollar exchange rates affect international agricultural commodity and fertilizer prices (5). Crude oil prices are the nonlinear Granger-cause of the USD exchange rate, but not vice versa (6). The dollar can fulfill all of the six required functions of a key currency in an unsurpassed way (7). Expectations of a fundamental change in the international role of the dollar are increasingly widespread (8). A positive association of BSI with Bitcoin's returns and volume, but a negative relationship with its return volatility (9). Economic uncertainty generates direct impacts on the correlation between gold and the dollar (10). Bitcoin represents one of the most interesting technological breakthroughs and socio-economic experiments of the last decades (11). Market forces and BitCoin attractiveness for investors and users have a significant impact on BitCoin price (12). Bitcoin returns have no exposure to common stock and bond market factors but rather are affected by Bitcoin-specific and external uncertainty factors (13). For a long time, gold investment has been regarded as an effective means to resist inflation and other economic uncertainties (14). Gold is a strong safe haven and a hedge for the oil market, while Bitcoin serves as a diversifier for the oil market during the COVID-19 period (15). Both gold and cryptocurrencies can be hedge and diversifiers for other traditional asset classes such as crude oil, fiat currencies, and other commodities (16). In recent years the development of cryptocurrencies and wider implementations of blockchain technology have been valourized as digitally decentralized networks that dissipate control evenly among their peers (17). Countries can grasp the trends in Bitcoin and gold prices to prevent large fluctuations in both markets and to reduce the uncertainty of the financial system (18). Bitcoin and its peculiar, decentralized transaction system, have already ignited interest by professional and retail traders in search for profits and by economists and legal experts, looking for possible regulation to contain illegal uses (19). Collective units should understand Bitcoin growth models to determine whether to accept Bitcoin transactions (20). Interestingly, results from the Wavelet Granger causality tests show no causality between the raw series of Bitcoin, Ethereum, and Litecoin prices (21). Digital technology developments shape the behaviour, performances, standards of society, organizations and individuals imposing new ways of payments and new forms of money (22). The digital asset economy evolves rapidly (23). Analyzing the gold market through a new perspective is crucial to forming a rational investment arrangement (24). Bitcoin is an entirely digital distributed currency, the disruptive and disintermediating nature of which has fueled the tremendous growth of the financial technology space over the past few years (25). In its first decade, Bitcoin has not proven to be a practical money form for most circumstances, but it has become a staging ground for debate around the cultural role of money in society (26). We noted that the US dollar, gold, and bitcoin are widely used as currencies in financial markets worldwide. Recently, interest in the US dollar, gold, and bitcoin has been growing in financial markets worldwide, and it is expected that their value will grow even more in the future. Hence, this study examines the trend of market fluctuations in the US dollar, gold, and bitcoin in the global economy. Specifically, this paper analyzes whether market price fluctuations in US dollars, gold, and bitcoin affect interactions with each other. Based on the findings, we discuss and present the interaction of market fluctuations in the US dollars, gold, and bitcoin.

Actual Tendency for the US Dollar, Gold, and Bitcoin

The international monetary system encompasses intersubjective perceptions and official rules about the composition and management of money used in the global economy. Since economic transactions are carried out through money in a capitalist market economy, the international monetary system functions to unite each country's economies. The international monetary system is formed and maintained based on a specific international order. It is used as a key currency worldwide and can be called a single currency system. The US dollar has become a solid key currency for the international economy, and US

monetary policy has been prioritized to achieve the international goal of stabilizing the international monetary system. As a key currency country, the United States has solved the global liquidity crisis through its role as an international final lender. If the financial market is confused, and the global economy is uncertain, safe assets without risks of use, such as gold, are preferred. Thus, including gold in the portfolio can disperse the risk of financial assets. It is common to see gold prices rise whenever the function of each country's currency is shaken because gold is one of the most made-a-deal products in the world. The worldwide demand for gold is primarily used for four purposes: (a) gold is held by central banks worldwide as part of foreign exchange reserves. The United States' gold reserves are the largest in the world's central bank; (b) jewelry and gold bars are owned and sold by the private sector; (c) industrial consumption; and (d) investment. The price of gold considers major financial markets' prices, exchange rates, transportation costs, insurance premiums, and other fees. The deal with gold is closely related to the storage of gold. Here, the institution that announces the base price of gold is pivotal in the gold market. Similarly, bitcoin is a virtual currency that receives a lot of attention. Bitcoin exists in the form of encrypted code and is a nominal currency with high anonymity, like cash transactions, but no real value. Bitcoin aims to be used in the real world. Bitcoin has characteristics such as high liquidity, low transaction cost, and anonymity required for currency, but it also has design weaknesses and legal and institutional instability in terms of being a sustainable currency in the long term. In economics, bitcoin has the deflationary characteristics of the money supply. Bitcoin shows very high price volatility, reducing its usefulness as a medium for purchasing. If there is a demand to perform cash-like forms of financial transactions and payment settlements and there is a technology that enables them, bitcoin or other types of virtual currency are expected to ultimately settle in some form.

Methodology

This study utilized two-way ANOVA for the flow fluctuations analysis of the US dollar, gold, and bitcoin. The factor design is an experimental design to investigate the change in the value of the outcome variable according to the change in the level of two or more independent treatment variables, and each treatment variable is called a factor. If the treatment level of Factor A is 'a,' and the treatment level of Factor B is 'b,' this experimental design is called axb factor design. Two-way ANOVA is applied to investigate the treatment effect. Since this study has two treatment levels, it becomes axb factor design and uses two-way ANOVA. In this study, the main effect and interaction effect are shown as treatment effects in the results. Therefore, we decided that the two-way ANOVA model was suitable for fluctuation analysis for the US Dollar, gold, and bitcoin. The main effect is the effect of a change in the treatment variable on the outcome variable, while the interaction effect refers to the effect of the treatment variable on the outcome variable according to the change of other treatment variables.

Analysis of variance is calculated as part of the overall volatility. The formula for the total adjusted sum of squares SS_T is as follows:

$$\sum_{i=1}^{a}\sum_{j=1}^{n}(y_{ij}-\bar{y}_{..})^2=\sum_{i=1}^{a}\sum_{j=1}^{n}[(y_{i.}-\bar{y}_{..})+(y_{ij}-\bar{y}_{i.})]^2 \quad [1]$$

or

$$\sum_{i=1}^{a}\sum_{j=1}^{n}(y_{ij}-\bar{y}_{..})^2=n\sum_{i=1}^{a}(y_{i.}-\bar{y}_{..})^2+\sum_{i=1}^{a}\sum_{j=1}^{n}(y_{ij}-\bar{y}_{i.})^2+2\sum_{i=1}^{a}\sum_{j=1}^{n}(y_{i.}-\bar{y}_{..})(y_{ij}-\bar{y}_{i.}) \quad [2]$$

The formula can be summarized as follows:

$$\sum_{j=1}^{n}(y_{ij}-\bar{y}_{i.})=\ y_{i.}-n\bar{y}_{i.}=\ y_{i.}-n\left(\frac{y_{i.}}{n}\right)=0 \quad [3]$$

In the last equation, the cross-product is zero. Therefore, the formula is as follows:

$$\sum_{i=1}^{a}\sum_{j=1}^{n}(y_{ij}-\bar{y}_{..})^2 = n\sum_{i=1}^{a}(y_{i.}-\bar{y}_{..})^2 + \sum_{i=1}^{a}\sum_{j=1}^{n}(y_{ij}-\bar{y}_{i.})^2 \quad [4]$$

The formula indicates that the total adjusted sum of squares can be divided into the sum of squares between the mean of the treatment and the sum of squares between the mean of the treatment and the difference for the observations in the treatment, plus the sum of the total mean. The difference between the overall mean and the observed treatment means is a measure of the difference between the treatment means, while the difference between the observations in the treatment and the treatment means is only the difference due to probability.

$$SS_T = SS_{Treatments} + SS_E \quad [5]$$

$SS_{Treatments}$ is the sum of squares generated by treatments. SS_E is the sum of squares caused by an error. The research questions in this study are as follows:

- Does gold change as the US dollar changes (α = 0.05)?
- Does gold change as bitcoin changes (α = 0.05)?
- Does bitcoin change as the US dollar changes (α = 0.05)?
- Is there an effect of interaction between the US dollar, gold, and bitcoin (α = 0.05)?

Specifically, the null hypothesis and the alternative hypothesis are as follows:

- H_0: $\mu_1 = \mu_2 = \mu_3 = \mu_4$
  H_1: Not all μ is the same.
- H_0: $\mu_{US\ dollar} = \mu_{Gold} = \mu_{Bitcoin}$
  H_1: $\mu_{US\ dollar} \neq \mu_{Gold} \neq \mu_{Bitcoin}$
- H_0: These have no interaction effect.
  H_1: These have no interaction effect.

Results and Discussion

In this study, we used the Investing.com's the fluctuation rate of US dollar market price (2013-2022), the fluctuation rate of gold market price (2013-2022), and the fluctuation rate of bitcoin market price (2013-2022). All data were utilized a three-month basis over the entire period and analyzed on the price fluctuation rate. We utilized two-way ANOVA for the flow fluidization analysis of the US dollar, gold, and bitcoin. Two-way ANOVA model accounts for temporal changes. Particularly, the following cases were explored in the study:

- Dependent variable: US dollar's market price fluctuation rate

Independent variable: gold's market price fluctuation rate, bitcoin's market price fluctuation rate

- Dependent variable: gold's market price fluctuation rate

Independent variable: US dollar's market price fluctuation rate, bitcoin's market price fluctuation rate

- Dependent variable: bitcoin's market price fluctuation rate

Independent variable: US dollar's market price fluctuation rate, gold's market price fluctuation rate. We conducted correlation analysis to validate dependency for variables. Table 1 describes correlations for gold and bitcoin. Table 2 describes correlations for dollar and bitcoin. Table 3 describes correlations for dollar and gold.

Table 1: Correlations for Gold and Bitcoin

Correlations		Gold	Bitcoin
Gold	Pearson Correlation	1	.300
	Sig. (2-tailed)		.060
	N	40	40
Bitcoin	Pearson Correlation	.300	1
	Sig. (2-tailed)	.060	
	N	40	40

Table 2: Correlations for Dollar and Bitcoin

Correlations		Dollar	Bitcoin
Dollar	Pearson Correlation	1	.021
	Sig. (2-tailed)		.896
	N	40	40
Bitcoin	Pearson Correlation	.021	1
	Sig. (2-tailed)	.896	
	N	40	40

Table 3: Correlations for Dollar and Gold

Correlations		Dollar	Gold
Dollar	Pearson Correlation	1	-.411**
	Sig. (2-tailed)		.008
	N	40	40
Gold	Pearson Correlation	-.411**	1
	Sig. (2-tailed)	.008	
	N	40	40

Note: ** Correlation is significant at the 0.01 level (2-tailed)

First, we set the US dollar's market price fluctuation rate as the dependent variable and the gold's market price fluctuation rate, and bitcoin's market price fluctuation rate as independent variables. Table 4 details the tests of between-subjects effects for gold and bitcoin, showing the main effect of gold's market price fluctuation rate and bitcoin's market price fluctuation rate on the US dollar's market price fluctuation rate and the interaction effect of the two variables. Looking at the interaction effect, "H_1: These have no interaction effect" is rejected with F = 0.000 and p-value = 0.000. In other words, it was found that the market price fluctuation rate of gold and bitcoin has an interaction effect. Figure 1 illustrates that in the profile plots for gold and bitcoin, the dots appear irregularly, demonstrating an interaction effect. Here, since the interaction effect is significant, it can be inferred that it differs from the US dollar's market price fluctuation rate and bitcoin's market price fluctuation rate according to the gold's market price fluctuation rate. Looking at the main effect of the gold price fluctuation rate, "$H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4$" is rejected with F = 0.000 and p-value = 0.000. Hence, there was a difference in the rate of change in the US dollar market price concerning the rate of change in the gold market price. Looking at the main effect of the bitcoin market's fluctuation rate, "$H_0: \mu_{US\,dollar} = \mu_{Gold} = \mu_{Bitcoin}$" is rejected with F = 0.000 and p-value = 0.000. In other words, a difference in the rate of change in the US dollar market price with respect to the rate of change in the bitcoin market price exists.

Table 4: Tests of Between-Subjects Effects for Gold and Bitcoin (Dependent Variable: Dollar)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	257.545[a]	39	6.604	.000	.000	1.000
Intercept	.035	1	.035	.000	.000	1.000
Gold	.000	0	.000	.000	.000	.000
Bitcoin	7.841	1	7.841	.000	.000	1.000
Gold * Bitcoin	.000	0	.000	.000	.000	.000
Error	.000	0	.000			
Total	257.623	40				
Corrected Total	257.545	39				

a. R Squared = 1.000 (Adjusted R Squared = .)

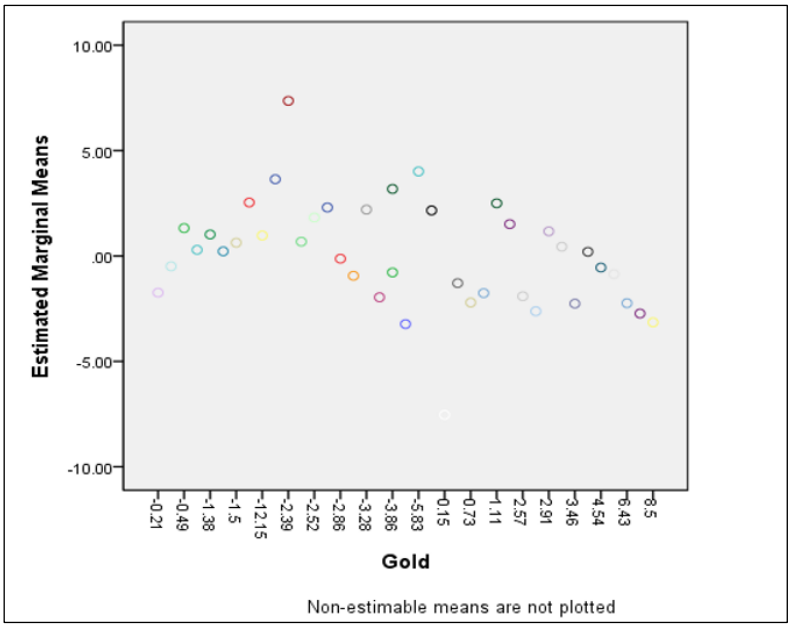

Figure 1: Profile Plots for Gold and Bitcoin

We set the US dollar's market price fluctuation rate as the dependent variable and the gold's market price fluctuation rate and the bitcoin's market price fluctuation rate as independent variables. Table 5 enumerates the tests of between-subjects effects for gold and bitcoin, presenting the main effect of the US dollar's market price fluctuation rate and bitcoin's market price fluctuation rate on gold's market price fluctuation rate, including the interaction effect of the two variables. Looking at the interaction effect, "H_1: *These have no interaction effect*" is rejected with F = 0.000 and p-value = 0.000. In other words, the market price fluctuation rate of the US dollar and bitcoin has an interaction effect. Figure 2 reveals that in the profile plots for the US dollar and bitcoin, the dots appear irregularly, depicting an interaction effect. Here, since the interaction effect is significant, it can be assumed that it differs from the gold's market price fluctuation rate to the bitcoin's market price fluctuation rate according to the US dollar's market price fluctuation rate. The main effect of the US dollar's market price fluctuation rate, "$H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4$," is rejected with F = 0.000 and p-value = 0.000. In other words, there was a difference in the rate of change in the gold's market price concerning the rate of change in the US dollar market price. Looking at the main effect of the bitcoin market fluctuation rate, "$H_0: \mu_{US\ dollar} = \mu_{Gold} = \mu_{Bitcoin}$" is rejected with F = 0.000 and p-value = 0.000. In other words, it was found that there was a difference in the rate of change in the gold market price with respect to the rate of change in the bitcoin market price.

Table 5: Tests of Between-Subjects Effects for US Dollar and Bitcoin (Dependent Variable: Gold)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	659.881[a]	39	16.920	.000	.000	1.000
Intercept	5.048	1	5.048	.000	.000	1.000
Dollar	.000	0	.000	.000	.000	.000
Bitcoin	.000	0	.000	.000	.000	.000
Dollar * Bitcoin	.000	0	.000	.000	.000	.000
Error	.000	0	.000			
Total	664.929	40				
Corrected Total	659.881	39				

a. R Squared = 1.000 (Adjusted R Squared = .)

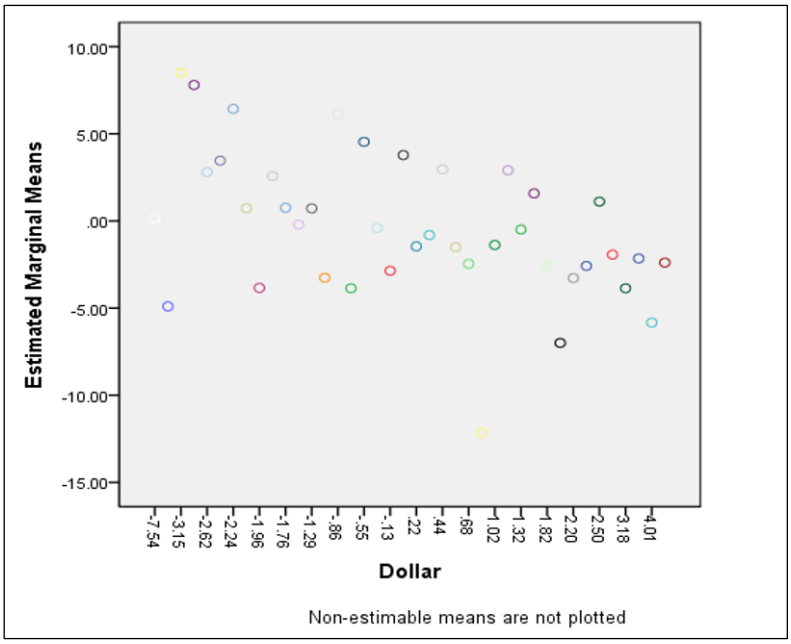

Figure 2: Profile Plots for US Dollar and Bitcoin

We set the bitcoin's market price fluctuation rate as the dependent variable and the US dollar's market price fluctuation rate and the gold's market price fluctuation rate as independent variables. Table 6 describes the tests of between-subjects effects for the US dollar and gold, depicting the main effect of bitcoin's market price fluctuation rate and the US dollar's market price fluctuation rate on gold's market price fluctuation rate, and the interaction effect of the two variables. Looking at the interaction effect, "H_1: *These have no interaction effect*" is rejected with F = 0.000 and p-value = 0.000. In other words, the market price fluctuation rate of the US dollar and gold has an interaction effect. Figure 3 lays out that in the profile plots for the US dollar and gold, the dots appear irregularly, implying an interaction effect. Here, since the interaction effect is significant, it can be assumed that it differs from the US dollar's market price fluctuation rate to the gold's market price fluctuation rate according to the bitcoin's market price fluctuation rate. Looking at the main effect of the US dollar's market price fluctuation rate, "H_0: $\mu_1 = \mu_2 = \mu_3 = \mu_4$" is rejected with F = 0.000 and p-value = 0.000. Hence, the findings show a difference in the rate of change in bitcoin's market price with respect to the rate of change in the US dollar market price. In the main effect of the gold market fluctuation rate, "H_0: $\mu_{US\ dollar} = \mu_{Gold} = \mu_{Bitcoin}$" is rejected with F = 0.000 and p-value = 0.000, which means there is a difference in the rate of change in bitcoin's market price with respect to the rate of change in the gold market price.

Table 6: Tests of Between-Subjects Effects for US Dollar and Gold (Dependent Variable: Bitcoin)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	46337.183[a]	39	1188.133	.000	.000	1.000
Intercept	355.493	1	355.493	.000	.000	1.000
Gold	.000	0	.000	.000	.000	.000
Dollar	170.017	1	170.017	.000	.000	1.000
Gold * Dollar	.000	0	.000	.000	.000	.000
Error	.000	0	.000			
Total	46617.924	40				
Corrected Total	46337.183	39				

a. R Squared = 1.000 (Adjusted R Squared = .)

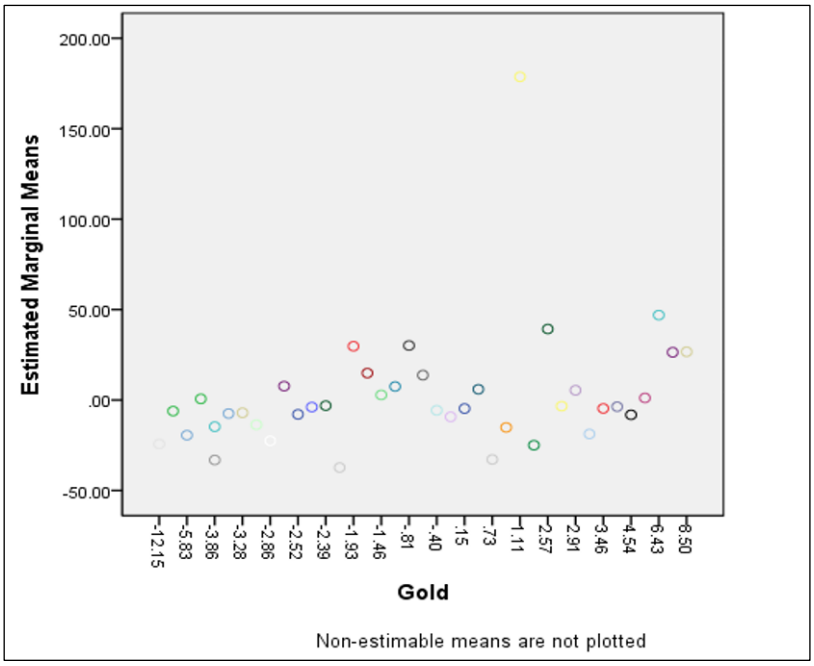

Figure 3: Profile Plots for US Dollar and Gold

In summary, the research findings are as follows:

Dependent variable: US dollar's market price fluctuation rate.

Independent variable: gold's market price fluctuation rate, bitcoin's market price fluctuation rate.

Dependent variable: gold's market price fluctuation rate.

Independent variable: US dollar's market price fluctuation rate, bitcoin's market price fluctuation rate.

Dependent variable: bitcoin's market price fluctuation rate.

Independent variable: US dollar's market price fluctuation rate, gold's market price fluctuation rate.

The effects of the between-subject tests indicated that in all three cases, the main effect and the interaction effect of the two variables appear. In terms of the interaction effect, "H_1: These have no interaction effect" is rejected with F = 0.000 and p-value = 0.000. That is, the dependent variable and the independent variable had an interaction effect. The points appear irregularly in the profile plots in all three cases, suggesting an interactive effect. Here, it can be gleaned that the interaction effect is significant. On the other hand, in the main effect of the dependent variable, "H_0: $\mu_1 = \mu_2 = \mu_3 = \mu_4$" is rejected with F = 0.000 and p-value = 0.000, whereas in the main effect of independent variables, "H_0: $\mu_{US\ dollar} = \mu_{Gold} = \mu_{Bitcoin}$" is rejected with F = 0.000 and p-value = 0.000. The study's results imply that in all three cases, there is an interaction effect between dependent and independent variables. Moreover, the market price fluctuation rates of the US dollar, gold, and bitcoin interact and significantly influence each other.

Conclusion

The international monetary system functions as an institutional basis that enables the operation of the global economy. Therefore, the international monetary system is vital and influential in causing fundamental changes in the global economy. The international monetary system integrates intersubjective perceptions and formal rules applied internationally in the composition and management of money used in the global market. Today, dollar hegemony, which operates the international monetary and financial system, began with the birth of the Bretton Woods system based on gold and fixed exchange rates. With the beginning of the Bretton Woods system, the world expected the US dollar to serve as a stabilizer and final lender to prevent chaos in the global economy. Currently, the international monetary system operates around the US dollar. The US dollar has functioned as the key currency of the international monetary system, and, consequently, the international monetary system has moved, following changes in US monetary policy. The US Treasury bonds, along with the US dollar, function

as the most liquid and stable financial assets in the international financial market.

The gold can be made a deal only when high-purity gold is made through mining and smelting. The gold market is closely connected to the financial market, and active gold transactions are possible only when gold is stored. Some gold futures products enable futures transactions using gold as an underlying asset to hedge the risk of gold price fluctuations. In the long run, it is also necessary to announce the gold standard price, especially since the general price in the market is not considered, even if only one price is found by applying price priority and quantity priority, and unbalanced selling and buying quantities remain. The base price is to find a price in which the market price exists, and there is no unbalanced selling and buying quantity left from the starting price. Here, members who can take over unbalanced quantities are also needed. In worldwide financial instability, gold prices rise rapidly, resulting in investors being more interested in gold products with excellent value storage than currencies with unstable value to prepare for financial market turmoil. As a result, for gold investment, spot investment and future investment are the preferred methods of investors.

Bitcoin cannot be compensated for damage by the government and central banks because it is not a government-recognized legal currency. Therefore, each country argues that a central bank, a management entity that can be managed and supervised in national currency, is essential. Bitcoin continues to be unstable due to sudden changes in its value due to speculation, considering its unique anonymity feature. With cryptocurrency, user personal information is not recorded in the electronic wallet address, and transaction records are also encrypted. The aforementioned characteristics lead to some doubts and challenges in using bitcoin, as reflected in countries' diverse positions on bitcoin. Still, interest in bitcoins increased a lot when the financial crisis occurred around the world. The research suggests the following prospects for bitcoin: First of all, it is expected that the number of bitcoin transaction brokerage service companies will increase worldwide. Thus, the proportion of illegal transactions due to bitcoin's anonymity will decrease. Currently, regulations on bitcoin-related industries that differ from country to country will be similar or standardized internationally. Lastly, bitcoin will be used for payment and remittance, which is expected to grow in the future, and legal relief is needed.

The study conducted a flow fluctuations analysis of the US dollar, gold, and bitcoin to analyze whether their market fluctuations affect each other's interactions. The research utilized two-way ANOVA for accurate flow fluidization analysis and established research hypotheses on the variables' significant relationship. The study examined the market price fluctuation rate of the US dollar, gold, and bitcoin by setting dependent and independent variables for the interaction analysis. The between-subjects test effects revealed that in all three cases, the main effect and the interaction effect of the two variables appear. The points appear irregularly in the profile plots in all three cases, indicating a significant interactive effect. The study's findings show that the market price fluctuation rates of the US dollar, gold, and bitcoin interact and influence each other. The results imply the need for further studies on flow fluctuations analysis of the US dollar, gold, and bitcoin to add to this underexplored concept in global economy trend research.

Abbreviation

Nil.

Acknowledgement

None.

Author Contributions

The author contributed the writing, the visualization, the validation, the supervision, the software, resources, the project administration, the methodology, the investigation, the funding acquisition, the formal analysis, the data curation, and the conceptualization.

Conflict of Interest

The author declares no conflicts of interest.

Ethics Approval

Not applicable.

Funding

This work was supported by Kyonggi University Research Grant 2022.

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