Optimization of Corporate Governance from the Perspectives of Law and Economics and Blockchain

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Abstract. Blockchain's spontaneous consensus mechanism, characterized by technologies of decentralization, immutability, high transparency, and codification, helps address agency costs and the formalization of shareholder meetings in traditional corporate governance. With the advancement of blockchain technology, the integration of legal rules and code rules in corporate governance has become the new norm. As per the transaction cost theory of law and economics and the Coase Theorem, blockchain has promoted changes in governance rules by markedly reducing agency costs within companies. Corporate governance will exhibit partial and gradual adjustments when blockchain technology substantially diminishes these costs but falls short of achieving the optimal state of zero transaction costs. These changes not only enhance the transparency and efficiency of corporate governance but also effectively curb the misconduct of controlling shareholders and protect the rights of minority shareholders.

Keywords: Blockchain · Corporate Governance · Agency Costs · Law and Economics

The phenomenon of equity decentralization in joint-stock companies engenders a "rational apathy" among minority stakeholders. The lack of direct incentives dampens their enthusiasm for exercising shareholder rights, leading to a mindset that "inaction means no protection, and action may not bring more benefits". This represents a significant contradiction in modern corporate governance, causing majority shareholders to compromise the interests of the company and minority shareholders. Therefore, drawing on the perspective of law and economics, this paper explores how to innovate corporate governance models based on the characteristics of blockchain technology, aiming to uncover new paths for optimizing corporate governance amidst the practical constraints of bounded rationality.

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D.-J. Deng and J.-C. Chen (Eds.): SGIoT 2024, LNICST 633, pp. 208–215, 2026.
https://doi.org/10.1007/978-3-031-93825-2_19

1 Corporate Governance Dilemma from the Perspective of Law and Economics

1.1 Research Methods of Law and Economics

When studying legal phenomena, law and economics analogizes the system of legal rules to a market price system, guiding and constraining the decision-making process of individuals. Just as market participants analyze costs and benefits based on market prices (commodity prices, wages, etc.) to determine their economic behavior, individuals subject to legal rules adjust their behavioral strategies according to these "legal prices" (legal responsibilities, rights allocation, punishment mechanisms, etc.).

When applying law and economics to corporate governance research, legal rules (company law, securities law, etc.) constitute the foundation of the corporate governance structure, stipulating the rights, obligations, and responsibilities of various stakeholders within the company (shareholders, directors, management, employees, etc.). These legal rules form an intricate "legal price system" that impacts various aspects of corporate governance. For instance, while two-tier and unitary corporate governance models are applied in different countries, neither model can avoid the limitations of "bounded rationality", [1] which leads to rising corporate governance costs, evidenced by the formalization or the perfunctory nature of shareholder meetings.

1.2 Current Dilemmas in Corporate Governance

1.2.1 Free Riding Phenomenon

The formalization of shareholder meetings derived from the separation of management rights and ownership in companies causes institutional investors to adopt a "free riding" strategy in exercising shareholder rights. Free riding refers to the phenomenon where minority shareholders rely on the supervisory efforts of majority shareholders over company managers, indirectly enjoying the benefits of management without incurring any costs themselves [2]. The root of this phenomenon lies in the rational economic man's pursuit of profit maximization, the weakening of moral constraints, and the imperfections of the legal system. Additionally, the characteristics of public goods, unclear property rights, and external effects also provide ground for this problem. Through the "Boxed Pig Game" model in economics, one can vividly understand the equilibrium state where majority shareholders (big pigs) are responsible for the supervision, while minority shareholders (small pigs) choose to opt for a "free ride". Nevertheless, this phenomenon may lead to a scenario where majority stakeholders exploit their information advantages to make decisions detrimental to minority shareholders, thereby infringing on their interests. Moreover, investors often diversify their funds across multiple companies, making it difficult for them to devote sufficient time and effort to thoroughly research and participate in voting on proposals of a particular company, thus exacerbating the problem of passive shareholder engagement [3].

1.2.2 Agency Costs

The separation of ownership and management that evolved in modern enterprises inevitably gave rise to the principal-agent problem. The losses arising from the problem,

along with the costs incurred to address it, are known as "agency costs", which comprise monitoring costs, bonding costs, and residual loss. Owing to information asymmetry, shareholders cannot ascertain whether managers are working to maximize shareholder returns or merely aiming for stable investment returns and slowly growing financial indicators. Shareholders are likewise unable to monitor whether managers are using funds for beneficial investments or for activities that serve their personal interests. The costs incurred to resolve these principal-agent problems are called agency costs. This scenario is more prevalent in large publicly-traded companies with dispersed ownership and less common in small and medium-sized companies where ownership is more concentrated [4]. Consequently, agency costs originate from investors' inferior access to information, hindering shareholders' thorough supervision over corporate operations. This potentially allows managers to make decisions and actions that may harm investors' long-term interests while maximizing personal interests. In other words, agency costs result from information asymmetry, present not only between shareholders and company managers but also between controlling shareholders (or majority shareholders) and minority shareholders. Under these circumstances, shareholders may struggle to accurately assess the current situation or may become pawns manipulated by majority shareholders, making it challenging to make effective decisions.

1.3 Limitations of Traditional Solutions

Despite companies introducing and bearing certain agency costs [5] to improve transaction efficiency in their evolution as organizational forms, the Coase Theorem posits that optimal resource allocation is attainable only when transaction costs approach zero [6]. It is evident that the current high agency costs are far from the optimal state. Various sectors have proposed strategies to optimize corporate governance structures, but still face the following two dilemmas.

1.3.1 Proxy Voting Dilemma

The significant costs for shareholders to personally attend shareholder meetings cause many minority shareholders to forgo attendance, resulting in the increasing formality of such meetings. To address this issue, China's Company Law stipulates a proxy voting system,[1] allowing shareholders to appoint agents to attend and vote on their behalf. Nevertheless, there are still many deficiencies in practical implementation, such as the ambiguity of agents' authority and restrictions on aggregate voting rights, the unlimited number of agents, the unclear mechanism for revoking proxy rights, the undefined validity period of the proxy, and the absence of regulations for handling proxy voting rights in the event of shareholders' incapacity or death. These issues impact the practical effectiveness of the proxy voting system, deviating to some extent from its original intent and

[1] According to Article 118 of the Company Law of the People's Republic of China (2023 Revision), when shareholders entrust agents to attend shareholders meetings, they must specify the matters, authority, and duration of the agent's delegation. The agent must submit the shareholder's power of attorney to the company and exercise voting rights within the authorized scope.

transforming it into a tool for ownership disputes rather than effectively promoting the active participation of minority shareholders. Although China's Guidelines for Articles of Association of Listed Companies and the newly revised Company Law in China have new provisions for "online meetings" and "online voting", their overly principled and guiding nature and the lack of specific implementation details and mandatory requirements result in the lack of enthusiasm for participating in online voting by minority shareholders in practice.

1.3.2 Information Disclosure Dilemma

To preemptively incentivize company executives to reduce misconduct and enable shareholders to timely discover and hold executives accountable afterwards, laws mandate the establishment of corporate information disclosure systems [8]. For instance, the Standards for the Contents and Formats of Information Disclosure by Companies Offering Securities to the Public No. 26—Significant Asset Restructurings of Listed Companies (Revised in 2018) issued by the China Securities Regulatory Commission specify the frequency and density of information disclosure, covering the entire process from IPO preparation to delisting. Various types of disclosures, such as pre-disclosure, periodic reports (annual reports, interim reports), and temporary reports, ensure the continuity and transparency of market information. However, the effectiveness of information disclosure fails to meet expectations. For instance, the information disclosure mandated by China's Securities Law encounters issues of manipulated disclosure, where corporate executives alter disclosed information through earnings management and other methods, compromising the authenticity and accuracy of the information.

2 Corporate Governance Efficiency Enhancement Using Blockchain

2.1 Principle of Blockchain Technology

Blockchain is a distributed ledger that is formed by a series of network transaction data linked and combined in chronological order using cryptographic methods, based on a specific network and consensus mechanism. In other words, blockchain represents a comprehensive application of technologies including P2P distributed networking, data propagation verification mechanisms, asymmetric encryption, and smart contracts, [9] established through a series of algorithms and mechanisms like hash algorithms, Merkle trees, timestamps, and POW consensus [10].

Blockchain features decentralized distributed ledgers, trustless consensus mechanisms, and immutable databases [11]. These fully transparent, intelligent, and timely programmatic technologies can address current corporate governance issues. First, blockchain is a decentralized distributed ledger. Data is recorded across various nodes with fully transparent ledgers through distributed accounting, distributed propagation, and distributed storage methods. Each node possesses the same authority, and the failure of any single node does not affect the integrity of the system. Second, blockchain operates as a trustless consensus mechanism consisting of multiple linked block data. Asymmetric encryption technology and consensus mechanisms ensure that transaction

data in each block is the product of consensus and confirmation across the entire network. Any node generated through deceptive behavior will be rejected and discarded by other nodes, effectively resolving trust issues in the transaction process. Third, blockchain serves as an immutable database. Transaction data is timestamped and forms a complete copy in each block upon system verification. The blockchain's Merkle tree structure interconnects all data, requiring over 50% of the nodes to validate any transaction data modification. Modifications to less than 50% of the transaction data cannot affect the integrity and accuracy of the entire system ledger, making blockchain an almost tamper-proof database.

2.2 Integration of Blockchain into Corporate Governance

If a corporate governance structure can be established based on blockchain, according to the transaction cost theory of law and economics and the Coase Theorem, the blockchain system can reduce information asymmetry and corporate agency costs and stimulate shareholders' enthusiasm to exercise their rights.

2.2.1 Mitigation of Agency Costs

The fundamental operational mechanism of blockchain in corporate governance hinges on the decentralized or distributed spontaneous consensus mechanism (as shown in Fig. 1). The consensus mechanism enables the decentralized corporate governance network to naturally form consensus through asynchronous interaction under common and simple verification rules, and maintain the integrity of the distributed ledger. When consensus is reached, the new block is officially incorporated into the main chain of the corporate governance blockchain, permanently stored, and marked as immutable. Various consensus mechanisms have been developed, such as Proof of Work (PoW), Proof of Stake (PoS), Delegated Proof of Stake (DPoS), and Proof of Authority (PoA). Consensus mechanisms will play a crucial role in shaping the efficiency, scalability, and security of the corporate governance blockchain network. The legal significance of this consensus mechanism is profound, marking the gradual replacement of traditional rule-based trust mechanisms relying on central authoritative entities with digital trust mechanisms represented by decentralized "peer-to-peer systems".

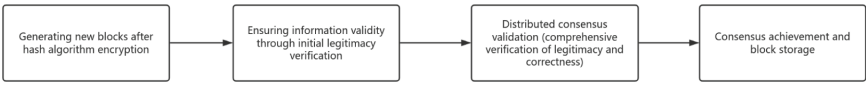

Fig. 1. Blockchain's Spontaneous Consensus Trust Mechanism

Blockchain's spontaneous consensus mechanism will greatly diminish agency costs in corporate governance. As the corporate governance blockchain platform can achieve real-time sharing of transactions, all external transactions conducted by controlling shareholders, directors, and managers will be akin to "real-time online streaming", substantially enhancing transparency. Therefore, this feature can effectively curb the

tendency of controlling shareholders, directors, and managers to use information advantages for insider trading or related-party transactions, which harm the interests of all shareholders and the company as a whole, thereby reducing agency costs. In addition, blockchain is highly transparent and immutable, which can significantly cut accounting and audit costs [12].

2.2.2 Cost Reduction of Shareholders' Rights Exercise

Blockchain technology can markedly slash the intermediary costs in corporate governance. In traditional corporate governance models, decision-making processes usually need to be planned and transmitted through multi-layered, highly centralized internal intermediary organizations, a process that is not only cumbersome but also accompanied by substantial increases in behavioral costs, organizational costs, and time costs. However, by integrating blockchain technology into the corporate governance system, internal intermediation processes can be significantly simplified, pushing corporate governance structures towards a more flat and decentralized direction, thus achieving effective cost reduction and considerable efficiency improvement. Taking shareholders' participation in and voting at shareholder meetings as an example, the current Company Law requires shareholders to bear the transportation costs to the meeting venue and potential loss arising from work disruption due to attendance, while also involving costs for information gathering, in-depth analysis, and multi-party communication needed to make informed decisions. However, with the application of a corporate governance blockchain network, high transparency reduces the cost for shareholders to obtain information, while on-chain meetings, voting, and record-keeping can sharply decrease the costs of shareholders exercising their rights. At the same time, the exercise of shareholder rights is stored on the blockchain, perfectly avoiding tampering with evidence and ensuring the legality of corporate governance.

3 Legal Approaches to Corporate Governance Blockchain System

3.1 Challenges and Costs of Integrating Blockchain into Corporate Governance

Within the framework of law and economics, the blockchain system for corporate governance faces multiple challenges, leading to surging governance costs. First, security concerns regarding consensus mechanisms. Due to design flaws or technological limitations, the consensus mechanisms widely used today remain vulnerable to malicious attacks. Therefore, when establishing blockchain systems for corporate governance, it is necessary to enhance the ability of consensus mechanisms to resist attacks through technological innovation and institutional design, thereby averting risks of confidentiality breaches or tampering in corporate governance, which will raise governance costs. Second, transparency issues concerning smart contracts. As computer programs that autonomously execute, control, or document legal events and actions on the blockchain, smart contracts exhibit complexity and opacity that make it challenging to detect and preemptively avoid potential algorithmic vulnerabilities. If maliciously exploited, significant losses will be incurred to corporate governance. Consequently, in advancing the application of smart contracts in corporate governance, it is essential to intensify the

review and supervision of smart contracts, elevate their transparency and auditability, ensure compliance with legal requirements, and effectively prevent potential legal costs in corporate governance.

3.2 Tolerant and Flexible Legal Approaches

This paper contends that, at the legal level, the integration of blockchain into corporate governance should be approached with greater tolerance and protection for its development. Strict regulation should not be uniformly applied, as it may stifle the potential for innovation and growth. First, from the legal framework of the corporate governance blockchain system, it is necessary to ensure a dynamic balance between legal regulation and technological development and adhere to the core principles of the Coase Theorem. Overly stringent or premature legal intervention may inhibit technological innovation and vitality, while delayed regulation may be ineffective in addressing social risks brought about by technological innovation and is not conducive to positive technological development. In light of China's rapid development stage and its notably intense yearning for technological progress, encouraging technological innovation emerges as the paramount concern for current legal regulation. Thus, as for the legal approaches to the corporate governance blockchain system, potential legal issues should be reasonably regulated without impeding technological innovation. Second, from the perspective of international development experience, in July 2017, Delaware, USA, enacted legislation to permit the integration of blockchain with company shares, allowing the entire process of issuing, transferring, regulating, trading, and redeeming company shares to be conducted on a blockchain platform. This legislation signifies that blockchain, with its decentralized, high transparency, and robust traceability characteristics, will reshape the global securities market, create opportunities for the development of blockchain in corporate governance, and offer regulatory agencies clear and efficient supervisory means.

4 Conclusion

Blockchain, based on technical characteristics such as decentralized distributed ledgers, trustless consensus mechanisms, and immutable databases, minimizes corporate governance costs and stimulates shareholders' enthusiasm for exercising their rights. However, the full integration of blockchain into corporate governance systems still requires support from technological innovation and development. Only then can it achieve full-chain operations, reduce transaction costs to nearly zero, and reach Pareto optimality. Meanwhile, in the process of transforming corporate governance rules, it is crucial to develop more comprehensive legal rules that relate to the application scenarios and potential risks of blockchain and adapt to the development of the times.

Acknowledgements. This research was supported by 2025 Social Science Foundation of Fujian Province, China (Grant No. FJ2025T001) : Legalization of Data Sharing of Cross-Strait, Hong Kong and Macao.

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