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Blockchain Technology in Money and Capital Markets: Assessing Global Experiences and Providing Policy Recommendations

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Executive Summary:

Blockchain technology, as a type of distributed ledger technology, is a way to record and verify transactions in a decentralized manner. The parties have full access to transaction records, and there is no possibility of changing them. This technology can fundamentally change the role of existing financial intermediaries in exchange and settlement and simplify complex financial processes and reduce costs.

In the current value chain of the money and capital markets, different intermediaries operate at different stages. The presence of this volume of intermediaries in the value chain, in addition to low speed, carries operational risk and high costs. It is while Blockchain technology is claimed to make the settlement almost instantaneous, and the fees of various intermediaries are eliminated. Because of promises like this, banks and stock exchanges around the world are looking at how to make better use of Blockchain technology to reduce costs, reduce risk, improve efficiency, and increase security.

In an extreme scenario, distributed ledger technology could completely change the current structure of monetary and financial markets; By allowing participants in the financial markets to trade with each other directly and without the need for the intervention of a central intermediary, and use of smart contracts, to exchange assets and funds instantly without the intervention of financial intermediaries, and all accounts regularly and automatically integrate via the Internet. In this and similar scenarios, the connection of the real world to the Blockchain occurs through the tokenization of assets. In this process, physical (and non-physical) assets are converted into digital assets (tokens).

The third generation of Blockchain has emerged to combine important features such as high scalability, interoperability, stability, privacy, and self-governance. The type of Blockchain and the appropriate consensus mechanism are very important for the value chain of money and capital markets. In general, despite the potential benefits, Blockchain faces many operational challenges, such as lack of organizational readiness or technical infrastructure, Scalability problems, and the need for large financial resources to invest. For this reason, it is necessary to develop appropriate management strategies and governance models to overcome these challenges while making optimal use of its benefits. There are different criteria for choosing the type of Blockchain, all of which must be considered; Items such as the applicability of Blockchain (general-purpose or asset-based), its data model, its consensus mechanism, general ledger type, smart contract type, and programming language should be considered in decision making.

Another important point is that since multiple Blockchains will be deployed in the financial markets, interoperability will be a key factor in determining the extent to which this technology is being used. For two or more Blockchain ecosystems to integrate, there must be data standards and governance standards. In order to increase acceptance rates, organizations must first address business issues such as identity, data standards, and shared governance. It is important to note that Blockchain does not create a homogeneous institutional system but rather creates a hybrid, heterogeneous institutional system. Therefore, finding the optimal

combinations of different platforms that are interactive and compatible with each other will not be an easy task.

The unique features of Blockchain create the potential for multiple applications in the money and capital markets. One of the uses of distributed ledger and Blockchain is in the area of financial market supervision. Distributed general ledger monitoring differs from other forms of Regulatory Technology, such as RegTech and Supervisory Technology, such as SupTech, which aim to use machine learning or artificial intelligence to monitor the financial industry more effectively. The principle of supervision is distributed ledger based on a consensus mechanism and building trust in decentralized markets. If distributed general ledger-based markets are developed, this will change the way assets are traded and create complex financial products. Because a decentralized economic consensus verifies the information in the Blockchain, it can replace current processes for delivering and verifying data. In the current compliance process, ensuring the accuracy and integrity of the data is guaranteed by the legal system, relevant authorities, and legal penalties. But in distributed ledger markets, economic incentives and economic consensus guarantee data validity. Therefore, changes in rules and regulations commensurate with structural changes in the value chain are important.

Another important application of Blockchain is authentication, which is common to all organizations. With Blockchain, authentication is done once, and Blockchain tokens can be used everywhere, and there is no need for separate authentication; As a result, a bridge is created between the capital market, the money market, insurance, etc. Another application of Blockchain is the issuance of securities across financial markets (from the money market to the capital market, etc.) that are accepted by all of these markets and have no centralization in any centralized system; For example, open market operations and productive credit certificates can be easily implemented on the Blockchain.

Although Blockchain has a wide range of uses, the key point is the necessity and feasibility of its use; For example, industry experts do not recommend the use of Blockchain in the Iranian payment industry because Iranian payment systems are efficient and there is no major problem that Blockchain is trying to solve. But in financial and monetary markets such as the securities markets, Blockchain can play a significant role.

Especially in cases where the central bank and the stock exchange organization simultaneously request the registration of transactions in their system, it is possible to design a Blockchain in which all transactions are registered, and the securities are tokenized and issued in the same Blockchain, and none of them should have it alone. Any other organ or organization that wants to be added to the Blockchain is easily defined and operates as a node in the Blockchain.

Tokenizing is one aspect of using a distributed ledger that has more serious legal implications and requires an authority to define the correct legal and regulatory framework. In addition to the profitability of productivity due to non-intermediation, asset tokenization brings benefits such as increased transparency about transaction data and issuer information and asset characteristics. Asset tokenization can split asset ownership into smaller units than is commonly seen in stocks and bonds. Thus, micro-investors can access types of assets beyond their means or parts of financial markets that were previously reserved for large investors and participate in capital markets with a minimum of assets. This will bring the market out of recession and also lead to liquidity of frozen assets.

The more platforms and uses of tokening platforms, the greater the network impact and value; The use of asset tokenization in financial markets can have consequences for liquidity, asset pricing, and even monetary

policy. Trading in a tokenized environment benefits from increased transparency. One of the important benefits of transparency is the reduction of information asymmetry, which can improve the price discovery mechanism, give investors incentives to increase participation, bring additional liquidity to the market, and improve market competition.

The relationship between off-chain and on-chain can have other consequences on the pricing of instruments. In a decentralized world, tokens are traded 24 hours a day, seven days a week on multiple networks and platforms. In the absence of links between on-chain and off-chain relationships (native Blockchain and out-of-Blockchain), arbitrary opportunities and inconsistencies in asset valuation and market pricing differences will inevitably arise. The uncertain regulatory and legal status of tokenized assets is a risk for market participants that requires transparency and interpretation of existing laws and regulations by regulatory authorities. The legal status of smart contracts is not yet fully defined, as in most countries, these contracts are not yet considered legal contracts, but more reflection is needed on whether smart contracts can completely replace existing legal contracts or be used only to automatically execute the operations specified in legal contracts. Finally, it is worth noting that rapid advances in digital technology raise futuristic questions about the robustness of distributed ledger-based infrastructure technology against quantum threats to symmetric and even asymmetric cryptography; Therefore, more research on Asymmetric Postquantum Cryptography is needed.

In this report, we explore the applications of Blockchain technology in the money and capital markets and try to identify all the affected dimensions and their consequences in the financial markets and their opportunities and challenges. These include examining other countries' use of Blockchain in monetary and financial markets; Transaction, settlement, and clearing with distributed ledger technology; Central Bank Cryptocurrency; Tokenized securities; Use of digital tokens in the bank; Tokenization in the debt market; World Bank Blockchain bonds; Repo on a Blockchain platform; Sukuk on the Blockchain platform; And a case of tokenization inside the country.

According to the studies conducted at present, the immediate entry of crypto-securities is not recommended for the country's entire financial and monetary market. However, using this technology for niche market; specific market segments and specific functions or in protected conditions and Sandbox is very important to investigate the effects of this technology. Currently, the Tehran Stock Exchange also faces some core trading problems, such as stopping trading at certain hours, buying and selling queues, lack of transparency in trading, delays in clearing and settlement. Therefore, it is recommended that crypto-securities be implemented for the first time in a small segment of the market and for one or more instruments, and after analyzing all the affected dimensions, it will be implemented in the main financial instruments. Nevertheless, it should be emphasized that the widespread adoption of this technology and the fundamental transformation of securities markets face significant obstacles. The viability of these mental models depends on a number of factors, such as infrastructure, agility in changing rules and regulations, and public acceptance, and technical and governance standards must be developed prior to various large-scale technical designs. In short, the current focus and governance of the monetary and financial markets are not entirely excessive and unnecessary, and the use of distributed ledger technology is recommended in cases where different bodies simultaneously claim.

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