Available Online: 8 June 2026 DOI: 10.54254/2977-5701/2026.34303

Development and regulatory policies of cryptocurrencies

Juan Wang[1,2*], Li Wang[3]

[1]School of Economics and Management, Xi'an University of Posts and Telecommunications, Xi'an, China
[2]Beijing Computer Federation Blockchain and Digital Finance Specialized Committee, Beijing, China
[3]School of Electronic Engineering, Xi'an University of Posts and Telecommunications, Xi'an, China

*Corresponding Author. Email: Jane@xupt.edu.cn

Abstract. Cryptocurrencies have become an important variable in the global financial system. With the maturity of blockchain technology, new applications such as stablecoins, Decentralized Finance (DeFi), Non-Fungible Tokens (NFTs) and Real-World Asset (RWA) tokenization have emerged continuously, and the crypto-asset system has gradually formed a multi-layered and multi-functional complex structure. However, as the market scale expands, problems such as price volatility risks, systemic financial risks and illegal financial activities have become increasingly prominent, prompting the continuous evolution of regulatory policies in various countries. Especially after the concentrated outbreak of multiple industry risk incidents around 2022, the global regulatory attitude has been significantly tightened, and the regulatory framework has gradually evolved from fragmentation to systematization. At the same time, Central Bank Digital Currencies (CBDCs) have entered an important stage of transition from experimental research to large-scale pilots, becoming one of the core paths for the digital transformation of national monetary systems. This paper systematically sorts out the evolutionary logic of cryptocurrencies, compares the changes in regulatory policies of major countries and regions, conducts an in-depth analysis of the development trends of CBDCs and the changes in the regulatory structure of crypto-assets based on the latest global practices from 2020 to 2026, and further explores the evolutionary direction of the asymmetric regulatory framework.

Keywords: cryptocurrencies, blockchain, stablecoins, Decentralized Finance, CBDC, financial regulation

1. Introduction

Against the background of the digital economy, the financial system is undergoing a profound restructuring. The cryptocurrency system based on blockchain technology has broken the reliance of traditional finance on centralized institutions, bringing a fundamental change to the value transfer mechanism. Since the birth of Bitcoin, crypto-assets have gradually evolved into a comprehensive financial ecosystem covering payment, financing, investment and asset management.

Nevertheless, while its decentralized characteristics improve efficiency and reduce transaction costs, they also bring problems such as lack of supervision, market manipulation, asset bubbles and uncontrolled cross-border capital flows. Therefore, countries are constantly seeking a balance between promoting technological innovation and maintaining financial stability.

2. Development of cryptocurrencies

2.1. Concept of cryptocurrencies

Cryptocurrencies generally refer to digital value carriers constructed based on distributed ledger technology and guaranteed transaction security and data integrity through cryptographic mechanisms. Their operation relies on a peer-to-peer network structure, and ledger consistency is achieved through consensus mechanisms, thus completing value transfer and recording without a central institution. Such assets have both decentralized characteristics and technology-driven attributes, and can perform the functions of a medium of exchange and a store of value under certain conditions [1].

2.2. Development of cryptocurrencies

Since the birth of Bitcoin in 2009, cryptocurrencies have undergone significant changes in terms of currency types, market value and application scale. Up to now, according to statistics, there are more than 5,000 types of cryptocurrencies in the market, with a total market value of hundreds of billions of US dollars. Despite the wide variety of cryptocurrencies, they can be divided into the following three stages based on their release time, main characteristics and currency value fluctuations.

2.2.1. Stage 1: technology verification and early experimentation (2009-2013)

Represented by Bitcoin, this stage mainly solved the problem of "whether a decentralized payment system is feasible". Its core mechanism is Proof of Work (PoW). Although it ensures security, it has problems such as high energy consumption, low transaction throughput and long confirmation time. Therefore, cryptocurrencies in this stage are more reflected in the attribute of "digital gold" rather than a payment tool.

Most cryptocurrencies in this stage use blockchain as their main data structure and are widely used in data storage and transmission. Taking Bitcoin as an example, Bitcoin mining mainly uses the Proof of Work mechanism. The probability of mining each block depends on the computational workload completed by the computer. However, this process results in long information confirmation time, high cost and low data throughput. Bitcoin in this stage is far from meeting people's requirements for fast transaction data processing and large data throughput, so it cannot be used as a real currency for transaction and circulation. However, due to its "scarcity", people regard it as an investment tool for storage and investment. Therefore, despite the large fluctuations in Bitcoin's value, it has not dampened people's enthusiasm for investment.

2.2.2. Stage 2: smart contracts and platformization (2014-2018)

Smart contract platforms represented by Ethereum promoted blockchain into a programmable stage, enabling it to build complex financial applications. The main characteristics of this stage include the rise of Decentralized Applications (DApps), the explosion of the Initial Coin Offering (ICO) financing model and the formation of a token economic system, but at the same time, it exposed problems such as lack of supervision and market bubbles.

Cryptocurrencies with application platform attributes represented by Ethereum were born around 2014. Cryptocurrencies in this stage also adopt blockchain as the underlying technology, but unlike Bitcoin, this type of cryptocurrency has the attribute of an application platform and is mainly used as tokens for various application platforms. Ethereum mining is based on a mechanism called Proof of Stake (PoS). In this consensus algorithm, the probability of verifying a new block depends on the amount of equity held by an individual. Therefore, compared with Bitcoin, Ethereum's data processing speed has been greatly accelerated. However, this type of cryptocurrency still has not solved the defect of large fluctuations in currency value, and some types derived in the later period also have a very narrow scope of use.

2.2.3. Stage 3: stablecoins and financial instrumentalization (2018-2020)

The emergence of stablecoins has significantly reduced the volatility of the crypto market, gradually making them a medium of exchange. Typical stablecoins include USDT (Tether), USDC and DAI (algorithmic stablecoin). In this stage, crypto-assets began to enter the stage of "quasi-monetary functions", but systemic risks gradually emerged.

Stablecoins represented by Tether are cryptocurrencies with relatively stable value. In order to realize the functions of traditional fiat currencies as a measure of value, a means of circulation and a means of payment, they are linked to real fiat currencies through the design of some models to ensure the stability of their prices. Such stablecoins are the most commonly used cryptocurrencies in the current financial field. At present, stablecoins are mainly divided into three categories: fiat-collateralized, crypto-collateralized and uncollateralized (algorithmic). In this stage, crypto-assets began to enter the stage of "quasi-monetary functions", but systemic risks gradually emerged.

2.2.4. Stage 4: ecosystem integration and institutional restructuring (2020-2026)

Since 2020, cryptocurrencies have entered a new stage characterized by "financial ecosystem + institutional participation". The prosperity of the ecosystem has continuously promoted new application scenarios and participants. This stage marks the mature evolution period of the crypto-financial system, which is mainly manifested in the expansion of the DeFi system, building a financial system without bank intermediaries, including lending, trading and derivatives markets; the rise of NFTs and the digital asset economy, promoting the formation of digital property right confirmation mechanisms; the entry of institutional capital, with traditional financial institutions entering the market on a large scale (ETF, custody business, etc.); the on-chain of RWAs, and the securitization and on-chain of real assets have become a new trend. The resulting risk incidents have driven the strengthening of supervision. Therefore, the industry crisis in 2022 became a turning point for global regulatory tightening.

After entering this stage, the crypto-asset system presents highly financialized and diversified characteristics, interacting with the original financial system and financial innovation, and beginning to promote global regulatory policies, attitudes and mechanisms. The author summarizes them in chronological order as follows:

(1) DeFi Boom (2020-2022): Decentralized lending and Decentralized Exchanges (DEXs) developed rapidly, with the Total Value Locked (TVL) exceeding 100 billion US dollars at one point.

(2) Rise of NFTs and Web3 (2021-2023): Digital property right confirmation and cultural asset tokenization promote new application scenarios.

(3) Enhanced Institutionalization Trend (2021-2026): Traditional financial institutions such as BlackRock entered the Bitcoin ETF market (the United States approved spot ETFs in 2024).

(4) Concentrated Outbreak of Risk Incidents (2022): Including the collapse of the Terra/UST stablecoin and the bankruptcy of the FTX exchange, which brought huge financial and legal risks, triggered global financial turmoil, and directly promoted the tightening of global regulation.

(5) RWA (Real-World Asset On-Chain) (2023-2026): Traditional assets such as national debt, real estate and bonds began to be on-chain, becoming a new growth point.

3. Regulatory policies on cryptocurrencies in various countries

Due to the extremely unregulated development of the crypto market, the supervision of various countries has also failed to form a consistent system amid fluctuations. Therefore, we focus on sorting out the policies of the United Kingdom (the originator of traditional banking and an early pioneer of electronic money), the United

States (a globally developed financial country), Japan and South Korea (representative Asian countries) and the European Union (a leader in policy formulation), and list their supervision centered on central bank digital currencies in Table 1.

Table 1. Regulatory policies on central bank digital currencies in major economies

Country	Regulatory Policies
China	On December 5, 2013, the People's Bank of China issued the *Notice on Preventing Risks Associated with Bitcoin*, which clearly stated that Bitcoin is not a currency but a virtual commodity. In March 2014, the People's Bank of China issued the *Notice on Further Strengthening the Prevention of Risks Associated with Bitcoin*, requiring the closure of 15 domestic Bitcoin trading accounts before April 15. On September 4, 2017, seven ministries including the People's Bank of China jointly issued the *Announcement on Preventing Risks of Token Issuance Financing*. The announcement pointed out that financing through token issuance is essentially an unapproved illegal public financing activity, and all types of token issuance should be suspended immediately from the date of the announcement. In August 2018, the Office of the National Special Campaign for Rectifying Internet Financial Risks issued the *Notice on Further Rectifying and Regulating Bitcoin and Other Cryptocurrency Exchanges*. In November 2019, the Shanghai Headquarters of the People's Bank of China issued the *Notice on Conducting Investigations and Rectification of Virtual Currency Exchanges*. In December 2019, four regulatory authorities in Beijing jointly issued the *Risk Warning on Further Preventing "Virtual Currency" Trading Activities*. In September 2021, ten ministries including the People's Bank of China issued the *Notice on Further Preventing and Addressing Risks of Virtual Currency Trading Speculation*, clarifying that virtual currency-related businesses are illegal financial activities, and overseas exchanges providing services in China are also illegal. From 2022 to 2026, regulatory authorities such as the People's Bank of China and the Cyberspace Administration of China have continued to crack down on virtual currency mining and trading activities with high pressure, while actively promoting the large-scale pilots of the digital renminbi (e-CNY) and emphasizing the "de-tokenization" development path of blockchain.
Japan	In 2017, Japan implemented the *Fund Settlement Act*, recognizing the legality of digital currencies as a means of payment. In April 2018, 16 licensed Japanese exchanges jointly established a self-regulatory body called the Japan Virtual Currency Exchange Association. In March 2019, the Japan Virtual Currency Business Association issued *Proposals for New ICO Regulation*. In May 2019, Japan passed revised bills on the *Fund Settlement Act* and the *Financial Instruments and Exchange Act*, renaming "virtual currency" to "crypto-asset". In 2022, Japan passed a stablecoin regulation law, stipulating that stablecoins must be issued by banks or trust institutions.

Table 1. Continued

Japan	From 2023 to 2025, Japan relaxed Web3 tax policies to encourage the return of crypto enterprises. Trends in 2026 indicate that Japan is promoting a "Web3 National Strategy" to balance compliance and innovation.
South Korea	In February 2018, South Korean financial regulators required real-name trading for cryptocurrencies to prevent their use in money laundering and other criminal activities, and foreign investors and minors were prohibited from trading virtual currencies. In July 2018, financial regulators relaxed the regulations on crypto-assets in accordance with the "unified supervision" policy formulated by G20 countries. In September 2018, the South Korean government banned Initial Coin Offerings (ICOs), arguing that raising funds by issuing crypto tokens is no different from "gambling". In May 2019, the South Korean government announced the abolition of Anti-Money Laundering (AML) guidelines for cryptocurrencies, and directly regulated cryptocurrency exchanges through legislation. In 2021, the *Specific Financial Information Act* was implemented to strengthen real-name trading and anti-money laundering supervision of exchanges. In 2023, the *Virtual Asset User Protection Act* was passed. From 2024 to 2026, a unified regulatory framework will be established to strengthen exchange audits and asset segregation.
United States	In March 2018, the U.S. Securities and Exchange Commission (SEC) may regulate the issuance of tokens under the "Simple Agreement for Future Tokens" and issued subpoenas to 80 digital currency companies. In May 2018, U.S. and Canadian regulators jointly launched about 70 investigations into digital currency token issuance fraud, known as the "Crypto Purge". In July 2018, the U.S. Internal Revenue Service (IRS) formed an international working group with the United Kingdom, Canada, the Netherlands and Australia to deal with digital currency-related criminal activities. In August 2018, Kenneth Blanco, Director of the Financial Crimes Enforcement Network (FinCEN) of the U.S. Department of the Treasury, stated that institutions exchanging digital currencies, whether inside or outside the United States, even if they have no physical presence in the United States, must comply with the requirements of the *Bank Secrecy Act (BSA)* as long as their business involves the United States, even partially. In 2019, the heads of the Commodity Futures Trading Commission (CFTC), the SEC and FinCEN jointly issued a statement warning that participation in digital asset activities must comply with anti-money laundering regulations. From 2020 to 2022, the SEC intensified regulation of ICOs and exchanges, while the CFTC emphasized the commodity attributes of crypto-assets. In 2023, the SEC sued Coinbase and Binance, marking the entry of crypto industry regulation into an "enforcement-driven phase". In 2024, Bitcoin spot ETFs were approved (a landmark event) [1-3]. From 2025 to 2026, stablecoin legislation will advance (e.g., discussions on the *Payments Stablecoin Act*) to clarify the boundaries between security-type and commodity-type tokens.

Table 1. Continued

United Kingdom	In March 2015, the UK government first proposed regulatory sandboxes. In March 2018, Coinbase became the first crypto firm to obtain an e-money license issued by the Financial Conduct Authority (FCA). In May 2018, the FCA launched investigations into 24 companies conducting unauthorized crypto currency digital businesses. In June 2018, the FCA wrote to the CEOs of regulated banks, warning them of potential risks when handling crypto currency digital businesses. In July 2019, the FCA proposed banning financial instruments related to digital currencies. In 2022, it proposed building the UK into a "global crypto-asset hub". In 2023, the *Financial Services and Markets Act* incorporated crypto-asset regulation. From 2025 to 2026, stablecoins will be incorporated into the payment regulatory system to strengthen consumer protection [4, 5].
European Union	In 2023, the EU adopted the *Markets in Crypto-Assets (MiCA) Regulation*. Implemented from 2024 to 2026, it established a unified crypto-asset regulatory framework, specifying stablecoin issuance requirements, becoming one of the most systematic regulatory systems in the world [4, 5].

4. Development of Central Bank Digital Currencies (CBDCs) in various countries

Unlike decentralized crypto-assets, CBDCs are backed by national credit, emphasizing controllability and stability. Since 2020, many countries have gradually transitioned from the research stage to pilot and application exploration stages.

4.1. China

The People's Bank of China began researching digital currencies in 2014, established the Central Bank Digital Currency Research Institute three years later, and officially proposed its CBDC, DCEP (Digital Currency Electronic Payment), on October 28, 2019. In line with China's national conditions, the central bank digital currency adopts a "dual-operation model", namely "central bank–commercial banks, commercial banks–the public", and adopts a hybrid architecture with no preset technical route. As long as commercial institutions meet the central bank's requirements for concurrency, user experience and technical specifications, the central bank will not interfere with any technical means they adopt [6]. At the end of 2019, the central bank designated Shenzhen, Suzhou and other cities as DCEP pilot cities. On January 10, 2020, the central bank issued a document stating that it had basically completed the top-level design, standard formulation, functional development and joint debugging and testing of digital currencies. The next step is to reasonably select pilot verification regions, scenarios and service scopes to steadily promote the launch and application of DCEP [7].

Overall, regulation follows a dual-track approach: "strict supervision + technological development". After 2017, regulatory efforts focused on comprehensively preventing financial risks and banning token financing activities [8]. In April 2020, the central bank stated that it would strengthen top-level design and unswervingly promote the R&D of legal DCEP, and systematically promote the reform of cash issuance and return systems. In 2021, regulatory authorities further clarified the illegal nature of virtual currency-related businesses and included overseas trading platforms in the scope of supervision.

Subsequently, regulatory efforts focused on cracking down on illegal trading and mining activities, while promoting the application of blockchain technology in a "de-financialized" direction, reflecting the regulatory logic of "controllable technology, financial isolation". The digital renminbi has continued to advance as an important practice of legal digital currency. From 2021 to 2026, the digital renminbi has been continuously promoted, with pilot cities expanded to more than 30 countries and regions, covering cross-border payments (e.g., cooperation with Hong Kong and the UAE), and applied in retail payments, government subsidies and Winter Olympics scenarios.

4.2. Japan

Driven by the rapid development of China's DCEP, members of Japan's Liberal Democratic Party recently stated that Japan should issue CBDC as soon as possible to avoid China's monopoly in the future digital currency market. However, the Bank of Japan has long held a negative view on cryptocurrencies. In fact, the Bank of Japan's negative view on digital currencies has not changed. Japan emphasizes the importance of government control over CBDC and the undeniable nature of the yen as a legal digital currency, and affirms the role of blockchain technology in CBDC design. Six central banks including Japan and Europe, together with the Bank for International Settlements, announced that they will hold their first meeting in mid-April 2020 to discuss the development of their own digital currencies as an alternative to Libra or the digital renminbi.

From 2023 to 2025, Japan completed the Proof of Concept (PoC) of CBDC and has entered the pilot preparation stage. Japan recognized the legal payment status of crypto-assets at an early stage and regulates them through a combination of legislation and industry self-regulation. In recent years, regulatory focus has gradually shifted to stablecoin standardization and Web3 industry support, optimizing the tax and innovation environment while strengthening compliance requirements.

4.3. South Korea

The Bank of Korea has recently established a dedicated research department for CBDC research. However, an official of the Bank of Korea stated that due to South Korea's relatively sound electronic payment system, the demand for CBDC is not so urgent. The Bank of Korea has also stated that it has no immediate plan to launch a digital currency, and believes that adopting a similar digital currency in South Korea is difficult due to concerns about its impact on financial stability. However, on April 6, 2020, the Bank of Korea changed its previous wait-and-see attitude and announced the adoption of a central bank digital currency strategy similar to that of the United States and Japan. To this end, the Bank of Korea will launch a 22-month internal test from March 2020 to the end of 2021 to test the potential of digital currency to replace cash and possible technical problems.

From 2022 to 2024, South Korea completed CBDC simulation experiments, and from 2025 to 2026, it will explore technical scenarios for wholesale CBDCs (between financial institutions). South Korea's regulatory system centers on investor protection and anti-money laundering, and continuously improves the institutional framework through real-name trading and special legislation. In recent years, relevant laws have further clarified the responsibilities of trading platforms and strengthened information disclosure and asset security management.

4.4. United States

The rapid development of China's DCEP has forced the United States to reconsider its legal currency structure. The Federal Reserve is actively investigating and considering issuing a "digital dollar" as a tokenized legal

currency. Since the outbreak of COVID-19, the "digital dollar" plan has been vigorously promoted. The United States is still cautious about whether to formally issue a "digital dollar". On March 27, 2020, the draft U.S. COVID-19 relief bill abandoned the issuance of digital dollars because it was considered immature, and further research is needed on the basic framework and potential applications of digital currencies.

In 2022, President Biden issued the *Executive Order on Ensuring Responsible Development of Digital Assets*, announcing the responsible development of digital assets. Since 2023, the United States has intensified law enforcement against major trading platforms and gradually clarified the legal attributes of different types of crypto-assets. The approval of Bitcoin spot ETFs in 2024 is regarded as an important node in market standardization. At present, stablecoin legislation and the definition of regulatory boundaries are still in progress. From 2023 to 2026, the Federal Reserve will promote the FedNow instant payment system (replacing part of CBDC functions), while the digital dollar remains in the research stage. With the new term of President Trump, cryptocurrencies in the United States have developed rapidly, but the government's digital dollar has gradually faded out of sight.

4.5. United Kingdom

On March 12, 2020, the Bank of England published a discussion paper titled *Central Bank Digital Currency: Opportunities, Challenges and Design*. The document pointed out that Central Bank Digital Currency (CBDC) is electronic central bank money. It not only provides innovation in the form of currency for people, but also can reform the payment infrastructure. At present, the Bank of England has not decided whether to issue CBDC, but the document has fully planned and discussed issues related to CBDC.

In 2023, the UK announced the "Britcoin" digital pound plan, which will enter the design and public consultation stage from 2025 to 2026. However, due to prudent consideration of overall risks, it is initially judged that the technological development and testing of the UK will not become a reason for the rapid promotion of digital currency.

4.6. France and the European Union

On March 30, 2020, the Banque de France officially launched an experimental program aimed at exploring the potential opportunities of using Central Bank Digital Currency (CBDC) for clearing and settlement, and issued the *Recruitment for Participation in Digital Currency Experiments* at the same time. The experimental program is divided into three stages, which will guide the implementation of these projects in all aspects of CBDC issuance, including designing digital currency, analyzing its impact and final operation. In addition, the project will also study the impact of CBDC on monetary policy, macroeconomics, market infrastructure and legal regulatory framework. The Banque de France previously hoped to use a blockchain-based payment system in Europe, but the announced experimental program does not specify that any specific technology must be used.

The European Union has established a systematic regulatory framework through unified legislation (MiCA), comprehensively regulating issuers, trading platforms and stablecoins. On this basis, the United Kingdom is promoting itself as a hub for crypto-financial innovation while strengthening consumer protection mechanisms. From 2021 to 2026, calls for a "digital euro" in the European Central Bank have continued, but due to the instability of monetary, financial and energy issues in the Eurozone, the schedule for entering pilot testing is still moving forward hesitantly.

5. Asymmetric regulation of cryptocurrencies

Unlike decentralized crypto-assets, CBDCs are backed by national credit, emphasizing controllability and stability. Since 2020, many countries have gradually transitioned from the research stage to pilot and application exploration stages. When central bank digital currencies are issued and become global currencies, their regulation will become a major challenge and test for all countries. Central bank digital currencies are issued by the state and backed by national sovereignty credit. Their essence is currencies controlled and managed by sovereign countries and monetary authorities, and no other country has regulatory power over them [9].

Therefore, four types of asymmetric regulatory relationships will emerge: sovereignty-exclusive, fully shared, partially shared and layered and fragmented [1].

5.1. Sovereignty-exclusive model

This model means that the issuing country of CBDC fully enjoys regulatory power over the currency. A single country fully enjoys regulatory power because CBDC is issued by a single country, backed by national sovereignty credit, and managed, controlled and guaranteed by the country's central bank or currency issuing authority. All other countries, organizations, enterprises and individual users must abide by the issuing country's regulatory laws. However, as a global currency, this model of institutional penetration and financial hegemony will definitely be rejected by other countries. Facebook's Libra plan was firmly opposed by many countries and organizations because it was suspected of further strengthening U.S. dollar financial hegemony and threatening the status of some countries' sovereign currencies. At the same time, all countries have planned or already started to build their own digital fiat currency systems in the blockchain and digital currency fields. This regulatory mechanism prioritizes national sovereignty, so it is called the sovereignty-exclusive model.

5.2. Fully shared model

This model means that the issuing country and participating countries of the digital currency fully share regulatory power. Since the issuing country has invested huge human, material and financial resources in the planning, design, infrastructure investment and operation of the digital currency, and the issuing country is also the largest user of the digital currency, it is unfair to the issuing country if all transactions can be accessed by participating countries. Therefore, the issuing country will not accept this type of regulation from both security and economic interests perspectives.

5.3. Partially shared model

The issuing country of the digital currency can view all transaction information, while participating countries can only view transaction information related to their own countries. This regulatory model may be relatively acceptable and implementable for both the issuing country and participating countries. However, such a regulatory mechanism will complicate system design. Each country has different regulatory mechanisms, so the digital currency regulatory system may need to design a corresponding regulatory mechanism for each country. Current technological development makes it difficult to achieve this [10]. Therefore, to solve this problem, multiple countries need to jointly establish an alliance regulatory center mechanism specifically responsible for managing and accommodating the regulatory laws and regulations of various countries. However, issues such as whether this mechanism can be smoothly established and how to operate and manage it after establishment must be considered in the development of digital currencies. Similarly, how to ensure

that participating countries receive the information they should receive without seeing information from other countries, and how to solve problems such as multiple physical addresses and multiple network addresses—these issues need to be carefully considered and negotiated by all countries if this mechanism is adopted in the future.

5.4. Layered and fragmented model

Both the issuing country and participating countries of the digital currency can only view transaction information related to their own countries. Theoretically, the fairness of this regulatory mechanism is greatly improved compared with other mechanisms. However, since the issuing country has invested huge costs in the R&D and issuance of digital currency, it will inevitably require to master the dominance of transaction information or obtain much more information than other countries. Only if the issuing country wants to quickly promote its own digital currency, it may concede part of its power and agree to adopt this mechanism. In the design of this regulatory mechanism, the system stratifies ownership and cuts data of transaction information, so that each country can only see information related to itself. Countries can share transaction information with each other through ownership applications via the system, which avoids the problem of sharing data from other countries in full sharing. We call it the layered and fragmented regulatory model. Compared with other mechanisms, this is the closest to a symmetric regulatory mechanism, but it has not yet achieved complete symmetry.

5.5. Global coordinated regulation (quasi-symmetric)

Global coordinated regulation is a forced but inevitable regulatory situation, manifested in the Financial Action Task Force (FATF) promoting the Travel Rule. On the one hand, it promotes enhanced cross-border data sharing; on the other hand, it carries out global compliance certification for previously controversial exchanges. However, there are still problems: conflicts of national sovereignty among countries continue, and the impact of wars and geopolitics on finance is self-evident; data privacy conflicts are becoming increasingly fierce, and inter-country data disputes represented by TikTok are reflected in all aspects of commerce, finance and Internet technology; technical standards are not unified, and the security of many cryptocurrencies is poor. However, countries have different network security environments, network importance and response needs, and it is impossible to unify standards among countries with different economic interests and technical levels in the short term, providing a breeding ground for many non-compliant and unsafe platforms and transactions. In current practice, international organizations are promoting cross-border regulatory coordination mechanisms, such as the unification of anti-money laundering rules. This trend has weakened the completely asymmetric structure to a certain extent, but a truly unified global regulatory system has not yet been formed [11].

6. Conclusion

From the perspective of trends, frequent global diseases, wars and trade disputes have exposed some drawbacks of traditional currencies, making all countries realize the necessity of issuing digital currencies and accelerating the R&D of central bank digital currencies, hoping to occupy a commanding height in the digital currency field as soon as possible. Consequently, digital currency regulation has become the focus of attention for all countries and organizations. Some countries have adopted strict measures to prevent problems such as money laundering and terrorist financing caused by digital currencies, while some countries have actively embraced the development of digital currencies. Overall, four major trends are emerging: regulatory

globalization, deep participation of financial institutions, coexistence of CBDCs and stablecoins, and enhanced financialization of crypto-assets.

Since 2020, cryptocurrencies have evolved from "marginal financial experiments" to "an important part of the global financial system" [12]. Their development presents three major trends: first, comprehensive tightening but clarification of regulation; second, deep participation of traditional financial systems in ETFs and RWAs; third, CBDCs becoming a new track for national competition. There are still many unresolved regulatory issues for national digital currencies, private stablecoins and decentralized digital assets. The core challenges are:

(1) Difficulties in regulatory coordination, with large differences in national legal systems.

(2) Systemic financial risks, with rising risks of stablecoins and leverage mechanisms.

(3) Technical security issues, with frequent smart contract vulnerabilities.

(4) Conflicts between privacy and compliance, with prominent contradictions between data regulation and user privacy.

In today's era of economic globalization, no country can stand alone, and countries have become a closely connected community with a shared future. Therefore, solving digital currency regulatory issues requires the joint participation and discussion of all countries. The core issues in the future are: first, how to balance innovation and risk; second, how to establish a cross-border coordinated regulatory mechanism; third, how to resolve the contradiction between decentralization and sovereign control.

References

[1] Bank for International Settlements. (2023). *Central bank digital currencies: Progress report.* https: //www.bis.org/publ/othp66.htm

[2] European Commission. (2023). Regulation on markets in crypto-assets (MiCA). *Official Journal of the European Union.* https: //eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX: 32023R1114

[3] U.S. Securities and Exchange Commission. (2024). *Reports on cryptocurrency enforcement actions.* https: //www.sec.gov/

[4] International Monetary Fund. (2025). *Global financial stability report: Crypto assets and financial stability.* International Monetary Fund. https: //www.imf.org/en/Publications/GFSR

[5] World Bank. (2026). Digital finance and central bank digital currency report. World Bank Group. https: //www.worldbank.org/

[6] Qu, S. S., & Bao, H. (2019). Changes in the monetary functions of cryptocurrencies. *China Finance,* (15), 58–60.

[7] Hua, X. P., Xia, Z. B., & Zhou, J. (2019). How to solve the problem of virtual currency regulation. *Financial Regulation Research,* (11), 1–18. https: //doi.org/10.13490/j.cnki.frr.2019.11.001

[8] Shan, J. J. (2019). Current status and regulatory research of digital currencies. *Hainan Finance,* (10), 77–81.

[9] Yao, Q. (2017). Development and regulation of digital currencies. *China Finance,* (14), 38–40.

[10] Cheng, H. M. (2020). Research on anti-money laundering regulation in the context of digital currencies. *Times Finance,* (3), 42–43.

[11] Fan, Y. F. (2016). Theoretical basis and structural choices of China’s legal digital currency. *China Finance,* (17), 10–12.

[12] Cai, W. D., & Wang, J. (2019, November 12). *Legal digital currency: A new global currency under asymmetric regulation [Blog post].* Retrieved from http: //www.finacerun.com/home/news/detail/article_id/30143.html