The Effect of U.S. Monetary Liquidity Growth on the Stock Price Index

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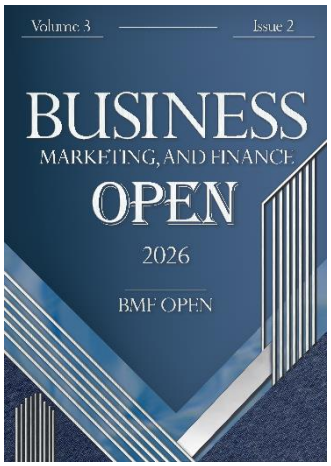

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Abstract: In recent years, the growth of U.S. monetary liquidity has been recognized as one of the key factors influencing fluctuations in asset markets and stock indices, and examining the relationship between monetary policy and the prices of risky assets has become particularly important for investors, researchers, and policymakers. The purpose of this study was to analyze the effect of U.S. monetary liquidity growth on the S&P 500 stock price index over the period from 2016 to 2024 and to examine the statistical significance of this relationship. To achieve the research objectives, a causal-comparative research design was employed, and secondary monthly data were collected from reputable economic and financial sources, including the Federal Reserve Economic Data (FRED) database and Yahoo Finance. The statistical population consisted of all monthly observations of monetary liquidity growth and the S&P 500 stock price index during the specified period, yielding a sample of 108 observations. The data were analyzed using fixed-effects panel models and the Estimated Generalized Least Squares (EGLS) method. Chow, Hausman, F-Limer, and Durbin-Watson tests were also applied to ensure the validity of the estimates and to control for heteroskedasticity and autocorrelation. The results indicated that U.S. monetary liquidity growth had a positive and statistically significant effect on the S&P 500 stock price index, and the main research hypothesis was supported at the 95% confidence level. Specifically, the coefficient of the independent variable was 0.32, with a t-statistic of 20.72, and the model explained approximately 78% of the variation in the stock index. By providing precise empirical evidence, this study clarifies the effect of monetary liquidity growth on the stock index. Furthermore, the application of a fixed-effects panel model and the EGLS method enhances the scientific validity of the data analysis, while the findings provide important practical insights for investors and policymakers regarding liquidity management, reduction of market volatility, and prevention of price bubbles in risky asset markets.

Keywords: liquidity growth, S&P 500 index, stock market, price bubble, monetary policy, econometrics.

1. Introduction

The interaction between monetary conditions and financial asset prices is one of the central issues in modern financial economics because changes in money supply, interest rates, credit conditions, and market liquidity can alter both the discount rates applied to future cash flows and investors' willingness to bear risk. Monetary policy therefore affects not only conventional macroeconomic variables such as output, inflation, and employment, but also the valuation of equities and other financial assets. From a monetary economics perspective, an expansion in broad money can influence financial markets through several interconnected channels, including lower financing costs, portfolio rebalancing, changes in expectations regarding future economic activity, and increases in the

amount of funds available for investment. These mechanisms make monetary aggregates particularly relevant when evaluating periods characterized by rapid asset-price appreciation. The theoretical foundations of monetary-policy transmission emphasize that money, credit, interest rates, expectations, and asset prices constitute mutually connected components of the financial system rather than isolated variables [1]. Consequently, understanding whether growth in monetary liquidity is systematically associated with changes in major equity indices has important implications for financial management, portfolio allocation, risk assessment, and macroprudential policy.

The relationship becomes particularly important when monetary expansion coincides with substantial increases in asset valuations. Asset-price bubbles arise when market prices depart persistently from levels justified by economic fundamentals, often because expectations of further price appreciation become self-reinforcing. Modern theoretical research demonstrates that monetary policy can interact with rational or speculative bubbles in ways that are more complicated than the conventional view that easier monetary conditions necessarily stimulate economic activity without significant financial side effects. New Keynesian analyses have shown that the response of asset-price bubbles to monetary-policy interventions depends on the underlying dynamics of expectations, interest rates, and bubble growth [2]. Related theoretical work has examined how monetary policy interacts with asset bubbles within dynamic macroeconomic environments and how policy choices may influence both bubble formation and broader economic stability [3, 4]. Research incorporating inflation and rational asset-price bubbles has further demonstrated that monetary-policy design cannot be separated from the possibility that financial valuations may contain a bubble component [5]. The connection among bubbles, banking conditions, and monetary policy also highlights the potential for elevated asset prices to interact with financial-system leverage and stability [6].

This theoretical complexity has generated a longstanding debate concerning whether central banks should respond directly to asset-price booms or restrict their attention primarily to inflation and real economic activity. One position emphasizes that monetary authorities face substantial difficulties in identifying bubbles in real time and that aggressive interventions may impose significant costs on the wider economy. An alternative position argues that ignoring persistent asset-price inflation can allow financial imbalances to accumulate and eventually increase the economic costs of market corrections. This debate has been revisited in the context of increasingly large and interconnected financial markets, with particular attention to whether monetary policy should react to asset-price bubbles before they become systemically important [7]. Empirical investigations have likewise questioned whether monetary-policy effectiveness changes during episodes characterized by stock-market bubbles [8] and whether monetary-policy shocks systematically affect the bubble component of stock prices [9]. Evidence also suggests that monetary-policy effects on stock-price bubbles may be asymmetric, meaning that tightening and easing measures need not generate effects of equal magnitude or opposite direction [10]. These concerns are reinforced by models indicating that monetary interventions in an economy containing bubbles may produce unintended effects [11], while recent research has continued to investigate whether monetary policies can themselves contribute to the inflation of stock-market bubbles [12].

Liquidity constitutes a particularly important component of this discussion. An expansion in monetary liquidity can raise the quantity of funds available to households, institutional investors, financial intermediaries, and firms. When the real economy cannot immediately absorb these funds through equivalent increases in consumption or productive investment, part of the additional liquidity may be redirected toward financial assets. Portfolio-rebalancing behavior can consequently increase demand for equities, bonds, property, commodities, and

alternative assets. The macroeconomic consequences of liquidity expansion, however, depend on the composition of monetary aggregates, economic conditions, and the channels through which money enters the financial system. Evidence concerning the differential effects of liquidity components on inflation and output illustrates that monetary aggregates are heterogeneous and may affect economic variables differently over time and across frequencies [13]. Funding liquidity is also closely connected to credit conditions and unconventional monetary policy, indicating that monetary-policy transmission can operate through financial intermediaries and the availability of financing as well as through conventional policy rates [14]. Thus, studying M2 growth provides a useful perspective on the broader monetary environment within which asset prices are determined.

The relationship between monetary policy and asset-price bubbles has been extensively investigated in equity and other financial markets. Studies of monetary-policy shocks and stock-market bubbles have shown that the association may vary over time, supporting the use of models capable of capturing changing relationships between policy variables and market valuations [15, 16]. More recent research has similarly evaluated the role of monetary-policy shocks in determining bubbles and asset prices [17]. Evidence from housing markets also indicates that monetary and fiscal policies can influence price-bubble dynamics, demonstrating that liquidity-related effects are not confined to traded equities [18]. Research on stock-market bubble formation and business cycles further suggests that speculative price dynamics may interact with broader macroeconomic fluctuations [19, 20]. Such interactions are especially important for financial management because a market increase caused primarily by improving fundamentals carries different risk implications from an increase sustained by excess liquidity and speculative behavior.

The detection and anticipation of bubble episodes have consequently become major concerns in financial-market research. Early-warning systems have been developed to identify conditions associated with stock-market bubbles and financial crises [21], while other studies have examined whether specific information events can be incorporated into models designed to predict bubble formation [22]. Information risk has also been associated with the probability of price-bubble formation, indicating that market inefficiency, uncertainty, and informational conditions may reinforce speculative dynamics [23]. Research on exchange-rate markets similarly demonstrates that price bubbles can coexist with broader macroeconomic forces and that nonlinear modeling may be necessary to distinguish speculative dynamics from fundamental movements [24]. Collectively, these studies indicate that the consequences of monetary liquidity cannot be evaluated independently of market expectations, information quality, investor behavior, and the possibility of nonlinear price adjustment.

Evidence from markets beyond conventional equities further demonstrates the importance of monetary conditions for asset valuation. Research on property stock indices has explicitly examined the joint effects of monetary policy, market sentiment, and market liquidity on bubble dynamics [25]. The rapid expansion of cryptocurrency markets has provided another setting in which the relationship among liquidity, monetary policy, speculation, and price instability can be observed. Structural-break and mixed-frequency models have been used to investigate whether monetary policy acts as a driver of cryptocurrency returns and volatility [26, 27]. Bitcoin-specific studies have likewise analyzed its sensitivity to monetary-policy conditions [28], while broader research has connected monetary policy with digital assets and decentralized-finance activity [29]. More recent evidence regarding Federal Reserve monetary policy and cryptocurrencies reinforces the proposition that changes in U.S. monetary conditions can affect asset classes beyond traditional securities markets [30].

The cryptocurrency literature is also informative because it illustrates how abundant liquidity may interact with speculative behavior in markets where valuation anchors are relatively uncertain. Empirical studies have detected

financial bubbles in cryptocurrency markets [31, 32], while speculative bubbles and herding behavior have been examined as mutually reinforcing phenomena capable of amplifying price movements [33]. Research on collapsing cryptocurrency bubbles further emphasizes that rapid valuation increases can be followed by abrupt corrections [34]. Recent analyses have examined bubble periods across cryptocurrency markets [35], as well as the role of media sentiment in Bitcoin bubble dynamics [36]. The potential consequences of virtual currencies for broader financial-market stability have similarly received increasing attention [37]. Contemporary market commentary has also associated increases in global liquidity with expectations of higher Bitcoin prices, illustrating how closely liquidity narratives have become embedded in investor decision-making [38]. Although cryptocurrencies differ fundamentally from large-cap U.S. equities, these findings reinforce the broader proposition that liquidity conditions can affect risk-taking, valuation, and speculative demand across asset classes.

A further methodological consideration concerns the way liquidity is incorporated into the analysis of returns and volatility. Financial-market movements reflect not merely observed price changes but also the liquidity conditions under which transactions occur. Recent approaches to liquidity-adjusted returns and volatility emphasize that conventional return measures may fail to capture the complete dynamics of markets when liquidity changes substantially over time [39, 40]. Such findings are relevant to the analysis of broad monetary liquidity because monetary expansion may influence market valuations partly by altering investors' effective liquidity constraints and the ease with which portfolios can be reallocated. In highly liquid markets, additional monetary resources can be incorporated into asset prices rapidly, whereas under stressed conditions the same quantity of money may have weaker or more uneven effects. Therefore, investigating monetary liquidity together with a highly traded benchmark such as the S&P 500 provides an opportunity to evaluate how broad monetary expansion is associated with the valuation of a market characterized by substantial depth, institutional participation, and global importance.

Experimental and theoretical evidence additionally indicates that investor expectations are an important part of the monetary-policy–bubble relationship. Laboratory research has demonstrated that monetary-policy interventions can affect asset-price bubbles through behavioral and expectation channels, thereby complementing purely theoretical models [41]. This finding is particularly important because monetary expansion may affect stock prices even before corresponding changes in corporate earnings or economic output become visible. Investors frequently respond to anticipated policy paths, expected financing conditions, and forecasts of future liquidity. Accordingly, asset prices may incorporate monetary information quickly, while the real economy adjusts with longer lags. This difference in adjustment speed can contribute to periods during which equity valuations grow more rapidly than contemporaneous fundamentals. The interaction between monetary accommodation and speculative valuation therefore has implications not only for central banks but also for investment managers seeking to distinguish sustainable market appreciation from liquidity-driven price expansion.

For the United States, these issues acquired exceptional importance during the period from 2016 to 2024. This interval encompassed markedly different monetary and financial environments, including periods of relatively conventional monetary policy, substantial monetary accommodation, extraordinary interventions associated with the COVID-19 economic shock, rapid expansion of broad monetary aggregates, strong appreciation in major financial assets, and subsequent monetary tightening. Because the S&P 500 is one of the most widely followed indicators of U.S. equity-market performance and represents a substantial share of the capitalization of publicly traded U.S. corporations, changes in this index have major consequences for household wealth, institutional portfolios, corporate financing conditions, and international capital allocation. At the same time, M2 provides a

broad measure of monetary liquidity available within the economy. Examining these two variables over a period containing significant changes in both monetary conditions and stock valuations can therefore provide meaningful evidence on whether increased monetary liquidity is systematically associated with higher equity prices.

Despite the extensive literature on monetary-policy shocks, interest rates, asset bubbles, cryptocurrencies, housing prices, market sentiment, and nonlinear financial dynamics, a more direct empirical assessment of the association between U.S. M2 liquidity growth and the S&P 500 remains valuable. Much of the existing literature focuses on policy-rate shocks or specialized bubble-detection models rather than directly evaluating the explanatory contribution of broad monetary liquidity to a major equity index. Furthermore, findings from smaller or structurally different financial markets cannot necessarily be generalized to the United States because market depth, institutional composition, monetary-policy transmission, and investor participation differ substantially across economies. Establishing the magnitude and statistical significance of the relationship between U.S. monetary liquidity growth and the S&P 500 can therefore contribute to the literature by providing evidence that is readily interpretable for investors, financial managers, researchers, and policymakers. Such evidence may also improve understanding of how liquidity management relates to equity-market volatility and the potential development of excessive valuations.

Accordingly, the aim of this study was to examine the effect of U.S. monetary liquidity (M2) growth on the S&P 500 stock price index during the period from 2016 to 2024.

2. Methodology

This study employed a causal-comparative research design to examine the effect of U.S. monetary liquidity growth (M2) on the S&P 500 stock price index over the period from 2016 to 2024. This research method was considered appropriate because it focuses on identifying causal relationships between the independent and dependent variables and allows for the analysis of data trends and simultaneous changes over time. The data were collected in secondary and quantitative form. The sources included the Federal Reserve Economic Data (FRED) database for the M2 monetary liquidity growth variable and reputable international financial databases, such as Yahoo Finance and Bloomberg, for the S&P 500 stock price index. The statistical population of the study consisted of all monthly data on monetary liquidity growth and the S&P 500 stock price index in the United States during the 2016–2024 period. Since complete data were available for the entire period, the sample comprised all monthly observations, equivalent to 108 observations (9 years × 12 months). The data analysis was based on an econometric approach and was conducted using EViews software to obtain accurate and reliable quantitative results.

3. Findings and Results

In this study, the Breusch-Pagan/Cook-Weisberg test was used to examine the presence of heteroskedasticity.

Table 1. Results of the Breusch-Pagan/Cook-Weisberg Test for Detecting Heteroskedasticity

Null Hypothesis (H0)	Breusch-Pagan/Cook-Weisberg Statistic	p-value	Test Result
The variances are homogeneous	2.09	0.019	H0 is rejected (heteroskedasticity exists)

According to the results of this test, presented in Table 1, the research model suffers from heteroskedasticity because the calculated probability value, or p-value, is less than 0.05. Therefore, the final estimation of the model was conducted using the Generalized Least Squares (GLS) method to address the violation of the homoskedasticity assumption in the regression analysis and thereby correct the heteroskedasticity problem.

Multicollinearity is a condition in which an independent variable can be expressed as a linear function of other independent variables. If multicollinearity is high in a regression equation, it indicates a high degree of correlation among the independent variables, and the model may lack sufficient validity despite having a high coefficient of determination. According to the final column of Table 2, the Variance Inflation Factor (VIF) for all independent variables is less than 5 (VIF < 5). Therefore, no problematic multicollinearity exists among the independent variables, and the fitted model can be considered statistically valid.

Table 2. Results of the Variance Inflation Factor (VIF) Test

Variable	VIF
Stock Price	1.534

One method for identifying heteroskedasticity in a model is the Breusch-Pagan test. In this test, the null hypothesis indicates homoskedasticity of the error variances. If the obtained significance level is less than 0.05, the null hypothesis of homoskedasticity is rejected. When heteroskedasticity is present, the Generalized Least Squares method should be employed, whereas the Ordinary Least Squares method is appropriate when the error variances are homogeneous. The following table presents the results of all three tests, namely the F-Limer, Hausman, and Breusch-Pagan tests. The final column indicates how the data should be entered into the software for model estimation. At this stage of the study, the statistical hypotheses were tested. The research hypotheses were examined using EViews software.

Table 3. Results of the F-Limer, Hausman, and Breusch-Pagan Tests for the Research Models

F-Limer Statistic	Probability	Hausman Statistic	Probability	Breusch-Pagan Statistic	Probability	Result
67.71	0.000	2.78	0.037	2.92	0.003	Panel data, fixed effects, with correction for heteroskedasticity

As shown in Table 3, the result of the Chow test indicates that the probability associated with the F-statistic is less than 5%; therefore, panel data should be used to test the hypothesis. The table also shows that, based on the criteria described above, the significance level of the F-Limer test for both research models is less than 0.05; consequently, the data for both models should be treated as panel data. Furthermore, the significance level of the Hausman test for both models is less than 0.05, which is below the specified research error level. Accordingly, the null hypothesis favoring random effects is rejected, and the models should be estimated under the fixed-effects specification. In the first model, because the heteroskedasticity test is statistically significant, a correction for heteroskedasticity is required; however, no such correction is necessary for the second model. The fixed-effects model was subsequently estimated using the Estimated Generalized Least Squares (EGLS) method, and the results are presented in Table 4.

Table 4. Results of the Estimated Model Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2049.172	288.2769	-7.108346	0.0000
SP500	0.327344	0.015793	20.72749	0.0000

Model Statistic	Value	Model Statistic	Value
R-squared	0.784526	Mean dependent variable	3812.277
Adjusted R-squared	0.782700	S.D. dependent variable	1315.872
S.E. of regression	613.4005	Akaike information criterion	15.69244
Sum squared residuals	44,398,706	Schwarz criterion	15.73890
Log likelihood	-939.5464	Hannan-Quinn criterion	15.71131

F-statistic	429.6288	Durbin-Watson statistic	2.048981
Prob(F-statistic)	0.000000		

The main research hypothesis states that U.S. monetary liquidity growth has a positive and statistically significant effect on the S&P stock price index. According to the results presented in Table 4, the t-statistic associated with the U.S. monetary liquidity growth variable is 20.72, and its significance level is less than 0.05. Therefore, the hypothesis is supported at the 95% confidence level.

One of the common problems in a regression model is the presence of correlation among the residual terms. Autocorrelation violates one of the standard assumptions of the regression model. Consequently, the desirable properties of the Best Linear Unbiased Estimator (BLUE) may be compromised, making statistical inference unreliable. The Durbin-Watson statistic is used to examine specification-related errors associated with serial correlation in a regression model. In other words, if the regression residuals exhibit a substantial and systematic pattern, model specification problems may be present. In simple terms, such correlation may indicate that certain variables belonging to the true model have been omitted and are instead reflected in the disturbance term; these variables should therefore be removed from the disturbance component and appropriately incorporated into the model as explanatory variables. In general, when the Durbin-Watson statistic falls within the range of 1.5–2.5, it can be concluded that there is no substantial autocorrelation among the residual terms. Following estimation of the coefficients, the Durbin-Watson statistic was found to be approximately 2.04, indicating the absence of serial correlation in the disturbance term. Accordingly, no serial autocorrelation problem was observed for this hypothesis.

Before testing the research hypothesis on the basis of the obtained results, the validity of the overall model must be established. For this purpose, the F-test was used to examine the overall statistical significance of the model. Given the significance level associated with the calculated F-statistic ($p = 0.0000$), it can be concluded that the fitted regression model is statistically significant.

Based on the coefficient of determination of the fitted model, it can be concluded that approximately 78% of the variation in the dependent variable is explained by the independent variable(s) included in the model.

4. Discussion and Conclusion

The purpose of this study was to examine the effect of U.S. monetary liquidity growth on the S&P 500 stock price index over the 2016–2024 period. The empirical findings supported the main research hypothesis and indicated that growth in U.S. monetary liquidity had a positive and statistically significant effect on the S&P 500. The estimated coefficient was approximately 0.327, with a t-statistic of 20.72 and a significance level below 0.05, demonstrating that higher monetary liquidity was associated with an increase in the stock price index. Furthermore, the coefficient of determination indicated that approximately 78% of the variation in the dependent variable was explained by the fitted model. The overall regression was statistically significant, as reflected in the F-statistic of 429.63 and its probability value of less than 0.001. The Durbin-Watson statistic of approximately 2.05 also suggested that serial autocorrelation did not constitute a substantial problem in the estimated model. After correcting for heteroskedasticity through the Estimated Generalized Least Squares approach and adopting a fixed-effects specification on the basis of the diagnostic tests, the results therefore provided robust empirical support for a meaningful relationship between monetary liquidity and equity-market valuation.

The positive effect identified in this study is consistent with the conventional monetary-transmission mechanism through which an expansion in the money supply affects financial asset prices. An increase in broad monetary liquidity can reduce the relative attractiveness of holding money and low-yield financial instruments, thereby encouraging investors to rebalance portfolios toward equities and other risk-bearing assets. Greater liquidity can also lower financing constraints, support aggregate expenditure, improve expectations regarding corporate revenues, and reduce the effective discount rate applied to future cash flows. These mechanisms collectively increase the present value of equities and contribute to higher stock-market indices. From the broader perspective of monetary economics, monetary conditions influence asset prices through interest-rate, credit, expectations, and portfolio-rebalancing channels [1]. The present finding is therefore compatible with established monetary theory: when monetary resources available to investors and financial intermediaries expand, a portion of this additional liquidity may flow into the equity market and increase demand for securities, resulting in higher market valuations.

The findings are also aligned with the growing theoretical and empirical literature linking accommodative monetary conditions to asset-price increases and bubble dynamics. Galí demonstrated that monetary policy and rational asset-price bubbles may interact in complex ways and that policy-induced changes in financial conditions can substantially alter bubble trajectories [2]. Similarly, Dong et al. showed that monetary policy can affect the emergence and evolution of asset bubbles, reinforcing the view that financial valuations respond endogenously to changes in monetary conditions [3]. Bonchi likewise emphasized the importance of monetary policy in environments characterized by asset-price bubbles, indicating that monetary interventions may alter incentives for speculative asset accumulation [4]. Ikeda further connected monetary policy, inflation, and rational bubbles, suggesting that asset valuation cannot be analyzed independently of the monetary regime within which investors form expectations [5]. These studies provide theoretical support for the current result because an increase in M2 represents an expansion in the monetary environment that can stimulate financial-market demand and potentially raise equity prices beyond what would be expected solely from changes in underlying corporate fundamentals.

The magnitude and statistical significance of the relationship found in the present study are also broadly consistent with empirical evidence concerning monetary-policy shocks and stock-price bubbles. Naderi et al. found that monetary-policy shocks significantly influence stock-price bubble dynamics, although the magnitude of their effects can vary over time [16]. Mohammadi and Hosseini similarly reported a time-varying dependence of stock-market bubbles on monetary-policy shocks, suggesting that the connection between financial valuations and monetary conditions becomes particularly pronounced during certain market regimes [15]. Hosseini Jahromi et al. also highlighted the role of monetary-policy shocks in explaining bubbles and asset-price movements [17]. Although these studies were conducted in different institutional contexts, their results support the central conclusion of the present research that monetary conditions are capable of significantly influencing equity valuations. The strong explanatory power obtained in the current model may therefore reflect not only the direct relationship between liquidity and stock demand but also the broader effects of liquidity on expectations, credit availability, financing costs, and investors' tolerance for risk.

Another interpretation of the findings concerns the possibility that excessive monetary liquidity can support speculative price movements and facilitate the formation of financial bubbles. When the supply of liquid funds expands faster than opportunities for productive investment, investors may increasingly allocate capital to existing financial assets, raising prices without a proportional increase in intrinsic value. This interpretation is supported by Blot, who documented asymmetric effects of monetary policy on stock-price bubbles and demonstrated that accommodative and restrictive policies need not have equivalent impacts on financial valuations [10]. Magnani

similarly examined whether monetary policies can inflate stock-market bubbles and emphasized the potential connection between monetary accommodation and excessive equity valuations [12]. Ciccarone et al. further showed that monetary policy in an economy containing asset bubbles can generate undesirable side effects, suggesting that policies designed primarily to stabilize the real economy may simultaneously amplify financial imbalances [11]. In this context, the positive coefficient obtained in the present study may capture both fundamentally justified responses of equity prices to improved monetary conditions and a speculative component generated when surplus liquidity is directed toward financial markets.

The present results also contribute to the longstanding debate over whether monetary authorities should respond to asset-price developments. Wadhwani argued that asset-price bubbles can create macroeconomic and financial-stability risks sufficiently important to warrant consideration within the monetary-policy framework [7]. Fullana found that the effectiveness of monetary policy can differ in the presence of stock-market bubbles, indicating that asset-market conditions can themselves affect the transmission of policy [8]. Gambetti and Galí also provided evidence that monetary-policy actions can influence stock-market bubbles [9]. Experimental evidence further demonstrates that monetary-policy interventions can affect speculative price formation by altering investor expectations and market behavior [41]. The results of the current study reinforce this debate because they indicate that monetary-liquidity growth is not neutral with respect to the valuation of a major equity-market benchmark. If changes in liquidity materially influence the S&P 500, then monetary authorities and financial-stability regulators may need to consider the asset-price consequences of major liquidity expansions, particularly when such expansions persist for extended periods.

The period examined in the present study is particularly informative in this respect because 2016–2024 encompassed substantially different monetary regimes, including extraordinary monetary expansion during the COVID-19 crisis and subsequent monetary tightening. The rapid increase in liquidity during periods of economic stress was intended primarily to support economic activity, preserve market functioning, and prevent disruptions in credit markets. However, large amounts of liquidity can also stimulate investor demand for financial assets once immediate precautionary motives decline. Moramarco demonstrated that unconventional monetary policy affects funding liquidity and credit conditions, highlighting the importance of financial intermediaries in transmitting policy to asset markets [14]. Bagherpour Oskouei and Shakeri also showed that different liquidity components can exert distinct effects on inflation and output, illustrating that changes in monetary aggregates can have heterogeneous macroeconomic consequences [13]. The present evidence extends this general argument to equity-market valuation and suggests that broad liquidity conditions should be considered alongside conventional interest-rate measures when evaluating financial-market responses to monetary policy.

The results are further supported by evidence from other asset classes, where monetary conditions have been found to affect returns, volatility, and speculative behavior. Studies of cryptocurrencies show that monetary policy can influence digital-asset markets and that these markets respond to changes in macro-financial liquidity [26, 28-30]. Ma et al. similarly examined monetary policy as a potential driver of cryptocurrency-market dynamics [27]. Evidence of cryptocurrency bubbles and herding further demonstrates how abundant liquidity and speculative demand may jointly amplify asset-price fluctuations [31-33]. More recent work concerning cryptocurrency bubble collapses, media sentiment, and virtual-currency risks also indicates that liquidity, expectations, and speculative behavior can interact to create financial instability [34, 36, 37]. Although the S&P 500 represents a substantially more mature and fundamentally anchored market than cryptocurrencies, the consistency of liquidity-related effects

across different asset classes strengthens the interpretation that monetary abundance can raise demand for risky assets more generally.

The observed relationship can additionally be understood through changes in investor behavior and market liquidity. Higher monetary liquidity may reduce investors' preference for holding cash because the opportunity cost of remaining outside financial markets increases when asset prices are rising and financing conditions are accommodative. This can encourage greater participation, increased leverage, and momentum-oriented investment strategies. Recent approaches emphasizing liquidity-adjusted returns and volatility demonstrate that market liquidity materially affects measured risk-return dynamics and that liquidity conditions should be explicitly considered when interpreting financial-market behavior [39, 40]. At the same time, speculative behavior can become self-reinforcing when rising prices attract additional capital. Research on information risk and bubble formation indicates that imperfect information can further intensify speculative valuation [23], while early-warning studies emphasize that bubble episodes frequently emerge from combinations of financial, informational, and macroeconomic factors rather than from a single cause [21, 22]. These findings suggest that monetary-liquidity growth may constitute an important enabling condition for equity-price expansion even when investor expectations and information dynamics determine the precise timing and magnitude of market responses.

The current findings also align with research demonstrating that bubble formation is closely connected to broader economic cycles. Izadi et al. reported that stock-market price bubbles can influence business-cycle dynamics, demonstrating feedback between financial markets and the real economy [19, 20]. Hojjat et al. likewise found that monetary and fiscal policies affect housing-price bubbles, suggesting that the effects of expansionary policy can be transmitted to multiple asset markets [18]. Dasman identified monetary policy and market liquidity as relevant determinants of bubble behavior in property-related stocks [25]. Zahedi et al. similarly showed that macroeconomic variables influence bubble behavior in exchange-rate markets [24]. Taken together, these studies indicate that liquidity-induced asset-price movements are not isolated financial phenomena; rather, they may interact with consumption, investment, credit creation, wealth effects, and economic activity. Therefore, the positive association between U.S. monetary liquidity growth and the S&P 500 documented in the present research may have wider implications for macroeconomic stability.

Overall, the findings demonstrate that U.S. monetary-liquidity growth constitutes an important explanatory factor for movements in the S&P 500 during the study period. The statistically significant positive coefficient, strong overall model significance, relatively high explanatory power, and satisfactory diagnostic statistics collectively support the conclusion that liquidity conditions were closely associated with equity-market performance. The result is consistent with theoretical models of monetary-policy transmission, empirical evidence on monetary-policy shocks and stock bubbles, and findings from other financial markets. At the same time, the relationship should not be interpreted as implying that monetary liquidity is the sole determinant of stock prices. Equity valuations also reflect corporate earnings, productivity expectations, interest rates, inflation, risk premiums, fiscal conditions, geopolitical developments, technological change, and investor sentiment. The importance of the present result lies instead in demonstrating that broad monetary liquidity represents a quantitatively meaningful component of the environment within which equity prices are formed.

This study is subject to several limitations that should be considered when interpreting its findings. First, the analysis was restricted to the 2016–2024 period and therefore covered a relatively limited number of monthly observations, including several unusual episodes such as the COVID-19 crisis and the subsequent rapid monetary tightening, which may have exerted disproportionate effects on the estimated relationship. Second, the model

concentrated primarily on monetary liquidity and the S&P 500 and did not simultaneously control for all macroeconomic and financial determinants of equity prices, such as interest rates, inflation, corporate earnings, unemployment, fiscal stimulus, market volatility, investor sentiment, and geopolitical risk. Third, monthly data may obscure higher-frequency responses of financial markets to monetary developments. Fourth, the existence of a statistically significant association does not by itself establish complete structural causality, because feedback may also run from financial-market conditions to monetary-policy decisions. Finally, the use of an aggregate stock-market index may conceal substantial differences in the sensitivity of individual sectors and firms to changes in monetary liquidity.

Future studies should extend the analysis over longer historical periods and incorporate multiple monetary regimes to determine whether the relationship between liquidity growth and equity prices remains stable across expansionary, restrictive, crisis, and normal-policy environments. Researchers could employ higher-frequency weekly or daily data where appropriate and use dynamic econometric approaches such as vector autoregression, structural VAR, time-varying parameter models, nonlinear autoregressive distributed lag models, regime-switching models, or causality tests to examine directionality and changing effects more precisely. Future models should also incorporate control variables such as policy interest rates, inflation expectations, earnings growth, market volatility, credit growth, fiscal expenditure, and investor sentiment. Comparative studies across major international stock indices could reveal whether the U.S. experience is unique or reflects a broader global liquidity effect. Sector-level analyses would also be useful for identifying industries that are particularly sensitive to monetary expansion. Finally, future research could distinguish between liquidity-driven fundamental appreciation and speculative bubble components to determine whether monetary growth affects sustainable valuations and excessive market pricing differently.

The findings have several practical implications for policymakers, financial institutions, portfolio managers, and investors. Monetary authorities should monitor major asset-price indicators alongside conventional macroeconomic variables when implementing substantial liquidity expansions, particularly when monetary growth is unusually rapid or persists after the underlying economic emergency has diminished. Financial-stability authorities can incorporate broad monetary aggregates into early-warning systems designed to identify excessive asset-price appreciation and emerging financial vulnerabilities. Portfolio managers and institutional investors may benefit from including liquidity indicators in strategic asset-allocation and market-risk models because changes in monetary conditions can provide information about the broader environment supporting or constraining equity valuations. Investors should nevertheless avoid treating liquidity expansion as an automatic signal of continuously rising stock prices, since valuation, earnings, inflation, and policy reversals can materially alter market outcomes. More broadly, coordinated monetary, macroprudential, and supervisory policies may help preserve the benefits of adequate financial liquidity while reducing the likelihood that prolonged monetary expansion contributes to excessive leverage, destabilizing speculation, or unsustainable asset-price bubbles.

Authors' Contributions

Authors equally contributed to this article.

Ethical Considerations

All procedures performed in this study were under the ethical standards.

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Conflict of Interest

The authors report no conflict of interest.

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