Product Recall: A Synthesis of Marketing Findings and Research Directions[1]

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ABSTRACT

Since 1994, marketing academics have accumulated a wealth of empirical evidence on product recall. However, the findings have not been integrated into a framework that can summarize the evidence and elicit theoretically interesting and managerially relevant questions for future research. The authors address this shortcoming. Specifically, they create a framework that summarizes the causes, consequences, and strategies of product recall. Next, they use the framework to identify descriptive facts and empirical generalizations that pave the path for a meta-analysis. Lastly, the framework helps the authors suggest six questions—two each on causes, consequences, and strategies—that future research can consider answering.

Keywords: review, research agenda, product-harm crisis, conceptual, product recall

1. INTRODUCTION

The U.S. federal government defines a recall as "an action taken by a manufacturer, or the government, to protect the public from products that may cause illness or injuries" (U.S. Government 2020, p. 1). Theoretically, a recall can be a signal of low quality (Connelly et al. 2011), an act of social responsibility (Hora, Bapuji, and Roth 2011), a disclosure of negative information (Freedman, Kearney, and Lederman 2012), an outcome of managerial myopia (Bendig et al. 2018), or a demonstration of learning or the lack thereof (Kalaignanam, Kushwaha, and Eilert 2013). These varied perspectives make recall a theoretically rich phenomenon. In addition, because a recall involves a firm's exposure to product liability laws and interactions with product regulators (Cavazos, Rutherford, and Burman 2018), it offers a unique opportunity for academics to develop theory on business-law and business-politics interfaces.

Since 1994 (specifically, Siomkos and Kurzbard [1994]), marketing academics have accumulated a wealth of empirical knowledge on recalls (Cleeren, Dekimpe, and Van Heerde 2017). Table A1 in the Web Appendix summarizes the empirical marketing research on product recall. Despite four decades of research, the findings have not been integrated into a framework. Such integration—when achieved—can (1) summarize accumulated knowledge and (2) yield theoretically interesting and managerially relevant questions for future research. This article aims to address this shortcoming by proposing a framework that integrates accumulated knowledge in terms of the causes, consequences, and strategies of recall (Figures 1A and 1B). Next, we use the framework to distill descriptive facts and potential empirical generalizations, paving the path for a meta-analysis. Last, we pose six substantive questions—two each on marketing-relevant causes, consequences, and strategies—for future research (Table A2 in web appendix).

2. A FRAMEWORK FOR EMPIRICAL MARKETING RESEARCH ON RECALL

Our review of empirical marketing articles on recall suggests that research has evolved in three streams—the causes of recalls, their consequences, and the firm strategies that might moderate the recall incidence → consequences link. Consistent with these three streams of recall research, we propose a *causes-strategies-consequences framework* (see Figure 1).

Figure 1: A framework for marketing research on product recall
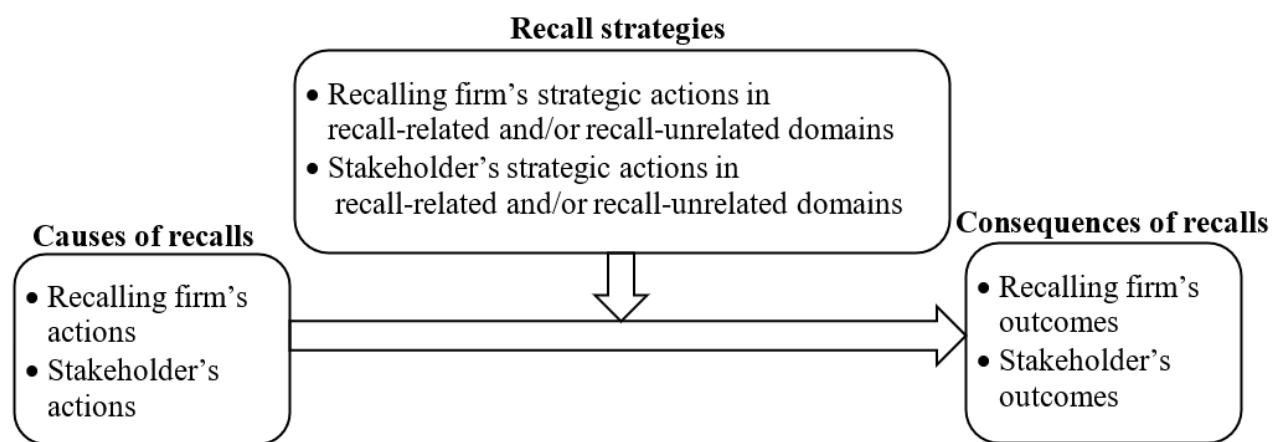
Causes of recalls: A recall can be caused by the focal firm's and/or its product-market stakeholders'[2] actions. Example of firm actions include marketing actions (e.g., Bendig et al.'s [2018] myopic marketing spending), and the deployment of marketing assets (Chakravarty, Saboo, and Xiong's [2022] marketing capabilities) and marketing personnel (Liu et al.'s [2023] presence of a Chief Marketing Officer). Nonmarketing actions include manufacturing (e.g., Kalaignanam, Kushwaha, and Eilert's [2013] shared product assets), strategic management (e.g., Kashmiri and Brower's [2016] strategic emphasis), finance (e.g. Bendig et al.'s [2018] share repurchase), or political activity (e.g., Giannetti and Srinivasan's [2022] lobbying). Examples of stakeholder's actions include product competition (e.g., Ball,

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[2] A firm's product-market stakeholders include its buyers, suppliers, rivals, product regulators, and strategic partners (Harrison, Bosse, and Phillips 2010).

Shah, and Wowak 2018), regulatory inspections (e.g., Ball, Siemsen, and Shah 2017), and consumer reports of product-harm incidents (e.g., Çolak and Bray 2016).

Several causes of recalls remain under-researched. For example, voluntary product recalls are managers' voluntary disclosure of negative information. Therefore, stakeholder actions that managers perceive as threats could be causes of voluntary recalls. For example, managers could perceive stakeholder activism—particularly one that targets lack of safety in a firm's products (e.g., Quintessential Capital Management 2021)—as a threat and may respond by initiating more recalls voluntarily (Connelly and Shi 2022). However, the alternative managerial response is equally plausible. Managers may become threat-rigid and suppress their voluntary recalls, lest they appear incompetent in the eyes of stakeholders and hurt their job prospects (Connelly and Shi 2022). In contrast to voluntary recalls, involuntary recalls indicate managers' lack of discretion (Ball, Shah, and Wowak 2018) and thus could be triggered by actions of stakeholders that have institutional power over managers (e.g., product regulators) (Eilert et al. 2018). These under-explored causes of recalls are fruitful avenues for future research.

Consequences of recalls: A second stream emphasizes the consequences of recalls on the recalling firm's product-market performance (e.g., Cleeren, Dekimpe, and Helsen's [2008] repurchase), stock-market performance (e.g., Chen, Ganesan, and Liu's [2009] short-term stock return), or societal outcomes (e.g., Kalaignanam, Kushwaha, and Eilert's [2015] number of injuries to the public). Although this stream has historically concentrated on the *negative* consequences of recalls, some academics have adopted an organizational learning view to examine positive implications of recalls (e.g., Kalaignanam, Kushwaha, and Eilert's [2013] product reliability). Further, a brand's recalls can impact outcomes for the recalling firm's other brands, for the parent manufacturer, and for other brands from the same country of origin (Giannetti and Srinivasan 2021). A firm's recalls can also impact its product-

stakeholders, such as buyers, suppliers, and rivals (Liu and Varki's [2021] negative spillover on rivals' stock return).

An opportunity awaits marketing academics to examine the consequences of recalls on the recalling firm's *buyers* and *suppliers*. Unlike rivals that may experience positive or negative spillover from the focal firm's recalls (Shi, Wajda, and Aguilera 2022), the focal firm's buyers and suppliers are more likely to be held guilty by association and thus stand to experience contagion from the focal firm's recalls. The contagion could be reflected in their product-market outcomes (Roehm and Tybout 2006) or financial-market performance (Zou and Li 2016). Despite the contagion in the eyes of stakeholders, buyers and suppliers could learn vicariously from the focal firm's recalls, and improve their product quality processes. Should this vicarious learning occur, one would expect the focal firm's buyers and suppliers to experience fewer product-harm incidents and recalls. Marketing academics could thus research not only the performance spillover but also learning spillover of recalls.

Recall strategies. A third and relatively less developed stream assesses the *strategies* that (a) a recalling firm can use to mitigate the negative consequences of recalls (e.g., Rubel, Naik, and Srinivasan's [2011] and Gao et al.'s [2015] advertising) and (b) its rivals can use to strengthen the positive spillover (e.g., Zhou et al.'s [2019] price discounting). These strategies could be related to the domain of recalls or unrelated to it. For example, once a firm becomes aware of a potential defect, it can expedite its decision-making process and expedite recall announcement, should the defect be confirmed (Astvansh, Ball, and Josefy 2022). Similarly, the recalling firm could acknowledge responsibility for the defective product or lower the recalled product's price to arrest the decline in the product's demand (Cleeren, Van Heerde, and Dekimpe 2013). Strategies outside the recall domain include adjusting marketing-mix variables (e.g., Rubel, Naik, and Srinivasan 2011). Similarly, manufacturers

of the recalled product's substitutes may reduce their prices, aiming to steal the recalled

product's sales (Zhou et al. 2018).

Again, multiple opportunities exist in this stream of research. For example, managers

know that a recall announcement would elicit a punitive reaction from shareholders and

consumers. Anticipating this penalty, they may frame the announcement strategically

(Graffin, Haleblian, and Kiley 2016), aim to manage the impressions of stakeholders and

attenuate the penalty. Similarly, the recalling firm's suppliers are likely to interpret the recall

as a threat (Shi, Wajda, and Aguilera 2022) and may undertake actions to distance themselves

from the recalling firm (Roehm and Tybout 2018). Alternatively, they may undertake

aggressive advertising to emphasize the superior quality of their offerings and thus mitigate

customers' unfavorable comparisons relative to the recalled product.

We next apply our framework to the empirical marketing research on recall and distill

descriptive facts and potential generalizations.

3. EMPIRICAL RESEARCH ON RECALL

4.1. Descriptive facts

We structure our descriptive facts on empirical recall research in marketing on two

dimensions: (1) empirical settings, and (2) theories used by this research.

The extant empirical evidence is highly skewed toward automobiles, food, and

consumer goods. Three articles (Hsu and Lawrence 2016; Kashmiri and Brower 2016;

Kashmiri, Nicol, and Arora 2017) have sampled recalls from a broader set of categories.

While Hsu and Lawrence (2016) used recall data for multiple product categories from U.S.

federal government's Search.USA.gov, Kashmiri and colleagues proxied recall by the KLD[3]

database's indicator of whether a firm-year experienced a product safety controversy. The

insight is that while the marketing discipline knows much about recalls of automobiles,

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[3] KLD = Kinder, Lydenberg, and Domini; a database for firm-year specific corporate social responsibility
ratings.

consumer goods, and food, we know little about recalls of other products such as drugs, medical devices[4], and biologics. Within automobiles, the exclusive focus has been on passenger cars, leaving academics and practitioners with no knowledge about recalls of motorcycles, buses, trucks, trailers, recreational vehicles, specialty vehicles, etc.—product categories that serve niche customer segments, such as leisure riders, organizational customers, and people with special needs (e.g., mobility impairment). Further, despite regulators from Europe, Canada, Australia, and New Zealand offering rich data, no marketing study has sourced data from these countries, leaving us with an exclusively U.S.-centric understanding of the recall phenomenon.

An eclectic set of theories has informed research on recall causes, consequences, strategies, and marketing mechanisms. Quality failure (e.g., Kalaignanam, Kushwaha, and Eilert 2013) is the most studied cause of product recalls, with signaling (e.g., Astvansh and Eshghi 2023) emerging as a novel perspective to examine recall announcements. With respect to consequences, studies of shareholder reaction (e.g., Chen, Ganesan, and Liu 2009) have relied on the efficient market hypothesis. Academics who have examined the sales effects of recalls have reasoned that a recall may lead consumers to infer that the recalled product and associated products are low quality. This quality inference and spillover lead to sales drop. Lastly, some academics (e.g., Kalaignanam, Kushwaha, and Eilert 2013) have framed recalls as an organizational failure that can facilitate learning, manifest in a lower incidence of recall in future. Strategy-oriented manuscripts have relied on the behavioral theory of the firm (Eilert et al. 2017), strategic response (e.g., Chen, Ganesan, and Liu 2009), crisis management (Liu, Shankar, and Yun 2017), and competitive reaction (Zhou et al. 2018) to identify strategies that can moderate the consequences of recalls. Lastly, marketing academics have proposed marketing myopia (Bendig et al. 2018) and capability improvement

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[4] Giannetti and Srinivasan (2022) is a welcome exception on medical device recalls.

(Chakravarty, Saboo, and Guiyang 2021) as mechanisms that underlie the recalls →

consequences link.

4.2. Potential generalizations

Despite multiple studies on recalls—particularly, in automobiles, consumer goods, and food categories—no meta-analysis exists on the causes or consequences of recalls, leaving managers and regulators with no empirical generalizations. Our review and the conceptual framework help us distill the following potential generalizations and set the stage for a future meta-analysis.

1. *Causes*: A firm's manufacturing decisions (e.g., product variety, plant variety) and supply chain choices (e.g., outsourcing, supplier concentration) are causes of recalls.

2. *Consequences*: A firm's recall announcements hurt its own and rivals' stock returns.

3. *Causes and consequences*: The recalling firm's media coverage, regulatory investigation preceding a recall, and product newness impact (a) the recalling firm's sales and stock return, and (b) the likelihood of a proactive (vs. reactive) recall strategy.

4. *Causes and consequences*: Rivals' marketing mix impacts the recalling firm's likelihood of a proactive recall strategy and the impact of the recall on the recalling firm's sales.

5. *Consequences*: A firm's recalls hurt its consumers' attitude and behavior towards the firm.

6. *Consequences*: A firm's recalls in the current period lower its likelihood of recalls in the following period.

4. RESEARCH DIRECTIONS

We use our framework to propose six research directions: two each on recall causes, consequences, and strategies. Our conceptual framework considers the focal firm and its stakeholders for causes, consequences, and strategies. However, in the interest of space and

coherence, we focus on directions that relate to the focal firm's causes, consequences, and strategies.

Table 1 summarizes the six topics and lists illustrative research questions for each. Table A2 offers details for each research direction. More specifically, it cites references to establish the theoretical importance and practitioner relevance of the direction proposed. It also suggests an appropriate theoretical lens, which enables us to propose three representative hypotheses and the relevant dependent variables (DVs) and explanatory variables (EVs). We also suggest data source(s) for each DV and EV.

Table 1: Potential Topics and Questions for Future Recall Research in Marketing

Broad Topic	Example Research Questions
Marketing representation at organization levels and product recalls	How and why do the representations of the marketing function at the board level, C-suite, and lower management impact a firm's recall decisions and outcomes? Do marketing representations at various organization levels complement or substitute each other with respect to recall decisions and recall outcomes?
Business-to-business marketing relations and recalls	How and why do a manufacturer's outsourcing and/or offshoring of the manufacturing of a product component impact its speed of remedying the products recalled due to a defect in the focal component? How do characteristics of the buyer-supplier network impact the postrecall change in the relationship between a recalling buyer and its at-fault supplier (that is, the supplier that manufactured the defective component that caused the recall)?
Shareholder reaction to recall announcements	What characteristics of a recall announcement lead shareholders to *reward* the recalling firm? How can the recalling firm use framing and impression management tactics to mitigate shareholders' reaction to its recall announcements?
Consequences of recalls on trade credit	In the wake of recalls, what actions can a manufacturer undertake to restore its buyer's confidence in the quality of the manufacturer's products and thus reduce its sales on credit? Do a manufacturer's recalls cause a decline in its credit purchases? If yes, does the decline happen because suppliers perceive a drop in the demand for the manufacturer's products, or because suppliers perceive the manufacturer to be less creditworthy? How can the manufacturer mitigate such supplier perceptions?

Recall communication strategy	How much communication of a recall is enough? For example, should a firm issue a press release or post a message on its social media pages, or do both? Should the firm's choice of communication channel depend on the size of recall and/or the severity of the defect? Does extensive communication help arrest the damage to the firm's reputation in the aftermath of recalls?
Recall announcement strategy	Is there an optimal time to recall? That is, is a firm better off not recalling too early, or not delaying the recall beyond a threshold? Should the firm partner with the regulator in its announcement of the recall? Should the firm adopt a regulatory program that requires the firm to expedite remedy, while being assured that the regulator is less likely to press civil penalties against the firm? Does disclosing information about the defective component and its manufacturing plant help lower investors' informational disadvantage and thus mitigate their punitive reaction to the recall announcement?

RQ #1 on (Lack of) Marketing's Representation as a Cause of Recalls: Is a nonuniform representation of the marketing function across different levels of the organization associated with higher incidence of recalls, longer time to recall, and lower rate of remedy of recalled products?

Marketing academics have documented that the stronger a firm's marketing function's representation at the C-suite, the more the firm's number of new-product announcements (Kashmiri and Mahajan 2017), the more profitable the firm (Feng, Morgan, and Rego 2015), and the higher the firm's value to shareholders (Feng, Morgan, and Rego 2015). That is, the marketing discipline knows the positive outcomes of marketing's representation at the C-suite. How and why does the marketing function's representation across the various levels of the organization—i.e., the board, C-suite, and lower levels of the organization—impact firm's occurrence and management of recalls (Kashmiri and Brower 2016; Giannetti and Srinivasan 2022; Liu et al. 2023)?

We reason that *uniform* representation of the marketing function throughout the organization would make the firm more customer oriented, which in turn will boost the firm's

emphasis on product safety (Kashmiri and Brower 2016; Giannetti and Srinivasan 2022). The emphasis may lower the number of recalls and the time to recall (Liu et al. 2023) and expedite the rate at which the firm remedies the recalled products. Conversely, a nonuniform representation of the marketing function would impede customer-oriented mindset, recall decisions, and recall outcomes. Such evidence, if provided, would attest to the value of marketing function in suppressing negative events and the societal outcomes thereof. Future research may consider testing our suggestions and thus offer a novel contribution to the literature on the value of a firm's marketing function.

RQ #2 on Buy-versus-Make Decision as a Cause of Recalls: Does a product manufacturer's decision of buying versus making a product component impact its incidence of recalls triggered by defects in the focal component? Does the decision impact the rate at which the manufacturer is able to remedy the recalled products?

When a firm recalls a product, the defect is often in a specific component of the product. The recalling firm may have purchased the defective component from a supplier or manufactured the component by itself (Astvansh, Ball, and Josefy 2022; Astvansh and Eshghi 2022). The firm may choose to buy (rather than self-manufacturer) the component because the supplier may specialize in manufacturing the focal component and thus sell the component at a lower cost. However, the firm will cede its ability to control the quality of the component. In contrast, the make decision will allow the firm greater control, but the firm may lack the specialization for manufacturing the focal component. The dilemma poses theoretically interesting and managerially relevant questions for the recalling firm and its supplier. Marketing academics can leverage the rich buyer-supplier relationship theory to determine how and why the buy (make) decision may impact the firm's recall occurrences and outcomes.

RQ #3 on Consequence of Recalls on Shareholder Reaction: Why and when can the recalling firm's shareholders react positively to a recall? How can a firm use this knowledge to mitigate shareholder reaction to recall announcements?

Most marketing studies have reported that—on average—a recalling firm's shareholders react punitively to its recall announcement (e.g., Chen, Ganesan, and Liu 2009). However, some studies have documented insignificant (e.g., Eilert et al. 2017), or even a positive reactions (e.g., Salin & Hooker [2001] report 6.06% stock return to a recall). Among those that have reported a punitive reaction, the magnitude varies from −.24% (Chang and Chang 2015) to −17.36% (Govindaraj, Jaggi, and Lin 2004). Lastly, some event studies (e.g., Liu, Shankar, and Yun [2017] in their web appendix) have reported the number of recalls that received a positive reaction and the number that received a penalty from shareholders. Marketing academics may consider exploring whether positive reactions to recall announcements are (1) an artifact of the event study's data and design, (2) caused by the recalling firm's strategic framing and/or timing of the recall announcement (Mukherjee et al. 2022). If evidence suggests that shareholders could be biased by the recalling firm's framing and/or timing of the announcement, managers may leverage this evidence to strategically frame and time their recall announcements.

RQ #4 on Consequences of Recalls on Credit Sales and Credit Purchases: Do a manufacturer's recalls compel it to sell more (and purchase less) on credit than in cash?

Manufacturers routinely allow their organizational buyers to receive the former's offerings in the present and pay for them later. This practice is called trade credit—or more exactly, credit sale for the manufacturer and credit purchase for its buyer (Astvansh and Jindal 2022; Frennea, Han, and Mittal 2019). While a credit sale reflects on the manufacturer's balance sheet as receivables, a credit purchase appears on the buyer's balance sheet as payables. The theory of trade credit positions the manufacturer's credit sale as a

signal of the quality of its offerings (Ng, Smith, and Smith 1999). By extension, if the quality

of the manufacturer's offerings drops—as happens when the manufacturer initiates recalls—

the manufacturer may need to strengthen its signal, and thus raise its credit sales. Increasing

credit sales can hurt the manufacturer's credit ratings, which may lower its supplier's

willingness to extend trade credit to the manufacturer (Astvansh and Jindal 2022). That is,

recalls hurt the manufacturer's trade credit in not only downstream relations but also their

upstream counterparts. Future research may test this double whammy and thus offer a novel

contribution at the intersection of business-to-business (B2B) marketing and trade credit.

RQ #5 on Recall Communication Strategy: How can a recalling firm strategically

leverage social media to inform social media users of the recall, while mitigating their

negative evaluations of the firm?

Firms face a dilemma when deciding how and when to notify the affected customers

(Federal Register 2019). Issuing a press release or a social media message can alert a larger

segment of customers, thus limiting public harm and showcasing corporate responsibility.

Alternatively, such mass communication may unnecessarily cause anxiety among customers

and cause investors to anticipate substantial potential loss (Chen, Ganesan, and Liu 2009).

The order of notification poses similarly thorny issues. Notifying the retailers first and the

customers next may signal superior management of the recall but may increase the public's

exposure to defective products and the recalling firm's risk of lawsuits. The opposite order,

however, can leave customers dissatisfied and confused. Future research can weigh the

alternatives' pros and cons and suggest the best strategy.

RQ #6 on Recall Announcement Strategy: At what stage of the defect discovery and

confirmation process should the firm notify the affected customers?

The answer to the question can offer novel theoretical insights into the firm's

decision-making *process*. Further, one can model the intermediate steps of the process to

understand which steps shorten and which ones lengthen the time to recall—that is, the number of days a firm takes between becoming aware of a potential defect and recalling the products with that defect. Our analysis of the U.S. Food and Drug Administration's (FDA's) recall database—that we obtained through a Freedom of Information Act (FOIA) request—suggests that the time to recall varies from 0 to 895 days, with a mean of 61 and standard deviation (SD) of 136 days. We hypothesize that customers' and investors' punitive responses will vary systematically with the time taken to issue the recall notice. Too prompt a recall may lead to customer anxiety, particularly if the remedy is unavailable. Similarly, a recall too late may increase consumer harm and elicit product liability lawsuits and regulatory penalties. Another strategy could be to use a regulatory program (e.g., CPSC's Fast-Track Program) that allows the firm to expedite the remedy, while mitigating chances of regulatory penalties. Lastly, a viable strategy might be to disclose information about the defective product component and the manufacturer of the component. Such disclosure could attenuate investors' informational disadvantage and signal the firm's transparency and competence in managing the recall.

5. CONCLUSION

The framework, descriptive facts, potential generalizations, and questions for future research can help academics, managers, and regulators grasp the state of knowledge on product recall. At the same time, they would know what aspects of this phenomenon require further empirical analysis.

Our review has limitations that suggest at least three directions for further reviews. First, we list six potential empirical generalizations but do not undertake a meta-analysis. Future research can overcome this limitation by meta-analyzing the consequences of recalls on outcomes in the product market and financial market. Second, we suggest research directions with respect to the focal firm and do not consider the firm's stakeholders. For

example, data on product-harm incidents involving a firm's products are available almost in real-time in regulatory databases. A firm's activist stakeholders could read the database and identify impending negative news. They could thus pressure the firm's managers to reveal safety defects, leading to an increase in the firm's number of voluntary recalls. Future research could consider listing a firm's stakeholder actions as causes for the firm's recalls.

Similarly, future research could consider consequences of a firm's recalls on the firm's stakeholders or strategies that these stakeholders could take to strengthen positive spillover and/or weaken negative spillover. Third, we do not review other related yet distinct negative events that theoretically overlap with product recall—e.g., data breach, service failure, ethical misconduct, and brand scandals. Future research could address this limitation by considering these other negative events that organizations face, and help identify corrective actions in response to or anticipation of these failures (e.g., service recovery). Such a review can offer a more generalizable framework of causes, consequences, and strategies for a broader set of negative marketing events. In summary, we hope our research represents a useful stepping-stone for much needed further inquiry on product recall.

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Product Recall: A Synthesis of Marketing Findings and Research Directions

WEB APPENDIX A

Table A1: Empirical Research on Product Recall in Marketing Journals

Notes: DV = Dependent variable, EV = Explanatory variable.

CAR = Cumulative abnormal return. CEO = Chief Executive Officer. CSR = Corporate social responsibility. R&D = Research and development. HHI = Herfindahl-Hirschman index. UGC = User-generated content. FE = Fixed effects. ROA = Return on assets. NHTSA = National Highway Traffic Safety Administration. CPSC = Consumer Product Safety Commission. FDA = Food and Drug Administration. PMA = Postmarket application. 510(k) = Name used for a firm's application to the U.S. FDA for market approval of an incrementally innovative medical device. PVAR = Panel vector autoregression.

Marketing journals = *Management Science | Journal of Business Ethics | Journal of Business Research |* journals that have either "Consumer," "Marketing," "Brand," or "Promotion" in their name.

CNS = Consumer Needs & Solutions, EJM = European Journal of Marketing, IJCS = International Journal of Consumer Studies, IJRM = International Journal of Research in Marketing, IJMR = International Journal of Marketing Research, IMR = International Marketing Review, JAMS = Journal of the Academy of Marketing Science, JBM = Journal of Brand Management, JBE = Journal of Business Ethics, JBR = Journal of Business Research, JCA = Journal of Consumer Affairs, JM = Journal of Marketing, JMChannels = Journal of Marketing Channels, JMComm = Journal of Marketing Communications, JMR = Journal of Marketing Research, JPBM = Journal of Product & Brand Management, JPM = Journal of Promotion Management, MKSC = Marketing Science, ML = Marketing Letters, MS = Management Science

Citation and Descriptors	Variables	Relevant Finding(s)
Astvansh and Eshghi (2023) *JBR* *Constructs*: Signaling *Sample*: 612 vehicle recalls, initiated by 14 vehicle manufacturers from 2009 to 2019 *Unit of analysis*: Recall *Model*: Cross-sectional regression	DV: $CAR_{[-2,0]}$ EV: Duration of regulatory investigation, supplier (vs. manufacturer) defect, and market age of the recalled product-lines *Controls*: *Recall level*: Recall volume, defect severity, recall scope *Recalling firm level*: Size, profit, leverage	On average, a recall elicits a $-.22\%$ reaction from the recalling firm's shareholders. The duration of the regulatory investigation aggravates, whereas market age of the recalled product-lines attenuates the shareholder penalty. Whether the defective component was manufactured by the recalling manufacturer or another firm does not impact the penalty.
Bendig, Willman, Strese, and Brettel (2018) *JM* *Constructs*: Myopic marketing *Sample*: Recalls in the United States of general consumer goods, 2008-2013. 804 firm-year observations *Unit of analysis*: Firm-year (*i,t*) *Model*: Fixed effects panel regression	*DV*: Recall incidence$_{i,t+n, \text{ where } n = 1,2,3}$ *EV*: Share repurchase$_{i,t}$, myopic marketing spending$_{i,t}$ *Controls*: *Recalling firm level*: Age, income, number of employees *Industry level*: Technology turbulence (R&D expenses-to-sales), market turbulence (SG&A expenses-to-sales), competitive intensity (HHI)	A firm's myopic marketing spending—greater than expected intensity of earnings (ROA ÷ AT) but lower than expected intensity of marketing ({XSGA − XRD} ÷ AT) and intensity of R&D (XRD ÷ AT)—increases the firm's number of recalls in the $t + 2$ (but neither in $t + 1$ not $t + 3$). If a firm repurchases it shares (versus it does not), its number of recalls increases in $t + 2$, but neither in $t + 1$ nor $t + 3$.
Borah and Tellis (2016) *JMR* *Constructs*: Spillover *Sample*: Automobile recalls in the United States, January 1, 2009, through April 15, 2010. 48 models (or nameplates) by four brands (Chrysler, Honda, Nissan, and Toyota)	*DV*: CAR, sales volume *EV:* Advertising content (apology, promotion, leasing) *Controls*: *Recall level*: UGC, publicity	Negative UGC about a car model's defects spills over to models from the same brand but across segments, and to models from rival brands. The spillover is strongest between brands from the same country and stronger from a more dominant to a less dominant brand.

Unit of analysis: Recall *Model*: PVAR		If a recalling brand apologizes in its advertisements, the spillover becomes stronger for both the recalling brand and its rivals. Negative UGC hurts the rival brand's sales volume and stock return.
Byun, Duhan, and Dass (2020) *JBR* Constructs: Sample: 20,342 purchase transactions of 200,000 loyalty card members of a retailer in six stores. 31 product recalls across 31 categories, 2011-2013. Of the 200,000 customers, 1,919 were "regular" customers—that is, they had purchased the recalled product at least once in the three months before the date of recall. Of the 1,919 customers, 1,191 bought the recalled product at least once in the three months after recall. That is, 728 did not buy any product from the retailer after the recall. Unit of analysis: Customer Model: Logit	*DV1*: Whether the customer purchased the recalled product at least once in the three months after the initiation of the focal recall *DV2*: Time to repurchase *EV*: Recall occurrence *Controls*: *Customer level*: Loyalty with the recalled product, shopping habit, promotion sensitivity *Recall level*: Severity and public announcement	High (vs. low) proportion of the customer's spending on the recalled product raises (a) the odds that the customer will repurchase the recalled product postrecall and (b) the time to repurchase. The stronger the shopper's purchasing habit, the (a) lower the likelihood of the customer purchasing the recalled product postrecall, and (b) the shorter the time to repurchase. The higher the proportion of items purchased at a discounted price, the (a) lower the likelihood of the customer purchasing the recalled product postrecall and (b) the shorter the time to repurchase.
Byun and Shammari (2021) *JBR* *Constructs*: CEO narcissism, CEO structural power, ownership power *Sample*: 319 firm-year observations, spanning 84 consumer goods firms, 2006-2013 *Unit of analysis*: Firm-year *Model*: Logit regression	*DV:* Whether the firm initiated a recall in a year (binary) *EVs*: CEO narcissism (a composite of four items: the prominence of the CEO's photograph in the firm's annual report, the same measure but for press releases, CEO's cash compensation divided by the cash compensation of the second-highest paid executive, same ratio for the noncash compensation), structural power (composite of the ratio of inside directors, CEO tenure, and CEO duality), ownership power (a sum of a standardized CEO shareholding ratio and whether the CEO is a founder), and age *Controls*: Categories of number of the years of CEO experience; firm size, age, leverage, profitability, investment growth, R&D expense ratio, CSR, and industry operations	Each of CEO narcissism, CEO structural power, and CEO age lowers the likelihood of the firm initiating a recall in a year. CEO ownership power raises the likelihood. Each of CEO ownership power and CEO age aggravates the negative effect of CEO narcissism on likelihood of recall, whereas CEO structural power does not moderate the effect of COE narcissism on recall likelihood.
Chen, Ganesan, and Liu (2009) *JM* *Constructs*: Strategic response (proactive vs. passive)	*DV1*: CAR$_{[0,0]}$ *DV2 and EV*: Timing of recall initiation (before or after any harm incident)	*Proactive* recalls (those that are announced before any report of safety incidents) have a negative mean

Sample: 153 recalls in the United States of general consumer goods, 1996-2007 *Unit of analysis*: Recall *Models*: Event study, regression	*Controls*: *Recall level*: Recall volume, hazard *Recalled product level*: Market age of recalled products *Recalling brand level*: Does recalled brand use company's name? *Recalling firm level*: Reputation, size, liability *Industry level*: Product category	abnormal return of −.59%, which is statistically significant. *Passive* recalls (those that are announced after at least one report of safety incidents) have a mean AR of .097%, which is statistically insignificant. Recall strategy mediates the effect of recall on stock return. Surprisingly, hazard has a positive effect on return to recall. Recall volume does not matter. Nor do characteristics of the recalled product (whether it is branded, price, and market age) and those of the recalling firm (reputation, size, liability). The firm's corporate reputation lowers the likelihood of a firm choosing proactive (over passive) recall. Recall volume and market age of the recalled product also decrease this likelihood.
Cleeren, Dekimpe, and Helsen (2008) *JAMS* *Constructs*: Branding *Sample*: Kraft Foods recall of its two brands of peanut butter (Kraft and Eta) in Australia in 1996 *Data*: Observational *Unit of analysis*: Recall *Model*: Regression	*DV*: Household's time to first post-recall purchase of the recalled brand *EV1*: Ad spending by the recalling brand *EV2*: Ad spending by the rival brand *Controls*: *Brand level*: Loyalty, familiarity, category usage	A household's pre-recall loyalty (market share) toward a recalled brand marginally increases the household's likelihood of purchasing the recalled brand. However, its buffering effect diminishes over time. Pre-recall familiarity marginally lowers a household's post-recall repurchase likelihood of the recalled brand. A household's category usage increases the repurchase likelihood. Own advertising increases the repurchase likelihood for the premium brand (Kraft) but does not matter for the value brand (Eta). Rival brand's ad spending decreases the repurchase likelihood for the recalled brand.
Cleeren, Van Heerde, and Dekimpe (2013) *JM* *Constructs*: Branding *Sample*: 36 consumer good recalls in the United Kingdom and 24 in the Netherlands, 2000-2007 *Unit of analysis*: Recall	*DV*: Change in a brand's market share and change in a household's category purchase *EVs*: Recalling brand's ad spending, price, negative publicity received by the recall, whether the brand accepts blame *Controls*: *Recall level*: Scope (number	Recalling brand's increase (post-recall minus pre-recall) in advertising (relative to the five rivals) increases the brand's market share. The positive effect is (1) stronger if the recall receives higher negative publicity, and (2) weaker if the brand acknowledges blame.

Models: Event study, regression	of brands recalled) *Recalling brand level*: Loyalty, price premium, national brand or private label *Recalling firm level*: Country *Industry level*: Competition density	The brand's change in price has positive but insignificant effect on the brand's market share. However, the effect is lower (and significant) if the brand acknowledges blame. Neither of the following two recall variables has a main effect on market share: Negative publicity received by the recall and whether the recalling brand accepts blame An increase in category advertising increases category purchases. The positive effect is (1) higher if the recall receives higher negative publicity, and (2) lower if the brand acknowledges blame. An increase in category prices decreases category purchases. The negative effect is stronger if the recall receives higher negative publicity. Negative publicity received by the recall does not have a significant main effect on category purchases, whereas blame increases purchases.
Cockrell, Friske, Voorhees, and Calantone (2024) *JBR* *Constructs*: Innovation radicalness *Sample*: 184 vehicle make-years, comprising 29 makes from 18 firms over a 11-year period (years not reported) Unit of analysis: Model:	*DV*: Number of recalls a make initiates in a year *EVs*: Innovation radicalness of the make's models; # of models the make manufactures in a year <u>Controls</u>: *Recalling make-year level*: Financial slack, age, advertising spending, reliability, price, make-versus-buy	The innovation radicalness of a make's models in a year, and the make's model-line breadth (# of models the make produces in a year) each raises the likelihood of recall in the following year.
Eilert, Jayachandran, Kalaignanam, and Swartz (2017) *JM* *Constructs*: Motivation-ability *Sample*: 381 NHTSA investigations of automobile defects in makes, 1999-2012. Of these, 201 investigations yielded a recall *Unit of analysis*: Recall *Models*: Event study, regression	*DV1*: $CAR_{[-2,2]}$ *DV2* and *EV*: Time to an involuntary recall <u>Controls</u>: *Recall level*: Harm severity, size *Recalling brand level*: Diversification, reliability, experience, publicity, price tier *Recalling firm level*: Size, the region of headquarters	Problem severity increases time to and involuntary recall. Brand reliability decreases it whereas neither brand diversification nor past recall intensity impacts it. Brand reliability and past recall intensity each weakens whereas brand diversification strengthens the positive effect of problem severity on time to an involuntary recall.

Gao, Xie, Wang, and Wilbur (2015) *JM* *Constructs*: Organizational crisis management *Sample*: 105 recalls in the United States from six automobile manufacturers (Chrysler, Ford, General Motors, Honda, Nissan, and Toyota), 2005-2012 *Unit of analysis*: Recall *Models*: Event study, regression	*DV*: CAR$_{[0,1]}$ *EV*: Change in ad spending before announcing a recall *Controls*: *Recall level*: Harm severity, voluntary or influenced, recall size, level of publicity (negligible, local, national, supranational) *Recalled product level*: Age (newness) of the recalled product, average quality of the recalled products *Recalling firm level:* number of recalls in the previous year, size, debt, reputation, change in ad spending of unaffected product lines	A recall decreases the recalling firm's stock return by −.89% in the [0,1] window. On average, decreasing ad spending before initiating a recall strengthens the shareholder penalty. This effect is greater when the recalled product is new, while it does not vary by hazard. On average, increasing ad spending does not matter. However, increasing ad spending when the recalled product is new mitigates the negative return to recall. Increasing it when the hazard is high aggravates the return. Relative to a manufacturer-initiated recall, a NHTSA-initiated recall has a more negative return. Recall publicity makes more negative the return. Recall size does not matter.
Germann, Grewal, Ross, and Srivastava (2014) *ML* *Constructs*: Strategic response (proactive vs. passive) *Sample*: One lab experiment, involving 133 students 55 recalls in the United States from seven automobile manufacturers (Chrysler, Daimler, Ford, General Motors, Honda, Nissan, and Toyota), 2005-2012 *Unit of analysis*: Recall *Models*: Event study, random-effects panel regression	*DV*: CAR$_{[-1,0]}$ *EV1*: Harm severity *EV2*: Brand commitment *Controls*: None	A recall has a marginal negative (−.37%) effect on stock return of the recalling firm in the [−1,0] window. High brand commitment attenuates negative return to a low-severity recall but augments negative return to a high-severity recall.
Giannetti and Srinivasan (2021) *ML* *Constructs*: Consideration set formation, accessibility, diagnosticity, manufacturer's country of origin *Sample*: 124 "large" car models in the United States, 2006-2015. Price should be under $150,000. Recalls should affect >= 15,000 vehicles.	DV: Sales volume of the focal model in the focal month *EVs*: The number of recalls by (1) sibling models from the parent *make* in the previous 12 months, (2) the number of recalls by the focal model's *manufacturer* in the previous 12 months, and (3) the number of recalls in the previous 12 months by *other manufacturers* with the same country of origin as the focal manufacturer	The number of recalls of sibling models (i.e., the same make) in the past 12 months *decreases* the number of sales of the focal model. The focal model's advertising and price *mitigate* the negative effect. The number of recalls by the parent manufacturer does *not* affect sales of the focal model.

Unit of analysis: Model-month, model-year *Model*: Random-intercepts mixed regression	*Moderators*: Focal model's advertising spending in the previous year and its price in the previous month *Controls*: The number of car recalls in the United States in the previous year, the horsepower, size, weight, and luxury of the focal model	The number of recalls by other manufacturers from the same country-of-origin as the focal manufacturer *increases* the sales volume of the focal model in the focal month. The focal model's advertising and price *weaken* the positive effect.
Giannetti and Srinivasan (2022) *JAMS* *Constructs*: Corporate lobbying *Sample*: 696 firm-years, comprising 86 U.S. public firms in six medical device SIC4 codes, 2005-2018 *Unit of analysis*: Firm-year *Model*: Panel data regression withy year FEs	*DV*: Number of recalls EV: Stock of lobbying spending directed at the FDA Mechanism: Emphasis on product safety (whether the firm has ISO 13485 quality certification) Moderators: Focus on radical (vs. incremental) innovation (= # of PMAs ÷ (#PMAs + #510ks)}, whether the CEO's functional background is in marketing nr nonmarketing, functional background in R&D (or non-R&D) *Controls*: *Firm specific*: Stock of lobbying directed at entities other the FDA, firm size, extent of labor use, ROA, Tobin's q, intensity of stock of 510(k)s, intensity of stock of PMAs, R&D intensity, advertising intensity, slack resources, financial distress, democratic power *CEO specific*: CEO tenure, CEO stock options pay, CEO age	A firm's lobbying lowers its emphasis on product safety, which leads to an increase in its number of recalls. The firm's (1) focus on radical (vs. incremental) innovation attenuates, (2) marketing (vs. nonmarketing) CEO aggravates, and (3) R&D CEO attenuates the negative effect of emphasis on product safety on number of recalls.
Hoffer, Pruitt, and Reilly (1994) *JCA* *Constructs*: None *Sample*: 108 automobile recalls in the United States, 1984-1986 *Unit of analysis*: Recall *Model*: Regression	*DV*: Owner response rate to notices of car recalls (fraction of contacted owners who repaired their vehicles by the end of the first year) *EVs*: *Recall*: Product age (newness), harm severity, recall size, *WSJ* publicity *Controls*: *Firm level*: Region of headquarters	Vehicles two or more model-year-old are less likely than those one model-year-old to be returned for repair. Vehicles with high (vs. low) severity defects are more likely to be returned. Vehicles from Japanese or European (vs. U.S.) manufacturers are less likely to be returned.

		Publicity in *WSJ* does not matter.
Hsu and Lawrence (2016) *IJRM* Constructs: Branding Sample: 26 recalls of drugs and cosmetics, 26 recalls of electric or electronic appliances, 31 recalls of food and consumables, and 11 recalls of toys and small appliances in the United States, December 2010 to February 2012 Unit of analysis: Recall Model: Regression	DV: $CAR_{[-1,1]}$ EV: Participation in the recall specific UGC Controls Recall level: UGC (volume, valence, growth rate, breadth), whether the recalling participated in the UGC, recall size, harm severity Recalling brand level: Equity Recalling firm level: Size (market value of equity), operating margin, and financial leverage Industry level: Product category	Recall has a negative and significant (−.453%) effect on the recalling firm's stock return in the [−1,1] window. UGC moderates the effect. Specifically, volume, valence, and growth rate make the return more negative. Breadth makes it less negative. Company involvement mitigates. Brand equity mitigates the effects of volume, valence, and breadth, but does not moderate the effect of growth rate. Recall volume, hazard severity, firm size, and operating margin do not matter. Leverage mitigates.
Huang and Radighieri (2021) *JPM* Constructs: Post-recall market signal, resource advantage, expectations Sample: 93 recalls by six automobile manufacturers (Toyota, Honda, Nissan, General Motors, Ford, and Volkswagen), 2011-2015 Unit of analysis: Recall Model: Regression	DV: Recalling manufacturer's sales volume EV: Severity of recall = 1 if the CAR to recall is below median, and 0 otherwise Moderator: Change (estimated minus actual) total ad spending by the recalling manufacturer, spending on the recalled model, and spending on the nonrecalled model from the same make Intermediate DV: Sales volume of the recalled model	None of the key regressors affect the change in the manufacturer's sales. These regressors are recall severity, change in ad spending by the manufacturer, change in ad spending of the recalled model and the nonrecalled model An increase in the ad spending by the nonrecalled model increases sales volume of the recalled model. This main effect weakens when the recall is severe (CAR to the focal recall exceeds median CAR in the sample).
Javadinia, Gill, and Jayachandran (2023) *JAMS* Constructs: Recall environment, information salienc e Sample: 497 large recalls initiated in the United States by six vehicles manufacturers, 2007-2019 Unit of analysis: Recall Model: Cross-sectional regression with year FEs	DV: $CAR_{[-2,2]}$ EV: Recall environment = z-scores of weighted five recall variables at industry level = size, scope, publicity, hazard, and recency Moderators: Recalled product's age (year of recall minus year of the recalled model, averaged over all recalled models). Reputation for reliability (averaged over all models, *Consumer Reports*' "overall problem rate" in the three years prior to the year of recall) Controls: Recall specific: Size, scope, severity, recall strategy, and recall publicity	The more salient the industry-specific recalls are to the focal firm's shareholders, the less punitive their reaction to the focal firm's recall. Reputation strengthens the above positive effect, whereas age of the recalled product weakens it.

	Recalling brand-specific: Diversification *Recalling firm-specific*: Past number of recalls, and number of recalled vehicles, size, debt, ROA, #days between focal recall and its predecessor	
Johnson-Hall (2017) *JMChannels* *Constructs*: Failure, learning, signaling, rare events *Sample*: 322 food recalls in the United States, 2009-2012 *Unit of analysis*: Recall *Model*: Regression	*DV*: Number of recalls by a firm in a year *EVs* *Recall level*: Internal vs. external locus of defect (internal vs. external), FDA influenced, number of product specifications impacted (scope), number of states in which the defective product has been sold, how long the product has been sold, product type (fresh, frozen, shelf table). Recalls that are initiated by the FDA are marginally more likely to receive a procedural- or process-based corrective action, or a change in supplier. *Recalling firm level*: Number of manufacturer recalls, number of supplier recalls, number of rivals' recalls, size, status, international distribution	Relative to an internal recall, a major supplier recall has a lower probability of corrective action, whereas a nonmajor supplier recall has a higher probability. The probability is higher if the FDA (vs. food producer or supplier) discovers the defect and if the volume is high. Neither the number of recalled product specifications nor the number of states in which the product was distributed matters. Firm size and pathogen as contamination type (versus not pathogen) decreases the probability. Status (public versus private) does not matter.
Kalaignanam, Kushwaha, and Eilert (2013) *JM* *Constructs*: Learning *Sample*: Recalls in the United States by 27 automobile *makes*, 17 years, 1995-2011 *Unit of analysis*: Make-year *Model*: Regression	*DV1*: Change in future number of injuries between $t + 1$ and t *DV*: Change in future recall frequency, measured by the number of recalls between $t + 1$ and t *DV*: Future harm incidence *EVs*: Change (between t and $t − 1$) in the make's recall magnitude—that is, the number of vehicles recalled ÷ the number of vehicles sold by the make in $t − 1$ *Mediator*: Reliability of the recalled make's vehicles, measured by the number of problems) *Moderator*: Shared product assets = z-score of four components: number of manufacturing plants, number of platforms, range of engine sizes, and number of models *Controls*:	Change in recall magnitude is negatively associated with the changes in (1) the future number of injuries and (2) the future number of recalls. Future product reliability mediates the above effects. Change in shared product assets and change in brand quality moderate the effect of change in recall magnitude on change in future product reliability.

	Recalling firm level: Consumers' perceived quality of the brand, number of recalls in a year, number of units recalled in a year, financial slack, and financial performance	
Kalaignanam, Kushwaha, and Nair (2017) *CNS* *Constructs*: Manufacturer-supplier relationship *Sample*: Recalls in the United States in 2012 by 13 automobile makes, involving 12 component systems *Unit of analysis*: Manufacturer-year *Model*: Regression	*DV*: Future perceived reliability of the product *DV*: Future recall incidence *EV:* Characteristics of the buyer manufacturer's network for the component *Controls*: *Recalling firm level:* The number of models offered by the manufacturer, sales volume in the previous year, R&D intensity	Density of a manufacturer's network (#ties between the manufacturer's suppliers divided by maximum #ties) and betweenness centrality in the manufacturer's network increases the future product reliability and future recall magnitude (#units recalled). Reliability mediates. Strength of design interface moderates the effects of density and structural holes on future product reliability.
Kashmiri and Brower (2016) *JBR* *Constructs*: Agency theory *Sample*: 116 S&P firms, 2006-2011 *Unit of analysis*: Firm-year *Model*: Regression	*DV*: Product safety controversy *EV*: CMO presence, diversification, globalization, number of new products *Mediator:* Strategic emphasis on product quality *Controls*: *Recalling firm level:* Size, age, prior performance, R&D intensity, leverage, stock ownership by board members, founding family presence	Percentage of stock owned by directors and executives, presence of founding family on board or executive team ow owning 5% equity, and presence of a CMO increases the likelihood that a firm would be ISO 9001-certified. This emphasis on quality decreases likelihood of the firm being involved in a product safety concern in the same year.
Kashmiri, Nicol, and Arora (2017) *JAMS* *Constructs*: Upper echelons *Sample*: 395 U.S. public firms, 2006-2010 *Unit of analysis*: Firm-year *Model*: Regression	*DV*: Product safety controversy *EV*: Globalization, diversification *Controls*: *Recalling firm level*: The narcissism of its CEO, equity component in the CEO's compensation *Industry level*: Identity (1-digit SIC code)	CEO narcissism increases the firm's competitive aggressiveness, which increases the probability of the firm being involved in a product-harm crisis in a year. Customer orientation and power of the marketing department attenuate the effects.
Liu, Liu, and Luo (2016) *JM* *Constructs*: Organizational crisis *Sample*: 170 recalls in the United States of general consumer goods, 1996-2007 *Unit of analysis*: Firm-year *Model*: Regression	*DV*: CAR *DV* and *EV*: Remedy choice (full vs. partial) *Controls*: *Recall level*: Recall size, harm severity, proactive vs. passive recall, recall by a retailer	Product value (# or vehicles recalled × price) decreases whereas product hazard increases the likelihood that a firm would choose full (over partial) remedy. CEO cash compensation and tenure decrease whereas equity incentive increases the likelihood.

	Recalled product level: Price of the recalled product, age of the recalled product *Recalling brand level:* Company-named brand *Firm level:* CEO compensation, (cash, equity incentive, and tenure), reputation, recall experience, size, *penIndustry level*: Product category	
Liu, Liu, Luo, and Wang (2023) *ML* *Constructs*: CMO impact, proactive recall strategy *Sample*: 380 CPSC recalls initiated by a 134 U.S. public firms from 2001 to 2014. Of the 380 recalls, 230 are initiated by a firm that had a CMO in the year when the recall was initiated. *Unit of analysis*: Firm-year *Model*: Probit cross-sectional regression for DV1; negative binomial for DV2; linear regression for DV3	*DV1*: Whether the recall was initiated before any incident of harm was reported to the CPSC *DV2*: Number of harm incidents reported to the CPSC by the date of recall initiation *DV3*: $CAR_{[0,3]}$ <u>Controls</u>: *Recall specific*: Severity level; total cost = ln(number of recalled units × unit price),; sell time, number of prior recalls by the focal firm in the sample, the number of news articles on the recall *Recalled product-specific*: Whether the recalled product bears the company's name in its brand name *Recalled firm-specific*: COO presence, size, leverage, financial slack, income, advertising, R&D, whether the recalling firm is the manufacturer, Fortune reputation score	A firm with a CMO takes less time to initiate recalls and incurs fewer product-harm incidents. Shareholder reaction to a recall announcement is more punitive for a firm with a CMO than a firm without a CMO.
Liu and Shankar (2015) *MS* *Constructs*: Spillover *Sample*: Observational data of vehicle recalls (NHTSA) at car model (i.e., nameplate) level *Unit of analysis*: Firm-year *Model*: PVAR	*DV*: Change in monthly sales of the focal car model and other models under the same parent *DV*: Ad spending for the focal model (e.g., 2019 Corolla) and its parent (Toyota) *EV*: Number of vehicles recalled by the focal make in the focal month <u>Controls</u>: *Recall level*: Harm severity, publicity *Brand level*: Perceived quality, price	The effect of a recall on sales is more negative when the recall receives more media attention, has more severe consequences, and the recalled product has higher perceived quality. A recall decreases the recalled brand's advertising spending. However, the effect is more negative for the recalled brand than for the parent brand. The recalled brand's advertising becomes less effective and so does the advertising of other brands within the same parent brand.

	Firm level: Number of units recalled per month	
Liu, Shankar, and Yun (2017) *JM* *Constructs*: Organizational crisis *Sample*: 280 automobile recalls in the United States, 2005-2015 *Unit of analysis*: Recall *Model*: OLS regression	*DV*: CAR *EV*: Ad spending at model level, ad content (branding vs. promotional), recall completion *Controls*: *Recall level*: Recall size, voluntary or influenced, number of blog posts, publicity (number of articles in the print media), number of recalls in the past six years *Recalling brand level*: Reliability, number of products, model-level ad spending *Recalling firm level*: Labor intensity, R&D intensity, prior year's sales, number of franchised dealerships, number of products, financial leverage, market-to-book ratio	A recall decreases in the (−2,2) window the recalling firm's stock return by −.69%, which is statistically significant. Recall volume (#units recalled) makes more negative the stock return to a recall in the short- and long-terms. Recalling firm's advertising spending on branding aggravates the effect on short-term return but mitigates the effect on long-term return. Ad spending on promotion mitigates the short-term effect but aggravates the long-term effect. Recall initiation does not matter in the short-term. But voluntary (versus involuntary) initiation mitigates the long-term effect. Rate of post-recall remedy also makes the effect less negative in the long-term.
Liu and Varki (2021) *JBR* *Constructs*: Corporate product reliability, market value *Sample*: 105 major recalls by one of six public car manufacturers (Toyota, GM, Ford, Chrysler, Honda, and Nissan) *Unit of Analysis*: Recall *Model*: OLS regression	*DV:* Rival's CAR(0,1) to a recall by a car manufacturer DV2: CAR to a rival's preannouncement of a new product *EV:* Corporate product reliability (source: *Consumer Reports*) *Controls:* Recalling and rival firm-level: advertising spending and R&D spending, number of brands, the number of recalls in the prior three months, the number of news articles about the focal manufacturer's recalls in the period between the focal recall and recall by any rival, the number of news articles about the focal rival's recalls in the period between the focal recall and recall by any rival, the number of blog posts about the focal recall, newness of the recalled vehicles	The higher the recalling car manufacturer corporate product reliability, the more negative the CAR for the rival firm. The rival's CPR attenuates the negative effect. The competition in the rival's product market and the recalling manufacturer's product market (e.g., in 2013, Ford competed with Chrysler in two product markets of sedan and minivan, but with Honda in five markets of sedan. SUV, truck, compact, and minivan) does not moderate the effect. If the rival preannounces a new product: (a) the recalling manufacturer's CPR decreases the rival's CAR to a preannouncement, and (b) the rival's CPR attenuates the effect.
Ma, Zhang, Wang, and Li (2014) *IJMR* *Constructs*: Spillover, similarity, dominance *Sample*: Survey (13 items) of 2,145 vehicle owners in China before (year 2008; 4,439 responses), during (end of	*DV*: Consumer's perceived value from purchase of cars from 14 rival brands (rival of Toyota) *Controls*: *Recalling brand level*: Customer-perceived value	The researchers study the product-harm crisis involving Toyota's unintended acceleration defect in 2009-2010. They study the effect of the recall on Chinese consumers' perceived value (four dimensional-variable) from cars sold by 14 other brands (a product category-level DV). They find that pre-crisis and during

March 2010; 2,688 responses), and after (December 2010 and January 2011; 2,145 responses) the product-harm crisis involving Toyota's unintended acceleration defect *Unit of analysis*: Respondent *Model*: Regression	*Recalling firm level*: Manufacturer's country of headquarter	crisis, emotional value was most important to consumers, followed by functional performance, social value, and perceived value. However, post-crisis, functional performance became the most important dimension, followed by emotional value, perceived cost, and social value.
Mackalski and Belisle (2015) *JBM* *Constructs*: Spillover, brand ecosystem, similarity, dominance *Product category*: Automobiles *Sample*: Land O'Lakes 2003 recall of its salted stick butter. Sales of Land O'Lakes brand in three related categories, sales of private labels, and sales of four national brands in related categories in two affected cities (Chicago and Minneapolis) and two unaffected cities (Boston and Los Angeles). Four weeks in the pre-recall period and four weeks in the post-recall period. *Unit of analysis*: Respondent *Model*: Difference-in-differences	*DV*: Sales volume *EVs*: Ad spending, price promotion, couponing *Controls*: *Recalling brand level*: Similarity with the recalling brand, private label or national brand	The negative sales effect of Land O'Lakes butter recall spilled over to other brands from Land O'Lakes for related products (margarine, butter blends, and vegetable spreads and sprays). The recall hurt the sales of margarine sold by private label. The effect lasted only in the week immediately following the recall and not in the later three weeks. The recall had no effect on the sales of margarine sold by any of the four rival brands (Parkay, Blue Bonnet, Parmalat, and I Can't Believe It's Not Butter).
Mafael, Raithel, and Hock (2022) *JAMS* *Constructs*: Customer satisfaction, brand equity, and remedy *Product category*: Consumer goods (CPSC) *Sample*: 159 recalls by 60 brands from January 2008 to February 2020 *Unit of analysis*: Recall *Model*: PSM	*DV*: CSAT *EVs*: Remedy *Moderators*: Brand equity and failure severity	Brand equity and failure severity moderate the effect of remedy on CSAT.
Majid and Bapuji (2018) *IMR* *Constructs*: Outsourcing, responsiveness, outsourcing *Sample*: Recalls in the United States by 12 automobile makes (Acura, Audi, BMW, Cadillac, Chevrolet, Dodge, Ford, GMC, Honda, Toyota, and Volkswagen), 2002-2010	*DV:* Time to recall *Controls*: *Recall level*: Time to recall (recall date - manufacturing date), and size *Recalling brand level*: Market share	Car manufacturers headquartered outside the United States take longer than U.S. manufacturers to initiate a recall. Sourcing parts from the United States or Canada shortens the time-to-recall for manufacturers located headquartered outside the United States.

Unit of analysis: Recall *Model*: Regression	*Recalling firm level*: Assets, number of employees, reputation, headquarters in the U.S. or outside, percentage of content manufactured by the U.S. suppliers, percentage manufactured by foreign suppliers	Sourcing parts from outside the United States and Canada lengthens the time-to-recall for manufacturers located in the United States.
Matos and Rossi (2007) *IJCS* *Constructs*: Negative information, negative publicity, involvement *Sample*: Survey of students (study 1) and non-students (study 2) in Brazil about their perception toward newspaper report of a defect in cars of a fictitious company *Unit of analysis*: Respondent *Model*: Regression	*DV*: Judgment and behavioral intention *EVs:* prior CSR, perceived danger, perceived firm responsibility, involvement with the recall message <u>*Controls*</u>: *Recall level*: Consumer's involvement with the message, perceived danger, existing customer *Recalling firm level*: Prior CSR, blame attributed	Following newspaper report of a defect in a company's cars, consumers judge the company more favorably when they perceive it as higher (versus lower) on CSR, less favorable when they attribute more (versus less) blame to the company, and more favorably when they own (versus do not own) a car from that company. CSR has the highest effect size among all predictors. The following variables do not affect the judgment: product involvement, knowledge, message involvement, and perceived danger. Behavioral intention as DV: Owning a car from the company, message involvement, and judgement improve behavioral intention, whereas perceived danger diminish it. Other predictors do not matter.
Muralidharan, Hora, and Bapuji (2022) *JBR* *Construct*: Time to recall, crisis management *Sample*: 833 recalls of toys initiated by 445 firms in the United States, 1988-2018 *Unit of analysis*: Recall *Model*: OLS regression	*DV:* Time to recall = natural log of the number of days between a product's first sale and its recall *EVs:* Hazard severity = high (1) if the recall notice mentions at least one incident, one injury, or one death, and low (0) otherwise (334 recalls have high hazard and 499 have low hazard) Recall experience = sum of the discounted number of recalls by the focal firm in each of the past 10 years Natural log of the average selling price of the recalled product Design defect (1) or manufacturing defect (0) <u>*Controls:*</u> Log of the number of units recalled; whether the recalling firm is a toy manufacturer, distributor, or retailer; public (1) or private (0)	Recall experience decreases time to recall when the defect is less (vs. more) severe (no harm incident or harm) Time to recall is longer for design (vs. manufacturing) defect when the defect is more (vs. less) severe (has caused at least one harm incident or harm). Time to recall is longer for expensive products when the defect is more (vs. less) severity.
Noack, Miller, and Smith (2019) JBE *Construct*: Reputation	*DV*: $BHAR_{[0,60]}$, and long-term CAR *EV*: Event visibility (#news articles on the focal recall in [0,7]), event magnitude	#news articles on recall and $CAR_{[-1,1]}$ each is negatively associated with $BHAR_{[0,60]}$.

Sample: 197 recalls by 168 public U.S. firms from 58 SIC4 codes, 1999-2009 *Unit of analysis*: Recall *Model*: Cross-sectional regression	(CAR$_{[-1,1]}$), CSR intensity (#CSR activities in [0,60]), CSR timing (#days between recall and first CSR activity after recall), and CSR frequency (average #days between consecutive CSR activities) <u>*Controls*</u>: *Recalling firm-specific:* Size and #recalls in the past	CSR (intensity, timing, frequency) each weakens the negative effect of CAR on BHAR.
Pagiavlas, Kalaignanam, Gill, and Bliese (2021) *JM* *Construct*: Digital marketing *Sample*: 296 recalls that were active before and after the NHTSA's "Save Cars Save Lives" direct marketing campaign ($1 million spent on sponsored ads on Google, Facebook, etc.) in January 2016 *Unit of analysis*: Recall *Model*: Regression	*DV*: Consumer recall compliance *EV*: Time since the start of the NHTSA's digital marketing campaign <u>*Controls*</u>: *Recall level*: Media coverage, average age of recalled models, time needed to repair the defective component	The NHTSA's direct marketing campaign increases the number of vehicles repaired by 20,712 per recall. The digital marketing campaign is more effective for recalls with high media coverage and older models, and less effective for recalls that require longer time to repair.
Pupovac, Carrillat, and Michayluk (2021) *EJM* *Constructs*: Slicing versus chunking, slack *Sample*: 378 large recalls initiated by five firms (Ford, General Motors, Honda, Nissan, and Toyota) in the United States from 2006 to 2017 *Unit of analysis:* Recall *Model*: Probit and cross-sectional linear regression	*DV1*: Whether a recall is sliced (versus chunked) *DV2*: CAR$_{[-2,2]}$ *EVs for DV1*: Firm slack, firm size, firm reputation, and number of vehicles recalled *EV for DV2*: Whether the firm sliced the affected vehicles	The larger the firm, the lower its likelihood of slicing the set of affected vehicles into different recalls. Firm R&D, firm reputation, and number of affected vehicles each increase the firm's likelihood of slicing. Slicing elicits a sharper penalty than chunking.
Raithel, Hock, and Rafael (2023) *JAMS* *Constructs*: Recall effectiveness, reputation *Sample*: 338 CPSC recalls initiated from January 2001 to December 2013 *Unit of analysis*: Recall *Model*: Fractional probit regression	*DV*: Recall effectiveness = the number of corrected units ÷ the number of affected units *EVs*: Whether the remedy is full (or partial), incident likelihood = (natural log of the number of safety incidents reported to the CPSC before the recall initiation) ÷ (the natural log of the recalled units), reputation (*Fortune*) <u>*Controls*</u>: *Product level*: Price, sell time, product relevance, product registration	Full (vs. partial) remedy raises recall effectiveness, whereas firm reputation lowers its. Incident likelihood does not impact.

	Recall level: Recall volume hazard level, media attention, investor response	
Raithel, Mafael, and Hock (2021) *JPBM* *Construct*: Product failure, remedy *Sample*: 60 consumer goods brands' 159 recalls, initiated between January 2008 and February 2020 *Unit of analysis*: Recall *Model*: Cross-sectional regression	*DV*: Whether the offered remedy is full (vs. partial) *EV*: Severity of the product failure, brand equity *Controls*: Minimum price of the recalled product *Recall level*: Recall volume	Severity of the failure increases the likelihood of the firm offering full (vs. partial) remedy. Brand equity has an inverted U effect on the likelihood of full remedy. The effect is contingent on severity.
Singh and Grewal (2009) *JMR* *Construct*: Institutional theory, legitimacy *Sample*: 576 manufacturer-quarters, covering 678 recalls by 16 vehicle manufacturers in the United States, 2008-2016 *Unit of analysis*: Manufacturer-quarter *Model*: 2SLS, with firm, year, and quarter FEs	*DV1:* Number of voluntary recalls *DV2*: Number of involuntary recalls *Moderator:* Defect severity, media coverage *Controls*: *Recalling manufacturer level*: Quarterly ad spending (Kantar Media), media coverage of the manufacturer's recalls (Nexis Uni), vehicle quality (*Consumer Reports*), number of complaints, number of deaths, sales volume, agency costs, R&D intensity, CAPEX intensity, size, domestic, age	The higher a firm's lobbying spending directed at the NHTSA, the fewer its number of voluntary recalls and its number of involuntary recalls. Number of deaths and number of media reports attenuate these two negative associations.
Souiden and Pons (2009) *JPBM* *Construct*: Crisis response (voluntary recall, involuntary recall, and super effort) *Sample*: Survey of 573 visitors to "car-related websites" (p. 109) during January 29, 2006, to February 18, 2006 *Unit of analysis*: Respondent *Model*: Cross-sectional regression	*DV:* Manufacturer's image, consumer loyalty, and consumers' purchase intention *EVs:* crisis-struck firm's image, brand loyalty *Controls*: *Recall level*: Does manufacturer contest/deny the recall?	Involuntary (contested) recalls hurt manufacturer's image, consumers' loyalty, and consumers' purchase intention. In contrast, voluntary recalls or improvement campaigns help these three DVs.
Topaloglu, and Gokalp (2018) *JBR* *Construct*: Brand concept = functional versus luxury *Sample*: 29,663 model-months, covering 390 models of 39 makes from 18 car makers, 2003-2014	*DV*: Sales volume for the focal model in the focal month minus sales volume in the same month of the previous year, divided by sales volume in the same month of the previous year. Converted to % *EV*s: Number of severe recalls during the past quarter. A recall is severe if (1) it	A model's number of severe recalls in the preceding quarter cause a drop in its year-on-year month sales. The negative effect is stronger for functional (vs. luxury) models.

Unit of analysis: Model-month *Model*: Cross-sectional regression	was influenced by the NHTSA *and* (2) the number of deaths or number of injuries caused by the focal death exceed the industry average *Moderator*: Whether the model is functional or luxury, reliability rating <u>Controls</u>: Recall level: Recall size Recalled model level: Price, rebates Recalling firm level: Age, domestic versus foreign, number of nonsevere recalls in the past 12 months	Further, the higher the functional model's reliability rating, the stronger the negative effect.
Van Heerde, Helsen, and Dekimpe (2007) *MKSC* *Constructs*: Ad and price elasticity *Sample*: Kraft Foods recall of its two brands of peanut butter (Kraft and Eta) in Australia in 1996 *Unit of analysis*: Recall *Model*: Time-series regression	*DV:* Time to first post-recall purchase *EVs:* ad spending, and price <u>Controls</u>: *Recall level*: None *Recalling brand level*: Price, ad spending	For the value brand (Eta): Post-recall, a value brand's advertising effectiveness became insignificant in both short- and long-runs (both were significant pre-recall). Post-recall, price effectiveness became more negative (relative to pre-recall) in the short-term and continued to be insignificant. For the premium brand (Kraft): Post-recall, advertising became more effective in the short-run but less effective in the long-run. Post-recall, price effectiveness became more negative in the short-run and stayed insignificant in the long-run.
Wei, Wang, Yu, and Zhao (2016) *JMComm* *Constructs*: Public engagement *Sample*: 432 automobile recalls in China, 2010-2014. User engagement with manufacturer's recall announcements on Sina Weibo *Unit of analysis*: Recall *Model*: Regression	*DV:* UGC: number of likes, number of comments, and number of shares *EVs*: recall size, recall counter (1 for first recall from the manufacturer, 2 for second, and so on), remedy (0 for repair, 1 for replace), age of recalled product (ln of number of days between announcement date and manufacturing date), product average price of the recalled model, and country of origin (0 for non-China and 1 for China) <u>Controls</u>: *Recall level*: Recall size, remedy, price of the defective product *Recalling firm level*: Recall history, country of origin	Social media users' engagement with recall announcements increases (1) as the recall size increases, (2) as the count of the manufacturer's recalls increases, (3) if the manufacturer offers replacement (versus repair), (4) as the average price of the recalled model increases, and (5) if the manufacturer is headquartered in China (versus non-China). Age of the recalled car model does not matter.
Zhao, Zhao, and Helsen (2011) *JMR*	*DV:* Time to a household's first post-recall purchase of the recalled brand	Relative to pre-crisis period, in the during-crisis period, household

Constructs: Consumer learning *Sample*: Kraft Foods' recall of its two brands of peanut butter (Kraft and Eta) in Australia in 1996 *Unit of analysis*: Recall *Model*: Structural model	*EV*: Changes in prices and ad spending <u>*Controls*</u>: None	consumers become less price sensitive and more risk averse. Also, advertising becomes less effective. Further, if the brand's perceived quality is high, consumers become less quality conscious. But if the brand's perceived quality is low, they become more quality conscious. Relative to pre-crisis period, in the post-crisis period, household consumers become less price sensitive, and more risk averse. They attach greater weight to quality. Also, advertising becomes less effective.
Zhou, Sridhar, Becerril-Arreola, Cui, and Dong (2019) *JAMS* *Constructs*: Competitive reaction *Sample*: Toyota's unintended acceleration recall in November 2009 to January 2010 *Unit of analysis*: Recall *Model*: Regression	*DV:* Sales volume *EV*: Price discounting <u>*Controls*</u>: *Recalling brand level:* Price, ad spending, number of dealerships, NHTSA safety rating *Recalling firm level*: None *Recalling firm's peer level*: Price discount	Following Toyota's recall in 2009-2010, 50% of Toyota's premium rival brands and 36% of its nonpremium rivals discounted their price. The average discount was $850. Among premium brands, 86% benefitted in terms of higher sales, whereas nonpremium brands either did not benefit or lost sales.

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Table A2: Directions for Future Recall Research in Marketing

Note: DV = Dependent variable. EV = Explanatory variable

Research question, and Empirical setting	Theoretical lens(es)	Hypotheses	DV(s)	EV(s)
Topic #1: (Lack of) Marketing's Representation as a Cause of Recalls (Kashmiri and Brower 2016; Giannetti and Srinivasan 2022; Liu et al. 2023)				
How and why does uniform representation of marketing function across levels of an organization impact recall decisions and outcomes? *Setting*: All public firms traded in the United States or Europe	Upper echelons	RQ1_H1: The higher the representation of the marketing function at the board of directors, the greater the CEO's customer orientation.	Customer orientation, measured from CEO's presentation in the earnings calls and/or their answers to analysts' questions (sources: SeekingAlpha.com, or ThomsonReuters' StreetEvents + dictionaries of customer orientation)	The number of directors with marketing functional background divided by the total number of directors (source: BoardEx) Weigh the numerator by the inverse of the number of years when the director played a marketing role.
	Stakeholder salience	RQ1_H2: The more powerful the marketing function at the C-suite, the stronger the firm's emphasis on product safety.	Emphasis on product safety, measured by whether the firm has earned an ISO certification for product quality (source: KLD)	Power of the marketing function at the C-level (see Feng, Morgan, and Rego's 2015 five indicators) (source: BoardEx)
	Responsibility and responsiveness	RQ1_H3: The more a firm's proportion of marketing employees, the fewer the firm's number of recalls and the lower the firm's average time to a recall.	Number of recalls and average time to a recall (Capital IQ Pro Key Developments, RavenPack Analytics, NHTSA, CPSC, FDA)	Number of employees classified in marketing jobs divided by the total number of employees (sources: People Data Labs, Revelio Labs)
Topic #2: Buy-versus-Make Decision as a Cause of Recalls (Bruccoleri et al. 2019; Martin and McKinnon 2017; Steven and Britto 2016; Steven, Dong, and Corsi 2014))				

Does relational orientation between a recalling firm and its supplier persist in the face of product failure? *Setting*: All public firms traded in the United States or Europe	Agency cost	RQ$_2$_H$_1$: A product manufacturer's decision to buy (vs. make) a product component (a) is positively associated with the likelihood of the manufacturer recalling the focal product due to a defect in the focal component and (b) negatively associated with the days to such a recall.	Whether the focal product manufactured bought or self-manufactured the focal component in the focal product (source: MarkLines)	Whether the focal manufacturer initiated any recall of the focal product due to a defect in the focal component and if yes, number of days between the first sale of the recalled product and the year in which the outsourcing began (sources: NHTSA, CPSC, FDA, RAPEX)
	Quality control, monitoring	RQ$_2$_H$_2$: The more distant the focal component's manufacturing plant and the product manufacturer's headquarters, (a) the higher the likelihood of the manufacturer recalling the focal product due to a defect in the focal component and (b) the shorter the days to such a recall.	Geographical distance between the manufacturing plant and the manufacturer's headquarters (source: MarkLines, NHTSA, FDA)	
	Relationship longevity, commitment	RQ$_3$_H$_3$: A recall by a product manufacturer of its product due to defect in a component that the manufacturer bought from a supplier (as opposed to self-manufactured) lowers the (1) monetary value of the relations in the following year and (2) the longevity of the relation between the focal supplier and the hip with the supplier.	Recall occurrence (sources: RavenPack, Capital IQ Pro, NHTSA, CPSC, FDA)	The monetary value of the focal relation (source: Bloomberg SPLC) The number of years between the year of recall occurrence and the year when the two parties do not renew their contract (source: Revere)
Topic #3: Shareholders' positive reaction to a recall announcement (Cheah, Chan, and Chieng 2007; Minor and Morgan 2011; Salin and Hooker 2001)				

Why and when can stock returns to recalls ever be *positive*? *Setting*: All public firms traded in the United States or Europe	Impression management, framing	RQ$_3$_H$_1$: Recall announcements that emphasize social responsibility as the cause for recall elicits a stronger penalty from shareholders. Conversely, not stating responsibility as the reason makes shareholders interpret that recall is triggered by economic reasons and thus are less punitive. However, in the longer-term, recalls triggered by responsibility elicit a more positive response.	CAR, BHAR, and calendar-time portfolio (CTP) analysis (sources: Eventus, Event study by WRDS)	Recall event date; recall management (sources: Capital IQ Pro Key Developments, RavenPack Analytics, NHTSA, CPSC, FDA, RAPEX)
	Signaling	RQ$_3$_H$_2$: A recall in which the recalling firm signals preparedness achieves *positive* short-term stock returns.		Preparedness signaled in recall announcement text, such as replacement component available with retailers (sources: Capital IQ Pro Key Developments)
	Expectation	RQ$_3$_H$_3$: Over time, the magnitude of investor reaction to recalls has decreased, thus indicating that recalls do not surprise investors anymore.		Recall history (sources: Capital IQ Pro Key Developments, RavenPack Analytics, NHTSA, CPSC, FDA, RAPEX)
Topic #4: Consequences of Recalls on Credit Sales and Credit Purchases (Astvansh and Jindal 2022; Frennea, Han, and Mittal 2019)				
How and why do a manufacturer's recalls impact its credit sales and credit purchases? Setting: All public firms traded in the United States	Quality signal, warranty	RQ$_4$_H$_1$: The higher a manufacturer's number of recalls, (a) the greater its receivables (i.e., share of sales on credit) and (a) the lower its payables (i.e., share of purchases on credit).	Receivables intensity (RECT divided by SALE) and payables intensity (AP divided by COGS) (source: Compustat)	Number of recalls (sources: Capital IQ Pro Key Developments, RavenPack Analytics, NHTSA, CPSC, FDA)
	Interfirm marketing network	RQ$_4$_H$_2$: The higher the manufacturer's embeddedness in its buyer-supplier network, the weaker the above two associations.		Manufacturer's network of buyer and supplier relations (sources: Revere and Bloomberg SPLC)

		RQ4_H3: The more strategic the manufacturer's position in its buyer-supplier social network, the weaker the above two associations.		
Topic #5: Recall communication Strategy (Brown 2020; Federal Register 2019; Krisher 2014)				
How and when should the recalling firm notify the impacted consumers?

Setting: Food, drug, and device recalls in the U.S. (FDA) | Product liability | RQ5_H1: Using public (over private) media for recall notification increases the recalling firm's product liability risk. | Number of media reports that refer to liability law. Intensity of such reference (RepRisk) | Whether the firm issues a press release, posts on its social media page, takes both actions, or takes neither (Regulatory databases and RavenPack Analytics) |
	Crisis communication	RQ5_H2: Investors punish, but consumers reward the recalling firm that issues a press release or a social media message to inform people of the recall.	CAR and consumer attitude (YouGov)	
	Crisis management	RQ5_H3: Notifying retailers prior to notifying affected customers is a superior strategy because it attenuates customer's unfavorable evaluation of the firm and shareholders reaction to recall.	CAR and consumer attitude (YouGov)	Whether the firm's notification to affected customers states that retailers have been notified (NHTSA's owner notification letters)
Topic #6: Recall announcement strategy (Fletcher and Mufson 2014; National Public Radio 2014)				
What announcement strategies help a firm and what strategies hurt the firm?

Setting: Consumer goods recalls in the U.S. (NHTSA) | Signaling | RQ6_H1: Time-to-recall has a curvilinear impact on consumer attitude and investor reaction, such that the firm receives a greater penalty if it initiates a recall too soon or too late. | CAR and consumer attitude (YouGov) | The number of days between the firm's being aware of the potential defect and the firm announcing a recall (source: FDA FOIA request or Astvansh, Ball, and Josefy's [2022] data file) |
| | Information asymmetry | RQ6_H2: Using CPSC's Fast Track program to expedite the recall remedy elicits a lower penalty from investors. | CAR | Whether the recall used the CSPC's Fast Track program (source: CPSC recalls) |

		RQ$_6$_H$_3$: The more the information about the defective component and the manufacturer of the component in the recall announcement, the less punitive the investor reaction.	CAR	The extent to which the recalling firm's announcement contains information about the defective component and the manufacturer of the component (source: NHTSA's recall notification letters)

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