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The Requirements for Ensuring Financial Stability in Using Financial Technology and Cryptocurrencies

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Abstract: The study aims to elucidate the challenges and ramifications of financial technology and cryptocurrencies on financial stability by identifying the advantages and threats associated with implementing financial technology and using cryptocurrencies on financial stability. The study concludes that financial stability faces significant threats, primarily linked to cybersecurity and privacy concerns. Financial technology enables the reduction of risks and costs and the development of specialized financial tools for risk management, thus enhancing financial stability. Cryptocurrencies are utilized in speculative operations and are considered a source of financial instability due to their economic significance in transferring collapse risks to stock markets. Therefore, it is imperative to establish a regulatory environment for financial technology.

Keywords: Central Bank, Cryptocurrencies; Financial Technology; Monetary Policy.

1. Introduction

The financial system plays a pivotal role in the economic framework of a nation, with its components comprising financial institutions, financial markets, and financial instruments. The significance of the global financial system lies in its fundamental function of financial intermediation, facilitating the flow of funds between savers and borrowers to ensure the efficient allocation of financial resources, thereby enhancing economic growth and financial stability. Given that financial stability encompasses stability across all elements of the financial system, which witness the entry of new features, the financial sector undergoes a qualitative leap due to financial technology services, commonly referred to as FinTech. These technologies can potentially bring about radical changes in the financial industry, being faster, easier, and less costly than traditional financial services. They encompass four main sectors based on their business models: financing, asset management, payments, and other financial technologies, with cryptocurrencies falling under the payments sector. Cryptocurrencies are decentralized currencies with encryption to secure transactions and verify balances. Risk levels rise in such circumstances and financial developments, leading to more significant challenges in achieving financial stability. These challenges are significantly linked to the transition from centralization to decentralization based on blockchain technology in various financial transactions, hindering the role of regulatory authorities and diminishing their role in managing multiple financial and monetary policies. Based on the preceding, we attempt to shed light on the challenges facing achieving financial stability in the context of using financial technology and cryptocurrencies, as well as the most critical opportunities they offer, posing the following problem.

1.1. Research Problematic

In light of the preceding, the essence of our study's problem is encapsulated in answering the following question:
What are the most significant challenges hindering the achievement of financial stability in the context of using financial technology and cryptocurrencies?

1.2. Hypotheses

We propose the following hypotheses:
• Cryptocurrency value is transferred in a decentralized digital environment provided by blockchain technology.
• Differences between cryptocurrencies and fiat currencies lie in the absence of physical existence in the former.
• Challenges hindering the achievement of financial stability in the context of the trend towards financial technology and cryptocurrency.

1.3. Significance of the Study

The study's significance is associated with understanding the impact of financial technology and cryptocurrencies on financial stability. The study derives its importance from financial stability in any country, especially considering financial technology and cryptocurrencies are among the latest global technological developments, presenting challenges.

1.4. Study Methodology

The study relies on descriptive-analytical methodology suitable for the subject's nature. It is the appropriate method to describe all the study variables and analyze the impact of financial technology and cryptocurrencies on financial stability.

1.5. Study Objectives

This study aims to understand the impact of financial technology and cryptocurrencies on financial stability through the following:
• Understanding blockchain technology and its applications in the financial sector.
• Understanding cryptocurrencies, their developments, and the impact of financial technology and cryptocurrencies on financial stability.

2. Literature review

The burgeoning integration of financial technology and cryptocurrencies into the global financial system heralds a transformative era for financial services, promising unprecedented efficiencies and broader access. However, this evolution also brings forth significant challenges to financial stability, necessitating a robust framework for oversight and regulation. The literature underscores a dual narrative: the potential of these innovations to streamline and democratize financial transactions and the imperative to mitigate their inherent risks to the financial ecosystem. Establishing comprehensive regulatory measures is critical to ensuring financial stability in this dynamic landscape. (Diaby, et al., 2021) Moreover, (Arner et al., 2020) highlight the need for regulatory frameworks that address cryptocurrencies' rapid growth and volatility, the emergence of stablecoins, and their potential to disrupt traditional financial markets. The concept of "embedded supervision" proposed by (Arner et al., 2020) offers a forward-looking approach, suggesting that regulatory mechanisms be integrated within the technological infrastructure of financial services to enhance oversight efficiency. Moreover, stringent financial regulation and supervision are emphasized (Brühl, 2017), particularly for virtual currencies like Bitcoin. The disruptive potential of distributed ledger technologies necessitates an adaptable and vigilant regulatory environment that ensures the benefits of these technologies can be harnessed without compromising financial stability. The expansion of big tech firms into

finance, as noted in the Fintech and the digital transformation of financial services (2023), introduces additional layers of complexity. These entities leverage big data to offer financial services outside traditional banking frameworks, which, while innovative, pose unique challenges in ensuring financial stability. Therefore, regulatory bodies must evolve, adopting new strategies to monitor and manage the risks associated with these non-traditional financial service providers. Furthermore, the legislative and regulatory landscape must keep pace with technological advancements. The agreement reached by the European Union on crypto-assets, as mentioned in Digital Finance (2022), exemplifies a balanced approach to fostering innovation while safeguarding financial stability and consumer protection. This entails not only the adaptation of existing legal frameworks but also the development of new regulatory paradigms responsive to digital finance's nuances. The quest for financial stability in the age of financial technology and cryptocurrencies calls for an integrated, proactive, and reactive regulatory approach. It requires collaboration among global regulatory bodies, standard-setting entities, and the private sector to develop and implement regulatory frameworks that can effectively address the multifaceted challenges posed by these innovations. Ensuring financial stability in this evolving landscape is paramount, necessitating a delicate balance between encouraging technological advancements and safeguarding the financial system's integrity.

3. Cryptocurrencies

Cryptocurrencies emerged after the global financial crisis of 2008, which prompted the search for more stable and secure solutions.

3.1. Definition of Cryptocurrencies

There are various definitions of cryptocurrencies, commonly referred to as "cryptocurrency," and among the most prominent are: The International Monetary Fund defines cryptocurrencies as "digital representations of value not issued by a central bank or public authority, and not necessarily linked to a digital currency, but accepted by natural or legal persons as a means of payment, and can be transferred, stored, or traded electronically." (Ibrahim, 2022, p. 16)

• Cryptocurrency is a novel form of digital currency that differs significantly from traditional metallic currencies in banks, as it is not tied to a central bank, state, or regulatory authority. It is used for electronic payments like conventional currencies. (Danial, Laurence, Kent, Bain, & Solomon, 2022).

• Cryptocurrency is "a digital asset produced by blockchain technology, interchangeable, divisible, and highly transferable and trackable unless the chain contains embedded privacy features" (Shin, 2022, p. 364). From these definitions, we infer that cryptocurrency is an encrypted online number issued by entities and traded through blockchain, which eliminates double spending and is stored in electronic wallets.

3.2. Distinguishing Cryptocurrency from Fiat Currency

The following table illustrates the differences between cryptocurrency and fiat currency

Table .1. Differences between Cryptocurrency and Fiat Currency

Cryptocurrency	Fiat Currency
Decentralized and distributed by design	Centralized
Not subject to banks and government regulations	Subject to banks and government regulations
Exists only in the digital realm	Exists in tangible, physical form
Limited supply	Infinite supply
Created by computers	Issued by banks and governments
Market value not determined by supply and demand forces	Market value determined by supply and demand

Source: Compiled by researchers based on (Bray, 2022, p. 10)

3.3.Types of Cryptocurrencies and Their Effects

Cryptocurrencies are digital or virtual currencies that use cryptography for security and operate on blockchain technology. They have various types, each with unique features and effects on financial markets, investments, and the broader economy. Below is a detailed table outlining different types of cryptocurrencies, their respective effects, and the corresponding references.

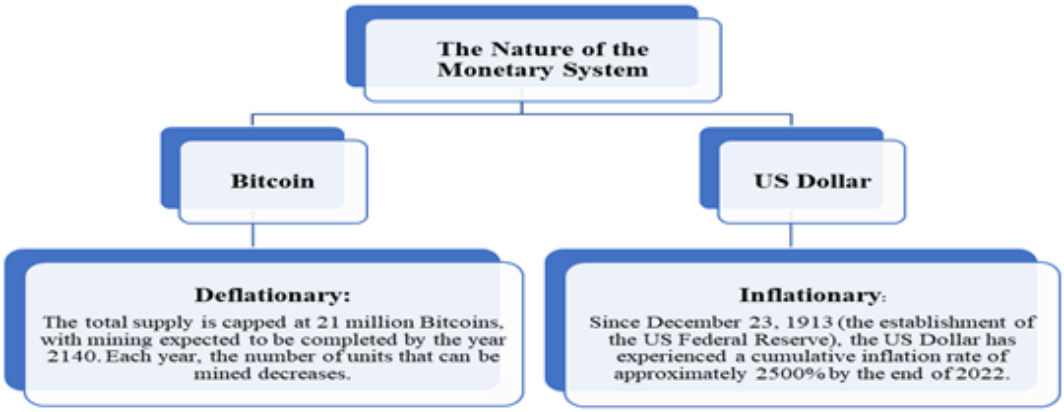
Table .2. Types of Cryptocurrencies and Their Effects

Cryptocurrency	Type	Effects	References
Bitcoin (BTC)	The first and most widely recognized cryptocurrency.	- Serves as a store of value and investment vehicle. - High volatility attracts high-risk investors. - Influenced the creation of altcoins. - Network and switching costs hinder widespread acceptance without significant support.	(Field & Inci, 2023); (Gunarso & Stephanie, 2022) (Luther, W. J. , 2016) (Yoo, 2021) (Mazambani & Mutambara, 2019);
Ethereum (ETH)	A blockchain platform with smart contract functionality.	- Enables smart contracts, expanding use beyond currency. - Fosters innovation in finance, real estate, and supply chain management through decentralized applications (DApps).	(Hamayel & Owda, 2021); (Letho, Sarin, & Vashishtha, 2022); (Makurin, 2023)
Ripple (XRP)	A cryptocurrency aimed at enabling fast, low-cost international payments.	- Used by financial institutions for cross-border payments, reducing transaction times and costs. - Centralized nature criticized by cryptocurrency purists.	(Andrianto & Diputra, 2017); (Ferdiansyah, Sukarno, & Nurhayati, 2023);
Litecoin (LTC)	A peer-to-peer cryptocurrency created as a lighter, faster alternative to Bitcoin.	- Faster block generation time and efficient transaction processes. - Suitable for smaller transactions and everyday use. - Serves as a testbed for Bitcoin improvements.	(Khavrova & Korenitsyna, 2021)(Dierksmeier & Seele, 2018) (Omari & Ngunyi, 2021)
Stablecoins (e.g., Tether - USDT)	Cryptocurrencies are pegged to a stable asset like the US dollar.	- Provide benefits of cryptocurrencies without volatility. - Useful for trading, savings, and as a medium of exchange. - Stability fosters trust and adoption in digital finance.	(Cherniei, Kuzmenko, & Shushkova, 2021);(Cumming, Johan, & Pant, 2019)

Source: Compiled by researchers based on the references mentioned above.

The Difference Between the Digital Currency System and the Fiat Currency System: We will examine a specific currency from each type to facilitate the distinction. On the one hand, we will consider Bitcoin, the first and most widely known and traded digital currency. On the other hand, we will examine the US dollar, which is extensively used for global financial and commercial transactions. The comparison is as follows:

Fig .1. The Digital Currency System Vs the Fiat Currency System



Source: Compiled by researchers based on the above

3.4. Applications of blockchain technology in the financial sector

Blockchain technology benefits the financial system by providing a direct, efficient, and secure environment for transactions ranging from the exchange of stocks and bonds to cash currencies, wages, and interests. While blockchain technology is associated with Bitcoin, its applications extend beyond enhancing transaction performance, reducing costs, and eliminating the need for existing systems. Blockchain technology, while modern and complex, operates as follows (Al-Bar & Al-Marhabi, 2018, pp. 2-3)

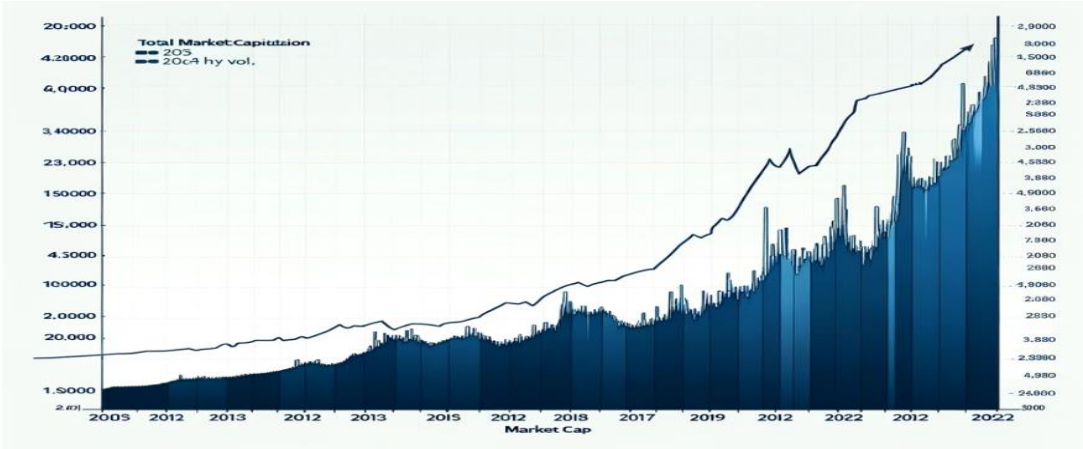
- In this technology, transaction records are stored in what is called a ledger;
- The ledger maintains a detailed history of records, each encrypted with a key;
- The following record is combined with the previous key and then encrypted with a new key, thus creating a chain of interlinked and encrypted documents.

Blockchain technology is recognized as a tool that establishes trust without needing third-party verification. (Hossein, Emmanuel, & Xu, 2019, pp. 52-53)

3.5.The Evolution of Cryptocurrencies

Cryptocurrencies experience significant fluctuations in their value due to speculative activities. The following table illustrates their importance in Algerian Dinars, as per the data from investing.com.

Fig .2. Total Market Capitalization of Cryptocurrencies



Source: (coinmarketcap, 2022)

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Figure 02 illustrates that the overall market value of cryptocurrencies from April 28, 2013, to March 2017 was meager due to their novelty and the limited culture of dealing with them. More importantly, their recognition and acceptance as a means of payment for settling transactions were minimal. In 2018, there was a spike in their market value, but it quickly fell and continued to fluctuate. Following the outbreak of COVID-19 and the imposition of health quarantines starting in early 2020, individuals and economic operators were compelled to resort to electronic and digital transactions to continue their activities and generate income. This necessity led to increased dealings in cryptocurrencies, boosting their market value to record highs quickly and gaining widespread popularity worldwide, especially after being accepted as a payment method.

Table .3. Changes in the Dollar Compared to the Evolution of Bitcoin Prices.

Period	Dollar Change	Percentage Change
May 25, 2021	+ $123.86	+ 0.32%
Last seven days	+ $1,737.23	+ 4.73%
Last 30 days	- $15,566.69	- 28.79%
Last six months	+ $19,779.28	+ 105.64%
Last year	+ $29,631.77	+ 334.03%
Last two years	+ $29,719.76	+ 338.38%
Last three years	+ $31,157.86	+ 424.21%
Last five years	+ $38,029.36	+ 8,032.10%
Last seven years	+ $37,928.37	+ 6,602.50%

Source: (Lakhangaonkar & Kamath, 2021)

Bitcoin prices have only recently increased compared to the US dollar, especially after the spread of the coronavirus. Over the past seven years, its price has changed significantly, reaching record numbers recently despite periods of stability.

Table .4. A Comparative Analysis of Bitcoin with Major Fiat Currencies Worldwide by Market Capitalization

Period	Dollar Change	Percentage Change
May 25, 2021	+ $123.86	+ 0.32%
Last seven days	+ $1,737.23	+ 4.73%
Last 30 days	- $15,566.69	- 28.79%
Last six months	+ $19,779.28	+ 105.64%
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Last three years	+ $31,157.86	+ 424.21%
Last five years	+ $38,029.36	+ 8,032.10%
Last seven years	+ $37,928.37	+ 6,602.50%

Source: (CoinMarketCap, 2022)

The table indicates that Bitcoin, compared to fiat currencies worldwide by market capitalization, holds a negligible position. Consequently, its current impact on economic variables in general is almost negligible. However, it is noteworthy that the significant increase in Bitcoin's market capitalization by very high percentages calls for an exploration of the reasons behind it and the construction of models and scenarios for the future of this currency. This is especially pertinent considering its impact on monetary policy and the global monetary system, given the inherent characteristics of Bitcoin and the inability of regulatory authorities to control its markets and prices and realize gains from its trading for the state.

Despite the evident benefits of advancing innovative technological companies and their increasing collaboration with traditional financial intermediaries, the 2008 global financial crisis has underscored the necessity of studying and identifying potential systemic threats to

overall financial stability. The evolutionary shifts in financial intermediation are evident today.

4. The Impact of Financial Technology and Cryptocurrencies on Financial Stability

Financial stability is highly sensitive to changes occurring in the financial sector, and with recent developments and the emergence of financial technology and its techniques, notably cryptocurrencies, numerous challenges have arisen.

The Impact of Financial Technology on Financial Stability: Its impact becomes apparent through its utilization across various dissemination channels, as illustrated in the following table:

Table .5. Objectives of Financial Innovations Utilized by Financial Institutions in the Context of Dissemination Channels.

Period	Dollar Change	Percentage Change
May 25, 2021	+ $123.86	+ 0.32%
Last seven days	+ $1,737.23	+ 4.73%
Last 30 days	- $15,566.69	- 28.79%
Last six months	+ $19,779.28	+ 105.64%
Last year	+ $29,631.77	+ 334.03%
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Last three years	+ $31,157.86	+ 424.21%
Last five years	+ $38,029.36	+ 8,032.10%
Last seven years	+ $37,928.37	+ 6,602.50%

Source: (Pantielieieva, 2020)

These innovations will impact the concept of ensuring financial stability and the characteristics of financial innovation development. The modern trend in financial innovation development lies in its high technological level. Therefore, it is essential to identify the features of the impact of financial technology on financial stability. We must recognize that the current state of financial technology does not reveal any significant signs of threats to financial stability. However, if qualitative and quantitative standards for its future development are maintained (which is highly expected), financial technology could become a channel for systemic risks. This is why it is crucial to pay special attention to understanding potential threats to financial stability due to the active development of financial technology, requiring systematic monitoring by concerned financial stability providers.

Table .6. Threats of Financial Technology to Financial Stability

Period	Dollar Change	Percentage Change
May 25, 2021	+ $123.86	+ 0.32%
Last seven days	+ $1,737.23	+ 4.73%
Last 30 days	- $15,566.69	- 28.79%
Last six months	+ $19,779.28	+ 105.64%
Last year	+ $29,631.77	+ 334.03%
Last two years	+ $29,719.76	+ 338.38%
Last three years	+ $31,157.86	+ 424.21%
Last five years	+ $38,029.36	+ 8,032.10%
Last seven years	+ $37,928.37	+ 6,602.50%

Source: (Pantielieieva, 2020)

The impact of cryptocurrencies on financial stability: Recently, a novel form of financial assets, referred to as "cryptocurrency," has emerged, with Bitcoin being the most renowned among them (Bariviera, 2017). As the table shows, Bitcoin represents 60.13% of the market

capitalization of the top 10 cryptocurrencies. Other cryptocurrencies besides Bitcoin include Litecoin, Ethereum, and Ripple, with a reported total of 9951 cryptocurrencies. (CoinMarketCap,2022).

5. Discussion about Algeria's Stance on Cryptocurrencies

Article 117 of Law No. 17-11, issued on 27/12/2017, states: "The purchase, sale, use, and possession of virtual currencies are prohibited." The Algerian legislature defined virtual currencies as those used by Internet users through the web, characterized by the absence of physical support such as coins and banknotes and payment operations by check or bank card. Violators of this provision are subject to penalties under the applicable laws.

The Algerian government's position is justified by its pursuit of a stricter monitoring system to track electronic transactions that could be used in drug trafficking, tax evasion, or money laundering, owing to the guaranteed anonymity for users of cryptocurrencies. The ease and low cost of transfers contribute to capital flight. Given the weak technical and internet infrastructure, precautionary measures were necessary from the outset to prohibit them. For example, Algerian exchange law requires financial transactions to be conducted through banks and prohibits transactions in currencies other than the dinar within the state. The law also restricts hard currency export in cash if it exceeds seven thousand euros or its equivalent in dollars.

The Bank of Algeria relies on the classical method of issuing money, which requires physical support as a cover. Currency represents a symbol of sovereignty and should be issued by an official sovereign entity, whereas private entities and companies issue cryptocurrencies without physical backing.

If the trading of digital cryptocurrencies becomes widespread, it could compete with the central bank's role in managing monetary policy using its known tools, thereby reducing the Bank of Algeria's influence on the monetary and financial market. Given the high inflation rate, this could lead to severe consequences.

Table .7. Regulatory Stances Towards Cryptocurrency Transactions

Period	Dollar Change	Percentage Change
May 25, 2021	+ $123.86	+ 0.32%
Last seven days	+ $1,737.23	+ 4.73%
Last 30 days	- $15,566.69	- 28.79%
Last six months	+ $19,779.28	+ 105.64%
Last year	+ $29,631.77	+ 334.03%
Last two years	+ $29,719.76	+ 338.38%
Last three years	+ $31,157.86	+ 424.21%
Last five years	+ $38,029.36	+ 8,032.10%
Last seven years	+ $37,928.37	+ 6,602.50%

Source: (Zulkhibri, 2019)

Integrating financial technology (FinTech) and cryptocurrencies into the financial sector has created opportunities and challenges for financial stability. On the one hand, FinTech can enhance financial stability by reducing risks and costs, developing specialized financial tools for risk management, and fostering innovation in financial services. On the other hand, cryptocurrencies, mainly due to their decentralized nature and speculative use, pose significant threats to financial stability. These threats are primarily linked to cybersecurity and privacy concerns, the potential for market manipulation, and the challenge of regulatory oversight in a rapidly evolving technological landscape.

Algeria can benefit from integrating FinTech and cryptocurrencies by adopting a balanced regulatory approach that fosters innovation while safeguarding financial stability. By establishing a robust regulatory framework, Algeria can attract FinTech companies and encourage the development of innovative financial services. Algeria can enhance its monetary policy tools and improve financial inclusion by exploring the potential issuance of a central bank digital currency. Furthermore, leveraging blockchain technology can enhance the efficiency and security of financial transactions, providing a competitive edge in the global financial market. Finally, investing in cybersecurity measures and regulatory oversight can mitigate the risks associated with cryptocurrencies and ensure a stable financial environment conducive to economic growth.

6. Conclusion

This study has explored the impact of financial technology and cryptocurrencies on financial stability through an extensive literature review, identifying both threats and benefits presented by financial technology. Ultimately, financial technology and cryptocurrencies represent some of the most recent innovations within the financial world, holding significant importance for the financial sector due to their positive and negative effects on financial stability. Through this research, we have arrived at several key findings, which are outlined as follows:

6.1. Findings

- Cryptocurrencies are inherently unstable and are predominantly used for speculative purposes, posing substantial risks to achieving financial stability, especially in the absence of central regulatory authorities.

- Financial technology offers considerable opportunities for the development of the financial sector but also introduces numerous threats to financial stability, particularly with the entry of new technologies embodied by fintech companies.

- Financial technology enhances the support for achieving financial stability despite not having reached a stage of maturity.

- Blockchain technology offers numerous benefits for financial stability, notably providing a secure and efficient environment.

- Binance is the largest exchange for trading Bitcoin. There are 9,951 cryptocurrencies, with Bitcoin being the most renowned.

- Cryptocurrencies' Instability: Cryptocurrencies are inherently unstable and predominantly used for speculative purposes. Their volatility and the lack of centralized regulatory oversight make them a source of financial instability. The speculative nature of cryptocurrencies can lead to significant financial disruptions and pose risks to the overall stability of the financial system.

- Opportunities and Threats of FinTech: While FinTech offers considerable opportunities for developing the financial sector, it also introduces numerous threats to financial stability. These threats include increased compliance costs for traditional financial intermediaries, cybersecurity risks, and the potential for operational disruptions in payment services.

- Enhancement of Financial Stability through FinTech: Financial technology can enhance financial stability by providing innovative solutions for risk management and increasing transparency. However, the maturity of FinTech is crucial for these benefits to be realized. Immature or poorly regulated FinTech solutions can become channels for systemic risks.

- Blockchain Technology: Blockchain technology offers numerous benefits for financial stability, including secure and efficient transaction environments. However, its decentralized nature challenges regulatory authorities in managing financial and monetary policies.

- Regulatory Stance on Cryptocurrencies: Different countries have adopted varying

regulatory stances towards cryptocurrencies. While some countries have embraced cryptocurrencies and integrated them into their financial systems, others, like Algeria, have imposed strict regulations or outright bans to mitigate potential risks.

6.2. Recommendations

- Efforts should be made to establish a regulatory and legislative environment conducive to the operation of financial technology and define the regulatory framework for trading and using cryptocurrencies.

- Central banks should issue cryptocurrencies to control and regulate the money supply, exert influence over monetary policy, and achieve financial stability.

- Utilize financial technology innovations for risk management and increased transparency to support financial stability.

- Identify all threats associated with using cryptocurrencies and their various negative impacts on financial stability and attempt to manage them effectively.

- Establish Regulatory and Legislative Frameworks: Efforts should be made to establish a regulatory and legislative environment conducive to the operation of financial technology and the trading and use of cryptocurrencies. Clear guidelines and regulations are essential to manage the risks associated with these technologies.

- Central Bank Issuance of Cryptocurrencies: Central banks should consider issuing cryptocurrencies to control and regulate the money supply, exert influence over monetary policy, and achieve financial stability. Central bank digital currencies (CBDCs) could provide the benefits of cryptocurrencies while maintaining regulatory oversight.

- Utilize FinTech Innovations for Risk Management: Financial institutions should leverage FinTech innovations to enhance risk management and increase transparency. This can support financial stability by mitigating the risks associated with traditional financial services.

- Identify and Manage Cryptocurrency Threats: It is crucial to identify all threats associated with using cryptocurrencies and their various negative impacts on financial stability. Effectively managing these threats requires collaboration between regulatory authorities, financial institutions, and technology providers.

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