

Cryptocurrencies and their impact on the global economy

Gleb Trostyanskiy*

Undergraduate Student

Paris 1 Panthéon-Sorbonne University

75231, 12 Pantheon Sq., Paris, France

<https://orcid.org/0009-0004-6192-9363>

Abstract. The purpose of the study was to comprehensively analyse the impact of cryptocurrencies on the global economy and financial systems. Cryptocurrencies are considered as blockchain-based digital assets with transparent and secure transactions, and they are compared with fiat money in terms of functions, liquidity, speed of operations, and stability. It has been revealed that cryptocurrencies provide fast cross-border settlements and access to new financing channels, but are accompanied by increased volatility, while fiat money retains stability and government control over the money supply. The research methods included descriptive and dynamic analysis of the capitalisation of stablecoins, comparative analysis of cryptocurrencies and fiat money by emission characteristics, regulation, volatility, and international use, case analysis of individual countries (USA, China, Japan, Germany, Switzerland, Kazakhstan), and graphical visualisation of data. The results showed that cryptocurrencies provide fast cross-border settlements and expand the capabilities of financial technologies, while fiat money maintains stability and government control over the money supply. An analysis of the capitalisation of stablecoins and on-chain Assets Under Management for 2023-2025 testified to the institutionalisation of the market: in 2024, the capitalisation of stablecoins exceeded USD 200 billion, and in 2025 reached USD 250-300 billion with assets under management, which indicates the establishment of sustainable on-chain models and the integration of digital assets into the financial system. The results of the study confirmed the impact of digital assets on capital allocation, investment flows and financial stability, and also allow predicting the further development of global payment and investment networks. The practical significance of the study lies in the possibility of using the findings to develop strategies for regulating and introducing cryptocurrencies into national financial systems

Keywords: blockchain; capitalisation; investments; financial technologies; transactions

Introduction

Cryptocurrencies are digital assets that operate based on blockchain technology, which ensures transparency of operations and their decentralised nature. Their appearance has changed the approach to financial transactions, allowing the exchange of funds without the participation of traditional intermediaries. The expansion of the use of digital currencies contributes to the development of new business models and the establishment of global financial settlement networks. The widespread use of cryptocurrencies has influenced international capital markets, creating conditions for the emergence of new investment tools and increasing the liquidity of digital assets. However, high exchange rate volatility creates additional risks for investors and requires adaptation of existing regulatory mechanisms. Central banks and international financial organisations

are exploring the possibilities of integrating digital currencies into the existing system to maintain stability and prevent threats to financial security.

In the long term, cryptocurrencies can change the balance of power in the global economy, forming new centres of influence and setting course for the development of the global financial architecture. G.M. Caporale & A. Plastun (2020) analysed the impulse effects in the cryptocurrency market after one-day abnormal price changes. The researchers found that cryptocurrency assets exhibit short-term behavioural patterns similar to the effects of inertia in traditional financial markets, but their severity is significantly higher due to increased volatility and the speculative nature of trading. A study conducted by Y. Liu & A. Tsyvinski (2021) considered the ratio of risks and returns of

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*Corresponding author



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cryptocurrencies in a global financial context. The paper emphasised the importance of cryptocurrencies as a separate object for the analysis of investment strategies, and also considered the factors shaping the dynamics of profitability and systemic risks.

The analysis conducted by A.A. Satmurzaev *et al.* (2024) showed that the development of cryptocurrencies in Kazakhstan has a limited but growing impact on the country's financial system, especially in the field of cross-border transfers and the shadow economy. The researchers found that the lack of comprehensive regulation leads to risks of financial instability and capital outflow, while the introduction of controlled oversight mechanisms can increase market transparency and stimulate the development of the fintech sector. The study confirmed that institutional uncertainty and the low level of financial literacy of the population are holding back the integration of cryptocurrencies into the official economy.

The study by S. Bibi & I. Yerzhan (2025) revealed that digitalisation of payment instruments in Kazakhstan helps to reduce transaction costs and accelerate interbank settlements. However, the researchers noted that insufficient infrastructural readiness and a weak legal framework hinder the effective implementation of the central bank's digital currency. The results showed that the implementation of the digital tenge project will require strengthening cybersecurity, modernising banking platforms, and increasing public confidence in new financial technologies. In addition, the study demonstrated that the active development of digital payment systems can enhance Kazakhstan's integration into international financial flows and reduce dependence on external payment centres.

H.N. Luu *et al.* (2023) showed that the introduction of digital currencies by central banks on a global scale contributes to increasing the stability of the financial system, subject to proper regulation and coordination between countries. The researchers concluded that Central Bank Digital Currency can reduce liquidity risks and improve the efficiency of interbank transactions, but if implemented uncoordinated, it can create imbalances in international capital flows and increase competition between central banks. The study noted that successful integration of digital currencies requires restructuring the institutional mechanisms of the banking system and adapting to new forms of financial intermediation.

Observations by T. Keister & D. Sanches (2023) analysed the feasibility of issuing digital currencies by central banks. The paper considered the possible consequences of the introduction of digital currencies for monetary policy, including the transformation of monetary transmission channels and the impact on the banking system. The researchers showed that the development of a central bank digital currency requires an analysis of institutional mechanisms and an

assessment of its impact on financial stability. The study by A. Zhanturina (2023) was devoted to the analysis of trends in the development of financial technologies in Kazakhstan and their connection with the spread of cryptocurrencies. The processes of digitalisation of financial services, the development of new electronic payment instruments and their integration into the national economy were considered. The researcher noted that the active implementation of fintech solutions creates the conditions for the creation of the infrastructure necessary for the functioning of digital currencies and crypto assets. The study also highlighted the impact of innovation on increasing the availability of financial services to the public.

S. Dow (2019) examined monetary policy reform in the context of the emergence of digital currencies and the role of central banks in regulating this process. Through the analysis of institutional approaches, changes in money management and issues of interaction between conventional and digital instruments were considered. The researcher emphasised that the integration of digital currencies into the monetary system has an impact on the stability of the financial sector and defines new vectors of its development. The analysis conducted by T. Baimaganbetov *et al.* (2023) showed that the accelerated digitalisation of the currency in Kazakhstan is accompanied by high financial and institutional risks, primarily related to the lack of readiness of the regulatory framework and infrastructure vulnerability. The researchers found that the introduction of digital assets without comprehensive regulation can lead to an increase in the shadow economy, an increase in speculative transactions, and increased volatility in the financial market.

Research has revealed a number of gaps: limited analysis of the integration of cryptocurrencies into the banking system, insufficient attention to regulatory and institutional challenges, lack of empirical data on the impact on payment systems and the investment environment. These gaps determine the relevance of this study, which aimed to consider cryptocurrencies as an element of the global economy through the prism of their functional interaction with the conventional financial system, and to identify the consequences for national and international markets.

Materials and Methods

The study was an overview, analytical, and comparative economic analysis of the development of the digital asset market in 2020-2025, including the stages of growth, the crisis of 2022, and subsequent institutionalisation. The main materials used were data from CoinGecko's (2021; 2022) analytical reports, and official market statistics. Additional data included information on the capitalisation of stablecoins, the volume of on-chain assets under Assets Under Management, the dynamics of institutional activity, and key market events

such as the collapse of Terra/Luna and the bankruptcy of Futures Exchange, which allowed tracing the structural changes of the crypto market (CoinGecko, 2021; McGleenon, 2024; Reuters, 2025).

National cases from the USA (Genc & Takagi, 2024), China (Li *et al.*, 2019), Japan (Huynh *et al.*, 2022), Germany (Hütten, 2022) and Switzerland (Zehnder, 2024) were used for comparative analysis, which provided an opportunity to compare different models of digital asset regulation and their impact on financial systems, payment infrastructure, and budgetary indicators of countries. The research methodology included a comparative analysis of cryptocurrencies and fiat money based on the characteristics of issuance, regulation, volatility, anonymity and international use, which allowed summarising the features of the functioning of digital assets and their interaction with national financial systems. The case analysis of the countries was used to assess the budgetary and socio-economic consequences of the introduction of digital assets, including the impact on tax revenues, the development of investment platforms, and the transformation of banking services.

A descriptive and dynamic analysis of the capitalisation of stablecoins and on-chain Assets Under Management for 2020-2025 (CoinGecko, 2021; CoinGecko, 2022; Kosse *et al.*, 2023; McGleenon, 2024) highlighted key market trends, including fluctuations during the 2022 crisis and subsequent recovery. To visually represent the dynamics, graphical visualisation of data in Excel was used, which was applied to the findings to reflect changes in capitalisation and institutional allocations.

The system-structural approach helped to assess the impact of digital assets on the banking sector, payment systems and investment instruments, including the integration of distributed ledger technologies, and the development of on-chain services. The research materials covered data on the distribution of digital assets, market capitalisation, and statistical indicators of countries, which provided an opportunity to compare different regulatory models.

The limitations of the study were related to the incomplete availability of detailed data on transactions, taxation and mining of cryptocurrencies, which limited the depth of assessment of individual budgetary and institutional effects. Nevertheless, the combination of applied methods, including comparative and case analysis, dynamic capitalisation review, and graphical visualisation, allowed forming a holistic view of the transformation of financial systems under the influence of digital assets in 2020-2025.

Results

Cryptocurrency is a digital payment system that operates based on blockchain technology and allows transactions to be carried out without the participation of banking institutions. The system is organised in a decentralised manner, which means there is no single regulatory authority and distributed data storage among many network participants. Most cryptocurrencies have a limited volume of issuance, which determines their scarcity and distinguishes them from conventional currencies, which can be issued by central banks in unlimited quantities. The cryptocurrency market is characterised by high volatility, expressed in sudden changes in exchange rates depending on demand, the news background, and global economic processes (Basil, 2022). All transactions are recorded in an open registry, which ensures transparency of operations, but participants remain anonymous, using cryptographic addresses instead of personal data.

Cryptocurrencies and conventional fiat money are two types of funds used for making payments, settlements, and storing value, but they operate on different principles. Fiat money is issued by government agencies and has a legitimate status as an official means of payment, its value is ensured by the economic system and trust in the state. Cryptocurrencies exist exclusively in digital form, are based on blockchain technology and are decentralised, which allows transactions to be carried out directly between participants without the involvement of banks and government intermediaries (Table 1).

Table 1. Comparative analysis of cryptocurrencies and fiat money in an economic context

Criterion	Cryptocurrencies	Fiat money
Issue	Limited edition, pre-established by the algorithm (for example, Bitcoin – 21 million coins), which excludes the possibility of additional issuance	Unlimited issuance by central banks in accordance with macroeconomic policy and economic needs
Regulation	Lack of centralised control; rules of operation are determined by network protocols	Regulated by the government and financial institutions, including laws on monetary circulation and central bank policy
Form of existence	Fully digital, based on blockchain technology, has no physical form	Exist in physical form (banknotes and coins) and in electronic payment systems
Provision	Have no material or government support; the value is established based on the demand and trust of the network participants	Supported by the state economic system, reserves and trust in financial institutions
Transactions	Pass directly between the participants through the blockchain without intermediaries; recorded publicly	Pass through banks and regulated payment systems with the participation of intermediaries

Table 1. Continued

Criterion	Cryptocurrencies	Fiat money
Calculation speed	High in the absence of intermediaries and automated algorithms; may slow down when the network is overloaded	Depends on the banking infrastructure, and often requires processing within business days, especially for international transfers
Anonymity	Participants are hidden behind cryptographic addresses, but all transactions are public	Identification of participants is mandatory; all transactions are conducted through banking systems
Volatility	Subject to significant exchange rate fluctuations in short periods of time	Relatively stable, the exchange rate is regulated by monetary policy and economic factors
International use	Used globally without reference to national borders; cross-border transfers are carried out directly	Mainly used within countries; international transfers require currency exchange and the participation of banking intermediaries

Source: compiled by the author based on M. Warkentin & C. Orgeron (2020), F.M. AbdelSalam (2023)

A comparative analysis of cryptocurrencies and fiat money shows fundamental differences in their nature, functioning mechanisms, and impact on the financial system. Fiat currencies have historically been the basis of monetary circulation and are backed by the state through a system of central banks. They have the status of legal tender, which guarantees their acceptance as a means of payment and accumulation. Government institutions' control allows for the regulation of the money supply, inflation, interest rates, and the sustainability of the financial system as a whole (De Vries, 2020). Fiat money is not only an economic, but also a political instrument through which the state implements macroeconomic policy and maintains socio-economic balance. Cryptocurrencies, on the contrary, arose as a reaction to the limitations and disadvantages of centralised financial systems. Their appearance in 2009 with the launch of Bitcoin marked the beginning of a new stage in the development of digital forms of money based on the principles of decentralisation, transparency and autonomy. The key feature of cryptocurrencies is the absence of an issuing centre: the creation and circulation of digital assets is provided by blockchain technology algorithms, where each transaction is confirmed by a network of participants. This model eliminates the need for intermediaries, reduces the cost and time of calculations, forming an alternative system of trust based on mathematical and cryptographic mechanisms. Fiat currencies remain a part of the traditional banking sector, ensuring the functioning of credit and deposit operations, the development of payment systems and investment instruments. Their circulation is regulated at the national and international levels through a network of financial institutions, interstate agreements, and monetary unions. In contrast, cryptocurrencies operate outside national borders and can be used without the involvement of banks, which contributes to the growth of cross-border transactions and the establishment of a new model of global financial flows (Mankala *et al.*, 2023). However, the lack of centralised control poses risks to financial stability related to price volatility, speculative fluctuations, and the possible use of digital assets in illegal transactions.

The results of the analysis show that cryptocurrencies only partially perform the functions of traditional money. They can be used as a means of accumulation or exchange, however, limited scalability, dependence on technological infrastructure and legal uncertainty prevent their mass distribution. However, the high volatility of the exchange rate makes cryptocurrencies attractive to investors, which turns them into a speculative asset rather than a stable means of payment. Fiat money, on the other hand, provides predictability, government guarantees, and the ability to pursue flexible monetary policy, which makes it more reliable in the face of macroeconomic instability.

The investment and budget components also demonstrate the differences between the two types of currencies. Fiat money allows the government to control cash flows, collect taxes, and direct funds to finance social programmes and infrastructure projects. Cryptocurrencies in this context create alternative channels of capital circulation that are more difficult to control, which necessitates the development of new regulatory and tax mechanisms (Treiblmaier, 2023). International experience confirms that countries choose different strategies: some (for example, Switzerland, Singapore, Estonia) integrate digital assets into the financial system, creating a legal framework for their functioning; others (China, India) restrict their use, seeking to minimise threats to financial stability and protect the domestic market. Despite the existing risks, the development of cryptocurrencies has stimulated government institutions to search for new solutions in the field of digital finance. The Central Bank Digital Currency has become the answer to the challenges associated with the proliferation of private cryptocurrencies. Central Bank Digital Currency combines the technological advantages of the blockchain with the guaranteed stability and legal status of fiat currencies, ensuring transparency of transactions and maintaining government control. Thus, the monetary system is gradually moving towards a hybrid model in which traditional and digital forms of money coexist and complement each other. The prospects for the interaction of cryptocurrencies

and fiat money largely depend on the pace of digitalisation of the global economy, the development of the regulatory framework, and the level of trust from society and business. In the context of globalisation and technological transformations, cryptocurrencies remain an important element of financial innovation, while fiat currencies continue to play a stabilising role, providing the basis for national and international settlements (Subbagari, 2024). In the long term, a gradual convergence of the two systems can be expected, where digital technologies will be integrated into conventional monetary circulation mechanisms, and government regulation will become a key factor in their sustainable coexistence.

The current stage in the development of the global economy is characterised by the rapid digitalisation of the financial sector, in which traditional institutions are confronted with new forms of capital and innovative circulation tools. Digital assets, which are the result of the integration of financial and information technologies, are gradually becoming an important element of the global financial ecosystem. Their distribution has led not only to the emergence of new channels of investment activity, but also to profound structural changes in the work of banking institutions, transforming conventional approaches to management, intermediation, and liquidity provision (Subbagari, 2024). The impact of digital assets on financial infrastructure is manifested primarily in the changing role of banks as the central link of financial intermediation. In the context of decentralised financial platforms, some of the functions previously owned by banks are moving to the digital space, where transactions are carried out without the participation of conventional intermediaries (Givens, 2025). This leads to lower transaction costs, faster settlements, and increased transparency of financial flows. However, the loss of the monopoly position of banks in the field of payments and lending creates new risks related to data security, stability of payment systems and capital controls.

Banking institutions are forced to adapt to new technological and behavioural models of market participants. In response to the growing popularity of digital currencies and tokenised assets, banks are developing their own digital products, implementing blockchain and smart contract technologies, and creating internal platforms for servicing digital asset transactions. This contributes to the emergence of hybrid service models that combine traditional regulatory mechanisms and innovative technologies (Hütten, 2022). There is a gradual shift in emphasis from classical deposit and loan intermediation to the provision of digital financial services, data analytics, and cybersecurity.

The change in the financial infrastructure is also associated with the need to rethink regulatory mechanisms. State and supranational bodies strive to work out a balance between innovation and stability by introducing regulations aimed at preventing money

laundering and ensuring the protection of investors' rights. This process is accompanied by a growing interest in the Central Bank Digital Currency, which is seen as a tool for maintaining state control while simultaneously implementing the benefits of digital technologies (Ramos, 2022). The introduction of such currencies can radically change the structure of settlement and deposit operations, making the financial system more flexible and technologically advanced.

The impact of digital assets on banks is evident not only in technological changes, but also in the transformation of strategic priorities. Financial institutions are forced to reorient their business models, invest in innovation, expand partnerships with fintech companies, and strengthen customer trust in the face of digital competition. Digital assets act as a catalyst for the evolution of the banking sector, stimulating the transition to a new model of financial intermediation based on transparency, technology, and integration with global digital ecosystems. The combination of these processes indicates that digitalisation does not undermine the role of banks as backbone elements of the economy, but, on the contrary, encourages them to innovatively update (Zehnder, 2024). In the long term, it is the ability to adapt digital solutions and combine conventional tools with blockchain technologies that will become a determining factor in the competitiveness of banking institutions and the sustainability of the financial infrastructure as a whole.

The impact of digital assets on financial infrastructure is reflected in the transformation of banking institutions, payment systems, and the investment environment. Blockchain technologies, smart contracts, tokenisation, and decentralised platforms are changing the processes of lending, settlement, risk management, and capital allocation (Zhou *et al.*, 2024). Digital assets create new channels of interaction between market participants, enhance transparency of transactions, accelerate the movement of financial flows and expand opportunities for the diversification of investment instruments (Khosravi & Szămäki, 2023). Such changes form the basis for the integration of various segments of the financial system and stimulate the introduction of innovative models of financial services (Table 2). Banks are forced to integrate new technologies to work with digital assets, which transforms operational processes and risk management models. Adapting the infrastructure to blockchain networks and distributed ledgers creates opportunities to increase transaction transparency, reduce costs, and accelerate transaction processing. The use of smart contracts automates the fulfilment of contract terms, reduces the need for manual control and increases the effectiveness of compliance, including compliance with anti-money laundering regulations (Chen & Tomblin, 2021). Digital assets influence lending through the use of tokenised collateral and digital guarantees, which expands the possibilities of managing liquidity and capital.

Table 2. Impact of digital assets on the banking sector, payment systems and the investment environment

Area	Impact aspects	Examples of technologies/tools	Effects/Changes
Banking sector	Change in lending models and deposit products	Tokenised collateral, smart contracts, digital currencies	Automation of processes, acceleration of operations, new forms of liquidity management
	Risk management and compliance	Blockchain for tracking transactions, AML (Anti-Money Laundering)/ KYC (Know Your Customer) systems	Increase in transparency, reduction of fraud, improvement of risk monitoring
	Interbank settlements and international transfers	Central Bank Digital Currency, a decentralised financial platform	Reduction of transfer costs, acceleration of settlements, reduction of dependence on traditional clearing systems
Payment systems	Expansion of payment channels	Digital wallets, Peer-to-Peer (P2P) platforms, tokenised currencies	Increase in the speed and availability of payments, reduction of transaction costs
	Automation and security of operations	Smart contracts, distributed registries	Automatic execution of terms of transactions, data protection, immutability of records
	Financial accessibility	Mobile payments, integration with digital platforms	Increase in customer coverage, improvement of financial integration of regions
Investment environment	Portfolio diversification	Cryptocurrencies, tokenised assets, and decentralised funds	Possibility of new investment strategies, access to global assets
	Transparency of ownership and transactions	Blockchain, digital asset registration systems	Simplification of transaction accounting, reduction of administrative barriers
	Liquidity and financing	Crowdfunding, tokenisation of real estate and raw materials	Expansion of investment channels, acceleration of asset turnover
	Risk management	Algorithmic models, stress tests, big data analytics	Improvement of forecast accuracy, automation of the assessment of credit and market risks

Source: compiled by the author based on L. Badea & M.C. Mungiu-Pupăzan (2021), J.A. Afolabi & B.U. Olanrewaju (2023)

Payment systems are also undergoing a transformation: the integration of tokenised currencies and digital wallets ensures instant transfer processing without intermediaries and increases transaction security through cryptographic protection and immutability of records (Chen & Tomblin, 2021). The introduction of smart contracts speeds up calculations and reduces operational risks, while mobile and online payments become more universal and accessible. The investment environment receives new tools and strategies for money management. Digital tokens and cryptocurrencies contribute to portfolio diversification, the introduction of algorithmic strategies, and participation in tokenised investment funds. Blockchain technologies increase the transparency of asset ownership, simplify the registration of transactions, and reduce administrative barriers for investors. Decentralised financial platforms provide access to liquidity and credit products outside the conventional banking system, stimulating the development of regulatory frameworks and accounting standards.

Digital assets unite the banking sector, payment systems and the investment environment into a single ecosystem, creating platforms for transactions with minimal involvement of intermediaries and increased processing speed. Analytical tools based on blockchain data help to assess risks and predict capital movements in real time, and decentralised platforms expand the

participation of various market participants (De Vries & Stoll, 2021). The regulation of digital assets creates the basis for the safe functioning of the financial system. The development of regulatory frameworks, accounting standards, and control procedures reduces systemic risks, ensures transparency of operations, and protects market participants. International standards and government cooperation contribute to the harmonisation of approaches to the use of digital assets and stimulate the development of financial technologies, including the integration of central banks' digital currencies, which expands monetary policy tools and increases the efficiency of financial infrastructure (Gallersdörfer *et al.*, 2020).

Cryptocurrencies have an impact on the economy and financial systems of states, affecting both the formation of budget revenues and socio-economic development. Their use is accompanied by changes in taxation, regulation of financial flows, integration of new technologies into business processes, and creation of conditions for innovative directions in the economy. The development of digital assets encourages increased transparency of financial transactions and increased opportunities for international transactions. However, there is a growing need to adapt legal and institutional mechanisms to minimise the risks of financial instability and protect the interests of the state and market participants (Table 3).

Table 3. Impact of cryptocurrencies on the state budget and the socio-economic sphere

Country	Impact on the state budget	Impact on the socio-economic sphere
USA	Taxation of income from cryptocurrencies, expansion of the tax base, income from operations of companies and investors	Job creation in fintech, professional development, development of storage and cybersecurity services
China	Control over financial flows, reduction of shadow turnover, development of the digital yuan	Growth of non-cash payments, strengthening the role of state institutions, increasing transparency of transactions
Japan	Taxes on operations and profits of crypto companies, the formation of a regulated environment	Public and business access to alternative investments, growth of innovations, new business models
Germany	Taxation of income from cryptocurrencies, development of tokenised financial products	Entrepreneurship support, simplification of accounting and contracts through blockchain
Switzerland	Income from taxation of transactions and companies, attraction of international fintech companies	Strengthening the status of an innovation centre, new jobs, and the growth of high-tech services
Kazakhstan	Income from taxation of mining and operations with cryptocurrencies, legalisation of shadow funds	Business investment opportunities, new jobs in IT and fintech, development of digital currencies and tokenisation

Source: compiled by the author based on M. Hütten (2022), S.M. Ramos (2022), A. Zhanturina (2023), F.O. Zehnder (2024), A.D. Givens (2025)

In the United States, the development of a regulatory framework around digital assets expands the tax base: income of individuals and legal entities from operations with cryptocurrencies is accounted for by the tax service, which increases budget revenues. Institutional investments stimulate job creation in the financial and technology sectors, and the development of industries related to cybersecurity and data storage (Genc & Takagi, 2024). Additionally, legislative initiatives contribute to the development of a transparent financial environment, reducing opportunities for tax evasion. The expansion of the regulatory framework encourages companies to implement internal digital asset accounting systems, which increases investor and customer confidence. The involvement of the private sector creates new opportunities for the development of fintech start-ups and the integration of innovative technologies into traditional financial services.

In China, the approach is characterised by strict regulation and the development of the digital yuan. The ban on mining and operations with decentralised cryptocurrencies has redistributed computing power, and control of financial flows reduces shadow turnover. State-owned financial institutions provide public access to digital services, contributing to the growth of non-cash transactions and transparency of money turnover (Li *et al.*, 2019). Strict government policy also encourages the introduction of digital technologies into the banking system, increasing the effectiveness of internal controls and settlements. In addition, centralised regulation supports the stability of the national currency and protects the economy from the volatility of external crypto markets. This creates the basis for the safe implementation of innovative financial services and stimulates the development of infrastructure for digital payments.

In Japan, regulation is carried out through licensing exchanges and payment operators, which

provides revenue to the budget and stimulates tokenisation of assets, increased access to alternative investment instruments and the emergence of new business models (Huynh *et al.*, 2022). The country actively supports educational programmes and the development of competencies in the field of digital finance, which contributes to the training of qualified personnel. In addition, legal regulation reduces the risks of fraud and increases public confidence in digital assets. This creates conditions for wider participation of retail and institutional investors in innovative financial instruments.

In Germany, cryptocurrencies are considered as part of the financial market with income taxation forming an additional source of budget, and the development of tokenised financial products that stimulate entrepreneurship and the use of blockchain in small and medium-sized businesses (Hütten, 2022). In addition, the development of the regulatory framework contributes to the formation of a transparent financial environment and reducing risks for investors. The use of digital assets in corporate processes facilitates contract management and accounting. These measures strengthen market confidence and stimulate the growth of innovative financial projects.

Switzerland has implemented a flexible regulatory model: taxation of transactions and income of companies and individuals attracts fintech companies, increases the attractiveness of the country for innovative business and strengthens its position in the international financial system (Zehnder, 2024). Regulatory openness helps to quickly introduce new technologies and test innovative financial products. This creates an ecosystem favourable for start-ups and international investors. In addition, the country actively supports the integration of digital currencies into the banking and payment infrastructure, increasing transparency and trust in the financial system.

In Kazakhstan, digital assets are integrated into the financial system, legalising some of the funds and creating additional revenue through taxation of mining and operations with cryptocurrencies. Regulatory frameworks and pilot projects in the field of digital currencies and tokenisation are emerging, enterprises' access to investments is expanding, and new jobs are being created in the IT and fintech sectors (Baimaganbetov *et al.*, 2023). The development of the sector stimulates the training of specialists and the improvement of competencies in the field of digital finance. In addition, the state receives tools to more effectively control financial flows and prevent shadow transactions. These measures create conditions for sustainable growth and digital transformation of the economy.

Different countries use different approaches, from strict control and strengthening of the national currency to stimulating innovation and the private sector. The impact on the budget ranges from direct tax revenues to indirect effects through the development of the fintech industry. Socio-economic effects include increased employment, the emergence of new business models, and increased transparency of financial flows (Xiao *et al.*, 2023). This diversification of strategies allows considering the specifics of the national economy and infrastructure. The impact of digital assets extends to the financial literacy of the population and stimulates the adaptation of the corporate sector to digital tools. This creates a complex effect for sustainable economic development.

International experience shows a combination of strict government controls, as in China, with conditions for innovation, as in the United States, and European countries create standardised rules for integrating cryptocurrencies into existing infrastructure. In Japan, a comprehensive regulatory system is applied, combining strict supervision with support for legal cryptocurrency services. Kazakhstan combines national initiatives with international practices, adapting technologies to the specifics of the economy and legislation (Xiao *et al.*, 2023). Various regulatory models form the basis for analysing their effectiveness and application in national contexts. This allows identifying best practices for ensuring transparency, security, and sustainability of financial systems. In addition, the experience of international markets contributes to the development of a comprehensive strategy for digitalisation and innovation in the financial sector.

The integration of blockchain technologies and smart contracts is changing the way financial institutions work, speeding up transaction processing, and increasing transaction transparency. The emergence of new tools and platforms contributes to the diversification of investment portfolios, expands access to financial services and stimulates the development of innovative lending and payment models. Digitalisation of financial assets requires a review of regulatory approaches,

risk management methods, and organisational development strategies. The impact of digital assets on the financial ecosystem is manifested in the strengthening of interaction between market participants, the integration of various sectors, and the creation of conditions for the further development of the digital economy.

In 2020, the digital asset market was at a stage of active growth after the first wave of institutional interest: the total capitalisation of the largest cryptocurrencies increased sharply compared to 2019, and the stablecoin market at the end of 2020 was estimated at several tens of billions of dollars (values of the order of USD 20-30 billion appear as the total capitalisation of jointly dominant issuers), which made stablecoins a notable instrument of liquidity on exchanges and within the payment rails of the crypto ecosystem (CoinGecko, 2021). In 2021, the crypto market experienced a phase of large-scale growth: the total market capitalisation and capital inflows increased, and by the beginning of 2022, stablecoins were already showing significant expansion (CoinGecko (2022) recorded a total figure for stablecoins of the order of USD 150-168 billion as of January 1, 2022), which reinforced their role as a "bridge" of liquidity for trading and intra-market settlements.

In 2022, the sector experienced the collapse of the algorithmic stablecoin Terra/Luna and the bankruptcy of the centralised Futures Exchange platform, which led to a reduction in trust and an outflow of capital; by the end of 2022 and early 2023, the total capitalisation of stablecoins shrank compared to the beginning of 2022 (CoinGecko/NY Fed indicated a drop to the level of about USD 125-140 billion in April-January 2023), which forced banks and payment providers to review counterparty risk models and strengthen AML/KYC procedures when working with digital rails (Kosse *et al.*, 2023). In 2023, despite the "crypto winter", a gradual transition from speculative flows to institutional infrastructure began: markets were groping for storage standards and infrastructure for regulatory compliance, accumulating technological developments for tokenisation of assets and the release of institutional products. In 2024, the market recovered significantly: by the end of 2024, the total capitalisation of stablecoins exceeded USD 200 billion (The Block and market analysts recorded levels above USD 200 billion at the end of 2024), growth was facilitated by the restructuring of issuers' reserve practices, the development of tokenised cash and the launch of pilots for the use of stablecoins in payment schemes from large payment operators and corporate liquidity providers (McGleenon, 2024). In 2025, accelerated institutionalisation was observed: according to various analytical publications and news reports, the total capitalisation of stablecoins in 2025 fluctuated between USD 250-300 billion on different dates (a number of reports indicated USD 251.7 billion in mid-2025 and approximately USD 290-302 billion as of late 2025),

which strengthened the role of stablecoins as a means of pre-financing settlement pools and an instrument for inter-exchange/cross-border transfers. At the same time, in 2025, on-chain products and on-chain Assets Under Management showed rapid growth – specialised reports noted an increase in on-chain Assets Under

Management to approximately USD 35 billion in 2025 (more than 100% year-on-year growth in the on-chain managed assets segment), reflecting the migration of some institutional strategies to on-chain formats (automated income strategies, structured products, lending) (Reuters, 2025) (Fig. 1).

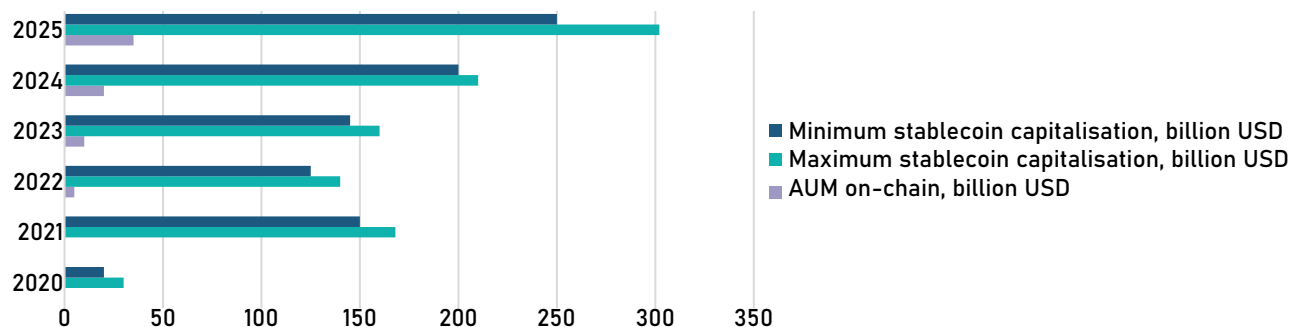


Figure 1. Analysis of the impact of digital assets on the banking sector, payment systems, and the investment environment in the world in the period 2020-2025

Source: created by the author based on CoinGecko (2021; 2022), A. Kosse *et al.* (2023), B. McGleenon (2024), Reuters (2025)

For the banking sector, consistency meant a paradigm shift: in 2020-2021, banks looked at the crypto industry mainly through the prism of risks and possible admissions in trading and brokerage services; the events of 2022 increased caution, led to the temporary suspension of a number of initiatives on custodial services and increased requirements for liquidity and stress testing. However, already in 2023-2025, most of the major banks and payment providers began systematically investing in DLT infrastructure, custody solutions, and Application Programming Interface integrations: regulatory signals (including steps by individual US regulators and initiatives to introduce frameworks for payment stablecoins in the EU and other jurisdictions) made it acceptable for a number of banks to launch pilots for the storage of digital assets, the issuance of tokenised instruments, and the integration of stablecoins into settlement chains are examples of official regulatory statements and permits/recommendations for banks to participate in certain crypto-active operations (Benigno & Rosa, 2023).

From a theoretical standpoint, the integration of digital assets and DLT technologies into the banking sector reflects the transformation of the financial paradigm, the transition from a centralised cash flow management model to a hybrid one, which combines traditional regulatory mechanisms with decentralised solutions. This approach is based on the concept of increasing transparency, reducing transaction costs, and expanding opportunities for innovative financial products, including asset tokenisation, and automated contract execution through smart contracts. The theoretical model assumes that the systematic implementation of custody solutions and Application Programming Interface integrations creates a platform for

interaction between banks, payment providers and fintech companies, ensuring the stability of the financial infrastructure while complying with AML/KYC standards and regulatory requirements for liquidity and risk management. The results of the study show that cryptocurrencies are gradually moving from the status of an alternative instrument to a full-fledged element of the global financial system, influencing the banking sector, payment systems and government policy. They are stimulating the development of blockchain technologies, the emergence of central bank digital currencies, and the transformation of traditional financial models. Despite the volatility and existing risks, digital assets are becoming an important factor in financial innovation, and their integration into a regulated infrastructure creates the prerequisites for a more transparent, efficient, and technologically flexible economy.

Discussion

Cryptocurrencies continue to influence the global economy by transforming the structure of financial flows, investment practices, money management methods, and international settlements. The growth of the spread of digital assets in 2020-2025 was accompanied by the widespread introduction of blockchain technologies, decentralised platforms, and new capital raising mechanisms, which led to a change in the usual models of financial institutions. During this period, there was an active development of cryptocurrency funds, the expansion of their investment opportunities, integration into global financial systems and the gradual involvement of institutional players who were previously skeptical about digital assets. An analysis of the global impact of cryptocurrencies conducted by G. Azretbergenova & A. Syzdykova (2021), revealed the development of

new channels of financial flows, a significant change in market liquidity, and the expansion of opportunities for integrating digital assets into cross-border settlements. The results of the study partially coincide with the results of the conducted study, which also noted the impact of cryptocurrencies on international financial transactions and capital redistribution, but revealed differences in the rate of adoption of digital assets by developed and developing countries.

The study by D. Bianchi & M. Babiak (2022) focused on the performance of cryptocurrency funds and their impact on financial markets. The analysis showed that such funds create new investment models, increase liquidity, and open up opportunities for capital allocation in blockchain projects. In 2020-2025, cryptocurrency funds began to actively use an asset diversification strategy, combining traditional financial instruments with tokenised products, which reduced volatility risks and attracted institutional investors. The data obtained confirms the influence of digital assets on investment strategies, however, it revealed a high sensitivity of funds to global volatility and key market events, which was less evident in previous studies.

The study by D. Cumming *et al.* (2025) was devoted to the role of cryptocurrency funds in financing decentralised platforms and blockchain start-ups. The researchers determined that the participation of funds contributes to the accelerated growth of digital projects, the development of infrastructure for blockchain platforms, and the expansion of international financing. In the period from 2020 to 2025, funds became a key tool in attracting capital for innovative projects, especially in the areas of decentralised financial platforms and asset tokenisation, which stimulated the development of new models for the allocation of financial resources. These findings are consistent with previous analyses on stimulating innovation and expanding international integration. However, differences in institutional support and legal mechanisms in different jurisdictions have been identified, which was not previously reflected in the overall study.

Comparison with the results of C. Fisch *et al.* (2022) revealed a coincidence in the conclusions about the impact of blockchain technologies on raising capital for start-ups and allocating financial resources through Initial Coin Offering and venture investments. The analysis showed that digital platforms create new opportunities for financing innovative projects and expand access to international investors. In the period 2020-2025, there was an increase in venture capital investments in the crypto industry and an increase in the number of tokenised projects, which highlights the role of digital assets in stimulating international financial integration.

C.A. Makridis *et al.* (2023) focused on decentralised cryptocurrency exchanges and platform management features. The researchers reviewed the institutional and technological aspects of such exchanges, including

transparency of operations, decentralised transaction confirmation mechanisms, and interaction between network participants. Although the study highlighted the impact of platform structure on user behaviour and market efficiency, it did not address the topic of airdrop campaigns and initial token distribution, nor did it assess their impact on liquidity and financial stability. J. Mattke *et al.* (2021) revealed the influence of individual factors on investment decisions in cryptocurrencies, including profitability expectations and strategic goals of investors. In 2020-2025, investor motivations are complemented by institutional and macroeconomic factors, such as the growing digitalisation of financial systems, increased access to tokenised assets, and regulation of international capital flows. The study focuses on the behaviour of retail market participants, while the analysis expands the scope of consideration, considering the influence of institutional players, political factors, and global macroeconomic trends on the dynamics of the crypto markets.

Comparison with the study by G. Nurkeyeva, & A. Sargaskayeva (2021) revealed general conclusions about the impact of cryptocurrencies on financial markets and international settlements, including the transformation of payment systems and changes in the structure of investments. In the period 2020-2025, digital assets have strengthened the role of alternative tools for cross-border settlements, stimulated the development of fintech infrastructure and opened up new opportunities for decentralised financial products. The analysis demonstrated additional aspects such as the role of decentralised funds, regulation of international capital flows, and differences in national approaches to digital asset integration, which were not fully reflected in the publication.

Comparison with the results of C. Wronka (2022) confirmed the coincidence in identifying the role of digital currencies in circumventing international sanctions and transforming financial flows between countries. Cryptocurrencies can be used to circumvent restrictions in international settlements, but in the period 2020-2025, there were differences in the scale and mechanisms of application: some countries strengthened control over the movement of digital assets, while others implemented pilot projects to integrate stablecoins into national settlement systems. Analysis by D. Tercero-Lucas (2020) found a coincidence with the analysis conducted regarding the potential of the global digital currency and its impact on international payment systems. The paper discussed the concept of a single digital currency for the euro region, which partially overlaps with the previously identified trends towards standardisation and integration of crypto assets. The analysis revealed a broader range of digital currencies' impacts, including the adaptation of national financial systems, regulation of investment flows, and institutional risk mitigation measures.

Comparison with the results of M. Peneder (2022) confirmed the importance of digital currencies as a technology for accounting and transforming the monetary function in society. In the period 2020-2025, the digitalisation of money has changed the usual mechanisms for storing and transferring value, stimulated the introduction of blockchain technologies into corporate and government structures, and also influenced international settlements and investment practices. However, differences have been identified in the emphasis on the institutional and macroeconomic effects of the introduction of cryptocurrencies, as the analysis examines the impact of digital assets on international capital markets.

A comparison of all the studies with the conducted analysis showed that cryptocurrencies affect the global economy through the transformation of payment systems, changes in international settlements, the distribution of financial flows, and the stimulation of technological innovations. The coincidences are in identifying the potential of digital currencies to circumvent sanctions, standardise calculations, and change the functions of money in the economy. Differences related to the scale of integration, institutional arrangements, and regulation of digital assets have been identified, underscoring the need for further study of their impact on global financial processes and national economic systems.

Conclusions

The impact of cryptocurrencies on financial infrastructure is reflected in the transformation of traditional settlement, investment, and asset management models. Decentralised platforms form alternative capital raising mechanisms, including initial coin offerings and tokenisation of real assets, create new forms of corporate governance through governance tokens. The development of crypto markets stimulates the adaptation of regulatory mechanisms, strengthening the role of international financial control, transaction monitoring and cybersecurity, which helps to reduce the risks of abuse and increase transparency of operations.

International experience demonstrates the heterogeneity of the integration of digital currencies into national financial systems. In countries with developed financial infrastructure, such as the United States, the European Union, and Japan, cryptocurrencies are gradually becoming part of official settlement

and investment instruments, including institutional asset allocation and participation in digital platforms. In developing economies, including Kazakhstan, there is an experimental stage of the introduction of digital currencies – digital currencies of central banks are being tested, cryptoplatforms are functioning poorly, and local regulatory models are being formed. These differences reflect institutional features, the level of trust in innovative financial instruments, and the willingness of national regulators to integrate digital assets into the existing financial system.

The dynamics of the development of the cryptocurrency sector from 2020 to 2025 indicates a gradual transition from the speculative use of digital assets to their integration into global settlement and investment processes. The expansion of regulation, the active participation of institutional investors and the introduction of digital currencies by central banks are shaping a trend towards market stabilisation, lower volatility, and an increase in the volume of managed on-chain assets. Cryptocurrencies are becoming an integral part of the global financial ecosystem, influencing capital allocation, investment models, the development of international cooperation and the development of new financial products.

The limitation of the study is the incomplete availability of detailed data on national programmes for the introduction of cryptocurrencies and the variability of their application in different countries and sectors of the economy. The prospects for further research include an in-depth analysis of the institutional and macroeconomic implications of integrating digital currencies, assessing the impact of regulation on the stability of financial markets, and developing methods to optimise the implementation of crypto assets in international settlements and investment processes, ensuring their sustainable integration into the financial infrastructure.

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Conflict of Interest

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Криптовалюталардын жана алардын дүйнөлүк экономикага тийгизген таасири

Глеб Тростянский

Студент

Париж университети 1 Пантеон-Сорбонна
75231, Пантеон аянты, 12, Париж ш., Франция
<https://orcid.org/0009-0004-6192-9363>

Аннотация. Бул изилдөөнүн максаты криптовалюталардын дүйнөлүк экономикага жана каржы системаларына тийгизген таасирин ар тараптуу талдоо болгон. Криптовалюталар блокчейнге негизделген, ачык жана коопсуз транзакциялары бар санариптик активдер катары каралат жана алардын функциялары, ликвиддүүлүгү, транзакциялардын ылдамдыгы жана туруктуулугу фиат валюталары менен салыштырылат. Криптовалюталар тез чек ара аркылуу төлөмдөрдү жана жаңы каржылоо каналдарына жетүүнү камсыз кылаары, бирок волатилдүүлүктүн жогорулашы менен коштолору, ал эми фиат валюталары акча массасынын туруктуулугун жана өкмөттүн көзөмөлүн сактаары аныкталган. Изилдөө ыкмаларына стейблкоин капитализациясынын сүрөттөмө жана динамикалык анализи, эмиссиянын мүнөздөмөлөрүнө, жөнгө салууга, волатилдүүлүккө жана эл аралык колдонууга негизделген криптовалюталардын жана фиат валюталарынын салыштырмалуу анализи, айрым өлкөлөрдүн (АКШ, Кытай, Япония, Германия, Швейцария, Казакстан) кейс-стадилери жана графикалык маалыматтарды визуалдаштыруу кирген. Жыйынтыктар криптовалюталардын тез чек ара аркылуу эсептешүүлөрдү жүргүзүүгө мүмкүндүк берерин жана каржы технологияларынын мүмкүнчүлүктөрүн кеңейтерин, ал эми фиат валюталары акча массасынын туруктуулугун жана өкмөттүн көзөмөлүн сактаарын көрсөттү. 2023-2025-жылдарга карата стабилкоин капитализациясын жана чынжырдагы AUMду талдоо рыноктун институционалдашуусун тастыктады: 2024-жылы стабилкоин капитализациясы 200 миллиард доллардан ашкан, ал эми 2025-жылы 250-300 миллиард долларга жеткен, активдердин көлөмү 100 миллиард долларды түзгөн. Бул туруктуу чынжырдагы моделдердин калыптанышын жана санариптик активдердин каржы системасына интеграцияланышын көрсөтүп турат. Изилдөөнүн жыйынтыктары санариптик активдердин капиталды бөлүштүрүүгө, инвестициялык агымдарга жана каржылык туруктуулукка тийгизген таасирин тастыктайт жана глобалдык төлөм жана инвестициялык тармактардын андан ары өнүгүшүн алдын ала айтууга мүмкүндүк берет. Изилдөөнүн практикалык мааниси ченемдик стратегияларды иштеп чыгуу жана криптовалютаны улуттук каржы системаларына киргизүү үчүн жыйынтыктарды колдонуу мүмкүнчүлүгүндө жатат.

Негизги сөздөр: блокчейн; капиталдаштыруу; инвестициялар; каржы технологиясы; транзакциялар

Криптовалюты и их влияние на мировую экономику

Глеб Тростянский

Студент

Университет Париж 1 Пантеон-Сорбонна

75231, пл. Пантеона, 12, г. Париж, Франция

<https://orcid.org/0009-0004-6192-9363>

Аннотация. Цель исследования заключалась в комплексном анализе влияния криптовалют на мировую экономику и финансовые системы. Рассмотрены криптовалюты как цифровые активы на основе блокчейна с прозрачными и безопасными транзакциями, проведено сравнение их с фиатными деньгами по функциям, ликвидности, скорости операций и устойчивости. Выявлено, что криптовалюты обеспечивают быстрые трансграничные расчёты и доступ к новым каналам финансирования, но сопровождаются повышенной волатильностью, тогда как фиатные деньги сохраняют стабильность и контроль государства над денежной массой. Методы исследования включали описательно-динамический анализ капитализации стейблкоинов, сравнительный анализ криптовалют и фиатных денег по характеристикам эмиссии, регулированию, волатильности и международному использованию, кейс-анализ отдельных стран (США, Китай, Япония, Германия, Швейцария, Казахстан) и графическую визуализацию данных. Результаты показали, что криптовалюты обеспечивают быстрые трансграничные расчеты и расширяют возможности финансовых технологий, фиатные деньги сохраняют стабильность и контроль государства над денежной массой. Анализ капитализации стейблкоинов и on-chain Assets Under Management за 2023-2025 гг. засвидетельствовал институционализацию рынка: в 2024 г. Капитализация стейблкоинов превысила 200 млрд долл., а в 2025 г. Достигла 250-300 млрд долл. С объемом активов долл., что свидетельствует о формировании устойчивых on-chain моделей и интеграции цифровых активов в финансовую систему. Результаты исследования подтверждают влияние цифровых активов на распределение капитала, инвестиционные потоки и финансовую стабильность, а также позволяют прогнозировать дальнейшее развитие глобальных платёжных и инвестиционных сетей. Практическая значимость работы заключается в возможности использования выводов для разработки стратегий регулирования и внедрения криптовалют в национальные финансовые системы

Ключевые слова: блокчейн; капитализация; инвестиции; финансовые технологии; транзакции