

## IMPACT OF DIGITAL CURRENCIES ON GLOBAL FINANCIAL STABILITY

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### ABSTRACT

*New opportunities and dangers for the global monetary system are emerging as a result of the proliferation of crypto currencies and other kinds of digital money, such as central bank digital currencies (CBDCs). However, owing to the speculative nature of crypto currencies like Bitcoin and Ethereum, as well as their extraordinary volatility, the decentralized and perhaps fee-reducing transaction methods that these crypto currencies provide are not without risk. Due to the lack of regulation and oversight, the crypto currency market is more susceptible to fraudulent activity, cyber assaults, and price manipulation, all of which have the potential to have a domino effect on investor portfolios. Despite the fact that CBDCs are more stable and are supervised by the state, they nonetheless represent a danger to traditional banking systems. This is due to the fact that they have the potential to alter the manner in which commercial and central banks interact with one another in the supply chain for credit and money. The implementation of monetary policy and the maintenance of financial stability across international borders are both made more difficult by the likelihood that the adoption of digital currency might affect the movement of foreign money. The purpose of this article is to investigate these concerns and analyse the impact that the proliferation of digital currencies has had on consumer protections, monetary policy, and financial markets. It is vital to have regulatory mechanisms in place and to collaborate with other nations in order to ensure that digital currencies have a positive influence on the economy without putting the stability of the financial system at risk. The purpose of this article is to highlight significant variables that policymakers should bear in mind when they are trying to strike a balance between encouraging innovation and guaranteeing the stability and security of the global financial system. The study depends on a literature review to do this.*

**Key words:** Digital Currency, Banking System, Central Bank, Monetary Policy, Digital Transformation.

### INTRODUCTION

The primary goals of central banks worldwide are price and financial stability; nonetheless, there has been much discussion about the possibility of implementing CBDCs as of late (Auer et al., 2022; Chiu and Keister, 2022). Although central banks are considering CBDCs, they are being quite careful about it (Elsayed and Nasir 2022). They are being cautious for a couple of reasons. First, there's the huge undertaking of enabling people and enterprises to directly deal in central bank-issued money (BOE 2020). Second, there's a chance that CBDCs will supplant the current reserve money systems. In order to prevent or at least mitigate any unforeseen repercussions, it is crucial that the ramifications of CBDCs be well considered.

There are many different aspects to the problem of implementing CBDCs, including technical, financial, social, political, legal, ecological, and ethical considerations (Bossu et al., 2020; Soderberg, et al.,

2022). Their widespread use will need suitable technical frameworks and public support; their execution must conform to political goals and social mores while also being ecologically responsible and morally sound. Nevertheless, the ways in which the adoption of CBDCs might circumvent these obstacles remain unclear. For this reason, a number of central banks have been "testing the waters" and advancing carefully towards the implementation of CBDCs. These include the Bank of England, the Bank of Japan, the European Central Bank, the US Federal Reserve, and the People's Bank of China (Boar and Wehrli, 2021, Nabilou, 2020). The introduction of CBDCs is being considered by many central banks as part of their responsibility to provide price stability, economic, financial, and (most recently) environmental stability (BOE 2020). When considering whether or not to implement CBDCs, financial institutions must weigh a number of factors, such as the impact on price stability, the efficiency of the banking and financial sectors, and the health of the labour, product, and service markets. Although central banks' embrace of digital money is critically important, our knowledge of the fundamental obstacles is lacking. This calls for more investigation on its own and also makes it harder to come up with an ideal solution. While there are many facets to consider, our primary emphasis here is on how CBDC adoption would affect the banking industry.

If implemented in the UK, CBDCs will be pegged to the pound sterling and will supplement, rather than replace, cash and bank deposits, as stated by the BOE (2020). The issue of how to carry out this supplementary function and the consequences it may have is yet unanswered. Some have speculated that CBDCs are an attempt by central banks to seize control of the digital currency market by expanding the function of digital currencies as "money"—that is, by crossing over into the realm of public funds, which are owned by the sovereign state. However, it is also crossing over into private funding. With a CBDC, all families and companies would have access to the central bank's electronic money, enabling them to make electronic payments using that money (Agur et al. 2022). However, further investigation is necessary to fully understand the consequences of this shift in the role of central banks towards private funds.

CBDCs must also help out with the things that central banks do. One of three tenets outlined in a study by a coalition of central banks was that "a central bank should not compromise monetary or financial stability by issuing a CBDC" (BIS 2020). The effect of CBDCs on monetary security, however, is quite unclear. According to BIS (2020), there are three main areas of uncertainty: (i) the future structure of the financial system, (ii) the design and underlying architecture of CBDCs, and (iii) the amount of user acceptance. Adopting a CBDC might prevent maturity transition, even if central banks are more stable than commercial banks and having a monopoly on CBDC deposit-taking is an indication of stability (Fernández-Villaverde et al. 2021). Because of this, the underlying circumstances, especially the volatility in the financial sector, are a crucial component of adoption and might postpone the adoption date. Nonetheless, one may make the case that central banks are prioritising CBDCs despite the financial instability. According to Waliczek and Buonocore (2023), central banks are under increasing pressure to improve economic circumstances during times of macroeconomic instability.

Even though they are going through a rough patch, they are still fully committed to CBDC investigation for the potential advantages it offers. Nobody has yet come to a consensus on how CBDCs affect financial stability, particularly the stability of the banking sector. Several writers have expressed pessimism about the effects of a CBDC, as seen in the literature study. For example, according to Kumhof and Noone (2021), banks' balance sheets, private loans, and liquidity provisions would be impacted by the implementation of a CBDC. If the e-krona CBDC does not bear interest, as Juks (2018) demonstrates, it can have a detrimental effect on the availability of credit and the stability of the financial system. The operational risks in the payment system, the financing costs of deposit-taking banks, and the threats to financial integrity may all rise with a CBDC, according to Mancini-Griffoli et al. (2018), hence reducing financial stability.

Several studies have shown that the implementation of a CBDC might cause private banks to transfer their savings to the central bank's digital currency account. These studies include Kim and Kwon (2019), Carapella and Flemming (2020), and Fernández Villaverde et al. (2021). Due to a decline in commercial banks' access to private credit, nominal interest rates would rise, reserve-deposit ratios would fall, and systemic banking stability would suffer (Carapella and Flemming, 2020; Kim and Kwon, 2019). In addition, as Ferrari Minesso et al. (2022) point out, a CBDC has the potential to strengthen international ties, which might make shocks have a greater impact on different parts of the world. A CBDC can potentially trigger panics among banks, according to Williamson (2022a).

## OBJECTIVES

1. Analyze the existing digital currencies, including central bank digital currencies (CBDCs), crypto currencies, and stable coins, to understand their characteristics and functions.
2. Identify and evaluate potential risks that digital currencies pose to financial stability, including market volatility, regulatory challenges, and systemic risks.

## RESEARCH METHODOLOGY

**Implications for the Banking and Financial Sectors** The introduction of digital money has a significant impact on the traditional monetary systems that have ever existed. As a result of the introduction of new prospects for financial inclusion and the reevaluation of regulatory frameworks by governments, the traditional function of intermediaries is being called into question. To have a complete understanding of the influence that digital money has had on the larger financial landscape, it is necessary to have a solid understanding of its history. As a result, this will provide the foundation for the subsequent chapters, which will conduct an in-depth investigation of these consequences.

### Comparative Analysis with Traditional Payment Systems

A scenario of continually evolving technology, changing client preferences, and the need for international financial efficiency may be seen when digital currencies are contrasted to more conventional payment methods. This is because digital currencies are less dependent on traditional payment systems. Traditional payment systems, which are founded on fiat currencies and well-established banking networks, have always provided a stable foundation for the conduct of worldwide financial transactions. This has been the case for as long as there has been that foundation. Nevertheless, the security and regulatory monitoring that are offered by these systems that are operated by banks and government agencies come at a cost. This price comes in the shape of greater transaction charges, longer processing times (especially for foreign transactions), and impediments to access for those who do not have bank accounts. On the other hand, digital currencies are causing a stir because they eliminate the need for intermediaries and enable users to conduct immediate, decentralized transactions with one another via the use of blockchain technology. As a result of this decentralization, the costs of transactions will be reduced, transactions will be completed more quickly, and more people will have access to financial services. There are a number of issues that it brings with it, including security, volatility, and regulatory acceptability. There are considerable problems that need to be solved before digital currencies can completely take off, despite the fact that they have the potential to transform the way financial transactions are conducted in the digital age. This is highlighted by the contrast between conventional payment systems and digital currencies, which demonstrates a substantial shift in the manner in which value is traded when compared to traditional payment methods. In addition to shedding light on the benefits and drawbacks of both systems, this comparison provides the framework for a financial ecosystem that includes all of them. This ecosystem would allow for greater innovation while also making global finance more stable and accessible to everyone.

**Examining the Economic Growth of Digital Currency**

In order to find out how the economy of a nation evolves as a result of the use of digital money, we need to conduct an in-depth investigation into the ways in which these new financial instruments influence conventional thinking and the larger picture of economics. Digital currencies such as Bitcoin, Ethereum, and Ripple are gaining popularity and are having an impact on many aspects of the economy and financial policy. This influence extends beyond their initial purpose of being speculative assets or technological advances. The purpose of this research is to better understand the complexities of the role that digital currencies play in shaping economic settings, with the goal of shedding light on their potential to stimulate innovation in the financial sector, economic development, and social change.

**Navigating the Dynamics of Digital Currency Transactions in the Modern Economy**

When attempting to get a knowledge of the present status of value exchange in the digital age, it is essential to do research on the systems and procedures that have been built to facilitate transactions using digital currencies. Coincident with their rise as investment vehicles and means of exchange, crypto currencies are at the core of this movement. This shift is occurring simultaneously. The primary emphasis of this inquiry is on two significant aspects: first, the widespread use of cryptocurrencies for payments in a number of countries; and second, the storage solutions, most notably cryptocurrency wallets, that have proliferated all over the globe to assist the protection of digital assets.

When doing research on the current state of value exchange in the digital era, it is necessary to have a comprehensive understanding of the unique frameworks and processes that facilitate the utilisation of digital currencies for monetary transactions. The evolution of cryptocurrencies from speculative investment tools to practical ways of transferring money has brought about a sea shift. Previously, cryptocurrencies were used for the purpose of exchanging money. This extensive research emphasises on two crucial areas: the rate of cryptocurrency-based payment usage across various nations and the development of storage mechanisms, particularly cryptocurrency wallets, which are now vital for the safeguarding of digital currencies on a global scale. Both of these factors are important in their own right.

**DATA ANYALSIS**

With the use of advanced statistical techniques applied to complex datasets and the evaluation of five key aims, the purpose of this research is to get an understanding of the consequences that digital money has on the monetary system. The basic goals of the research are to investigate the influence that digital currency has on the market, to compare and contrast its impacts with those of fiat money, to evaluate the benefits and drawbacks for the financial system, and to ascertain the contribution that digital currency has made to the growth of the national economy. In addition to this, it investigates the ways in which the exchange of value has evolved in the digital era. Because of the rapid expansion that has occurred over that period of time, doing research on this new subject from 2018 to 2023 guarantees that the findings will be relevant and up to date.

**1. Market Capitalization**

As a key measure of Bitcoin's financial standing within the universe of digital currencies, the market capitalization of Bitcoin encapsulates the entire value of all Bitcoins that are now in circulation.

**Table 1: Descriptive Statistics of Market Capitalization of Bitcoin**

Statistic	Value
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Coun	101
Mean	3,29,872.58
Std	1,05,395.52
Min	1,49,294.00
25%	2,62,509.00
50%	2,97,215.00
75%	3,63,432.00
Max	6,11,930.00

The market capitalization descriptive statistics of Bitcoin, which were calculated from 101 observations, provide a comprehensive picture of the crypto currency's financial movements as well as its inherent volatility characteristics. The information reveals that the overall valuation level of Bitcoin is 329,873 USD, and that its standard deviation is around 105,396 USD. This indicates that the mean value of Bitcoin is significantly impacted by the large fluctuations that it experiences. The fact that the value of Bitcoin on the market has ranged from 149,294 to 611,930 is evidence that the crypto currency is susceptible to fluctuations due to its inherent volatility. The dispersion and skewness of the data are highlighted by the median value of 297,215 and the quartile values of 262,509 and 363,432 at the 25th and 75th percentiles, respectively. The numbers demonstrate that the crypto currency suffers from a high degree of volatility and that its behaviour varies depending on the conditions and the passage of time. At the lowest points, there is pessimism or challenges with regulatory oversight, while at the greatest positions, there is speculative optimism.

## 2. Market Volatility

**Table 2 Descriptive Statistics of Market Volatility of Bitcoin**

Statistic	Value
Coun	104
Mean	9,03,861.85
Std	5,27,121.49
Min	1,21,965.00
25%	5,64,476.00
50% (Median)	8,86,196.00
75%	11,29,443.50
Max	43,78,556.00

A substantial amount of information about the studied financial parameter, which is likely market volatility or capitalization, is revealed by the study of 104 data points. Both the average value, which was recorded at about 903,861.85, and the considerable standard deviation, which was recorded at 527,121.49, highlight the significant swings that are present within the same dataset. From a low value of 121,965.0 to a maximum value of 4,378,556.0, there is a significant range of values, which highlights the variety that exists. The data's spread and central tendency are further shown by key distribution markers, such as the first quartile measuring 564,476.0 and the third quartile measuring 1,129,443.5. Additionally, the median value of 886,196.0 is also included in this illustration. This succinct statistical profile draws attention to the dynamic and changing character of the financial measure that is being examined, providing crucial insights into the manner in which it behaves within the market.

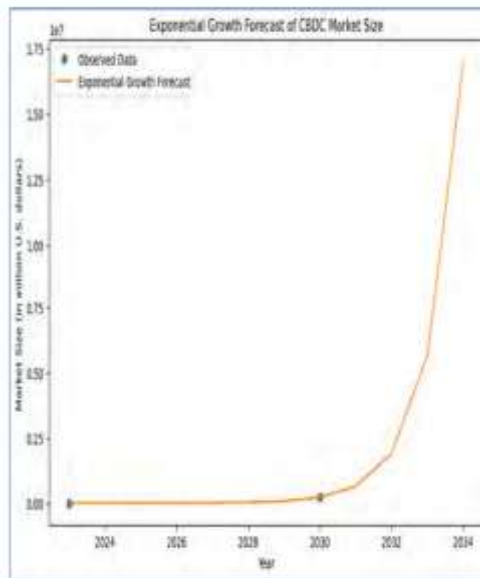
It would seem, on the basis of the data that you gave, that this graph is attempting to demonstrate how the Bitcoin market has evolved over the course of time. The graph would show periods of market conditions that were somewhat stable as well as times that were very volatile, with an average volatility of 903,861.85

and a significant range that began at 121,965.0 and ended at 4,378,556.0. The frequency of significant price movements in the Bitcoin market may be determined by examining the distribution of volatility levels, which is represented by the quartile values. This graph illustrates the unpredictable nature of the Bitcoin market by drawing attention to moments of significant volatility and the opportunities and risks that these periods may offer to investors. It also highlights the risks that may be incurred by investors during these periods.

**3. Rapid Growth and Adoption of Central Bank Digital Currencies (CBDCs)**

Growth Rate: 1.09483960838621

Forecasted Value for 2035: 16994594.455261935

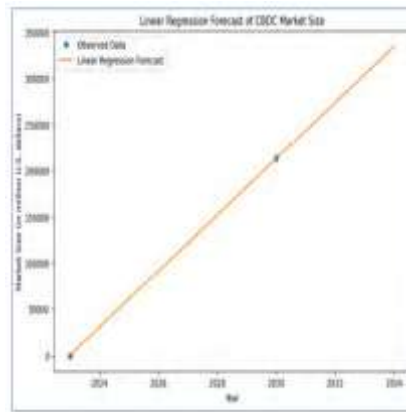


**Figure 1 Exponential Growth Forecast of CBDC Market Size**

According to the research, the CBDC business is seeing an incredible annual growth rate of around 109.48%, which indicates that the size of the market is increasing at a pace that is more than double each year. It is anticipated that the industry would skyrocket to approximately 16.99 trillion USD by the year 2035, having started at a paltry 100 million USD in 2023. The stratospheric ascent of CBDCs in the world of finance is a prime example of the expanding popularity and significance of these capital markets.

CAGR: 1.9887032820058699

According to the Compound yearly Growth rate (CAGR) of 1.9887, which is equivalent to 198.87%, it is anticipated that the market size of Central Bank Digital Currencies (CBDCs) would increase at an average yearly pace of roughly 199% between the years 2023 and 2030. At this astronomically high compound annual growth rate (CAGR), it is clear that the CBDC industry is expanding at a fast pace. This, in turn, is a reflection of the broad and increasing adoption of digital currencies across all dimensions of society.



**Figure 2 Linear Regression forecast of CBDC Market Size**

In order to produce a straight-line fit to the data points that have been observed, the linear regression model is able to forecast that the CBDC market size would continue to grow uninterrupted. In light of the information that has been presented, the model predicts a constant growth pattern, which indicates that the CBDC market is anticipated to increase in a consistent manner throughout the course of the next years. On the other hand, it is essential to keep in mind that linear regression presumes a constant rate of change and the possibility that it may not adequately capture non-linear growth patterns. There is a discernible rising trend in the plot, which indicates that the market is expanding significantly. According to the linear trend that was seen between the years 2023 and 2030, the anticipated numbers indicate the size of the market in the years to come, with the potential to reach around 16.99 trillion United States dollars by the year 2035.

## FINDINGS

A number of significant insights into the ecosystem of cryptocurrencies are disclosed by the findings of the research about the volatility of Bitcoin and its impact on the financial system. According to the findings of the study, the volatility of Bitcoin has changed over the course of time, exhibiting discernible patterns in the swings of its price. Bitcoin's price experienced a period of extreme volatility that exceeded 200% in 2014, and this level of volatility has not been seen since. Bitcoin's price volatility over a period of ninety days, on the other hand, dropped below fifty percent by the year 2023, showing a considerable decrease in volatility. A recent piece of information suggests that Bitcoin's 30-day historical volatility, after taking inflation into account, increased to roughly sixty percent, which is approximately ten percent more than Ether's. Two variables that have contributed to an increase in Bitcoin's volatility are the forthcoming halving of the Bitcoin blockchain and spot inflows from exchange-traded funds. As a result of the impending reward halving event, which slows down the rate at which Bitcoin is extracted from circulation, there is a high probability that there will be a demand-supply mismatch that will promote price rise. Market participants are keeping a close watch on the characteristics of the market in order to be ready for any price swings that may occur following the halving. Despite the fact that the upcoming halving event is getting closer and closer, the options market is furthermore reflecting the common forecast of increased volatility. Based on these findings, it is clear that the volatility of Bitcoin has a significant impact on the functioning of the financial system. There are a number of factors that are impacted by fluctuations in the price of Bitcoin, including market trends, investment objectives, and portfolio management. The study places a focus on the dynamic nature of the Bitcoin market and how it influences the activities of investors, the trends in the market, and the structure of the larger financial system. Bitcoin's volatility, which may be attributed to a wide variety of factors, has a significant impact on the digital financial ecosystem as well as the landscape of cryptocurrencies.

The complex relationship that exists between digital currencies and economic growth is shown by the fact that there are strong connections between foreign direct investment (FDI) inflows and outflows and ownership of digital currencies. There seems to be a connection between economic openness, the adoption of technology, and the incorporation of digital currencies into the financial ecosystem. This is due to the fact that nations that receive significant amounts of foreign investment also tend to have higher levels of ownership of digital currencies. In light of this association, it is logical to believe that digital currencies add to the appeal of a country to foreign investors. This might be due to the country's forward-thinking financial environment or to the country's perceived economic stability.

## CONCLUSION

The present study has investigated a number of aspects and repercussions associated with the implementation of CBDC law. On the basis of a comprehensive empirical analysis that makes use of a global dataset, we contend that the implementation of CBDC is associated with higher levels of bank stability. A better way to put it is that the use of CBDCs contributes to the stabilisation of the financial system by making banks more robust. Furthermore, it would seem that large banks have the potential to generate more profits than smaller banks if CBDCs are put into operations. This conclusion suggests that large banks have a higher level of financial security than smaller banks because they are better able to diversify their assets and make more effective use of risk instruments. In this study, the association between capitalization and bank stability may have a number of different explanations. One of these explanations is that bigger banks are better equipped to weather extreme economic conditions. The stability of banks is also thought to be connected with traditional banking operations and deposit funding, which makes sense given the fact that it is generally believed that these activities tend to be more stable over the course of a longer period of time. According to the findings of the analysis, there is an inverse relationship between the loan loss reserve and the soundness of the financial industry. Ex-ante credit risk is represented by this reserve, which acts as a representation of the risk. A greater amount of domestic investment, according to our findings, is beneficial for the stability of banks when it comes to the macroeconomic control factors. Taking into account the fixed effects of bank, region, and year, as well as the numerous measures of CBDC adoption and bank stability, as well as additional estimation methodologies, does not alter the primary results that we have reached.

After conducting an examination of the empirical data about the influence of CBDCs on the risk dynamics and management of the banking industry, we have arrived at the conclusion that the adoption of CBDCs may significantly reduce asset and leverage risk in addition to portfolio risk, despite the fact that this phenomenon is not statistically significant. Reducing the risks associated with leverage and assets, as opposed to portfolio risk, is what drives improvements in overall financial stability, according to the findings of our study. In order for banks to become more financially stable, they may expand lending, enhance loan quality, and minimize credit risk. Because of this, they will be able to realise profits from traditional interest-bearing enterprises that are more stable. Our results indicate that the expansion of lending, the strengthening of asset quality, and the reduction of ex-ante credit risk are the primary factors that have contributed to the overall improvement in financial stability that has occurred since the adoption of CBDC.

Additionally, we analyse CBDC Adoption for large, medium, and small banks in a separate manner. We are able to claim, on the basis of our results, that the adoption of CBDC is beneficial to large and medium-sized banks, but it is not beneficial to small banks. These results provide validity to the notion that smaller banks would not have a possibility of strengthening their financial stability after adopting a CBDC, but bigger banks do have the potential to take advantage of such an opportunity.

The process of financialisation and the inclusion of financial services are beneficial to all economies, but particularly to emerging and growing countries. Taking this perspective into consideration, the adoption

of CBDCs might be seen as a means by which emerging countries can become more financially sound and inclusive. The empirical evidence leads us to the conclusion that emerging market economies (EMDEs) gain more from the implementation of CBDC than established nations do.

The final finding is that wholesale CBDCs do not contribute to the stability of banks, however retail CBDCs do contribute to the stability of the system. This conclusion is based on a comparison with wholesale CBDCs. It is important for policymakers and central banks to give careful consideration to the impact that this would have on the stability of the financial system.

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