



Policy Coordination and Supply Chain Resilience

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Abstract. Against the backdrop of global industrial chain restructuring and frequent policy interventions, the relationship between policy coordination and supply chain resilience has become a central issue in national economic governance. Based on data from Chinese A-share listed companies from 2017 to 2024, this study constructs a policy coordination index using textual analysis and employs fixed-effects models along with mediation tests to empirically examine the impact of policy coordination on supply chain resilience and its underlying mechanisms. The results show that policy coordination significantly enhances supply chain resilience, a finding that remains robust after a series of tests. Mechanism analysis indicates that policy coordination strengthens resilience through three pathways: raising total factor productivity, lowering institutional transaction costs, and fostering corporate innovation. Heterogeneity analysis further reveals that this effect is more pronounced in non-state-owned enterprises and high-tech industries. This research provides theoretical and empirical support for shifting the governance focus from “policy accumulation” to “policy coordination,” thereby promoting supply chain security through systematic governance.

Keywords: policy coordination; supply chain resilience; institutional transaction costs; total factor productivity

1 Introduction

In an era marked by frequent policy interventions by governments worldwide in response to global turbulence, a profound paradox has emerged: policies designed to stabilize the economy may inadvertently exacerbate supply chain fragility. When different policies, driven by departmental objectives, operate in isolation, their overlapping effects can create new macro - level uncertainties, trapping firms in a “compliance trap” and undermining their overall capacity to withstand shocks. This suggests that the core of the problem may lie not in the quantity or intensity of policies, but in the synergy and consistency among policy instruments.

This real-world contradiction reveals a theoretical gap in existing research. Although the literature on supply chain resilience is extensive, it often treats macro-level policies as static background or single variables, overlooking the “ecosystem” formed by policy interactions and its fundamental impact on the conditions that generate resilience.

Consequently, conventional research paradigms struggle to uncover the systemic role of “policy coordination” as a key governance mode.

Against this background, this study aims to bridge disciplinary divides by operationalizing “policy coordination” into a core, empirically testable variable and systematically examining its driving mechanisms on supply chain resilience. The central research questions are: Does policy coordination enhance supply chain resilience, and if so, how? Does its internal mechanism function through pathways such as strengthening system adaptability and optimizing collective action?

Based on the above research gap, this paper seeks to systematically investigate the impact of policy coordination on supply chain resilience through rigorous empirical analysis. Specifically, it constructs a composite indicator to measure the degree of policy coordination at the regional or industry level and utilizes firm-level or industry-level panel data to test the net effect of policy coordination on supply chain resilience. Furthermore, it delves into the underlying mechanisms of this impact, examining potential mediating channels such as “innovation drive,” and “resource allocation optimization.”

The expected contributions of this study are both theoretical and practical. Theoretically, it builds an integrative analytical framework from the perspective of “dynamic policy capability,” promoting a shift toward more refined empirical research in this field. Practically, it offers critical insights for policymakers: in a highly uncertain environment, the strategic focus for enhancing supply chain security should shift from “adding more policies” to “achieving synergy,” by constructing a policy system with aligned objectives and complementary tools, thereby systematically forging a resilient supply chain at a lower cost.

2 Literature Review

Existing research offers a substantial micro-foundation for understanding the drivers of supply chain resilience. Studies show that firm-level digital investment, data sharing, supply chain digitalization [1], and the development of new-quality productive forces [2] significantly enhance resilience, primarily through operational optimizations such as diversification, lower information costs, improved efficiency, and higher total factor productivity. Furthermore, corporate ESG performance [3] and state-owned capital participation [4] strengthen resilience by boosting transparency, reputation, financing access, and relational resources. Collectively, these works highlight that resilience building depends heavily on firms’ own capabilities and strategic choices.

Simultaneously, a growing strand of literature examines macro-policy effects, introducing the concept of “policy synergy.” Evidence confirms that when policy objectives are compatible, coordination can produce “ $1+1>2$ ” effects. For example, synergy between smart supply chain policies [5], big-data and low-carbon pilots, industry-academia-research policies [6], or tech-finance and local-debt reforms [7] yields stronger outcomes in resilience, productivity, digitalization, and innovation than stand-alone policies. These findings underscore the importance of policy alignment.

Yet a core paradox remains: if synergy is generally positive, why does frequent policy intervention sometimes increase vulnerability? Clues exist. Environmental

subsidies and tax incentives, for instance, may lack synergy and even encourage opportunistic behavior in green innovation [8]. Heterogeneity analyses also show that policy effectiveness varies with ownership, region, and industry, implying that synergy is not universally positive and may involve boundary conditions or negative mechanisms. Most literature tests the “synergy” hypothesis under ideal conditions, paying less attention to cases where conflicting objectives or contextual mismatch turn coordination into a “rigid constraint” that crowds out corporate resources and undermines resilience.

In sum, prior research leaves a key gap: while affirming the positive roles of firm capabilities and compatible policy coordination, it does not systematically explain when coordination fails or inhibits resilience. This study addresses that gap by treating policy coordination not as an invariably beneficial factor, but as a core explanatory variable with effects to be tested—focusing on its potential dual impact. Through mechanisms such as “policy signal–organizational attention coupling,” we aim to open the black box of how coordination can shift from “remedy” to “poison,” offering a more dialectical theoretical resolution to the practical paradox.

3 Research Hypotheses

Policy coordination enhances supply chain resilience by stabilizing institutional expectations and optimizing firm resource orchestration. When policy objectives conflict and signals are chaotic, firms face high institutional complexity, forcing them to expend substantial resources on compliance, which crowds out core resources otherwise available for supply chain development. High-level policy coordination constructs a stable, predictable institutional framework, creating valuable “institutional redundancy”—an inherent buffering and fault-tolerance capacity within the policy system that prevents firms from falling into strategic confusion due to sudden policy changes. A stable institutional environment releases firms’ attention resources, allowing them to refocus on long-term capacity building such as supply chain diversification and digital transformation. According to resource orchestration theory, policy coordination reduces institutional friction, helping firms more effectively identify, configure, and utilize resources, thereby redirecting resources previously dissipated in policy response toward strategic investments that enhance resilience, thus systematically strengthening the adaptive and recovery capabilities of the supply chain.

The promoting effect of policy coordination on supply chain resilience can also be realized through the pathway of “reducing institutional transaction costs and reshaping cooperation expectations.” A fragmented policy system significantly raises institutional transaction costs within the supply chain network, including information, negotiation, and monitoring costs, which discourages firms from making long-term, specific resilience investments and may even lead to a “prisoner’s dilemma.” In contrast, policy coordination provides clear and stable policy signals and regulatory frameworks, establishing a credible commitment mechanism that systematically reduces information asymmetry and compliance uncertainty, thereby compressing transaction costs. This not only encourages firms to build stable collaborative relationships and invest in relationship-specific assets but also promotes collective action across the network in risk-

sharing and capability sharing, thereby transforming resources dissipated in institutional friction into substantive investments that enhance the overall resilience of the system.

Furthermore, policy coordination can improve supply chain resilience by incentivizing exploration and empowering diversified innovation. Unlike traditional “picking winners” policy support, policy coordination focuses on cultivating a resilient innovation ecosystem. Through the mutual reinforcement of science and technology, industrial, and financial policies, it enhances the diversity, adaptability, and selectivity of the innovation system. This diversified policy support system encourages both breakthrough innovation and incremental improvement, emphasizes the leading role of core firms while nurturing the supporting capabilities of small and medium-sized enterprises. This enables supply chain firms to quickly find alternative solutions from a rich technology reservoir and diverse innovation entities when facing technological changes or external shocks, avoiding technological path dependence. By empowering the self-adaptive and self-organizing capabilities of the innovation ecosystem, policy coordination significantly enhances the dynamic adjustment and transformation/upgrading capacity of the supply chain in the face of uncertainty.

Accordingly, we propose:

H1: Policy coordination has a significantly positive impact on supply chain resilience.

4 Empirical Framework

4.1 Data Sources

This study employs data from Chinese A-share listed companies for the period 2017–2024. The following data cleaning procedures were applied: (1) removal of companies designated as ST or *ST and those delisted during the sample period; (2) exclusion of financial firms; (3) elimination of observations with obvious financial data anomalies; (4) deletion of samples with incomplete data in the reporting year; and (5) To mitigate the potential impact of extreme values on test results, continuous variables underwent trimming at the upper and lower 1% percentiles. All variable data were sourced from the CSMAR database and the China City Statistical Yearbook. Data processing and analysis were conducted using Stata 19.0.

4.2 Variable Definitions and Measurement

Policy Coordination (COG): Measured through textual analysis of provincial government work reports. We count keywords related to collaborative governance and normalize the frequency by the report's total word count to construct COG. Higher values indicate stronger governmental emphasis on policy coordination.

Supply Chain Resilience (Resil): Conceptualized across resistance and recovery dimensions. Resistance (Resis) combines a process measure and an outcome measure. Recovery (Recov) includes operational recovery and economic recovery. These sub - indicators are synthesized into composite indices using the entropy weight method.

Control Variables: Following prior literature, this study selects the following control variables: Revenue growth (Growth); Fixed asset ratio (FIXED); Inventory ratio (INV); and Management shareholding ratio (Mshare). All are measured following standard practices in the literature.

4.3 Model Specification

To test the impact of policy coordination on supply chain resilience, we employ a two-way fixed effects model, specified as follows:

$$Resil_{it} = \beta_0 + \beta_1 * COG_{it} + \sum \alpha_k controls_{it} + \varepsilon_{it} + \lambda_{ind} + \mu_t \quad (1)$$

The dependent variable Resil represents corporate supply chain resilience, measured using supply chain resistance (Resis) and recovery capacity (Recov). The independent variable COG represents the government's policy coordination objective-oriented variable. λ_{ind} , μ_t and ε_{it} refer to industry fixed effects, year fixed effects and random errors separately. i and t represent company and year, respectively. k indicates the number of control variables, β_0 represents the constant term, and β_1 denotes the coefficient of the independent variable. Furthermore, based on the theoretical analysis in this paper, we expect model (1) to be significantly positive.

5 Empirical Analysis

5.1 Descriptive Statistics

Table 1. Descriptive Statistics.

Variable	Obs	Mean	Std. Dev.	Min	Max
resil	44346	0.428	0.152	0.000	0.745
COG	44346	0.000	0.000	0.000	0.001
Growth	44326	3.650	643.275	-1.445	134607.06
Top1	44317	0.339	0.151	0.011	0.900
TobinQ	44346	2.051	2.180	0.611	259.146
FIXED	44346	0.200	0.157	0.000	0.971
Mshare	42369	14.705	20.253	0.000	268.714
INV	43970	0.139	0.131	0.000	0.940

The descriptive statistics are presented in Table 1. The mean of the independent variable, Policy Coordination (COG), is 0.000 with a standard deviation of 0.000, indicating a relatively low overall level of policy coordination across the sample firms with minimal variation among them. The dependent variable, Supply Chain Resilience (Resil), has a mean of 0.428 and a standard deviation of 0.152, suggesting that the sample firms' supply chain resilience is generally above average, with notable variation across firms. This variation may be associated with differing levels of policy coordination or stem from the combined influence of firm-specific characteristics and external environmental factors. Furthermore, the statistical properties of the control variables are largely consistent with prior studies, providing a solid data foundation for subsequent empirical tests.

5.2 Baseline Regression

Table 2 presents the baseline regression results for the effect of Policy Coordination (COG) on Supply Chain Resilience (Resil). As shown in column (1), which controls for year and industry fixed effects without including any control variables, the coefficient of COG is 10.0355 and significant at the 5% level. Upon incrementally adding control variables and adjusting fixed effects in columns (2) and (3), the coefficient of COG remains stable, ranging from 10.9566 to 11.2218, and stays statistically significant at the 5% level. This suggests a robust positive relationship between policy coordination and supply chain resilience.

In column (3) of Table 2, the coefficient of COG is 11.2218 (significant at the 5% level), which carries substantial economic significance. Specifically, it implies that a one - unit increase in policy coordination (COG) leads to an average improvement of approximately 11.2218 units in supply chain resilience (Resil). This clearly demonstrates the significant positive impact of policy coordination on supply chain resilience, providing strong empirical support for the research hypothesis.

The relationships between the control variables and supply chain resilience are generally in line with expectations. For instance, Top1 and Mshare show significantly negative effects, whereas TobinQ, FIXED, and INV exhibit significantly positive relationships. These findings align with prior research, supporting the soundness of the model specification and the reliability of the estimation results.

Table 2. Basic results: the effect of Policy Coordination on Supply Chain Resilience.

	(1) resil	(2) resil	(3) resil
COG	10.0355** (4.80)	10.9566** (4.72)	11.2218** (4.71)
Growth		0.0001 (0.00)	0.0001 (0.00)
Top1		-0.0888*** (0.00)	-0.0780*** (0.00)
TobinQ		0.0058*** (0.00)	0.0051*** (0.00)
FIXED		0.0301*** (0.00)	0.0448*** (0.01)
Mshare		-0.0001*** (0.00)	-0.0002*** (0.00)
INV		0.0119** (0.01)	0.0142** (0.01)
_cons	0.3736*** (0.01)	0.3610*** (0.00)	0.3752*** (0.01)
<i>N</i>	29235	27376	27376
<i>R</i> ²	0.029	0.039	0.046
adj. <i>R</i> ²	0.028	0.039	0.044
year	Yes	Yes	Yes
industry	Yes	No	Yes

Standard errors in parentheses;

* p < 0.1, ** p < 0.05, *** p < 0.01

5.3 Robustness Tests

To ensure the reliability of the baseline results, this study conducts a series of robustness checks across multiple dimensions (see Table 3). First, replacing the dependent variable with Supply Chain Resistance (Resis) yields a coefficient for COG of 31.5897 (significant at the 5% level), indicating that policy coordination also enhances resistance capacity. Second, re-estimating the model using a high-dimensional fixed effects estimator (reghdfe) produces a consistently significant COG coefficient (11.2218, $p < 0.05$), confirming the robustness of the baseline specification. Third, further incorporating corporate governance variables—such as the management fee ratio, the proportion of independent directors, and CEO duality—into the control set leaves the COG coefficient positive and significant (11.6439, $p < 0.05$), showing that the core finding is not sensitive to the expansion of controls. Fourth, restricting the sample to the post-2020 period, the COG coefficient rises to 23.5337 and becomes significant at the 1% level, suggesting that the resilience-enhancing effect of policy coordination is more pronounced in the recent environment of frequent external shocks. Finally, using one-period lagged supply chain resilience (F.Resil1) as the dependent variable to mitigate reverse causality concerns, the COG coefficient remains significant (9.9544, $p < 0.01$), indicating a persistent effect of policy coordination.

In summary, the positive impact of policy coordination (COG) on supply chain resilience remains statistically significant across tests involving alternative variable measurements, model specifications, adjustments to the control set, variations in the sample period, and steps to address endogeneity. This systematically confirms the robustness and reliability of the baseline regression results.

Table 3. Robust tests results.

	(1)	(2)	(3)	(4)	(5)
	resis	resil	resil	resil	F.resil
COG	31.5897** (14.88)	11.2218** (4.71)	11.6439** (4.77)	23.5337*** (7.35)	9.9544*** (3.85)
Controls	Yes	Yes	Yes	Yes	Yes
_cons	0.7465*** (0.02)	0.3754*** (0.00)	0.3525*** (0.01)	0.3682*** (0.01)	0.4042*** (0.01)
<i>N</i>	27376	27376	27037	15855	23394
<i>R</i> ²	0.047	0.046	0.047	0.048	0.053
adj. <i>R</i> ²	0.046	0.044	0.045	0.046	0.051
year	Yes	Yes	Yes	Yes	Yes
industry	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

5.4 Heterogeneity Analysis

To investigate the boundary conditions of policy coordination's impact on supply chain resilience, we conduct heterogeneity analyses across ownership and industry technological intensity (see Table 4).

By ownership, the effect is significant for non-state-owned enterprises (coefficient = 16.5402, $p < 0.01$) but not for state-owned enterprises. This likely reflects non-SOEs' greater sensitivity to policy signals, whereby coordinated policies lower compliance risks and transaction costs, directing more resources toward resilience.

By industry, policy coordination significantly enhances resilience in high-tech sectors (coefficient = 15.9638, $p < 0.05$) but not in non-high-tech industries. High-tech innovation relies on multi-dimensional policy support; coordination helps build a coherent innovation ecosystem, enabling resilience through technological diversification. Non-high-tech firms may respond more to individual policies.

In summary, the resilience-enhancing effect of policy coordination is stronger among non-SOEs and high-tech industries, shaped by ownership structure and industry traits. This supports differentiated, targeted governance.

Table 4. Sub-sample results.

Variable	Ownership		Industry	
	SOEs (1) resill	Non-SOEs (2) resill	High-tech (6) resill	Non-high-tech (7) resill
COG	1.6725 (6.88)	16.5402*** (6.08)	15.9638** (6.21)	2.1131 (7.11)
Controls	Yes	Yes	Yes	Yes
_cons	0.3748*** (0.01)	0.3759*** (0.01)	0.2399*** (0.06)	0.3901*** (0.01)
<i>N</i>	8004	19372	17602	9672
<i>R</i> ²	0.054	0.054	0.049	0.039
adj. <i>R</i> ²	0.050	0.053	0.048	0.035
year	Yes	Yes	Yes	Yes
industry	Yes	Yes	Yes	Yes

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

5.5 Mediation Mechanism Tests

To reveal the underlying pathways through which policy coordination (COG) enhances supply chain resilience, this study conducts mediation tests based on the theoretical analysis for three core mechanisms, with results presented in Table 5. The findings indicate that policy coordination strengthens the adaptive and recovery capabilities of the supply chain system through three parallel channels: significantly improving total factor productivity, reducing institutional transaction costs, and stimulating corporate innovation vitality.

Specifically, policy coordination boosts productivity by stabilizing institutional expectations and optimizing resource allocation, reducing the resource drain caused by policy uncertainty. It also cuts transaction costs through clear, stable policy signals that build credible commitments, lowering information asymmetry and encouraging long-term resilience investments and network collaboration. Furthermore, coordinated S&T, industrial, and financial policies foster a more diverse innovation ecosystem, promoting technological exploration and enhancing the supply chain's capacity to adapt dynamically.

In summary, the tests confirm not only the direct positive effect of policy coordination on resilience but, more importantly, delineate three micro-level transmission channels. These findings link macro-level governance with micro-level firm behaviors, offering empirical evidence on how policy coordination shapes economic resilience.

Table 5. Mediation Mechanism Test Results.

	(1) TFP FE	(2) cost	(3) Patent
COG	142.5280*** (53.55)	-7.0848** (3.17)	173.2326*** (63.92)
Controls	Yes	Yes	Yes
_cons	11.1678*** (0.08)	0.0714*** (0.00)	1.6905*** (0.10)
<i>N</i>	28519	27005	28360
<i>R</i> ²	0.173	0.049	0.229
adj. <i>R</i> ²	0.173	0.049	0.229
year	Yes	No	Yes
industry	Yes	No	Yes

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

6 Conclusions and Policy Implications

The findings offer two main policy implications. First, governance should shift from increasing policy quantity to enhancing inter-policy coordination and consistency. Establishing cross-departmental mechanisms can align objectives, reduce signal conflict, and create stable “institutional redundancy,” freeing corporate resources for long-term capacity building. Second, given the heterogeneous effects, targeted governance is needed—for example, coherent policy packages for non-SOEs and high-tech sectors to channel synergy into firm-level resilience.

In summary, building resilient supply chains requires a paradigm shift from “policy accumulation” to “synergistic governance.” A policy ecosystem with aligned goals, complementary tools, and coordinated implementation can systematically enhance the adaptive and recovery capacities of firms at a lower institutional cost.

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