

Comparative Study on the Risk Assessment and Coping Strategies of Enterprise Supply Chain Disruptions in the Context of Policy Environment Changes

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ABSTRACT

Against the backdrop of increased global policy uncertainty and deepening domestic industrial transformation, changes in the policy environment pose multi-dimensional challenges to the stability of corporate supply chains. This work constructs a trinity analysis framework of "policy shock - risk assessment - response strategy" through cross-industry empirical comparative analysis. This framework systematically considers the transmission mechanism of policy changes in the supply chain procurement, production, logistics, sales and other links, and reveals the differentiated formation mechanism and response logic of supply chain interruption risks in different industries such as manufacturing, energy, and high-tech industries. The research results not only enrich the theoretical system of policy-driven supply chain risk management, but also provide scientific decision-making basis and practical guidance for enterprises to formulate differentiated risk response strategies and improve supply chain resilience.

KEYWORDS

Policy environment; Supply chain disruption; Response strategy; Risk assessment; Supply chain resilience

1 Introduction

1.1 Research background

Changes in policy environment such as global trade frictions, "dual carbon" goals, upgrades of environmental protection policies and improvements in logistics standards have become the core incentives for supply chain disruptions. The differences in the sensitivity of supply chain links in different industries (such as procurement, production, and sales) to policies lead to significant differentiation of risk transmission paths and response needs. For example, technology-intensive industries are significantly impacted by international technical policies, while resource-based industries are more sensitive to environmental protection policies. However, existing research focuses more on a single industry or policy, lacks systematic analysis of cross-industry comparison, and it is difficult to fully explain the complex relationship between policy impact and supply chain risks.

1.2 Research questions

(1) Policy Sensitivity Differences: Which links of the supply chains in different industries are most sensitive to trade, environmental protection, and industrial policies? What is the industry differentiation mechanism of policy sensitivity?

(2) Risk Assessment Logic: How do enterprises identify disruption risks caused by policies? What are the commonalities and characteristics of risk assessment among different industries?

(3) Strategy Evolution Path: What stages have the coping strategies gone through? What are the differences in the effectiveness of coping strategies?

1.3 Research significance

1.3.1 Theoretical significance

This study has constructed a cross-industry comparative analysis framework by integrating supply chain risk management theory, organizational information processing theory and industrial economics theory, and achieved theoretical innovation in the following aspects: First, break through the traditional single industry research paradigm and reveal the general laws of the interaction between policy environment and supply chain risks; Second, build a multi-dimensional analysis model for policy impact transmission to clarify the micro-mechanism of the formation of supply chain risks in different industries; Third, improve the policy-driven supply chain risk management theoretical system to provide a new theoretical perspective and analysis framework for subsequent research.

1.3.2 Practical implications

The research results have dual practical value for enterprises and policy makers: for enterprises, by revealing the differentiated logic of policy risk response strategies in different industries; for policy makers, the research conclusions

help optimize policy design, reduce the negative externalities of policy implementation, and promote the coordinated adaptation of industrial policies and supply chain development, thereby enhancing the overall resilience and international competitiveness of the industrial chain and supply chain.

2 Literature review and theoretical framework

Currently, the research on enterprise supply chain disruption risks in the context of policy environment changes has received much attention. Many studies have shown that trade policy shocks can significantly increase the "supply chain disruption" risk of enterprises. However, the irreplaceability of products, contract costs, and long-term cooperation foundations can enhance supply chain resilience (Ding et al., 2024). At the same time, some research has found that supply chain disruptions can reduce enterprises' selection of high-level foreign production technologies. There are also viewpoints suggesting that enterprises can cope with risks by strengthening supply chain resilience, optimizing the logistics network, and establishing emergency response mechanisms.

Despite certain achievements in existing research, there are still obvious shortcomings. Most existing research focuses on a single policy or industry, lacking research on the comprehensive impact of multiple policies and cross-industry comparisons. Future research needs to focus on strengthening the collaborative analysis of multiple industries and policies, deeply exploring the differences in coping strategies of different enterprises, and the collaborative paths between the government and enterprises, so as to improve the risk-resistance ability of the supply chain.

3 Research methods

Cross-industry comparative analysis is adopted, and multi-industry data is collected through structured interviews, focusing on policy-sensitive links, risk assessment tools and response strategies. The research sample covers three major industries: manufacturing, services and agriculture. Through qualitative content analysis and comparison, the "policy impact - risk assessment - response strategy" matrix is refined to reveal the path to build industry resilience.

4 Research

4.1 Differentiated impacts of policy environment on supply chains

4.1.1 Manufacturing shows dual sensitivity to technology dependence and export orientation

The manufacturing industry shows high sensitivity to trade and technical policies. For example, the import of key raw materials that technology-intensive enterprises rely on is susceptible to international policies, while export-oriented enterprises face rising costs and market shrinkage pressure due to tariff policy adjustments. The impact of environmental protection policies on the upstream procurement link of manufacturing industry is also significant, which may lead to fluctuations in raw material supply and increased compliance costs.

4.1.2 Service and agricultural industries exhibit link-specific impact characteristics

The service industry is affected by the cross-influence of multiple policies, such as trade policies affecting the procurement of imported raw materials, environmental protection policies increase operating costs, and the logistics network and compliance management capabilities need to be optimized simultaneously. Agriculture faces dual pressures from planting and processing end environmental protection policies. The long supply chain and complex links have exacerbated the complexity of risk transmission.

4.2 Commonalities and industry-specific characteristics of risk assessment

Under the backdrop of constantly evolving policy environments, enterprises' approaches to assessing supply chain disruption risks exhibit both commonalities and industry-specific differences.

4.2.1 Common methodologies

Enterprises generally use professional teams to monitor policy dynamics and evaluate risks in combination with quantitative indicators (such as the proportion of affected businesses and cost fluctuations). Tools such as risk matrix and supplier dependency analysis are widely used in risk identification and priority ranking.

4.2.2 Industry-specific differences

Based on the differences in industry characteristics, this study constructs a differentiated policy risk assessment dimension for three types of industries: manufacturing, service and agriculture:

- (1) Manufacturing: Focus on the supply and production and manufacturing links of raw materials, evaluate the constraints of environmental protection policies on supplier production capacity, and the impact of industrial policies on demand structure, and analyze the risks of capacity fluctuations and supply and demand imbalance caused by policy impact.
- (2) Service industry: Based on service characteristics, build a "policy-service process-customer experience" analysis model, evaluate the impact of multiple policies on service quality, and identify policy-sensitive nodes.
- (3) Agriculture: Incorporate the dual factors of policy and nature, build a "policy-climate-industry" interactive model, focus on the risk linkage between planting and processing, and simulate the risk evolution path under different policy situations.

4.3 Three-phase evolution of response strategies

Under the complex and dynamic policy environment, corporate supply chains face numerous disruption risks. To effectively address these risks, enterprises' response strategies evolve through two phases: **passive contingency**, **structural adjustments**. This progression reflects the gradual enhancement of risk management capabilities and the deepening of strategic approaches.

4.3.1 Phase 1: Passive contingency

In the initial stage, short-term emergency response will be the main focus, including establishing safe inventory (such as maintaining 1-3 months of raw material reserves), reserved emergency funds and backup production capacity to buffer supply interruptions caused by policy shocks.

4.3.2 Phase 2: Structural adjustments

Long-term strategies are shifting to supply chain reconstruction, such as manufacturing promoting domestic substitution of key raw materials and diversification of suppliers (maintaining at least 2-5 alternative suppliers), agriculture reduces the risk of a single source through diversification of production sites (cross-regional procurement), and the service industry optimizes the layout of logistics networks to improve flexibility.

5 Discussion

5.1 Industry differentiation mechanism of policy sensitivity

5.1.1 Demand side export dependence affects policy sensitivity

The difference of export dependence will directly lead to the differentiation of industry sensitivity to trade policy. "The uncertainty of Sino US trade policy will also significantly affect the production decision-making and investment layout of domestic enterprises or foreign-funded enterprises. Enterprises are faced with huge expected risks when making production and investment plans, and often adopt conservative strategies to reduce investment and expansion, resulting in weakening market vitality, which is not conducive to the transformation and upgrading of China's industry to the medium and high end." (Song Hao & Wang Teng, 2025)

5.1.2 The complexity of the supply chain affects policy sensitivity

The complexity of the supply chain plays a crucial role in the industry's sensitivity to policy changes. As the number of supply chain links increases, the transmission path of policy risks continues to expand. Industry with complex supply chains often involve multiple links, such as raw material procurement, production, logistics and sales, and are subject to policy restrictions in various aspects. Any linked policy changes, such as environmental protection policies, industrial policies and trade policies, can trigger chain reactions that will affect the overall operation of the supply chain. In contrast, industries with simple supply chain structures have fewer policies - sensitive nodes. They can more easily adjust local supply chain links to avoid policy risks, thereby reducing their overall sensitivity to policy changes.

5.2 Differences in the effectiveness of coping strategies

5.2.1 Efficient strategy

Early warning can help enterprises deal with risks in a timely manner and reduce losses. "Enterprise manufacturers can improve efficiency and risk management by applying emerging technologies such as artificial intelligence and optimizing supply chains to avoid supply chain disruption." (Song Hao & Wang Teng, 2025) By establishing a complete risk warning mechanism, setting reasonable monitoring indicators and early warning thresholds, and using multiple channels to collect information, enterprises can discover risks in advance and take measures to deal with them, effectively reducing the impact of policy risks on enterprises, thereby ensuring the stability of the supply chain.

5.2.2 Difficulties in data integration for small and medium-sized enterprises

In the process of improving the risk warning mechanism, small and medium-sized enterprises often face the problem of data integration. "In the context of globalization, enterprises are facing problems such as poor information acquisition and inefficient decision-making." (Ding et al., 2024). This is because small and medium-sized enterprises have limited resources and lack the ability to process professional data and improve information systems. It is difficult to effectively filter, sort and analyze massive and diverse data. In contrast, large enterprises may have stronger financial and technical strength to better solve data integration problems. The difficulty of data integration makes it impossible for small and medium-sized enterprises to make full use of big data to improve their risk warning capabilities, and are currently at a disadvantage in responding to policy risks, which reduces the effectiveness of the response strategy.

5.3 Theoretical contributions and practical implications

In the study of the risk of supply chain disruption caused by changes in policy environment, it is of great significance to construct a theoretical matrix of "policy impact intensity-supply chain complexity". As shown in TABLE 1.

Table 1 Policy Impact Intensity-Supply Chain Complexity

Environment	Peculiarity	Coping strategies
High policy shock intensity - high supply chain complexity	Enterprises are facing great challenges, such as trade protectionism, multinational suppliers and customers of manufacturing enterprises are affected, and procurement, production and sales are blocked	Establish a sensitive risk early warning mechanism, use big data and artificial intelligence monitoring, reconstruct the supply chain, increase supplier diversification, and explore emerging markets
High policy shock intensity - low supply chain complexity	Enterprises are directly affected by the policy, but it is relatively easy to deal with it, such as the export of a single product of local small enterprises is greatly affected by tariffs	Adjust the direction of production for domestic sales or explore new local markets, and negotiate procurement strategies with suppliers
Low policy shock intensity - high supply chain complexity	The complexity of the supply chain brings management costs, and policy changes trigger a chain reaction	Optimize the supply chain management process, strengthen supplier relationship management, and establish emergency reserves
Low policy shock intensity - low supply chain complexity	Businesses are less at risk	Pay attention to policy trends and use flexibility to capture development opportunities, such as expanding scale or expanding areas when industrial policies support

For enterprises, the establishment of dynamic models based on this theoretical matrix is a key measure to deal with risks. In the context of high policy impact intensity and high supply chain complexity, enterprises are facing great challenges. For example, when high tariffs are imposed in some areas where trade protectionism is prevalent, and enterprises have many supply chain links and scattered suppliers, enterprises should use dynamic models to monitor policy dynamics and supply chain data in real time, and plan raw material reserves, capacity adjustments and market expansion directions in advance.

6 Conclusions and prospects

6.1 Core findings

This study focuses on the risk of supply chain disruption in enterprises under the change of policy environment, and

through in-depth interviews and systematic analysis of multiple industries, key results have been achieved at both the theoretical and practical levels, and the limitations and future development directions of the research have also been clarified.

At the theoretical level, the theory of supply chain risk management and organizational information processing was successfully integrated, and a cross-industry comparative analysis framework was constructed. This study reveals the significant differences in policy sensitivity, risk assessment logic and coping strategies among different industries, and further analyzes the industry differentiation mechanism of policy sensitivity, that is, demand-side export dependence and supply chain complexity are the key influencing factors. These findings enrich the theoretical system of supply chain risk management and provide a new perspective and theoretical basis for subsequent research.

In practice, this study provides practical recommendations for enterprises. For enterprises, clarifying the sensitivity characteristics of their own industry policies is the basis for formulating effective response strategies. Technology-intensive and export-dependent enterprises should continue to pay attention to trade policy dynamics and actively promote the localization of key raw materials or the diversification of supply chains. Resource-based enterprises can reduce supply risks by diversifying production areas. At the same time, all enterprises should pay attention to the construction of risk early warning mechanism and use advanced technology to improve risk identification and response capabilities.

6.2 Research limitations

There are some limitations to this study. In terms of sample size, the number of selected enterprises is limited, and it is difficult to fully cover the supply chain situation of enterprises of all industries and sizes in response to changes in the policy environment, which may lead to bias in the research results. At the same time, the long-term effect of the policy impact is not tracked enough, and most of the enterprise cases only show the impact of policy changes in recent years, and fail to deeply explore the continuous effect and potential changes of the long-term implementation of the policy on the supply chain of enterprises.

6.3 Future directions

Quantitative models are essential for optimizing research methods. At present, most of the studies are qualitative analysis, and there is a lack of accurate quantitative evaluation. Quantitative models are introduced to construct econometric models that include policy, supply chain and enterprise performance indicators, which can accurately measure the impact of policy impact intensity and supply chain complexity on enterprises, and accurately evaluate the effect of coping strategies. With the help of big data analysis technology, it can mine policy, enterprise operation and supply chain data, monitor and predict risks in real time, provide scientific and accurate decision-making basis for enterprises and governments, and promote the transformation of supply chain risk management from experience-driven to data-driven.

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