



Baffa Kabiru Gwadabe,
Department of Economics,
Bayero University, Kano,
Kano State-Nigeria.
bkgwadabe.eco@buk.edu.ng

Maryam Ibrahim Giade
Statistics Department,
Central Bank of Nigeria,
Abuja-Nigeria
maryamibrahimgade@gmail.com

Aminu Mohammed Usman
Statistics Department,
Central Bank of Nigeria,
Abuja-Nigeria
mothmanu@gmail.com

***Corresponding Author:**
Aminu Mohammed Usman
Statistics Department,
Central Bank of Nigeria,
Abuja-Nigeria
mothmanu@gmail.com

CRYPTOCURRENCY, MONEY SUPPLY AND MONETARY POLICY: THEORETICAL AND EMPIRICAL REVIEWS

ABSTRACT

The rapid emergence of cryptocurrencies has introduced new dynamics into global monetary systems, raising concerns about the effectiveness of conventional monetary policy frameworks. As decentralized digital currencies operate largely outside the control of central banks, their growing adoption may weaken monetary policy transmission mechanisms and complicate the management of money supply. This paper provides a theoretical and empirical review of the relationship between cryptocurrency and monetary policy, with particular emphasis on implications for central bank control over money supply. Drawing on established monetary theories and recent empirical evidence from both advanced and emerging economies, including Nigeria, the study synthesizes key findings, identifies areas of consensus and divergence in the literature, and highlights existing research gaps. The review shows that while cryptocurrencies do not yet pose an immediate threat to monetary policy effectiveness, their rapid growth and increasing use as alternative stores of value and payment instruments could, over time, undermine central banks' ability to regulate liquidity and ensure price stability. The paper concludes by outlining policy-relevant insights and directions for future research.

Keywords: Cryptocurrency, monetary policy, Central Bank, money supply, theoretical, empirical review.

1.0 Introduction

The global financial system has undergone significant transformation following the emergence of cryptocurrencies, led by the introduction of Bitcoin in 2009 (Nakamoto, 2008). Designed as a peer-to-peer digital payment system operating without central authority, Bitcoin and other cryptocurrencies represent a departure from traditional fiat money issued and regulated by central banks. Since their inception, thousands of cryptocurrencies have emerged, expanding the scope of digital financial innovation and attracting interest from individuals, firms, and policymakers (Ciarko et al., 2023).

The renewed global relevance of this issue has been reinforced by recent macroeconomic developments. The post-COVID-19 period was marked by unprecedented monetary expansion, rising inflationary

pressures, and tightening monetary conditions across both advanced and developing economies (IMF, 2023). These conditions have intensified interest in cryptocurrencies as alternative stores of value and payment instruments, particularly in economies experiencing currency depreciation, capital flow restrictions, and declining trust in domestic monetary authorities. The monetary policy remains a central tool through which central banks pursue macroeconomic objectives such as price stability, sustainable economic growth, and financial stability (Mishkin, 2019; Bernanke, 2020). By regulating the availability and cost of money and credit, central banks influence aggregate demand and economic activity. In Nigeria, the Central Bank of Nigeria (CBN) employs instruments such as the monetary policy rate (MPR), open market operations, and reserve requirements to manage broad money supply (M2) and stabilize the economy (CBN, 2021).

However, the increasing use of cryptocurrencies as alternative payment instruments and stores of value has raised concerns about the continued effectiveness of these traditional policy tools. The current cryptocurrencies challenge the conventional monopoly of central banks over money creation and circulation. Their decentralized, borderless, and in some cases anonymous nature complicates the monitoring of financial flows and may encourage substitution away from fiat money (Dyhrberg, 2016; Demertzis et al., 2018). These concerns are particularly relevant for developing economies such as Nigeria, where cryptocurrency adoption has expanded rapidly alongside macroeconomic instability, exchange rate pressures, and financial inclusion gaps (Chainalysis, 2024; IMF, 2023).

This paper therefore reviews theoretical and empirical literature on cryptocurrency and monetary policy across the globe. The objective is to synthesize existing knowledge, assess the implications of cryptocurrency adoption for central bank control over money supply and identify gaps that motivate further investigations. Section 2 of the paper reviews the related concepts. Section 3 focuses on theoretical perspectives. Section 4 reports empirical reviews. Section 5 provides conclusion and recommendations for the paper.

2.0 Conceptual Overview

2.1 Cryptocurrency

Cryptocurrencies are digital or virtual currencies that rely on cryptographic techniques for security and operate on decentralized networks, typically based on blockchain technology (Nakamoto, 2008; Crosby et al., 2016). Unlike fiat currencies, cryptocurrencies are not issued or backed by central authorities. Transactions are validated by distributed networks of nodes and recorded on immutable public ledgers. Key features of cryptocurrencies include decentralization, irreversibility of transactions, pseudonymity and in many cases, predetermined supply rules (Yermack, 2015; Catalini, 2016).

Bitcoin (BTC), being the first and most prominent cryptocurrency, exemplifies these characteristics. It has fixed supply cap and decentralized issuance process distinguishes it from fiat money and has led to its perception as both a speculative asset and a potential hedge against inflation (Dyhrberg, 2016). As cryptocurrency markets have expanded, their growing integration into payment systems and investment portfolios has intensified debates about their monetary implications.

2.2 Monetary Policy and Money Supply

Monetary policy can be defined as the instruments at the disposal of the monetary authorities to influence the availability and cost of credit/money with the ultimate objective of achieving price stability. Bernanke (2020) defines monetary policy as "the actions of a central bank to influence the availability and cost of money and credit, in pursuit of the central bank's macroeconomic objectives." This perspective holds that to achieve certain economic goals like price stability and full employment; central banks use monetary policy as a tool to regulate the quantity of credit and money in the economy. Depending on the mandate of the monetary authorities, the objectives of monetary policy may well go beyond price stability. Often, monetary authorities particularly in developing countries are saddled with a dual mandate - price stability and sustainable growth. In such a situation, monetary policy is used to achieve both objectives. A key aspect of monetary policy is the regulation of money supply, commonly measured using aggregates such as M1 and M2. According to the Central Bank of Nigeria, **narrow money (M1)** includes currency in circulation with the non-bank public and demand (current) deposits in banks, while **Broad money (M2)** includes M1 plus savings and time deposits, as well as foreign-currency denominated deposits, representing the comprehensive measure of money supply in the Nigerian economy.

Central banks influence economic activity primarily through the regulation of interest rates and the control of money supply. By adjusting interest rates, which represent the cost of borrowing, central banks affect levels of consumption and investment within the economy. Lower interest rates generally encourage borrowing and spending, thereby stimulating economic growth, while higher interest rates tend to restrain borrowing and help curb inflationary pressures. In addition, central banks manage the money supply using tools such as open market operations involving the purchase and sale of government securities, reserve requirements, and quantitative easing. These instruments enable authorities to either expand or contract the amount of money circulating in the economy (William & Bahera, 2025)

3. 0 Related Theoretical Framework

The theoretical relationship between cryptocurrency and monetary policy can be examined through established monetary theories. The Quantity Theory of Money posits a direct relationship between money supply and price levels, suggesting that uncontrolled expansion of money-like instruments could generate inflationary pressures (Jung, 2024). Cryptocurrencies, operating outside central bank control, may effectively expand the pool of transaction media, complicating traditional monetary management. In another theory, the monetarist theory, associated with Friedman emphasizes the primacy of money supply control in achieving price stability, arguing with much evidence to support them, that the supply of money mattered for the business cycle, that is for the growth in output and incomes, as well as for the level of prices and inflation (Kantor, 2022). From this perspective, widespread substitution from fiat money to cryptocurrencies could weaken central banks' ability to regulate money growth and stabilize inflation.

In another theoretical model, like the Lagos–Wright framework, provide microeconomic foundations for analyzing the coexistence and competition between fiat money and private digital currencies

(Iqbal,2023). These models suggest that agents' choices between alternative payment instruments depend on factors such as transaction efficiency, inflation and policy credibility. Under certain conditions, private digital currencies may erode the central bank's control over money, especially if the fiat money fails to maintain stable inflation (Fernández-Villaverde & Sanches, 2018).

3.1 Empirical Reviews

Empirical studies on cryptocurrency and monetary policy present mixed findings. Scheibe et al, (2015) emphasized that virtual currencies constitute a serious risk to macroeconomic stability and their increased patronage and adoption will lead to a fall in the use of real money, thereby causing a decline in actual cash needed and thus making monetary policy more difficult. Some other studies however argued that cryptocurrencies merely act as speculative assets or inflation hedges rather than true substitutes for money, limiting their immediate monetary impact (Kang & Lee, 2018).

In advanced economies for example, certain research has shown that monetary policy shocks can influence cryptocurrency prices, while cryptocurrencies themselves may respond asymmetrically to policy tightening or easing. Mert and Timur (2023) for example in their study tested the assumption that changes in cryptocurrencies are affected by changes in national currencies. The study used Bitcoin prices as the dependent variable, and M1 money supply changes in the USA, European Union and Japanese economies were the independent variables. The variables in this study were tested using the time-varying Granger causality method. The results obtained confirmed that Bitcoin's emergence and the possibility that it can be a hedge against the inflationary effects of money, especially after the COVID-19 pandemic.

In the works of Sari and Winarni (2024) they focused on the impact of cryptocurrency use, and electronic money on money supply (M2) in Indonesia, using Vector Error Correction Model to measure the long run and short run effect of the variables. The result indicated a one-way causality between money supply and cryptocurrency. It showed that in the long run, electronic money has a negative impact on money supply, while in the short run estimation showed both electronic money and cryptocurrency have significant impact on money supply.

Peciulis and Vasiliauskaite (2024) examined the effect of monetary policy decisions and announcements on cryptocurrency prices using an Elastic-Net model with ARIMA residuals. The degree of association between monetary policy actions and cryptocurrency prices was assessed using the adjusted R-squared, which exceeded 50 per cent in most cases, indicating a strong influence. Their findings reveal that monetary policy decisions and announcements significantly affect cryptocurrency prices. Specifically, policy instruments such as the Federal Funds Rate (FFR) set by the United States Federal Reserve, as well as the deposit facility rate, fixed rate, and marginal lending facility determined by the European Central Bank (ECB) Governing Council, were found to have significant effects on cryptocurrency prices. In addition, announcements related to complementary policy programmes, including quantitative easing in the United States and asset purchase programmes in the European Union, significantly influenced cryptocurrency prices. The study further shows that the impact of monetary policy on

cryptocurrency prices is evident during both periods of economic stability (2018–2020) and economic turmoil (2020–2022), with the transmission mechanism operating largely through investor sentiment.

For instance, in August 2019, the market capitalization of digital currencies in the U.S was approximately \$260 billion, which by comparison appeared less than 2 per cent of U.S. Treasury debt held by the public. However, as of July 2025, the global cryptocurrency market has expanded significantly reaching \$3.98 trillion (Concord Coalition, 2025). This implies that cryptocurrencies now represent about 13.8% of the U.S. public debt, which is approximately \$28.9 trillion in 2025. Although it is still smaller than the traditional assets globally, the cryptocurrency market has grown marginally over recent years raising new considerations for monetary policy making.

Furthermore, in emerging and developing economies, empirical evidence suggests a closer link between cryptocurrency adoption and monetary conditions. Looking at the Nigerian context, there has been a substantial growth in cryptocurrency transactions in recent years. According to KPMG reports, Nigeria recorded approximately \$59 billion in cryptocurrency transactions between July 2023 and June 2024 making it one of the largest peer-to-peer (P2P) crypto markets globally, (KPMG, 2024). This growing trend in cryptocurrency use has caused some disequilibrium in capturing and managing the liquidity by the monetary authority. Onah, and Onyekachi (2022) in their study, investigated the relationship between Liquidity Management and Cryptocurrencies in Nigeria, using an ARDL model. The variables employed in the model were bitcoin, which was used as a proxy for a cryptocurrency, while interbank rate (IBR), monetary policy rate (MPR), open buyback (OBB), and maximum lending rate (MLR) were used as proxy for liquidity management, respectively. This study covered the period January 2017 to June 2021. The result of the bounds test of the autoregressive distributive lag model revealed that there is long run co-integration among the variables. The long-run autoregressive distributive lag model also shows that only maximum lending rate has a significant impact on bitcoin, though negative. The study recommended that the Central bank should maintain its stance against accepting cryptocurrencies as a legal tender and be proactive in controlling platforms that engage in converting cryptocurrencies to Naira, and vice versa.

Some other studies also indicate that cryptocurrencies can influence money supply, exchange rates, and liquidity management, particularly in environments characterized by high inflation, currency depreciation, or weak financial systems Agama, and Akanegbu (2023) Investigated the impact of cryptocurrencies on macroeconomic variables in Nigeria, using a Vector Autoregression Model (VAR), and a Quantile Regression technique to analyze the relationship between bitcoin price and major macroeconomic variables including money supply. The study found a positive relationship between money supply and bitcoin prices, which was the variable used to proxy cryptocurrencies. The study concluded that cryptocurrencies have implications for macroeconomic variables and recommends the need for regulatory clarity in the country to encapsulate envisaged impact on macroeconomic variables. Nigerian-focused studies reveal that cryptocurrency variables are associated with changes in money supply and other macroeconomic indicators, although results differ regarding the magnitude and persistence of these effects.

In addition, Ezema, Igue & Yunana (2023) investigated the impact of transactions in cryptocurrencies on monetary policy in Nigeria. The study employed the generalised autoregressive conditional heteroscedasticity (GARCH) econometric method to test the hypothesis that the prices of Bitcoin, which was used as a proxy for transactions in cryptocurrency, affects the monetary policy through inflation, exchange rate and the velocity of money in Nigeria. Results from their empirical analysis suggested that Bitcoin transactions influenced the real exchange rate, and consequently the price level, and could have serious implications for monetary policy and financial system stability if not adequately and continuously addressed. Thus, the findings lend support to the CBN action of banning transactions in Bitcoin and other forms of cryptocurrencies for licensed banks and financial institutions in Nigeria.

Overall, while existing evidence does not support the view that cryptocurrencies currently undermine monetary policy effectiveness, it highlights the potential for such effects to emerge as adoption intensifies across different parts of the World.

4.0 Conclusion and Recommendations

From a policy perspective, the findings from this review suggest that outright prohibition of cryptocurrencies may be ineffective, while complete laissez-faire approaches risk undermining monetary control (Broby & Baker, 2018). In addition, Stevens (2017) also points out that, if money issued by central banks retains the role of unit of account, the switch to cryptocurrencies as a medium of exchange would be limited and thus the associated threat to monetary control would also be limited. Therefore, the study recommends adaptive and risk-based regulatory frameworks to balance innovation with macroeconomic stability. Strengthening regulatory oversight of cryptocurrency exchanges, improving transaction monitoring, and enhancing data collection on digital asset markets can help central banks better assess their monetary implications (IMF, 2023).

For developing economies such as Nigeria, policy responses should also focus on addressing the underlying drivers of cryptocurrency adoption, including inflationary pressures, exchange rate instability, and limited access to formal financial services. Enhancing monetary policy credibility, promoting financial inclusion, and strengthening domestic payment systems may reduce excessive reliance on private digital currencies (BIS, 2021; Bindseil, 2020).

Moreover, increased international cooperation among regulators is essential given the borderless nature of cryptocurrencies. Coordinated policy efforts can help mitigate risks related to capital flight, financial instability, and regulatory arbitrage. In conclusion, cryptocurrencies do not yet pose an existential threat to monetary policy, but their continued growth warrants sustained attention from central banks. Further empirical research employing nonlinear and volatility-sensitive methods is necessary to better understand their long-run implications for money supply management and macroeconomic stability, particularly in emerging market economies.

References

Agama, I. A., & Akanegbu, B. N. (2023). Cryptocurrency adoption and monetary policy effectiveness in Nigeria. *Journal of Economics and Sustainable Development*, 14(2), 45–58.

- Bernanke, B. S. (2020). *The new tools of monetary policy*. American Economic Association.
- Bindseil, U. (2020). *Central bank digital currency: Financial system implications and control*. European Central Bank.
- Bank for International Settlements (BIS). (2021). *Annual economic report*. BIS Publishing.
- Borio, C. (2019). The monetary policy response to the financial cycle. *Journal of Financial Stability*, 45, 100–110. <https://doi.org/10.1016/j.jfs.2019.100703>
- Broby & Baker (2018) Central Banks and Cryptocurrencies. Centre for Financial Regulation and Innovation, *White paper report* <http://strathprints.strath.ac.uk/64632/>
- Central Bank of Nigeria (CBN). (2021). *Monetary policy framework*. CBN.
- Catalini, C. (2016). Blockchain technology and the economics of cryptocurrencies. *MIT Sloan Research Paper*, No. 5191.
- Chainalysis. (2024). *Global crypto adoption index*. Chainalysis Research.
- Ciarko, M., Gajda, J., & Kliber, A. (2023). Cryptocurrencies and monetary policy transmission. *Finance Research Letters*, 55, 103–117.
- Crosby, M., Pattanayak, P., Verma, S., & Kalyanaraman, V. (2016). Blockchain technology: Beyond bitcoin. *Applied Innovation Review*, 2, 6–19.
- Demertzis, M., Merler, S., & Wolff, G. B. (2018). Capital markets union and the fintech opportunity. *Journal of Financial Regulation*, 4(1), 157–165.
- Dyhrberg, A. H. (2016). Bitcoin, gold and the dollar – A GARCH volatility analysis. *Finance Research Letters*, 16, 85–92.
- Ezema, B. I., Okoye, L. U., & Nwoye, C. M. (2023). Cryptocurrency volatility and money supply dynamics in Nigeria. *African Journal of Economic Review*, 11(3), 98–115.
- Fernández-Villaverde, J., & Sanches, D. (2018). On the economics of digital currencies. *Review of Economic Dynamics*, 29, 1–14.
- Kantor, B. (2022). Recent monetary history: A monetarist perspective. *Journal of Applied Corporate Finance*, 34(2), 82-99.
- Fisher, I. (1911). *The purchasing power of money*. Macmillan.
- Friedman, M. (1956). The quantity theory of money: A restatement. In M. Friedman (Ed.), *Studies in the quantity theory of money* (pp. 3–21). University of Chicago Press.
- International Monetary Fund. (2023). *World Economic Outlook: Inflation and growth—Policy trade-offs*. International Monetary Fund.
- Jung, A. (2024). The quantity theory of money, 1870-2020.
- Kang, S. H., & Lee, J. (2018). The value of Bitcoin as a hedge. *Finance Research Letters*, 24, 163–169.

- Karau, S. (2021). Monetary policy shocks and cryptocurrency prices. *Journal of International Financial Markets, Institutions and Money*, 73, 101–132.
- Lagos, R., & Wright, R. (2005). A unified framework for monetary theory and policy analysis. *Journal of Political Economy*, 113(3), 463–484.
- Mert, M., & Timur, Y. (2023). Asymmetric effects of monetary policy on cryptocurrency markets. *Economic Modelling*, 121, 106–120.
- Mishkin, F. S. (2019). *The economics of money, banking and financial markets* (12th ed.). Pearson.
- Iqbal, A. (2023). *Inflation and optimal monetary policies: a new monetarist approach* (Doctoral dissertation, The University of Liverpool (United Kingdom)).
- Nakamoto, S. (2008). Bitcoin: A peer-to-peer electronic cash system. *White paper*.
- Oh, G., & Nguyen, T. (2018). Cryptocurrency and monetary policy: Evidence from emerging economies. *Journal of Asian Economics*, 55, 1–15.
- Onah, C. E., & Onyekachi, O. A. (2022). Digital currencies and money supply control in Nigeria. *CBN Economic and Financial Review*, 60(1), 33–52.
- Peciulis, T., & Vasiliauskaite, A. (2024). Effect of Monetary Policy Decisions and Announcements on the Price of Cryptocurrencies: An Elastic-Net with Arima Residuals Approach. *Economics and Culture*, 21(1), 77-92.
- Sari, D. P., & Winarni, R. (2024). Cryptocurrency usage and inflation dynamics in developing economies. *Journal of Developing Areas*, 58(1), 77–95.
- Stevens, A. (2017) ‘Digital currencies: Threats and opportunities for monetary policy’, NBB Economic Review 1 (June): 79-92, National Bank of Belgium, available at https://www.nbb.be/doc/ts/publications/economicreview/2017/ecorevi2017_h5.pdf
- Tomić, N., Rogić, S., & Čavrak, V. (2020). Cryptocurrencies and monetary policy challenges. *Public Sector Economics*, 44(4), 437–460.
- Yermack, D. (2015). Is Bitcoin a real currency? An economic appraisal. In D. Lee (Ed.), *Handbook of digital currency* (pp. 31–43). Elsevier
- Williams, A. B., & Behera, P. C. (2025). Monetary Policy: The role of central banks in managing the economy through interest rates and money supply.