INTERNATIONAL EXPERIENCES IN DIGITAL CURRENCY SYSTEMS FOR CENTRAL ASIAN COUNTRIES

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Abstract. *This article examines the impact of a Central Bank Digital Currency (CBDC) system on financial stability. The main focus of the article is to analyze the regional situation by comparing the financial stability of Central Asian countries and to draw inspiration from the experience of countries that have developed digital currencies and potential risks in their implementation, experiences in other countries in the region, and a comparative analysis. In this regard, it is proposed to use advanced CBDC projects such as China (e-CNY) and Sweden (e-krona) as models for Central Asian countries (e.g., Uzbekistan, Kazakhstan). Empirical evidence is provided based on statistical and descriptive data.*

Policy recommendations are provided to ensure financial stability and cybersecurity in regional cooperation and the implementation of digital currencies.

Keywords: *Central bank digital currency (CBDC), financial stability, Central Asian countries, e-CNY, e-krona, digital payment system, inflation control, cybersecurity.*

Introduction.

The effectiveness of monetary policy is a key element of macroeconomic stability and encompasses the ability of central banks to control inflation, stabilize the value of their currencies, and stimulate economic growth through instruments such as interest rates, open market operations, and reserve requirements [1]. In recent years, the effectiveness of these traditional policy mechanisms has begun to be challenged by the acceleration of financial digitalization, particularly the emergence of decentralized payment systems and the decline in the use of cash [2]. As digital transformation continues to shape economic infrastructure, central banks are facing pressure to rethink their policy tools. One of the most significant developments in this area is the evolution of central bank digital currencies (CBDCs), which offer new ways to conduct monetary policy and influence financial intermediation [3].

Central bank digital currencies (CBDCs) have a proven track record of transforming the traditional financial system and monetary policy. Central banks, including those in the European Union (Digital Euro), China (e-CNY), Nigeria (e-Naira), and South Korea (Digital Won), are piloting or developing digital currencies to improve payment efficiency and financial inclusion. However, despite the opportunities outlined above, the transition to a central bank digital currency (CBDC) poses cybersecurity threats, the risk of bank

disintermediation, and operational complexity. Existing research suggests that CBDCs can facilitate more direct remittance channels and improve policy delivery, but these benefits depend on technological readiness, regulatory frameworks, and user experience[4]. Given the evolving context in recent years, it is important to learn from the economies of developed and developing countries how to change the effectiveness of CBDC monetary policy.

Central bank Digital currencies are a key enabler in this system, from conceptual design to project development. The Bahamas, Nigeria, and China have implemented digital currencies on a varying scale, while others are still in the early stages of research [5]. A robust digital infrastructure, cybersecurity systems, and legal financial integration are closely linked to the successful implementation of development [6]. Central banks offer a direct interface with end users for the use of digital currencies, reducing reliance on financial institutions and providing greater control over monetary signals [7].

Therefore, Central Asian countries are actively working to develop a digital currency production infrastructure. This process has also brought the possibility of developing a digital soum concept to the agenda. For Central Asian countries, CBDC can be a tool not only to increase the efficiency of the payment system but also to reduce the shadow economy, reduce the need for cash, and strengthen the transmission mechanism of monetary policy. At the same time, regional characteristics—namely, the uneven development of digital infrastructure, issues of financial literacy of the population, and information security—remain key challenges in this process. Therefore, adapting international experience in implementing CBDC and developing a model integrated into local economic conditions remains one of the urgent scientific and practical tasks for Central Asian countries.

Materials and Methods.

In the technological age, as the spiritual aspect of money has become less important than before, various cryptocurrencies such as Bitcoin have begun to come into circulation. Banks are actively participating in maintaining their position, controlling the flow of money, and ensuring the sovereignty of the central bank.

"CBDCs can improve payment efficiency, but they can also negatively impact financial stability through bank intermediation" [8], the BIS (Bank for International Settlements) has stated that CBDCs are a new phase in the transition of payment systems in the digital era. The IMF has defined the introduction of central bank digital currencies as follows: "CBDCs can enhance monetary policy transmission and financial inclusion, but they can also increase the performance of banks during a crisis" [9], suggesting that this system requires a new approach and framework for monetary policy. In addition, the IMF (2025) notes that CBDC issuance may have implications for central banks' reserve management systems and require expanded lending mechanisms to maintain financial stability.

According to a comprehensive survey by Auer, Cornelli, and Frost (2020), more than 80% of central banks are exploring CBDCs, and this process has the potential to fundamentally transform monetary systems and financial stability. These statistics highlight the impact not only of technological innovation but also of factors such as improving payment efficiency, expanding financial inclusion, and overcoming the limitations of traditional monetary policy instruments. Thus, CBDCs

are seen not only as a technological project but also as a strategic element in the transition to a new phase of the monetary system.

The introduction of digital currencies by central banks not only has a positive impact on financial stability but also poses serious risks by reducing the role of commercial banks as intermediaries. According to a study by Bindseil and Trautwein (2025) conducted within the framework of the European Central Bank, "If the amount of digital currency users can hold in a CBDC is not limited, there could be a significant outflow of deposits from commercial banks, which would reduce the volume of lending and threaten the overall stability of the financial system" [10].

Although the introduction of CBDC is expected to improve the efficiency of payment transactions, strengthen its position in international markets and achieve other positive results in financial stability, weak fiscal policy, weak supervision during the transition to a new stage, and shortcomings in the clearly defined plan and its implementation may reduce the achievement of the expected result. In this context, economists Adrian and Mancini-Griffoli note that "While CBDCs reduce transaction costs, they may increase stability risks in emerging economies if control mechanisms are weak" [11].

Within the scope of the impact of CBDC on financial stability, a two-tier monetary system [12], as outlined by Carstens (2025), is of strategic importance in order to mitigate potential problems such as disintermediation, bank runs (mass withdrawals of bank customers' deposits at once), and disruption of the monetary policy transmission mechanism. In this model, the central bank assumes the functions of CBDC issuance, monetary base control, and macroeconomic stability, while commercial banks and other financial intermediaries perform CBDC distribution, user interface, payment services, and credit activities.

This study aims to examine the impact of a central bank digital currency (CBDC) system on financial stability, particularly in the context of Central Asian countries, on the effectiveness of monetary policy, and on the potential for mitigating risks through a dual-tier monetary system. The study is conducted using secondary data analysis and a comparative approach, drawing on the experiences of China (e-CNY) and Sweden (e-krona) and comparing them with the situation in Central Asian countries.

Results.

Currently, the central banks of developed and developing countries are pursuing policies to introduce a digital currency system, integrate it with the traditional currency system, and make structural changes in monetary policy. By 2025, a study on the introduction and development of central bank digital currencies has been conducted in 134 countries, of which 44 are in the pilot stage, 19 are in development, and 39 countries are in preliminary research.

From the above statistics, we can conclude that the introduction of a digital currency system by central banks is widely used. Therefore, the principles of monetary policy in the introduction of this system by the International Monetary Fund are shown in the figure below.

Figure 1. Central Bank Digital Currency Project Principles [13]

Policy objectives vary across jurisdictions, with factors related to domestic economic issues, payment system characteristics, and the central bank's legal mandate influencing this process. Typically, central bank laws mandate the development of efficient, safe, and secure payment systems or the conduct of effective monetary policy—both of which are directly relevant to CBDCs.

The table below shows the policy objectives that are considered important by different countries.

Table 1

Countries' stated policy objectives for central bank digital currencies (CBDCs)[13]

Countries	Financial Inclusion	Accessibility	Efficiency	Combating money laundering	Resilience	Monetary sovereignty	Competition
Bahamas	✓	✓	✓	✓	✓	✓	
Canada		✓			✓	✓	✓
China	✓		✓	✓		✓	✓
ECCU (Eastern Caribbean Union)	✓	✓	✓	✓	✓		✓
Sweden		✓	✓		✓		✓
Uruguay	✓	✓	✓				✓

As we can see from the table, each country has set different goals depending on its economic conditions, level of financial system, and strategic priorities. The Bahamas is the only country that covers all the goals. In Canada, the emphasis is on developing access and competitiveness, while China's policy goals are to combat the

illicit use of money and efficiency. The Eastern Caribbean Currency Union (ECCU) aims to expand financial inclusion and increase regional competitiveness through CBDC. In Sweden and Uruguay, access, efficiency, and competition are among the main goals.

In general, modernizing the financial system, increasing stability, and expanding digital payment systems have emerged as key priorities for all countries. At the same time, some countries (for example, China and the Bahamas) have also paid close attention to strengthening monetary sovereignty and ensuring security.

These international experiences serve as important models for Central Asian countries, as the process of introducing CBDCs in the region involves not only technological innovation but also strengthening financial stability and monetary sovereignty. In particular, a two-tier monetary system (as successfully used in the Swedish e-krona model) allows commercial banks to maintain their intermediary role by mitigating the risk of disintermediation. In this model, the central bank assumes control of CBDC issuance and the monetary base, while commercial banks carry out distribution, user interface, and lending activities. The introduction of this system in Uzbekistan and Kazakhstan could reduce the risk of bank runs by 20–30% and stabilize lending volumes.

At the same time, direct payment channels (as widely used in the Chinese e-CNY experiment) bring transaction costs close to zero and provide real-time payments.

This can be an important tool in the Central Asian region, especially in cross-border trade (for example, Uzbekistan-Kazakhstan or Kyrgyzstan-Tajikistan), and reduce the shadow economy.

Thus, Central Asian countries should integrate AI-based real-time monitoring systems on the Chinese model to strengthen inflation control.

Table 2

Status of CBDC projects in Central Asian countries (as of November 2025) [13]

Countries	Project Name/ Phase	Start Year	Main Objectives	Economic Impact Forecast (2025-2030)	Cybersecurity Measures
Kazakhstan	Digital Tenge (Pilot and development)	2020 (pilot 2023)	Payment efficiency, financial inclusion, international transactions	+5.7% economic growth (EBRD forecast), $1.4 billion crypto trade growth	Blockchain and offline features, 75% control of mining assets through AIFC
Uzbekistan	Digital Som (Research and limited pilot)	2022 (stablecoin trial)	Shrinking the shadow economy, inflation control	+6.7% economic growth (EBRD), 14 blockchain licenses issued	Legal framework strengthened, private sector cooperation
Kyrgyzstan	Digital Som	2025	National	+4.5%	Oversight

	(Pilot, stablecoin KGST)	(pilot)	crypto reserve, payment system modernization	growth, BNB Chain integration	through the National Council, AML protocols
Tajikistan	Baseline Study	2024	Financial Inclusion, Border Payments	+6.0% Growth (EBRD), Limited Infrastructure	International Assistance (EU BOMCA)
Turkmenistan	Exploration Phase	2025	Energy and Payment Integration	+6.3% growth (EBRD), gas export impact	Limited, Russian cooperation

The table above shows the status of CBDC projects in Central Asian countries, with Kazakhstan being the most advanced in the region, with two pilots conducted in 2023 and a full launch expected in 2025. For example, Uzbekistan is gaining experience through stable digital currency testing phases and Kyrgyzstan launched a stable digital currency in 2025 and began a CBDC pilot. Tajikistan and Turkmenistan are lagging behind due to infrastructure constraints.

Table 3

The history of the evolution of digital currency in Uzbekistan [18]

Years	Stages
2016	The government created the Humo payment system as a competitor to the private Uzcard system. Private local fintech companies — Click and PayMe — were established..
2017	The government transitioned the Uzbek som from a fixed exchange rate linked to the US dollar to a freely floating exchange rate.
2018	The Central Bank of Uzbekistan established the National Interbank Processing Center to improve competition and introduce modern technologies and products. This development opened the Uzbek market to international payment systems such as Visa and Mastercard.
2019	The government carried out major tax system reforms, including the removal of penalties previously applied to companies employing more than 100 workers. The number of newly registered businesses and individuals registered as taxpayers increased significantly. The Law of the Republic of Uzbekistan "On Payments and Payment Systems" was adopted, defining the roles of payment system participants and the concept of electronic money.
2020	The Central Bank removed the requirement to impose additional charges (surcharges) on cross-border transactions of international payment systems; banks can now set fees based on agreements with merchants.

	The Central Bank launched a QR-code payment system. The Tashkent Metro and public transport systems introduced contactless payments. Commercial banks launched joint initiatives to develop and promote digital banking services.
2021	The Central Bank approved regulations on digital customer identification, allowing banks to provide services without physical verification. The start of a pre-research project on CBDC was announced.
2022	Commercial banks, in cooperation with local payment systems, eliminated surcharges on domestic transactions for international payment systems. The Central Bank announced the start of research on CBDC ("digital som").
2023-2024	A special jurisdiction for crypto assets was established, and licensing procedures were launched.
2025	The Central Bank is considering the pilot implementation of the digital som and stablecoins.

From the information in the table above, we can see that CBDC has not yet been fully implemented in the country and is instead still at the preparatory stage for project implementation. During the years mentioned, the concept of digital currency was understood more broadly, also referring to electronic money and digital payment infrastructure.

Discussion.

These statistics show that the development of CBDCs in the region is linked to economic growth: according to the EBRD, the Central Asian economy will grow by an average of 6.1% in 2025, driven by digital transformation, including CBDCs. For example, the volume of crypto trading at Kazakhstan's Astana International Financial Center (AIFC) has increased from $324 million in 2023 to $1.4 billion in 2024 [14], and by 2025, 75% of mining assets must be traded through this platform. Uzbekistan, meanwhile, increased the number of blockchain licenses to 14 in 2022-2024, paving the way for the development of the concept of a digital soum [15].

Comparative analysis shows that China's e-CNY experience (direct payment channels and AI-based inflation monitoring) and Sweden's e-krona project (mitigating the risk of disintermediation through a two-tier monetary system) are the most successful models that can be adapted for Central Asia. While e-CNY has reduced transaction costs to near zero and inflation volatility by 15–40% through real-time monitoring [16], e-krona has reduced the risk of bank runs by 25% through a two-tier model [17]. By integrating these mechanisms, Central Asian countries can strengthen not only financial stability but also regional trade and inclusion.

The current economic situation of Uzbekistan and Kazakhstan is showing a higher result than other Central Asian countries, and it is expected that the development of CBDC in Uzbekistan will be realized in the short term.

As a result of observing the processes from the history of the development of the digital economy and fintech sector in the Central Asian regions to the current digital currency system, CBDC has not yet been fully implemented, and

rather, the project is considered to be in the preparatory stage for implementation. In recent years, the concept of digital currency has come to include electronic money and digital payment infrastructure in a broader sense.

Conclusions

This study analyzed the impact of a Central Bank Digital Currency (CBDC) system on financial stability, particularly in the Central Asian context, based on international experiences (China's e-CNY and Sweden's e-krona projects). Empirical evidence and statistical data show that the introduction of a CBDC not only improves payment efficiency and expands financial inclusion but also poses serious risks such as disintermediation, bank runs, and cybersecurity. Among the Central Asian countries, Kazakhstan is at the most advanced stage, planning a full launch by 2025 through the Digital Tenge project, while Uzbekistan and Kyrgyzstan are gaining experience through pilot and stablecoin experiments. However, Tajikistan and Turkmenistan lag behind due to infrastructure constraints.

Based on international experience, an integrated model combining a two-tier monetary system, direct payment channels, and AI-based inflation control mechanisms is proposed for Central Asian countries, and primarily Uzbekistan.

The following are recommendations and suggestions for implementing a digital currency system in monetary policy:

- Development of unified CBDC standards and cross-border pilot projects within the Central Asian Central Banks Association.
- Using the experience of China's e-CNY, bringing transaction costs close to zero through offline mode and smart contracts.
- Making blockchain, quantum-resistant encryption, and AML/CFT protocols mandatory at the national level.
- Increasing financial literacy of the population on digital payments through government programs and mobile internet networks to 90 percent, etc.
- Using EU Standarts in order to strengthen Cybersecurity, such as the model of "EU NIS2, ISO/IEC27001.
- Set individual holding caps and tiered remuneration to prevent CBDCs from replacing bank deposits and to lower the risk of bank runs.
- Enable offline payments and basic smartphone functionality to ensure financial inclusion in rural and low-connectivity regions of Central Asia.

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