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Research on Manufacturer Channel Strategies with the Cost Transparency Role of Blockchain and the Impact of Investment Efforts

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Abstract. In cross-border supply chains under the Belt and Road Initiative, longer supply chains, greater institutional heterogeneity, and limited information transparency exacerbate cost information asymmetry following supply disruptions. To capture this setting, this study develops a sequential game-theoretic model consisting of a single manufacturer and a single retailer to examine the interplay among blockchain investment, information sharing, and manufacturer encroachment. The results show that blockchain investment serves both as a market-expansion mechanism and as a cost-discovery mechanism; accordingly, both partial sharing and full sharing dominate non-sharing. However, the relative superiority of partial versus full sharing hinges on the threshold structure defined by recognition efficiency. Manufacturer encroachment strengthens the manufacturer's ability to internalize the returns to blockchain investment and thus intensifies its incentive to adopt more transparent governance. Nevertheless, such a strategy does not necessarily lead to a supply chain–wide optimum, as the retailer's profit remains jointly shaped by the channel substitution effect and the market expansion effect.

Keywords: "the Belt and Road" supply chain, blockchain technology introduction, information sharing, manufacturer encroachment

1. Introduction

Against the background of the in-depth restructuring of the global supply chain and the continuous penetration of digital technology, the "Belt and Road" cross-border supply chain has become an important carrier connecting countries along the routes, promoting regional coordination and ensuring the stable operation of the international industrial and supply chain [1]. Relying on cross-regional resource integration and division of labor and cooperation, the "Belt and Road" cross-border supply chain has played a significant role in promoting trade exchanges, improving regional connectivity and enhancing economic resilience [2]. However, while extending the chain, expanding nodes and enlarging spatial span, the "Belt and Road" cross-border supply chain has also significantly aggravated vulnerability in supply chain operation. On the one hand, the "Belt and Road" cross-border supply chain has longer transportation cycles, more participants and more complex institutional environments, making disturbance risks and disruption risks more easily transmitted and amplified along the chain. On the other hand, differences and opacity in technical standards, platform interfaces, certification rules and data governance mechanisms among different countries further increase information costs [3], weakening supply chain members' ability to identify and respond to abnormal conditions. For example, after a supply disruption occurs, the upstream procurement cost usually changes, but it may not be observed and verified by downstream enterprises in a timely and accurate manner, resulting in information asymmetry of cost structure [4], which has gradually become an important practical problem restricting the coordination of the "Belt and Road" cross-border supply chain.

Therefore, more and more enterprises and studies have begun to pay attention to the application value of blockchain technology in cross-border supply chain governance. Relying on the characteristics of distributed ledger, immutability, traceability and multi-party sharing, blockchain technology is considered to effectively alleviate information friction in cross-subject transactions, improve supply chain transparency, and build a more stable information coordination mechanism in an environment with strong institutional heterogeneity and relatively weak mutual trust foundation [5]. For example, after a supply anomaly occurs, blockchain technology can improve the verifiability of key information, thereby alleviating decision distortion caused by information lag and identification bias. With the deepening of application, blockchain has crossed the single stage of technology empowerment and evolved into a deep governance mechanism sufficient to trigger changes in channel power and asymmetric benefit distribution [6]. Based on this, in the face of private cost information derived from disruptions, how manufacturers weigh blockchain investment and endogenously formulate channel strategies will fundamentally dominate the final profit pattern and coordination state of complex supply chains.

At the same time, manufacturer channel encroachment is also a classic issue in supply chain management. In actual operation, manufacturers often establish direct sales channels through e-commerce platforms, self-built official websites or direct terminals to enhance their control over the terminal market and obtain more profits [7]. For manufacturers, channel encroachment is usually regarded as a strategic choice that can improve the profit structure. However, for retailers, the establishment of manufacturer direct sales channels will divert demand from original channels and intensify terminal market competition, thus triggering new channel conflicts. It should be noted that under the coexistence of supply disruption risk and cost information asymmetry, whether manufacturers implement channel encroachment and whether they are willing to introduce blockchain technology to share real cost information after disruptions are not independent of each other. Existing studies have shown that there is a significant strategic linkage between blockchain investment decisions and supply chain sales models, that is, technology adoption will further affect enterprises' channel choices by affecting profit distribution and operation structure [8]. On the contrary, when manufacturers master the real procurement costs after supply disruptions but cannot share information with retailers and achieve mutual trust, manufacturers need to jointly formulate strategies on whether to change the information structure through blockchain investment and whether to restructure their profit acquisition methods through channel encroachment. However, although existing studies have discussed blockchain application, supply disruption governance and channel encroachment respectively, there is still a lack of systematic answers to the issues concerned in this paper. On the one hand, most blockchain studies regard it as an exogenously given or binary adoption decision, mainly investigating the impact of blockchain application on supply chain efficiency and trust level, and rarely describe how enterprises endogenously choose investment intensity and how different investment levels simultaneously affect market demand and information identification ability. On the other hand, existing supply chain blockchain literature mostly focuses on product traceability, financing constraint alleviation and collaborative efficiency improvement, and often defaults that key information can be verified at a low cost, thus ignoring the situation that the cost structure has changed after disruptions but may not be identified and accepted by downstream parties, which is more prominent in the "Belt and Road" cross-border supply chain. Meanwhile, channel encroachment research and information sharing research are mostly treated separately. The former focuses on the impact of manufacturers opening direct sales channels on competition intensity, channel profits and double marginalization, while the latter focuses on the role of information sharing in demand, signal transmission and supply chain coordination, but rarely reveals how blockchain, as an information sharing mechanism, changes manufacturers' channel encroachment incentives, wholesale pricing power and profit distribution pattern with retailers when manufacturers hold private information on cost structure. Based on this, starting from the information asymmetry of cost

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structure in the "Belt and Road" cross-border supply chain, this paper constructs a game model composed of a single manufacturer and a single retailer. Under the condition of supply disruption risk, the manufacturer decides the blockchain investment intensity in advance, and selects channel and pricing strategies after the cost state is realized. Different from treating blockchain merely as a tool for efficiency improvement, this paper emphasizes that blockchain plays a dual role in this study: first, blockchain investment can improve supply chain transparency and consumer trust, thereby expanding market scale [9]; second, blockchain investment can also increase the probability of retailers identifying the real cost structure of manufacturers, thereby changing the transmission of cost shocks to downstream in high-cost states [10]. Therefore, blockchain is not merely a technical background in this paper, but a strategic decision variable that will simultaneously affect demand level, information structure, channel competition and profit distribution.

Centering on the above settings, this paper mainly focuses on the following issues: under the coexistence of supply disruption and cost structure information asymmetry, will manufacturers actively change the information structure through blockchain investment? How do partial sharing and full sharing affect the equilibrium profits of manufacturers and retailers respectively? When manufacturers can choose channel encroachment, how will the information identification effect and market expansion effect of blockchain jointly act on their optimal channel strategies and revenue performance? By answering these questions, this study realizes the integration of three types of research on blockchain, supply disruption and channel encroachment under a unified framework, and further reveals the internal connection between information governance mechanism and channel decision-making in complex cross-border supply chains.

2. Literature review

2.1. Utility and external constraints of the "Belt and Road" supply chain

Against the background of intertwined geopolitical games, trade frictions between major powers and regional conflicts, the risk of cascading failures and structural vulnerability faced by the global supply chain network are constantly rising [11]. Compared with the general transnational trade network, the "Belt and Road" cross-border supply chain spans both geographical space and institutional environment. Its function is not limited to the global flow and allocation of resources, but also to enhance the absorption and recovery capabilities of economies along the routes against external shocks through cross-regional industrial connection, infrastructure interconnection and institutional coordination. Most existing studies discuss from the perspectives of physical infrastructure construction, institutional transparency improvement and digital transformation promotion, holding that transnational supply chain networks can play an important role in improving trade resilience, optimizing resource allocation efficiency and promoting regional economic coordination [12].

However, the continuous expansion of the transnational physical chain will not automatically improve the efficiency of the supply chain system. While expanding the scope of resource allocation, it also embeds more external uncertainties into the supply chain operation, thus inducing new vulnerabilities within the system [13]. On the one hand, countries along the routes have strong heterogeneity in regulatory rules, technical standards, market systems and business practices. Such institutional differences will increase communication costs and matching difficulties in transnational coordination, and further induce information distortion, ambiguous responsibility definition and organizational integration barriers [14]; on the other hand, cross-border transportation, segmented processing and multi-agent collaboration make it difficult to continuously track key information such as product quality, performance status and cost changes. Information is prone to breakage, lag or selective disclosure in the long-chain transmission, thus forming prominent information faults [15]. Therefore, information friction caused by transnational spatial barriers and institutional differences has not only been a local problem affecting transaction convenience, but has gradually become a key factor restricting the stable operation, efficiency improvement and risk governance of the "Belt and Road" supply chain.

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2.2. Manufacturer channel encroachment

Manufacturer channel encroachment is an important topic in the research of supply chain management and channel coordination. Existing studies generally believe that by building a direct sales channel, manufacturers can directly reach end consumers, reduce channel dependence on traditional retailers, and transfer profits originally occupied by downstream channels to their own revenue system to a certain extent [16]. From the manufacturer's perspective, the introduction of direct sales channels helps improve its profit structure and market control ability; but from the perspective of the overall supply chain, this strategy will divert market demand from traditional retail channels, weaken the original sales space of retailers, and thus trigger retailers' fairness concerns, service competition and channel conflicts [17]. Focusing on the occurrence conditions and action boundaries of channel encroachment, existing literature has fully discussed from the perspectives of supply chain power allocation, direct sales channel construction cost and distribution contract model [18, 19]. Relevant studies show that when the construction cost of direct sales channels is lower than a certain threshold, or manufacturers occupy a strong bargaining position and game dominance in the supply chain, their incentives to implement channel encroachment will be significantly enhanced. With the research perspective further turning to the micro decision-making process, the impact of information factors on channel strategies has begun to receive more attention. Some studies have found that information asymmetry will not only change the pricing timing, demand allocation and profit segmentation under the dual-channel structure, but also act as an important signal mechanism to affect the initial motivation, timing and intensity of manufacturers' entry into the retail market [20, 21]. However, most existing studies still deal with channel restructuring and information sharing mechanisms separately, and rarely further discuss the strategic linkage between manufacturers' endogenous channel encroachment decisions and digital information governance mechanisms under the composite risk scenario of coexisting supply disruptions and cost information asymmetry.

2.3. Application of blockchain technology

Relying on the characteristics of distributed ledger, immutability, multi-party consensus and traceability, blockchain technology is gradually developing from a single information recording tool to an important digital infrastructure for supply chain information governance. Existing studies generally point out that blockchain can alleviate information friction in cross-agent collaboration and improve the verifiability of transaction records, logistics status and product circulation processes, thus enhancing the transparency of the entire supply chain [22]. From the perspective of information economics, by strengthening the signal transmission mechanism and external verification mechanism, blockchain can improve downstream agents' ability to identify upstream hidden information and reduce governance costs caused by adverse selection, moral hazard and opportunistic behavior [23]. However, the application scenarios of existing blockchain research mainly focus on attribute information such as product traceability, quality disclosure, green certification and low-carbon consumption preferences [24], with insufficient attention paid to the deeper economic variable of "cost structure". In cross-border supply chains facing supply disruption risks, the real upstream procurement costs often fluctuate sharply due to external shocks such as blocked transportation, raw material shortages, exchange rate fluctuations and policy adjustments, and such cost changes are difficult to be observed by downstream agents in a timely, accurate and complete manner [25]. In this scenario, blockchain is not only used to record product flow or disclose quality information, but also to provide technical support for external verification of cost structure through continuous recording of transaction data, logistics data, settlement data and performance data. Existing literature still lacks in-depth discussion on how blockchain breaks the cost information island through endogenous information identification effect and how to reshape the transmission path and revenue distribution pattern of cost shocks between upstream and downstream, which also constitutes an important entry point for further research in this paper.

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2.4. Literature review

To sum up, existing studies have formed relatively rich theoretical accumulation around the "Belt and Road" supply chain resilience, manufacturer channel encroachment and blockchain information governance, providing an important foundation for understanding the operational efficiency of cross-border supply chains, channel power allocation and digital governance mechanisms. However, under the scenario of intertwined supply disruptions, cost information asymmetry and channel restructuring, relevant studies still have room for expansion. Existing blockchain research mostly focuses on external attribute information such as product traceability, quality disclosure, green certification and low-carbon consumption preferences, pays less attention to cost structure changes caused by supply disruptions, and does not fully reveal the impact of improved cost information verifiability on upstream and downstream pricing power, profit distribution and revenue structure restructuring; although channel encroachment research has discussed factors such as direct sales costs, supply chain power and contract arrangements, it mostly examines channel restructuring and information sharing mechanisms separately, and has not systematically analyzed the endogenous correlation between blockchain investment intensity, information sharing depth and channel encroachment decisions under cost opacity. At the same time, existing studies usually regard blockchain application as an exogenous technical condition, focusing on its impact on transparency, consumer trust or market demand expansion, but pay insufficient attention to the composite attributes of its market expansion effect and cost identification effect. Based on this, this paper incorporates endogenous blockchain investment, information sharing depth and manufacturer channel encroachment into a unified sequential game framework, investigates manufacturers' trade-offs between technology investment and channel layout under the coexistence of supply disruptions and cost information asymmetry, and further reveals the impact of blockchain governance mechanisms on upstream and downstream information structure, competition structure and revenue structure.

3. Model setup

3.1. Supply chain structure

This paper considers a supply chain system composed of a single manufacturer and a single retailer. The manufacturer purchases input materials from an upstream supplier. Since the upstream supplier does not participate in subsequent channel decisions and information-sharing decisions, it is not regarded as a strategic game player. The manufacturer faces two procurement cost states, denoted as $m \in \{0,\},0$, where $m=0$ represents the low-cost state and $mc=$ represents the high-cost state. To ensure model solvability and obtain closed-form solutions, this paper further assumes that the two cost states occur with equal probability, i.e., $P(m=0)=P(m=c)=\frac{1}{2}$. In addition, the manufacturer needs to choose whether to implement channel encroachment. If encroachment is not implemented, products are only sold through the retail channel. If encroachment is implemented, the manufacturer wholesales products to the retailer while establishing a direct sales channel and bears a fixed entry cost E. When the manufacturer implements channel encroachment, the retail channel and the direct sales channel face the same terminal market together, and their inverse demand functions are respectively as follows:

$$p_R = a + \gamma e - q_R - b q_M$$

$$p_M = a + \gamma e - q_M - b q_R$$

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where q_R and q_M represent the sales volume of the retail channel and the direct sales channel respectively, p_R and p_M represent the terminal prices of the two channels respectively, and the parameter b characterizes the degree of cross-substitution between channels. The larger b is, the stronger the demand substitution and cannibalization effect between the two channels. If the manufacturer does not implement channel encroachment, the direct sales channel does not exist, that is $q_M = 0$. At this time, the retail channel demand function degenerates to $p_R = a + \gamma e - q_R$. The supply chain structure is shown in Figure 1.

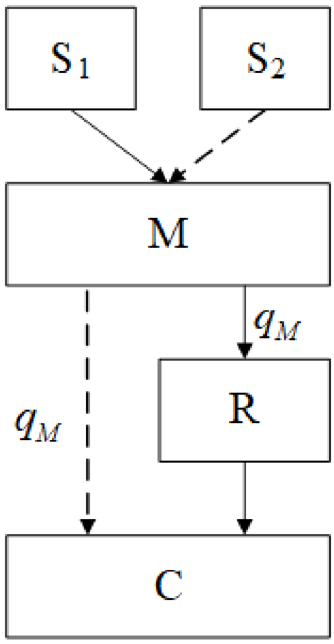

Figure 1. Supply chain structure

In addition, the manufacturer chooses the blockchain investment effort level $e \geq 0$, and bears a convex input cost $\frac{ke^2}{2}$, with $k > 0$. Blockchain investment affects corporate profits through two mechanisms: First, the market expansion effect. Blockchain improves product traceability and consumer trust, thereby expanding the market size from a to $a + \gamma e$, with $\gamma > 0$. Second, the cost state identification effect. In the high-cost state, the probability that the downstream buyer identifies the manufacturer's true cost state is $\mu(e) = min\{\delta e, 1\}$, with $\delta > 0$. Thus, the model endogenously generates three types of information sharing regimes: When $e = 0$, it corresponds to no sharing at all; When $0 < e < \frac{1}{\delta}$, it corresponds to partial sharing; When $e \geq \frac{1}{\delta}$, it corresponds to full sharing. It should be emphasized that no sharing corresponds to a corner solution rather than an interior interval where the effort level can be continuously optimized. Under partial sharing, the high-cost state is identified only with probability δe ; under full sharing, the high-cost state is surely identified.

3.2. Decision sequence

This paper adopts a manufacturer-led sequential game structure, as shown in Figure 2. First, at the initial stage of the model, the manufacturer decides in advance whether to introduce blockchain technology and determines its investment effort level, and this decision will lay the foundation for all subsequent actions and strategy choices. Next, the manufacturer determines its optimal channel strategy by observing the market, adopts a dual-sourcing procurement strategy to purchase from suppliers, and sets an appropriate wholesale price w for each unit of product. Subsequently, the retailer makes optimal decisions in the traditional channel based on the products provided by the manufacturer and determines the number of

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channels q_R it operates to maximize profits. In this process, the retailer not only needs to consider cost control and market demand, but also formulates a reasonable distribution strategy against the background of manufacturer encroachment to maintain competitive advantages. Finally, if the manufacturer chooses to establish a direct sales channel, that is, to conduct channel encroachment, it will independently determine the quantity q_M of the direct sales channel as an encroacher. This decision has a profound impact on the market structure, competition situation and final consumer choices. Through this series of decision arrangements, the manufacturer and the retailer can flexibly adjust according to their respective strategies and market reactions, so as to optimize the performance and competitiveness of the overall supply chain.

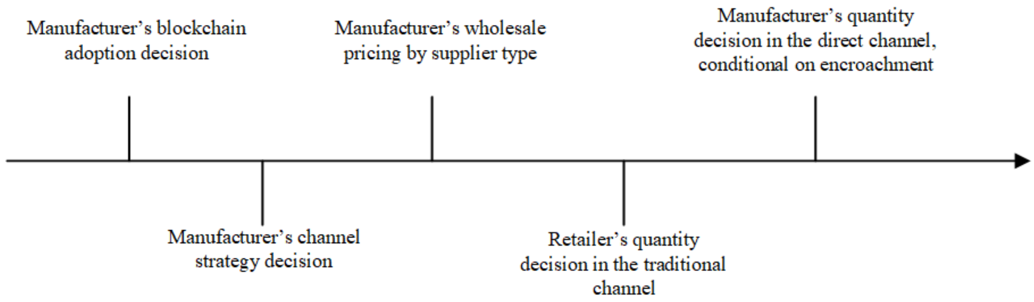

Figure 2. The event sequences

4. Solution and analysis

4.1. Solution of expected profits in various scenarios

Obviously, the profits of all participants in the supply chain are closely related to the manufacturer's channel choice and blockchain introduction strategy. Meanwhile, the manufacturer's investment effort level e also exerts a significant impact on the profits of all parties. Therefore, to characterize the optimal profits of supply chain participants under different decision scenarios, this paper separately solves the equilibrium profits under the manufacturer's encroachment and non-encroachment scenarios, as well as three information sharing strategies: no information sharing, partial information sharing, and full information sharing by the manufacturer. For convenience of expression, this paper uses 0, $c0$, and cc to denote no sharing, partial sharing, and full sharing respectively. The specific results are as follows.

In the non-encroachment scenario, if the manufacturer makes no blockchain investment (i.e., no sharing), the equilibrium expected profits of both parties are:

$$\boldsymbol{\pi}_{\boldsymbol{M},\boldsymbol{N},0}=\frac{1}{8}\left(\boldsymbol{a}^2+2\boldsymbol{a}\boldsymbol{e}\boldsymbol{\gamma}+\boldsymbol{e}^2\left(-4\boldsymbol{k}+\boldsymbol{\gamma}^2\right)\right)$$

$$\boldsymbol{\pi}_{\boldsymbol{R},\boldsymbol{N},0}=\frac{1}{16}\left(\boldsymbol{a}+\boldsymbol{e}\boldsymbol{\gamma}\right)^2$$

If the manufacturer chooses partial sharing, that is, the blockchain effort level lies in the partial sharing interval so that cost information is identified with probability δe, the equilibrium expected profits are respectively:

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$$\boldsymbol{\pi}_{\boldsymbol{M},\boldsymbol{N},\boldsymbol{c}0}=\frac{1}{8}\left(\boldsymbol{a}^2-2\boldsymbol{a}\left(\boldsymbol{c}-\boldsymbol{e}\boldsymbol{\gamma}\right)+\boldsymbol{e}\left(-2\boldsymbol{c}\boldsymbol{\gamma}+\boldsymbol{e}\left(-4\boldsymbol{k}+\boldsymbol{\gamma}^2\right)\right)\right)$$

$$\boldsymbol{\pi}_{\boldsymbol{R},\boldsymbol{N},\boldsymbol{c}0}=\frac{1}{16}\left(\boldsymbol{a}+\boldsymbol{e}\boldsymbol{\gamma}\right)^2$$

If the manufacturer chooses full sharing, that is, the blockchain effort level enters the full sharing interval so that the high-cost state can be fully identified, the equilibrium expected profits are respectively:

$$\boldsymbol{\pi}_{\boldsymbol{M},\boldsymbol{N},\boldsymbol{cc}}=\frac{1}{8}\left(\boldsymbol{a}^2+\boldsymbol{c}^2-2\boldsymbol{c}\boldsymbol{e}\boldsymbol{\gamma}-2\boldsymbol{a}\left(\boldsymbol{c}-\boldsymbol{e}\boldsymbol{\gamma}\right)+\boldsymbol{e}^2\left(-4\boldsymbol{k}+\boldsymbol{\gamma}^2\right)\right)$$

$$\boldsymbol{\pi}_{\boldsymbol{R},\boldsymbol{N},\boldsymbol{cc}}=\frac{1}{16}\left(\boldsymbol{a}-\boldsymbol{c}+\boldsymbol{e}\boldsymbol{\gamma}\right)^2$$

In the encroachment scenario, if the manufacturer makes no blockchain investment (i.e., no sharing), the equilibrium expected profits of the manufacturer and the retailer are respectively:

$$\pi_{M,E,0}=-\frac{a^2\left(12-8b+b^2\right)+2a\left(12-8b+b^2\right)e\gamma+e^2\left(2\left(-8+3b^2\right)k+\left(12-8b+b^2\right)\gamma^2\right)+4\left(-8+3b^2\right)c_E}{4(-8+3b^2)}$$

$$\pi_{R,E,0}=\frac{4(-1+b)^2(a+e\gamma)^2}{(8-3b^2)^2}$$

If the manufacturer chooses partial sharing under the encroachment scenario, the equilibrium expected profits of both parties are respectively:

$$\pi_{M,E,c0}=-\frac{a^2\left(12-8b+b^2\right)+2a\left(4\left(-1+b\right)c+\left(12-8b+b^2\right)e\gamma\right)+e\left(2\left(-8+3b^2\right)ek+8\left(-1+b\right)c\gamma+\left(12-8b+b^2\right)e\gamma^2\right)+4\left(-8+3b^2\right)c_E}{4(-8+3b^2)}$$

$$\pi_{R,E,c0}=\frac{4(-1+b)^2(a+e\gamma)^2}{(8-3b^2)^2}$$

If the manufacturer chooses full sharing under the encroachment scenario, the equilibrium expected profits of both parties are as follows, and Proposition 1 is obtained.

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$$\pi_{M,E,cc} = \frac{\left(a^2\left(12-8b+b^2\right)+8a\left(-1+b\right)c+4c^2-16e^2k+6b^2e^2k+2a\left(12-8b+b^2\right)e\gamma-8ce\gamma+8bce\gamma+12e^2\gamma^2-8be^2\gamma^2+b^2e^2\gamma^2+4\left(-8+3b^2\right)c_E\right)}{-4(-8+3b^2)}$$

$$\pi_{R,E,cc} = \frac{4(a(-1+b)+c+(-1+b)e\gamma)^2}{(8-3b^2)^2}$$

Proposition 1: The changing trends of profits of the manufacturer and the retailer with respect to investment effort level under various scenarios are:

(1) $\pi_{(M,N,0)}$, $\pi_{(M,N,c0)}$, $\pi_{(M,N,cc)}$, $\pi_{(R,E,0)}$, $\pi_{(R,E,c0)}$, $\pi_{(R,N,0)}$, $\pi_{(R,N,c0)}$, $\pi_{(R,N,cc)}$ are strictly monotonically increasing in effort level e for any $e \geq 0$;

(2) When $2\left(-8+3b^2\right)k+\left(12-8b+b^2\right)\gamma^2 \geq 0$, $\pi_{(M,E,0)}$, $\pi_{(M,E,c0)}$, $\pi_{(M,E,c0)}$ are strictly monotonically increasing in investment effort level; when $2\left(-8+3b^2\right)k+\left(12-8b+b^2\right)\gamma^2 < 0$, $\pi_{(M,E,0)}$, $\pi_{(M,E,c0)}$, $\pi_{(M,E,c0)}$ first increase and then decrease in investment effort level;

(3) When $c > (1-b)a$, $\pi_{(R,E,cc)}$ first decreases and then increases in investment effort level.

Proposition 1 shows that market size and product heterogeneity change the monotonicity of profit functions with respect to investment effort level and affect firms' optimal investment choices. The expansion of market size can release potential demand space and improve the marginal return of investment effort; the enhancement of product heterogeneity will amplify the benefits of differentiated competition, making firms more motivated to improve product attractiveness and channel competitiveness. At the same time, rising production costs will compress unit product profits, thereby strengthening firms' incentives to improve operational efficiency, expand demand base or mitigate cost disadvantages through investment. From this perspective, firms' investment decisions should not be regarded as static resource input, but dynamically adjusted with changes in market size, product heterogeneity and production costs. When the market size is large and product heterogeneity is low, firms need to increase investment effort in the early stage to enhance market recognition and consolidate first-mover advantages; when product heterogeneity is high, continuous investment is more likely to be transformed into differentiated benefits; if production costs are high, investment focus should shift to efficiency improvement and cost pressure mitigation. Managers need to incorporate the economic environment, cost structure and market conditions into the same decision framework, and carefully balance investment intensity, payback and risk tolerance to enhance firms' competitive resilience and sustainable operation capacity in complex market environments.

4.2. Blockchain investment effort strategy

According to Proposition 1, this study subsequently solves for the optimal investment effort level based on the expected profits of all supply chain parties, and derives the optimal profits of the manufacturer and retailer under corresponding structures. In addition, this study further reveals the manufacturer's optimal blockchain adoption strategy by comparing the magnitude differences of optimal profits, as shown in Proposition 2.

First, when the manufacturer shares no information at all, the expected profits of supply chain parties are:

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$$E\pi_{M,0} = \frac{1}{2}\pi_{M,N,0} + \frac{1}{2}\pi_{M,N,c0}$$

$$E\pi_{R,0} = \frac{1}{2}\pi_{R,N,0} + \frac{1}{2}\pi_{R,N,c0}$$

When the manufacturer shares information partially:

$$E\pi_{M,1} = \frac{1}{2}\pi_{M,N,0} + \frac{1}{2}(\delta e\pi_{M,N,c0} + (1-\delta e)\pi_{M,N,cc})$$

$$E\pi_{R,1} = \frac{1}{32}\left((a+e\gamma)^2 + e(a+e\gamma)^2\delta + (a-c+e\gamma)^2(1-e\delta)\right)$$

When the manufacturer shares information fully:

$$E\pi_{M,2} = \frac{1}{2}\pi_{M,N,0} + \frac{1}{2}\pi_{M,N,cc}$$

$$E\pi_{R,2} = \frac{1}{2}\pi_{R,N,0} + \frac{1}{2}\pi_{R,N,cc}$$

The optimal investment effort levels are obtained respectively as:

$$e_0 = 0$$

$$e_1 = \frac{-a(-6+b)(-2+b)\gamma + c\left(-2(-1+b)\gamma + c\delta\right)}{2(-8+3b^2)k + (-6+b)(-2+b)\gamma^2}$$

$$e_2 = \frac{-\left(a(-6+b)(-2+b) + 2(-1+b)c\right)\gamma}{2(-8+3b^2)k + (-6+b)(-2+b)\gamma^2}$$

Accordingly, the expected profits of the manufacturer and retailer under the corresponding structures are:

$$E\pi_{M,E0} = -\left(\frac{a\left(a\left(12-8b+b^2\right) + 4\left(-1+b\right)c\right)}{4(-8+3b^2)}\right) - c_E$$

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$$E\pi_{M,E1} = \frac{-2a^2\left(-96+64b+28b^2-24b^3+3b^4\right)k-2ac\left(4\left(8-8b-3b^2+3b^3\right)k+\left(12-8b+b^2\right)c\gamma\delta\right)}{4(-8+3b^2)(2(-8+3b^2)k+(12-8b+b^2)\gamma^2)}$$

$$+\frac{+c^2\left(-4\left(-8+3b^2\right)k+2\left(-10+4b+b^2\right)\gamma^2-4\left(-1+b\right)c\gamma\delta+c^2\delta^2\right)-4\left(-8+3b^2\right)\left(2\left(-8+3b^2\right)k+\left(12-8b+b^2\right)\gamma^2\right)c_E}{4(-8+3b^2)(2(-8+3b^2)k+(12-8b+b^2)\gamma^2)}$$

$$E\pi_{M,E2} = \frac{a^2\left(96-64b-28b^2+24b^3-3b^4\right)k-4a\left(8-8b-3b^2+3b^3\right)ck+c^2\left(\left(16-6b^2\right)k+\left(-10+4b+b^2\right)\gamma^2\right)}{2(-8+3b^2)(2(-8+3b^2)k+(12-8b+b^2)\gamma^2)} - \frac{\left(-8+3b^2\right)\left(2\left(-8+3b^2\right)k+\left(12-8b+b^2\right)\gamma^2\right)c_E}{(-8+3b^2)(2(-8+3b^2)k+(12-8b+b^2)\gamma^2)}$$

$$E\pi_{R,E0} = \frac{4a^2\left(-1+b\right)^2}{\left(8-3b^2\right)^2}$$

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$$E\pi_{R,E1} = \frac{1}{\left(8-3b^2\right)^2}\left(4a^2\left(-1+b\right)^2 + \frac{4\left(-1+b\right)^2\gamma^2\left(a\left(-6+b\right)\left(-2+b\right)\gamma+2\left(-1+b\right)c\gamma-c^2\delta\right)^2}{\left(2(-8+3b^2)k+(-6+b)(-2+b)\gamma^2\right)^2} + c^2\left(2-\frac{2\delta(-a(-6+b)(-2+b)\gamma+c(-2(-1+b)\gamma+c\delta))}{2(-8+3b^2)k+(-6+b)(-2+b)\gamma^2}\right) - \frac{4a\left(-1+b\right)\left(2a\left(-12+20b-9b^2+b^3\right)\gamma^2-4\left(-1+b\right)c^2\gamma\delta+c^3\delta^2-c\left(2\left(-8+3b^2\right)k+\gamma\left(\left(8-3b^2\right)\gamma+a\left(12-8b+b^2\right)\delta\right)\right)\right)}{2(-8+3b^2)k+(12-8b+b^2)\gamma^2} - \frac{4\left(-1+b\right)c\gamma(-a(-6+b)(-2+b)\gamma+c(-2(-1+b)\gamma+c\delta))\left(-1+\frac{\delta(-a(-6+b)(-2+b)\gamma+c(-2(-1+b)\gamma+c\delta))}{2\left(-8+3b^2\right)k+\left(-6+b\right)\left(-2+b\right)\gamma^2}\right)}{2(-8+3b^2)k+(-6+b)(-2+b)\gamma^2}\right)$$

$$E\pi_{R,E2} = \frac{2\left(\left(-1+b\right)^2\left(a-\frac{a\left(-6+b\right)\left(-2+b\right)+2\left(-1+b\right)c\gamma^2}{2(-8+3b^2)k+(-6+b)(-2+b)\gamma^2}\right)^2 + \left(a\left(-1+b\right)+c-\frac{\left(-1+b\right)\left(a\left(-6+b\right)\left(-2+b\right)+2\left(-1+b\right)c\right)\gamma^2}{2(-8+3b^2)k+(-6+b)(-2+b)\gamma^2}\right)^2\right)}{\left(8-3b^2\right)^2}$$

Proposition 2: Regardless of whether the manufacturer conducts market encroachment, partial sharing and full sharing are strictly superior to no sharing in all cases, and there exists a clear threshold δ between partial sharing and full sharing.

This is because, through calculation, this study obtains $E\pi_{M,N1} - E\pi_{M,N0} = \frac{\left(4a\gamma-2c\gamma-c^2\delta\right)^2+8c^2\left(4k-\gamma^2\right)}{128(4k-\gamma^2)} > 0$ and $E\pi_{M,N2} - E\pi_{M,N0} = \frac{\gamma^2\left(2a-c\right)^2+2c^2\left(4k-\gamma^2\right)}{32(4k-\gamma^2)} > 0$ when the manufacturer does not encroach. Similarly, when the manufacturer chooses channel encroachment, $E\pi_{M,E1} - E\pi_{M,E0} > 0$ and $E\pi_{M,E2} - E\pi_{M,E0} > 0$ hold. Meanwhile, in the non-

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encroachment scenario, the magnitude relationship changes with respect to $\delta_N^* = \frac{4\gamma(2a-c)}{c^2}$, namely $E\pi_{M,N2} - E\pi_{M,N1} = \frac{c^2\delta[4\gamma(2a-c)-c^2\delta]}{128(4k-\gamma^2)}$ if $0 < \delta < \delta_N^*$, $E\pi_{M,N2} > E\pi_{M,N1}$, and $\delta > \delta_N^*$, $E\pi_{M,N2} < E\pi_{M,N1}$; . Likewise, in the encroachment scenario, the magnitude relationship also changes with $E\pi_{M,E2} - E\pi_{M,E1} = \frac{c^2\delta\{2\gamma[(12-8b+b^2)a-2(1-b)c]-c^2\delta\}}{4(8-3b^2)(2(8-3b^2)k-(12-8b+b^2)\gamma^2)}$, where $\delta_E^* = \frac{2\gamma[(12-8b+b^2)a-2(1-b)c]}{c^2}$ is the threshold value.

This conclusion indicates that full transparency is not a necessary prerequisite for blockchain value. As long as the manufacturer makes positive transparency investment, even in a partial sharing state, it can achieve two types of benefits simultaneously: one is the market expansion benefit brought by transparency, and the other is the partial identification benefit formed by the improvement of information identification ability in the high-cost state. In contrast, no sharing can neither obtain transparency benefits nor effectively expand market demand through blockchain effort, so it is systematically dominated in equilibrium. In addition, there is no fixed magnitude relationship between partial sharing and full sharing, which is determined by the identification efficiency parameter δ. This means that higher transparency does not necessarily represent better performance. When δ is low, the improvement in identification probability brought by unit effort is limited, and the manufacturer tends to increase investment to a level sufficient for full sharing. However, when δ is sufficiently high, a small amount of effort can achieve a high identification probability, and the manufacturer may not have the incentive to push effort to the full-sharing threshold. In other words, partial sharing may be a rational optimal stopping point rather than a transitional state to full sharing. At the same time, this study points out that δ has a dual piecewise effect. As can be seen from the expected profits of all parties, when the manufacturer chooses no sharing or full sharing, the expected profits do not contain δ, while when partial sharing is chosen, the expected profits involve δ. This indicates that the role of δ is not a simple continuous marginal effect, but has two implications:

(1) Intra-institutional effect: When the manufacturer chooses partial sharing, δ determines the efficiency of converting unit effort into identification probability, thus directly entering the expected profit function;

(2) Inter-institutional boundary effect: Since the full-sharing threshold is $\frac{1}{\delta}$, a larger δ reduces the effort threshold required for the manufacturer to achieve full information sharing. Accordingly, Proposition 3 is obtained:

Proposition 3: The identification efficiency parameter δ has both intra-institutional effect and inter-institutional boundary effect. It not only determines the profit level under partial sharing, but also affects the feasible domain division between partial sharing and full sharing by changing the full-sharing threshold. This further illustrates that $\frac{1}{\delta}$ is not an ordinary efficiency parameter but an institutional switching parameter.

It determines both the actual value of partial sharing and the difficulty of achieving full sharing. Therefore, according to Propositions 2 and 3, when evaluating blockchain investment, enterprises should not only consider whether transparency efficiency can be higher, but also whether higher transparency efficiency will change the optimal sharing institution itself.

4.3. Interaction between channel strategy and information sharing strategy

Based on the solution and analysis of δ^* in Proposition 3, this study further considers the interaction effect $\delta_E^* - \delta_N^* = \frac{2\gamma[a(b^2-8b+8)+2bc]}{c^2} > 0$ and points out that manufacturer encroachment will expand the dominant region of the full-sharing strategy, as shown in Proposition 4:

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Proposition 4: Manufacturer channel encroachment raises the critical identification efficiency threshold δ between partial sharing and full sharing, i.e., $\delta_E^* > \delta_N^*$. Therefore, compared with the non-encroachment scenario, encroachment increases the manufacturer's optimal blockchain investment effort level and lowers the effective identification efficiency threshold for full sharing.

This is because after channel encroachment, the manufacturer no longer obtains demand expansion benefits brought by blockchain only through the traditional retail channel, but also captures new profit growth points by virtue of the direct sales channel, making it easier for the high effort cost required to promote full sharing to be covered by the internalization of dual-channel benefits, thus enhancing its willingness to improve supply chain information transparency and promote in-depth transparent governance. In addition, this paper also examines the impact of fixed channel encroachment cost c_E on the manufacturer's channel strategy and information sharing strategy. Among them, when the manufacturer does not share cost structure information at all, there exists $E\pi_{M,E0} - E\pi_{M,N0} = \frac{a^2(16-16b+5b^2)+abc(8-3b^2)}{8(8-3b^2)} - c_E$ for the manufacturer's expected profit, that is, when $c_E \leq \frac{a^2(16-16b+5b^2)+abc(8-3b^2)}{8(8-3b^2)}$, the manufacturer chooses to carry out channel encroachment. Similarly, as shown in Figure 3, in the full non-sharing scenario, the manufacturer carries out channel encroachment if and only if $c_E \leq -\frac{((a+e\gamma)(a(16-16b+5b^2)+16e\gamma+16b(c-e\gamma)+b^2(-6c+5e\gamma)))}{8(-8+3b^2)}$; in full sharing, the manufacturer chooses to carry out channel encroachment when $c_E \leq \frac{16a^2b-5a^2b^2-16a^2+6ab^2c-10ab^2e\gamma-16abc+32ae\gamma(b-1)-3b^2c^2+6b^2ce\gamma-5b^2e^2\gamma^2+16(be^2\gamma^2-bce\gamma-e^2\gamma^2)}{8(3b^2-8)}$, otherwise it will not establish a direct sales channel. It should be noted that when deciding whether to introduce a direct sales channel, the manufacturer does not measure the profitability of the direct sales channel unilaterally, but needs to consider whether the incremental profit brought by the dual channels is sufficient to cover the fixed cost under the optimal blockchain technology investment effort level.

5. Managerial implications

(1) Elevate blockchain investment to an information governance strategy. The role of blockchain in cross-border supply chains goes beyond technical onboarding, efficiency improvement or product traceability; it further affects market size, information transparency, channel competition patterns and profit distribution. Therefore, core enterprises should incorporate blockchain investment into their overall supply chain strategy and advance it in coordination with channel layout, procurement management, information sharing and pricing strategies, so as to alleviate insufficient trust and information friction in transnational cooperation, and enhance the verifiability of cost information and collaborative governance capacity under supply anomalies.

(2) Choose an appropriate sharing level based on threshold conditions. Higher transparency does not necessarily lead to higher returns, and partial sharing may also be the optimal choice under specific conditions. Enterprises should weigh the marginal benefits and costs of transparency according to supply disruption probability, identification efficiency, input costs and channel competition intensity, and design hierarchical and progressive information sharing schemes instead of taking full transparency as the sole goal.

(3) Deploy coordination mechanisms synchronously in channel encroachment. After establishing a direct sales channel, manufacturers can more fully internalize the new demand benefits brought by blockchain transparency, thus having stronger incentives to increase investment intensity and promote in-depth information sharing. However, for retailers, direct sales channels may cause demand diversion and intensified competition, and even erode their profits. Therefore, when promoting channel encroachment, manufacturers should simultaneously design mechanisms such as revenue compensation, profit sharing or service division of labor to prevent digital governance and channel expansion from jointly exacerbating channel conflicts.

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(4) Strengthen information identification and revenue coordination under abnormal conditions. The digital construction of cross-border supply chains should not only serve daily tracking and process optimization, but also improve the ability of cost identification and credible verification under abnormal conditions such as supply disruptions, delays, alternative procurement and quality fluctuations. Meanwhile, core enterprises should enable retailers to share the market expansion benefits and risk mitigation benefits brought by transparency through mechanisms such as contract coordination, cost subsidies, joint investment and revenue return, so as to improve the overall willingness of supply chain collaboration.

6. Conclusion

This paper focuses on the information asymmetry of cost structure under supply disruptions in the "Belt and Road" cross-border supply chain, constructs a manufacturer-led sequential game model, and analyzes the internal connections among three strategic decisions: blockchain investment, information sharing depth and channel encroachment. Different from regarding blockchain only as a technical tool to improve traceability or transaction transparency, this paper emphasizes its institutional role in cross-border supply chain governance, that is, blockchain not only changes information verifiability, but also affects demand formation, cost identification, channel competition and revenue distribution. Thus, the introduction of blockchain is not an exogenous technical variable attached to the existing supply chain structure, but embedded in the strategic interaction between manufacturers and retailers, further reshaping the incentive constraints, behavioral boundaries and equilibrium outcomes of both parties.

The study finds that the no-sharing strategy has obvious systematic disadvantages in equilibrium. Regardless of whether manufacturers implement channel encroachment, as long as they make positive blockchain investment, even if full sharing is not achieved, they can obtain the market expansion effect from transparency and the information effect from improved cost identification. This shows that in complex cross-border supply chains, the economic value of information governance does not depend on the extreme state of full transparency; as long as enterprises can convert part of the information into identifiable and verifiable governance resources through technical investment, their revenue structure will be substantially changed. Therefore, no-sharing is not merely a cautious or conservative strategy, but closer to a voluntary abandonment of potential value by enterprises when governance benefits are already available. In addition, there is no unconditional dominance between partial sharing and full sharing, and their relative merits depend on the full information sharing threshold determined by the identification efficiency parameter. Identification efficiency not only affects the marginal efficiency of converting unit blockchain investment into identification probability under partial sharing, but also redefines the boundaries between different information sharing systems by changing the full-sharing threshold. Therefore, identification efficiency is not a simply continuously changing technical parameter, but a key structural variable that can trigger institutional switching. This indicates that enterprises do not always benefit from higher transparency, and their optimal choices are jointly constrained by technical identification capability, input costs and institutional thresholds. Accordingly, the optimal degree of information sharing does not advance monotonically along "no sharing – partial sharing – full sharing", and partial sharing is not just a transitional stage before full sharing. Under specific parameter conditions, it may itself constitute a stable, interpretable and economically rational optimal strategy.

At the same time, manufacturer encroachment further changes the logic of revenue attribution of blockchain investment. Without a direct sales channel, manufacturers indirectly recover the market expansion benefits from blockchain investment mainly through retail channels; once entering the terminal market and forming a dual-channel structure, manufacturers can more fully internalize the new demand and value created by transparency. Due to the improved degree of revenue internalization, manufacturers' incentives to promote higher transparency governance are strengthened, the dominant region of full sharing expands accordingly, and the optimal investment effort level also rises. This shows that digital governance and channel restructuring are not independent strategic arrangements, but have a clear

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complementary relationship: blockchain investment improves manufacturers' ability to identify and utilize cost information by optimizing the information structure; channel encroachment enhances manufacturers' possibility of obtaining returns from information governance by changing the revenue extraction path. In other words, channel encroachment is not only a tool for market coverage expansion or channel competition intensification, but also reallocates blockchain governance benefits into the dual-channel structure, thereby changing manufacturers' information governance incentives. However, the optimal decision at the manufacturer level does not naturally translate into a Pareto improvement at the supply chain system level. For retailers, there is an inherent tension between the channel diversion effect caused by manufacturer encroachment and the market expansion effect induced by blockchain transparency. In the no-sharing scenario, manufacturer encroachment directly squeezes retailers' market space and harms their profits; even in partial sharing or full sharing scenarios, whether retailers can obtain compensatory benefits depends on whether the market expansion effect can offset the channel diversion loss, so there is no universally valid monotonic conclusion. This indicates a significant deviation between the manufacturer's individual optimum and the supply chain's overall optimum. Without profit compensation, revenue sharing or vertical coordination mechanisms, the combined effect of blockchain transparency and channel encroachment may not drive the supply chain toward a cooperative equilibrium, but instead amplify interest conflicts among channel members. Therefore, the digital governance of cross-border supply chains cannot be understood only from the perspective of technical efficiency improvement or unilateral revenue growth, but needs to be analyzed in a framework intertwined with channel power, revenue distribution and cooperation stability.

Overall, this paper integrates three research threads of blockchain governance, supply disruption management and channel encroachment under a unified analytical framework, revealing the action boundaries and economic consequences of information governance mechanisms in complex cross-border supply chains. The theoretical contribution of this paper does not lie in simply stating that blockchain can improve transparency, but in pointing out that blockchain investment will further affect corporate strategic boundaries and equilibrium choices by changing the information structure, competition structure and revenue structure. The above analysis not only provides a theoretical basis for enterprises in the "Belt and Road" cross-border supply chain to allocate blockchain investment, determine information sharing depth and optimize channel layout, but also offers a new research perspective for understanding supply chain power restructuring, revenue redistribution and the evolution of coordination mechanisms under digital governance.

References

[1] Pei, C., & Zhao, J. New Trends for the 15th Five-Year Plan: New Quality Productive Forces and the High-Quality Advancement of Belt and Road Cooperation [J]. Nankai Economic Studies, 2025(11): 3-24.

[2] Zhang, S., Sui, H., & Li, X. South-South Cooperation: Cross-Border Transport Infrastructure, Regional Integration, and Economic Development—An Evaluation of the Economic Effects of the China-Laos Railway [J]. The Journal of Quantitative & Technical Economics: 1-25.

[3] Sheng, B., & Wu, X. Regional Trade Agreements, External Uncertainty, and Firms' Global Value Chain Resilience [J]. International Economics and Trade Research: 1-20.

[4] Liu, J., Liu, D., & Zhu, Z. Contract Design for Supply Chain Disruptions under Bilateral Information Asymmetry [J]. Prices Monthly, 2019(12): 81-89.

[5] Dutta, P., Choi, T. M., Somani, S., et al. Blockchain Technology in Supply Chain Operations: Applications, Challenges and Research Opportunities [J]. Transportation Research Part E: Logistics and Transportation Review, 2020, 142.

[6] Zhang, P., Xiao, Y., Liu, H., et al. The Asymmetric Effects of Digital Transformation on Output Volatility of Upstream and Downstream Supply Chain Firms [J]. The Journal of World Economy, 2024, 47(07): 123-152.

[7] Zheng, B., Jin, L., Yang, C., et al. Manufacturer Channel Entry Strategy in a Closed-Loop Supply Chain [J]. Journal of Systems & Management, 2020, 29(04): 794-805.

[8] Wei, G., Yang, C., & Li, X. Sales-Mode Selection Strategy for a Low-Carbon E-CLSC under Blockchain Technology Investment [J]. Journal of Systems Science and Mathematical Sciences, 2025, 45(10): 3047-3075.

[9] Liu, X., Zhou, Z., & Zhong, F. The Interaction between Channel Choice and Supply Chain Transparency under Different Power Structures [J]. Chinese Journal of Management Science: 1-16.

[10] Cui, Y., Gaur, V., & Liu, J. Supply Chain Transparency and Blockchain Design [J]. Social Science Electronic Publishing.
[11] Xing, K. X., & Yuan, Y. Will Sino-U.S. Trade Friction Affect the Resilience of the Global Backbone Industry Network? [J]. Economic Analysis and Policy, 2025, 87: 893-908.
[12] Wan, L., Fang, Y. Q., Ban, N. N., et al. Digital Transformation, International Competition and Productivity Progress: Evidence from Health Silk Road [J]. Industrial Management & Data Systems, 2025, 125(3): 945-968.
[13] Wang, X. R., Zhang, M., Qi, Y. N., et al. Developing Supply Chain Resilience: A Supply Network Perspective [J]. Supply Chain Management: An International Journal, 2025, 30(3): 353-368.
[14] Xu, Z., Xia, J., & Yuan, H. The Achievements, Problems, and Policy Recommendations of China-Europe Railway Express Development [J]. International Trade, 2021(09): 45-51.
[15] Zhou, D. Innovation in the Cross-Border Export E-Commerce Model for Agricultural Products between China and ASEAN under the Belt and Road Initiative [J]. Journal of Commercial Economics, 2018(04): 141-144.
[16] Xu, M., Yuan, S., Qin, Y., et al. Manufacturer Encroachment and Retailer Information-Sharing Strategies under Quality and Retail Service Investment [J]. Systems Engineering—Theory & Practice, 2025, 45(11): 3853-3872.
[17] Zhao, Y., & Wang, Y. Service-Level Decisions in a Platform Supply Chain Considering Brick-and-Mortar Retailers' Fairness Concerns under Consumer Channel Preference [J]. Journal of Industrial Engineering and Engineering Management, 2023, 37(05): 116-129.
[18] Wang, D., Dong, H., & Zhou, Y. Product Pricing and Coordination in a Supply Chain Considering Power Structure and Heterogeneous Channel R&D [J]. Journal of Systems Science and Mathematical Sciences, 2025, 45(03): 813-832.
[19] Geng, X. J., Tan, Y. L., & Wei, L. How Add-on Pricing Interacts with Distribution Contracts [J]. Production and Operations Management, 2018, 27(4): 605-623.
[20] Zhang, L., Chang, L., & Zhang, C. Manufacturer Encroachment Strategy and Pricing Sequence under Power Structure [J]. Chinese Journal of Management Science, 2025, 33(08): 331-339.
[21] Dai, B., Chen, Q., Wang, C., et al. Supplier Platform-Channel Encroachment Strategy under Demand Information Asymmetry [J]. Chinese Journal of Management, 2026, 23(02): 349-358.
[22] Keskin, N. B., Li, C. H., & Song, J. S. The Blockchain Newsvendor: Value of Freshness Transparency and Smart Contracts [J]. Management Science, 2025, 71(8).
[23] Li, Q., Zhang, S., Huo, B., et al. Research Developments in Supply Chain Signaling Theory: Perspectives, Trajectories, Debates, and Blind Spots [J]. Chinese Journal of Management Science: 1-24.
[24] Shao, S. S., Li, Y. T., Cheng, X., et al. Green Investment Strategies and Pricing Decisions in a Supply Chain Considering Blockchain Technology [J]. Sustainability, 2025, 17(14).
[25] Zhang, H., Wang, H., Zhu, F., et al. Supply Chain Sourcing Strategies under Event-System Uncertainty: The Mechanism of Information Asymmetry [J]. Journal of Industrial Engineering and Engineering Management: 1-13.