



Role of Hazard Severity on the Effect of A Firm's Supply Chain Position on Time to Recall

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Honours Thesis

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Agenda



Introduction



Literature Review & Hypothesis



Methodology



Discussion



Conclusion



Data Analysis & Results

SAFETY

PROFIT

Introduction

- Product recalls are critical for protecting consumers from hazardous products
- A **shorter time to recall (TTR)** minimizes:
 - Consumer harm
 - Reputational and financial damage to firms.

Key Influencing Factors

- Supply chain position (e.g., manufacturer vs. retailer)
- Hazard severity of the crisis

The Nuance

- The effect of SCP on recall timing is **not straightforward**
- Recall decisions are shaped by both:
 - Firm characteristics (e.g., SCP, defect type)
 - Crisis characteristics (e.g., hazard severity)

👉 This study examines how **hazard severity moderates** the SCP–TTR relationship.

Research Question

How does **hazard severity** influence the relationship between supply chain position and time to recall?

Literature Review



Time to Recall (TTR)

- Time between sale and recall
- Shorter TTR → ↓ consumer harm
- Longer TTR → delay / strategic hesitation



Hazard Severity

- Measured by injuries, incidents or deaths
- High severity → ↑ risk & pressure
- Influences how quickly firms initiate recall decisions.



Supply Chain Position

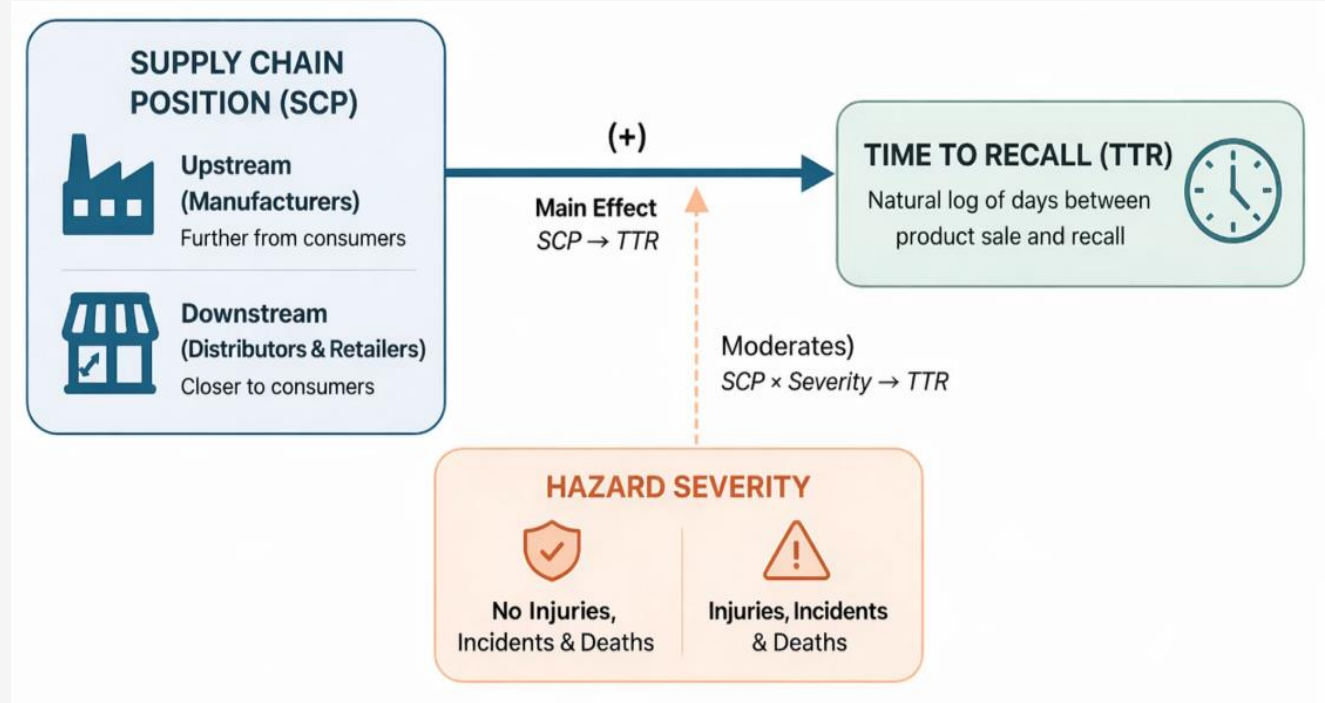
- **Upstream firms (manufacturers)**
 - Further from consumers → slower recalls
- **Downstream firms (retailers/distributors)**
 - Closer to consumers → faster response



Interaction between hazard severity and SCP

- Prior research examines independent effects of SCP and hazard severity
- Limited focus on their interaction

Conceptual Model & Hypothesis



Hypothesis

Hazard severity moderates the relationship between supply chain position and time to recall such that firms positioned upstream will exhibit longer recall times compared to downstream firms, and this difference will be bigger under conditions of high hazard severity than low hazard severity.

Conceptual Model

Time to Recall is depicted as the dependent variable. The independent variable is Supply Chain Position, and Hazard Severity is the moderator.

Methodology

Data Set

- U.S. toy industry
- Source: CPSC recall data
- Sample size: N = 400 products

Operationalization of DV, IV & the Moderator

Time to Recall (TTR)

- Log of days: sale → recall

Supply Chain Position (SCP):

- Categorical variable: manufacturer, distributor, or retailer

Hazard Severity:

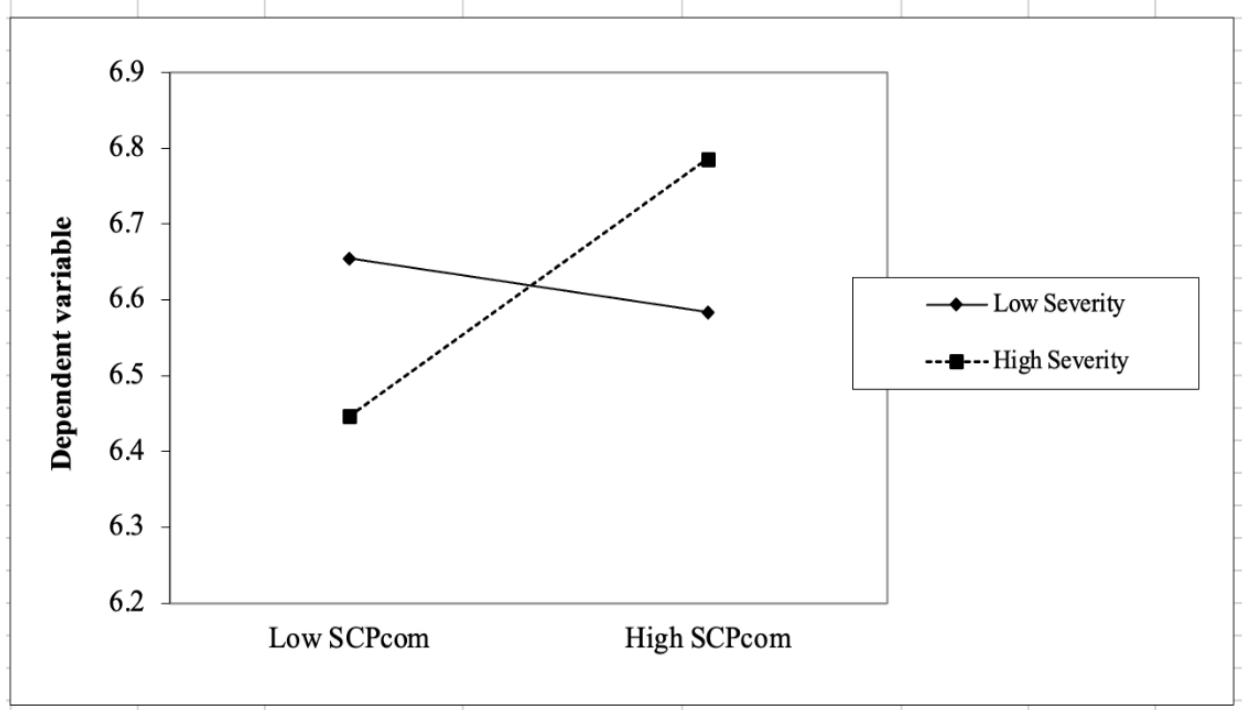
- 1 = High (incident, injury & death)
- 0 = Low (no incident, injury & death)

Control Variables

1. Number of Units Recalled
2. Product Price
3. Recall Experience
4. Defect Type
5. Firm Type
6. Year Dummies

Method Used: Ordinary Least Square (OLS) Regression

Data Analysis & Results



Moderating Effect of Hazard Severity and Supply Chain Position on Time-to-Recall.

Model 1: Controls

- Quantity → + **significant**
- Public company → - **significant**
- Design defect → + **significant**
- $R^2 = 0.135$

Model 2: Main Effects

- SCP → not significant
- Hazard severity → not significant
- $R^2 = 0.158$

Model 3: Interaction Effect

- SCP × Hazard Severity → + **significant** ($\beta = 0.411, p < 0.05$)
- $R^2 = 0.167$

Summary of Results

Overall, the results indicate that:

- Control variables such as quantity, public firm status, and defect type significantly influence recall timing
- The main effects of supply chain position and hazard severity are not significant
- However, their interaction is significant, supporting the study's hypothesis.

Discussion



Findings

- Relationship is conditional, may not direct
- SCP effect depends on hazard severity
- Low severity → minimal difference
- High severity → upstream firms delay more
- Hazard severity amplifies delays in high hazard



Theoretical Contribution

- Demonstrates interaction (moderation) effect
- Extends product recall literature
- Supports:
 - Behavioral Theory of the Firm
- **Recall decisions are conditional, not independent**



Managerial Implications

- Upstream firms → need faster recall systems
- Invest in early detection & crisis response
- Improve supply chain coordination
- Reduce delays in high-severity cases

Policy Implications

- Focus on high-severity recalls
- Monitor upstream firms more closely
- Enforce stricter recall timelines



Limitations

- Single industry (U.S. toys)
- Hazard severity as binary measure
- Cross-sectional data
- Operationalization of Time-to-Recall variable



Areas of Future Research

- Extend to other industries
- Growing role of media & regulators
- Examine voluntary vs involuntary or mandatory recalls
- Use detailed severity measures
- Explore additional moderators
- Study country-of-origin effects and their interaction with hazard severity and SCP

企業の責債性 CORPORATE RESPONSIBILITY



サステイのボリティ SUSTAINABILITY



Conclusion

Summary

- Examines how **hazard severity** shapes recall timing decisions
- Moves beyond direct effects to a **moderation perspective**

Key Insight

- Supply chain position alone may not determine recall speed
- Its impact becomes significant **under high hazard severity**

Overall Takeaway

- Recall decisions are **context-dependent and strategic**
- Firms respond not only to structure, but to **risk intensity and accountability**

Final Note

- Understanding these dynamics supports:
 - Safer products
 - Faster recall responses
 - More effective regulatory oversight

The background is a soft, pastel-colored illustration of a windowsill. On the left, a window with a wooden frame is visible. Several potted plants are arranged on the sill. On the far left, a large plant with broad, green, heart-shaped leaves is partially visible. Next to it is a tall plant with large, deeply lobed leaves in a dark brown pot. To the right of this are several smaller plants: two in light-colored pots, one in a small dark pot, and another in a light-colored pot. On the far right is a plant with long, thin, green leaves in a brown pot. The overall atmosphere is calm and cozy.

Thank You

Suchi:)