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Damage Control: Earnings Management by Firms Facing Product Harm Crises*

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Abstract

A product harm crisis is a publicized event whereby a firm's product is either reported as being defective and/or fails to fulfill a mandatory safety standard. Such crises undermine a firm's reputation and its managers' career outlooks. We find evidence that managers engage in income-increasing earnings management when their firms experience product harm crises. Such earnings manipulation reduces the likelihood of customer loss and CEO forced turnover in the short run. Various tests suggest that our finding is consistent with opportunistic earnings manipulation, rather than a signaling explanation. Collectively, our results point toward managers employing financial reporting discretion to mitigate the reputation impairment and potential personal costs associated with product harm crises. At the margin, customers and boards of directors appear to be influenced by such opportunistic behavior.

Résumé

Une crise résultant d'un rappel de produits est un événement relativement public au cours duquel un des produits d'une entreprise est reconnu comme étant défectueux ou ne rencontrant pas les normes de qualité requises. De telles crises minent considérablement la réputation d'une entreprise ainsi que les perspectives de carrière des membres de la direction. Nous constatons que les dirigeants de ces entreprises augmentent le niveau de leurs résultats financiers au moyen de manipulations comptables dans les différents comptes de résultats. De telles manipulations réduisent la propension des clients de l'entreprise à la quitter pour un concurrent ainsi que la probabilité que le PDG soit remplacé. Des tests additionnels confirment que nos résultats sont cohérents avec une approche opportuniste de la part des dirigeants. De fait, il ne semble que ces résultats en amélioration malgré la crise reflètent une volonté de signaler leurs attentes quant à des performances et résultats futurs supérieurs. Dans l'ensemble, nos résultats montrent que les dirigeants d'entreprises faisant face à une crise de rappel de produits utilisent leur marge discrétionnaire en matière de résultats financiers pour minimiser l'atteinte à leur réputation et à celle de leur firme et ainsi minimiser les coûts qu'ils devront assumer. À court terme, les clients et les membres du conseil d'administration de ces firmes semblent influencés par de telles pratiques.

Mots clés/Keywords: Product Harm Crisis; Earnings Management; Implicit Claim; Firm Reputation

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1. Introduction

We investigate managers' earnings management behavior when their firm faces a product harm crisis. Product harm crises are publicized events whereby a firm's product is reported as being defective and/or fails to fulfill a mandatory safety standard (Dawar and Pillutla 2000). A growing phenomenon, product harm crises often draw much publicity and can have serious economic consequences for a firm. Recent product harm crises that made headlines include Samsung's Galaxy Note 7 smartphone recall in 2016, Toyota's vehicle recalls of millions of cars in 2009 and 2010, and Takata's airbag recall, which ultimately led to the company's bankruptcy. According to Advisen Insurance Intelligence (2012), 2,363 consumer products, pharmaceuticals, and medical devices were recalled in the United States in 2011, a 62 percent increase from 2007. Similarly, the National Highway Traffic Safety Administration (NHTSA) reported that vehicle recalls increased by 76 percent (from 339 to 599) between 1994 to 2003 and 2004 to 2013 (Gao et al. 2015; NHTSA 2015).

When a product harm crisis occurs, firms incur significant direct costs, such as expenses associated with product recalls, production halts, and remediation (Jarrell and Peltzman 1985). More importantly, a product harm crisis can result in significant indirect costs related to losses in the firm's reputation, and thus a reduction in customers' trust and purchase intention (e.g., Chen et al. 2009; Dawar and Pillutla 2000; Devin and Halpern 2001; Jarrell and Peltzman 1985; Pruitt and Peterson 1986; Van et al. 2007). Because of the adverse impact of product harm crises, prior research documents that managers actively engage in marketing, recalling, and social media strategies to salvage their firms' impaired reputation during product harm crises (Chen et al. 2009; Cleeren et al. 2013; Gao et al. 2015; Lee et al. 2015; Zavyalova et al. 2012).

In this study, we investigate whether managers manipulate earnings upward as another way to alleviate the reputation loss, restore customer confidence, and attenuate personal costs

when a product harm crisis occurs.[1] Despite the costs associated with product harm crises, anecdotal evidence shows that firms often project a strong financial image in the year of a product harm crisis. [2] In this sense, we attempt to understand whether a strong financial image during a product harm crisis likely reflects genuine performance or earnings management.

There are several reasons why managers can be incentivized to manipulate earnings upward when faced with a product harm crisis. First, a product harm crisis casts doubt about product quality and safety and, hence, directly damages customers' perceptions of the firm's ability to fulfill implicit claims in the future,[3] and in turn their confidence and purchase intention (Cornell and Shapiro 1987; Devin and Halpern 2001; Maksimovic and Titman 1991; Titman 1984). The product harm crisis may also encourage financially strong competitors to aggressively advertise or price their products with an aim to drive out the crisis firm if it exhibits weak financial performance (Bolton and Scharfstein 1990; Opler and Titman 1994). Projecting a better financial image by showing strong earnings can reassure customers that the firm has the resources to continue investing in product quality and can discourage competitors from initiating an advertising or pricing campaign. Second, managers usually bear responsibility for the product harm crises. In some cases, managers can be fired or forced to resign, suggesting that product harm crises likely induce managers' career concerns. Given the

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[1] We do not rule out the possibility that the incentive of earnings management in the case of a product harm crisis is induced by the need to reassure shareholders. However, shareholders' biggest concern about a product harm crisis also arises from the potential loss of customers and sales. Restoring customers' confidence can eventually also appease shareholders.

[2] For example, GM's annual report for 2014 (a year in which there was a major GM product recall) states that: "In 2014, we earned net income to common stockholders of $2.8 billion, including recall-related costs. Turning to Earnings Before Interest and Tax (EBIT) adjusted results, we earned $6.5 billion, which included $2.8 billion in recall-related expenses … These results are important because this is the first year since 2010 that the company met its target for core operating financial performance." Similarly, Mattel's 2007 annual report mentions that "Globally, Mattel delivered a 6 percent increase in net revenues in 2007 … we did see strong performance across many areas of our portfolio … Despite the costs associated with the product recalls, we were also able to achieve improvements in gross margin and overall profitability." In a regulatory filing in January 2017, Samsung Electronics said its fourth-quarter operating profit jumped 50 percent to its highest in more than 3 years, as a diverse business portfolio masked the negative impact of its failed Note 7 phones (Reuters, January 24, 2017).

[3] Customers have both explicit and implicit claims on the firm once they enter into transaction with the firm. Explicit claims are guaranteed by the transaction contract and has legal standing. Implicit claims are not specified but are expected nevertheless. For example, customers usually expect a certain product quality level, as well as a commitment to continuously provide parts and services, timely delivery, warranty service, and future enhancements.

potential personal costs associated with the product harm crises, managers can be incentivized to manipulate earnings upward as a way to attenuate such costs (Fudenberg and Tirole 1995).

In contrast, there are also reasons for managers not to engage in income-increasing earnings manipulation when faced with product harm crises. As a publicized event, the product harm crisis attracts attention from auditors, investors, creditors, customers, and suppliers who are likely to increase monitoring and scrutiny of the crisis firm, which in turn increases the detection risk and constrains the firms' opportunities to manipulate earnings (Chia et al. 2007; Filip and Raffournier 2014; Francis et al. 2013). Moreover, managers may want to avoid showing strong earnings in a product harm crisis to reduce the amount of any settlement or fine that may arise from product liability or security lawsuits. As a result, it remains an empirical question whether managers engage in income-increasing earnings manipulation when faced with product harm crises.

We address this empirical question by examining performance-matched signed discretionary accruals (Jones 1991; Kothari et al. 2005) of a sample of U.S. non-financial firms from 2002 to 2012. We employ the Heckman two-stage model to address the potential selection bias arising from firms' fundamental characteristics that drive both the incidence of product harm crises and the discretionary accruals. We find that firms exhibit significantly greater discretionary accruals in the crisis years. The discretionary accruals increase by 3.4 percent of total assets during the crises, which is economically material given that the interquartile range of discretionary accruals of our sample is about 9 percent. Since we control for past discretionary accruals and employ Heckman correction for selection bias in the estimation model, accrual reversals and selection bias are unlikely to explain the accrual management we observe for the crisis firms.

To provide further evidence, we examine whether income-increasing earnings management indeed helps restore customers' confidence and alleviate managers' career

concerns. By dividing firms into two groups, one with high discretionary accruals and another with low discretionary accruals, we find that crisis firms with high discretionary accruals are less likely to lose major customers and experience turnover of Chief Executive Officers (CEOs) in the year after the crisis, compared to crisis firms with low discretionary accruals. These results are consistent with upward accruals management during product harm crises mitigating the adverse impact on customers' confidence and managers' career concerns.

While the preceding results are consistent with opportunistic earnings management to restore crisis firms' reputations and reduce managers' career concerns, they are also consistent with an alternative explanation that the managers use discretionary accruals to signal better prospects (Subramanyam 1996). To rule out this alternative explanation, we test and find that crisis firms with high discretionary accruals are more likely to, in the future, restate their earnings for the crisis year compared to crisis firms with low discretionary accruals. We also find that, in general, firms with high discretionary accruals exhibit lower future ROA compared to firms with low discretionary accruals, but there is no incremental difference in future ROA between crisis firms with high discretionary accruals and non-crisis firms with high discretionary accruals. When we limit our sample to the crisis firms only and discriminate high and low discretionary accruals *within* these crisis firms, we again find that crisis firms with high discretionary accruals are more likely to, in the future, restate earnings for the crisis year than crisis firms with low discretionary accruals. Also, future ROA of crisis firms with high discretionary accruals is lower compared to that of crisis firms with low discretionary accruals. Overall, these results support our main conclusion that the income-increasing earnings management observed during the crisis year likely reflects an opportunistic, rather than a signaling, behavior.

As a robustness test, instead of comparing the discretionary accruals of the crisis firms with those of non-crisis firms, we employ a self-comparison design. Focusing on first-time

crisis firms only, we treat the two years preceding the crisis as the pre-crisis period, and the crisis year and the immediately subsequent year as the crisis period. We find that discretionary accruals are significantly higher during the crisis period than during the pre-crisis period, holding the firms constant.

One may harbor a concern that, during the crisis period, high discretionary accruals reflect firms' legitimate actions to raise cash and increase earnings. We examine two types of actions to raise cash and increase earnings: reducing discretionary expenditures and increasing the sales of assets. We find no evidence that crisis firms with high discretionary accruals are more likely to cut discretionary expenditures or increase asset sales than crisis firms with low discretionary accruals, suggesting the discretionary accruals reported by the crisis firms are not a mere reflection of these legitimate actions.

This study makes the following contributions. First, given that product harm crises are becoming more prevalent in today's business world, it is essential to understand the impact of such crises on firms, as well as firms' reactions to such crises. Prior studies document that firms react to product harm crises by adopting marketing, recalling, and social media communications strategies (e.g., Chen et al. 2009; Cleeren et al. 2013; Lee et al. 2015). Our study complements these prior findings by showing that managers also leverage their financial reporting discretion by managing earnings upward as a way to maintain their firms' financial image and, hence, restore customers' confidence and safeguard managers' personal interests.

Second, this study contributes to the literature investigating customers' implicit claims as an incentive for firms to manipulate earnings (Bowen et al. 1995; Burgstahler and Dichev 1997; Dou et al. 2013; Matsumoto 2002; Raman and Shahrur 2008).[4] We identify a specific setting in which an operational problem threatens firms' perceived abilities to fulfill implicit

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[4] Generally, the implicit claims have no legal standing, so they can be breached by either party. Bull (1987) argues that there are forces that prevent firms from breaching their reputation to fulfill their implicit claims. Firms have incentives to build their reputation because the reputation determines the trade terms between firms and their stakeholders (Cornell and Shapiro 1987; Titman 1984).

claims to customers, and find that managers use their accounting discretion to manage earnings upward to salvage their firms' reputation.

Third, this study contributes to the literature on the relationship between crises and earnings management. Prior research shows that firms typically reduce the extent of their earnings management in the face of macro-level financial crises (e.g., Filip and Raffournier 2014; Kim et al. 2003). In contrast, we find that firms increase earnings management in response to firm-specific product harm crises. The difference is probably due to the reduced incentive to manipulate earnings during global financial crises, as markets have greater tolerance for poor performance (Filip and Raffournier 2014), whereas the markets do not have such tolerance in firm-specific crises such as product harm crises.

The rest of the paper is organized as follows. Section 2 discusses prior literature and develops our hypothesis. Section 3 discusses our sample and research design. Section 4 reports empirical results. Additional analyses are provided in Section 5. Section 6 concludes the paper.

2. Prior literature and hypothesis development

Prior studies on product harm crises

A product harm crisis affects a firm's performance due to direct costs associated with handling the crisis, such as the costs associated with correcting/replacing the defective product, the recall process, unsold inventory, potential litigation, and changes in practices to improve quality (Jarrell and Peltzman 1985). Besides the direct costs, the impairment of a firm's reputation caused by product issues is a greater concern. A large part of the stock price decline caused by a product harm crisis is due to the product harm crisis' negative impact on a firm's reputation, rather than its direct costs (Dawar and Pillutla 2000; Jarrell and Peltzman 1985; Pruitt and Peterson 1986). For example, crisis firms not only suffer sales losses on the recalled product, but also on non-affected but associated products (Van et al. 2007), and wealth losses

imposed on crisis firms' shareholders can be 12 times larger than the direct costs of recalls (Jarrell and Peltzman 1985).

Managers are concerned about the negative impact of product harm crises on corporate reputation (Crisis Reputation Preparedness Study 2011) and therefore engage in various actions to attenuate the negative influence to regain customers and restore a firm's reputation. These actions include conducting strategic communication via social media platforms (e.g., Facebook), taking different recalling actions, and engaging in intensive marketing (e.g., advertising) (Chen et al. 2009; Cleeren et al. 2013; Gao et al. 2015; Lee et al. 2015; Zavyalova et al. 2012). In this study, we focus on the effect of product harm crises on managers' financial reporting incentives.

Hypothesis development

Prior research documents that managers have various incentives to manipulate earnings, and that earnings management behavior is prevalent (Graham et al. 2005).[5] Managers' incentives to manipulate earnings upward can be intensified when they face a product harm crisis for the following reasons. First, projecting a better financial image by showing strong earnings can help regain customers' purchase intention. When selling products, a firm enters into both explicit and implicit contracts with its customers, and a large part of the ongoing relationship between the firm and its customers remains implicit. For instance, customers usually expect a certain product quality level, as well as a commitment to continuously provide parts and services, timely delivery, warranty service, and future enhancements (Baker et al. 2002; Cornell and Shapiro 1987). Both existing and future customers' willingness to buy from

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[5] For example, prior studies find that seasonal equity offering (Cohen et al. 2010), financial crises in Asia or in Europe (Chia et al. 2007; Filip and Raffournier 2014), an initial public offering (Ball et al. 2008), an acquisition financed by firms' equity (Botsari and Meeks 2008), management buyouts (Perry and Williams 1994), open-market repurchase (Gong et al. 2008), and CEO turnover or interim CEO succession (Chen et al. 2015) all incentivize managers to engage in earnings management.

a firm is affected by their perceptions of the firm's ability to honor its implicit commitments in the product market (Bowen et al. 1995; Maksimovic et al. 1991).

Prior literature suggests that customers care about the financial image of the firm from which they purchase products and services (Bowen et al. 1995), as the financial image influences the customers' perceptions of whether the firm will be able to honor implicit claims in the future. Given the reputation damage induced by the product harm crisis (Cornell and Shapiro 1987; Devin and Halpern 2001; Jarrell and Peltzman 1985), reporting weak financial performance in such a situation can further lower customers' purchase intention, as customers are worried that the crisis firm will not be able to honor future implicit claims due to the lack of sufficient financial resources. For example, customers may worry that crisis firms with finanical constraints will switch to poor-quality components, reduce future supply, and fail to honor warranty claims in the future (Hammond 2013; Maksimovic and Titman 1991; Opler and Titman 1994; Titman 1984). Through earnings manipulation, managers can project a better financial image to reassure customers that the firm has abundant financial resources and thus is competent to fulfill its implicit claims in the long term (Aaker et al. 2010; Bowen et al. 1995; Tian and Zhou 2015).[6] In line with this argument, prior studies document that firms use upward earnings management to avoid losses (Burgstahler and Dichev 1997), to meet analyst forecasts (Matsumoto 2002), and to portray a rosy financial prospect (Raman and Shahrur 2008) in a bid to influence customers' assessments of firms' future abilities to fulfill their implicit claims. When surveying executives, Graham et al. (2005) report that a majority of Chief Financial Officers (CFOs) are willing to manipulate earnings to manage customers' perceptions.

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[6] One of the anecdotal examples used in Bowen et al. (1995) to support their argument that customers care about firms' accounting numbers and thus earnings is the advertisement of La Cie. La Cie advertises that "the hard drives it manufactures are backed by $400 million in assets. That means you can trust La Cie to provide a constant source of high quality machines and components. And you can be certain that we'll be around to help you with service and support. For a long, long time" (MacUse , September 1991, p. 95). Besides, earnings matter particularly in the case of a product harm crisis because the press and media usually publicize firms' earnings performance and the product recall/crisis in the news headlines. For example, "Samsung earnings soar in Q4 despite unprecedented Note 7 recall" (Yahoo, January 2017); "Samsung to overtake Apple with record profits despite scandals" (The Daily Telegraph, August 2017); "Toyota earnings up 27% despite recalls in U.S." (*USA Today*, August 2010); "Despite recall woes, GM turns $2.8 billion profit" (Austin American-Statesman, February 2015).

The incentive to manipulate earnings to restore customers' confidence can be further intensified if the firm serves industrial customers. Industrial customers are not the end users of the products, but intermediate customers who further transform or integrate the products purchased from the supplier into an end product. Industrial customers typically enter into a long-term relationship with the supplier firms. A product harm crisis at a supplier firm can severely undermine a long-term relationship with its industrial customers, especially if it is accompanied by weak financial performance. This is because industrial customers are concerned that, due to the supplier's financial difficulties and reputation loss, the supplier experiencing the product harm crisis may breach contractual terms in the long run (Cen et al. 2017). For instance, the industrial customer can be concerned whether the supplier has sufficient resources to deliver the products and services specified in their long-term contracts, and whether the supplier will withhold relationship-specific investments that aim to improve product quality, delivery efficiency, and other long-term performance. Hence, a sound financial performance can reassure long-term industrial customers that the supplier is unlikely to breach long-term contracts (Costello et al. 2013).

The second reason why managers' incentives to manipulate earnings upward can be intensified when they face a product harm crisis is that managers fear that their competitors may take advantage of the product harm crisis. Reporting weak financial performance in a product harm crisis may attract aggressive advertising campaigns, greater production, and price low-balling from financially sound competitors, who have incentives to chase existing or potential customers away from the crisis firms (Bernard 2016; Opler and Titman 1994). To the extent that earnings are one of the most important indicators of a firm's financial condition, managers of crisis firms can be incentivized to manipulate earnings upward to discourage competitors from preying on their customers.

Third, a product harm crisis can also impose personal costs to managers, thus incentivizing them to manipulate earnings upward. Since the product harm crisis has a direct negative influence on a firm's profit and stock price, managers who bear direct or indirect responsibility for the crisis can be fired.[7] Fudenberg and Tirole (1995) suggest that job security concern incentivizes managers to shift future earnings into the current period in order to avoid being fired during a poor performance period, and Choi et al. (2014) find that CEOs manipulate earnings upward to avoid or delay forced resignation due to poor firm performance. Therefore, managers can be incentivized to present better financial performance in product harm crises to decrease the likelihood of dismissal.

Although managers' incentives to restore reputation and attenuate personal losses imply a positive relationship between product harm crises and income-increasing earnings management, there are counterarguments suggesting that such an association may not exist or may even be negative. First, as a publicized event, a product harm crisis attracts larger, and typically more negative, media coverage (Rhee et al. 2006; Zavyalova et al. 2012). Auditors, investors, creditors, customers, and suppliers are also likely to increase monitoring and scrutiny over the crisis firms. DeAngelo, DeAngelo, and Skinner (1994) find that firms with consecutive losses exhibit more income-decreasing accounting choices due to increased monitoring from auditors and lenders. Prior studies also find that, in the recent financial crisis, firms manipulated earnings less, partly because of the increased scrutiny from stakeholders (Filip and Raffournier 2014; Francis et al. 2013). Similarly, greater scrutiny from market participants and media during product harm crises can restrain managers from manipulating earnings (Chia et al. 2007; Filip and Raffournier 2014; Francis et al. 2013). Second, in anticipation of product liability or

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[7] Johnson & Johnson CEO Bill Weldon, who was with the company for more than 40 years, stepped down in April 2014 because of a series of product recalls over the previous 2 years that damaged the firm's, and his, reputation. Honda CEO Takanobu Ito unexpectedly stepped down in February 2015 after Honda was hit by several quality problems for its vehicles, which led to product recalls. Merck & Co.'s longtime CEO, Raymond Gilmartin, resigned in May 2006 after a drug's withdrawal from market tarnished the firm's reputation.

security lawsuits, firms may manipulate earnings downward, rather than upward, to avoid lawsuits from customers and shareholders and to reduce the amount of any settlement or fine, if sued. These possibilities point toward a null or a negative relationship between product harm crises and earnings management.

Given the above competing arguments, it remains an empirical question whether managers engage in income-increasing earnings management when faced with a product harm crisis. Therefore, we state the following hypothesis in the null form:

> HYPOTHESIS. *Product harm crises are not associated with income-increasing earnings management.*

3. Research design

Sample and data

Our sample consists of non-financial U.S. firms from 2002 to 2012. We rely on the MSCI KLD database (KLD) to identify firms that experienced product harm crises in our sample period. Specifically, KLD reports the number of strengths and concerns concerning firms' engagements in product safety and quality on a yearly basis. According to MSCI (2015), the product concern indicator is "designed to assess the severity of controversies related to the quality and safety of a firm's products and services."[8] Kashmiri and Brower (2016) validate the product quality concern variable in KLD and confirm that it is a reliable indicator of product harm crises.[9] Hence, we consider a firm to have a product harm crisis in a year if the firm is identified to have a product quality concern (i.e., product quality concern variable equal to one) in KLD in that year.

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[8] Factors affecting this evaluation include, but are not limited to, a history of involvement in product safety–related legal cases, widespread or egregious instances of recalls or fines due to defective or unsafe products and services, resistance to improved practices, and criticism by non-governmental organizations (NGOs) and/or other third-party observers.

[9] Kashmiri and Brower (2016) independently code the events related to product harm crises based on articles, press releases, and reports on product recalls, as well as product-related litigation and compensatory damages. They find that the hand-collected data match the product concern variable in KLD.

We merge KLD with Compustat, Audit Analytics, and Thomson Reuters 13-F forms to obtain firms' financial, auditor, and institutional shareholding data. A total of 17,177 observations remain in the sample after we merge different data sources. We further require that industries defined by two-digit SIC codes in the sample must have at least one incidence of product harm crisis during the sample period. After further deleting firms with missing values in the regressions, 11,040 firm-years are left in the sample, of which 885 firm-years have product harm crises. Panel A of Table 1 presents the sample distribution by year. The percentage of firms having product harm crises ranges from 6 to 15 percent across years in our sample period. Panel B of Table 1 reports the sample distribution by industry. A total of 68 percent of sample firms with product harm crises come from manufacturing industries.

[Insert Table 1 about here`]

Measure of income-increasing earnings management

Managers can time and engage in upward earnings management before the occurrence of a product harm crisis. Prior studies document that managers usually anticipate a product recall several months before publicly announcing the product recall. Such a time gap arises since managers have the opportunity to act strategically in deciding when to cooperate with the regulatory agents to issue a recall (Chen et al. 2009; Gao et al. 2015; Gokalp at al. 2016).[10] Thus, even if a product harm crisis occurs toward year-end, managers likely have ample time to engage in earnings management during the year before its announcement. For this reason, we focus on annual estimates rather than more granular quarterly estimates of earnings management.

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[10] For the firm-initiated recalls, after the manufacturer receives information about the potential hazard of the product from its customer, the manufacturer investigates whether the defect exist through its own analysis system, which can take months, before publicly announcing a product recall. Even if the recall was initiated by the regulatory agencies, the investigation period can still be lengthy, and the manufacturer can have the opportunity/time to act strategically to decide whether and when to cooperate with the regulators agencies to announce the product recalls (Chen et al. 2009; Gao et al. 2015; Gokalp et al. 2016).

Consistent with prior literature, we proxy income-increasing earnings management by signed discretionary accruals (Kothari et al. 2005; Mao and Renneboog 2015). We first estimate the following Jones model (Jones 1991) for each industry-year using all U.S. firms with available information in Compustat, where an industry is defined by two-digit SIC:

$$\frac{TACC_{i,t}}{ASSET_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{ASSET_{i,t-1}} + \alpha_2 \frac{\Delta SALES_{i,t}}{ASSET_{i,t-1}} + \alpha_3 \frac{PPE_{i,t}}{ASSET_{i,t-1}} + \varepsilon_{i,t} \qquad (1)$$

For each firm i in year t, $TACC$ is the total accruals defined as income before extraordinary items minus operating cash flows; $ASSET$ is the total assets; $\Delta SALES$ is the change of sales from $t-1$ to t; and PPE is the property, plant, and equipment. Discretionary accruals (DA) are calculated as the difference between observed total accruals (scaled by lagged total assets) and predicted normal accruals based on the parameters estimated in the above regression. We then adjust DA by performance (Kothari et al. 2005; Liu et al. 2017). Specifically, we construct five portfolios for each industry-year based on quantiles of ROA. Performance-matched DA ($PMDA$) for firm i in year t is the residual from the above equation minus the median residual of the ROA portfolio to which the firm belongs.

It is possible that the model for estimating DA remains misspecified for the firm-years experiencing product harm crises. However, we believe this is less of a concern in our setting, because abnormal accruals not captured by the model parameters, such as those arising from liability reserves and other accounts related to the product failure or defects, are mostly income-decreasing.[11] As such, the measurement error in the residual term used to measure earnings management is likely to bias DA downward, which is *against* finding income-increasing

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[11] Under U.S. GAAP, Statement of Financial Accounting Standards (SFAS) No.5 covers codification for product recalls (Gokalp et al. 2016), a firm must accrue a loss contingency when the management knows that the liability had been incurred before the issuance of the financial statements and when the amount of the loss can be reasonably estimated. SFAS #5 explicitly prohibits accruals for general or unspecified business risks, such as reserves for general contingencies. Based on our browsing of financial statements, in a product harm crisis year, firms typically make a specific provision/reserve for the expenses associated with product recall (e.g., Mattel 2007 Annual Report, General Motor Annual Report 2014).

earnings manipulation. Nevertheless, in a robustness test, we also use accounting restatements to rule out the concern that measurement errors in the discretionary accruals are driving our results.

Empirical model – Heckman two-stage model

We use Heckman's (1979) two-stage model in our main analysis, given the potential endogeneity issue arising from the fact that firms are not randomly assigned to have product harm crises. Heckman's (1979) two-stage model addresses the concern that there are unobservable omitted variables that drive both the incidence of product harm crises and the discretionary accruals. In the first stage, we model firms' probabilities of experiencing product harm crises and calculate the Inverse Mills Ratio (*IMR*). In the second stage, we test whether having product harm crises has a significant effect on income-increasing earnings manipulation while controlling for *IMR*. The first-stage probit regression (equation 2) and the second-stage ordinary least squares (OLS) regression (equation 3) are as follows:

$$PHC_{i,t} = \beta_0 + \beta_1 INDPHC_{i,t} + \sum \beta_k DETERMINE_{i,t} + \varepsilon_{i,t} \qquad (2)$$

$$PMDA_{i,t} = \beta_0 + \beta_1 PHC_{i,t} + \beta_2 IMR_{i,t} + \sum \beta_k CONTROL_{i,t} + \varepsilon_{i,t} \qquad (3)$$

Where, for each firm *i* in year *t*, *PHC* equals one if the firm has a product harm crisis, and zero otherwise. Following Lennox et al. (2012), we add *INDPHC* as the exclusion restriction into the first-stage prediction model. *INDPHC* is measured as the average number of product harm crises for the industry to which the firm belongs. Conceptually, industry-level product harm crises should have a significant prediction power for firm-level product harm crises, but industry-level product harm crises should not directly influence firm-level earnings management. *DETERMINE* in equation (2) is a set of other determinant variables. Specifically, we include firm size (*LogMV*), number of business segments (*SEG*), leverage (*LEV*), market-to-book ratio (*MTB*), lagged operating performance (Lag*ROA*), lagged sales growth

(Lag*GROWTH*), lagged cash holding (*LagCASH*), lagged stock return (*LagRETURN*), lagged

working capital (*LagWC*), and lagged discretionary accruals (*LagPMDA*). Moreover, we add

managerial ability (*MA*) and the percentage of institutional shareholding (*IO*), given that

product safety issues can also be influenced by managers' competency and external monitoring.

We also add an indicator variable of whether firms raised additional capital (*FINANCE*).

Finally, we add industry fixed effects and year fixed effects.

Based on the estimations of equation (2), we calculated *IMR* and add it into the second-

stage regression, as depicted by equation (3). We also add all determinant variables, that is, the

set of *DETERMINE* in equation (2) as control variables, which are represented by the variable

CONTROL in equation (3), as well as industry and year fixed effects. All variables are defined

in the Appendix. If managers of crisis firms engage in income-increasing earnings management

when faced with a product harm crisis, the coefficient on *PHC* in equation (3) should be

significant and positive.

4. Results

Main regression results

Panel A of Table 2 tabulates descriptive statistics of variables used in the analysis, and

Panel B of Table 2 tabulates correlations between these variables. The pair-wise correlations

of *PHC* and other control variables, as well as correlations among the control variables, are not

large, suggesting that multicollinearity is not a serious concern in our regression model. The

untabulated univariate comparison suggests that the mean *PMDA* of crisis firms is -0.004,

whereas the mean *PMDA* of non-crisis firms is -0.012, and the difference is statistically

significant (t-statistic=1.77, $p < 0.05$, one-tailed), providing preliminary evidence that crisis

firms have greater discretionary accruals than non-crisis firms.

[Insert Table 2 about here]

Table 3 provides the results of the two-stage regressions. The first-stage probit regression results are reported in Panel A. The coefficient on *INDPHC* is significant and positive, consistent with our prediction that industry-level incidences of product harm crises have a significant predictive power of the probability that individual firms within the industry experience product harm crises. The results also show that larger firms, firms with more business segments, and firms with a higher leverage ratio are more likely to have product harm crises. Moreover, firms with better prospects (i.e., higher lagged market-to-book ratio and higher sales growth), a better cash position, and additional external financing are less likely to experience product harm crises. Note that *LagPMDA* is not statistically significant, which alleviates the concern of reverse causality.

Panel B of Table 3 presents the regression results of equation (3). The coefficient on *PHC* is significant and positive (coefficient=0.034, *t*-statistic=2.248), indicating that having a product harm crisis is associated with significantly higher discretionary accruals, consistent with managers in crisis firms manipulating earnings upward using income-increasing discretionary accruals. Regarding economic significance, crisis firms exhibit an increase in discretionary accruals that is equivalent to 3.4 percent of lagged total assets. This increase is economically significant, given that the interquartile range of *PMDA* in our sample is 9 percent of lagged total assets. Note that the greater *PMDA* we document for crisis firms is unlikely attributable to the reversal of *PMDA* before the crisis, as we include lagged *PMDA* to control for the effect of accruals reversals.

[Insert Table 3 about here]

Effect of earnings management on likelihood of losing major clients

We argue that, in product harm crises, managers manipulate earnings upward as a way to assure customers of the firm's financial viability and ability to honor future implicit claims.

If this argument holds, it is logical to expect that income-increasing earnings management behavior should be somehow effective in retaining customers' confidence. Arguably, customers cannot easily discern earnings management done by the managers, or it is too costly for them to do so.[12] To test this prediction, we investigate whether income-increasing earnings management helps crisis firms retain major customers in the year following the product harm crisis.

We use customer information disclosed in the Segment File of Compustat to identify firms' major customers. Compustat Segment Files contain firms' major customers who contribute to 10 percent or more of the suppliers' sales. *LOSSCLIENT* equals one if a firm loses at least one major client in the following year, and zero otherwise. We separate sample firms into high and low *PMDA* firms in each industry-year, based on the median value of *PMDA* in the industry-year. *HighDA* equals one for firms with high *PMDA*, and zero otherwise. We then regress *LOSSCLIENT* on *PHC*, *HighDA*, and the interaction term between *PHC* and *HighDA* (*HighDA_PHC*). If income-increasing earnings manipulation helps crisis firm retain major clients, we expect the interaction term to be negative and significant.

Regression results are reported in Table 4. We find that income-increasing earnings management significantly reduces the likelihood of losing major clients for crisis firms, which manifests itself as a significant and negative coefficient on the interaction term *HighDA_PHC* (coefficient=-0.251, *z*-statistic=1.81). Such a result corroborates evidence of managers' incentives to manipulate earnings upward when a product harm crisis occurs, as doing so helps the managers retain customers, at least in the short term.

[Insert Table 4 about there]

Effect of earnings management on CEO forced turnover

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[12] This is consistent with the assumption in Liu et al. (2017) that customers (and other market participants) functionally fixate on reported earnings, as well as the large literature in finance that shows that agents are not perfectly rational.

Our arguments suggest that CEOs manipulate earnings upward to alleviate the personal losses associated with product harm crises. To provide supporting evidence for this argument, we examine whether income-increasing earnings manipulation in product harm crises reduces occurrences of CEO forced turnover, given that earnings affect boards' decisions on CEOs' retention (Engel et al. 2003).

We obtain CEO turnover data from the ExecuComp database. The variable *LEAVE* equals one if a CEO was dismissed, and zero otherwise. We consider that a CEO forced turnover occurs in year $t+1$, i.e., the year following the crisis year, if the CEO identification number for a company in ExecuComp changes from $t+1$ to $t+2$. Among these CEOs, we exclude cases where the turnover reason provided in ExecuComp is "deceased" or "retirement."

Like the analysis of losing major clients, we regress *LEAVE* on *PHC*, *HighDA*, and the interaction term *HighDA_PHC*. Results are tabulated in Table 5. The coefficient on *HighDA_PHC* is significant and negative (coefficient=-0.229, *z*-statistic=1.88), suggesting that the more upward earnings management a CEO conducts in a product harm crisis, the less likely the CEO will be dismissed in the year following the crisis. The result provides further evidence that CEOs are incentivized to manipulate earnings upward when faced with a product harm crisis, as doing so indeed alleviates CEOs' own personal costs.

[Insert Table 5 about here]

We acknowledge that it certainly seems plausible that enhanced scrutiny from various market participants and regulatory agencies around product harm crises would elevate the costs of earnings management and potentially undercut the benefits of earnings management. Our results, however, indicate that, at the margin, customers and boards of directors are deceived by the reporting choices, at least in the short-run.[13] This is consistent with the interpretation

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[13] Prior studies provide supporting evidence that, even sophisticated information users, such as credit rating agencies, cannot fully unravel earnings manipulation conducted by managers (e.g., Alissa et al. 2013; Liu et al. 2017)

that earnings management appears to play a part in reducing the probability of customer loss and CEO turnover when product harm crises occur.

Refuting signaling as an alternative explanation

Our findings that managers manipulate earnings upward with income-increasing *PMDA* when faced with product harm crises can also be explained by managers' incentives to use discretionary accruals to signal their private information about future performance (Subramanyam 1996). To rule out this alternative explanation, we perform two additional analyses. First, instead of using *PMDA* as the proxy for earnings manipulation, we investigate whether the financial statements of crisis firms in the crisis years are more likely to be restated in the future. Even though the use of income-increasing *PMDA* can be interpreted as managers signaling private information, signaling should not lead to inappropriate accounting treatments that result in future restatements. Therefore, a significant and positive association between *PMDA* and accounting restatements for crisis firms, combined with our prior evidence of higher *PMDA* exhibited by crisis firms, should be more in line with managers' opportunistic incentives to manipulate earnings upward when faced with product harm crises. Second, we test whether high *PMDA* in crisis firms are associated with better future performance. If the signaling explanation holds and high *PMDA* conveys private information rather than being a consequence of opportunistic earnings manipulation, the high *PMDA* should manifest as better future performance for crisis firms.

We obtain data on restatements from Audit Analytics. We only consider restatements caused by accounting issues and frauds, and exclude restatements caused by mere clerical errors or changes in accounting standards. The variable *RESTATE* is an indicator variable that equals one if a firm's financial statements in year *t* are subsequently restated, and zero otherwise. We then regress *RESTATE* on *PHC*, *HighDA*, and the interaction term

HighDA_PHC. If our argument of opportunistic earnings manipulation holds, the interaction term *HighDA_PHC* is likely to be significant and positive; that is, the high *PMDA* in crisis firms increases the likelihood of accounting restatements of crisis firms, compared to other non-crisis firms that have a high *PMDA*. On the contrary, if the signaling explanation holds, the interaction term *HighDA_PHC* is likely to be insignificant. Panel A of Table 6 presents the regression results. The coefficient on *HighDA_PHC* is significant and positive (coefficient=0.226, *z*-statistic=1.96), consistent with the opportunistic earnings manipulation explanation.

We proxy future performance by future *ROA*. Employing the same research design as our above analysis of restatements, we regress leading *ROA* (ROA_{t+1}) on *PHC*, *HighDA*, and *HighDA_PHC*. The signaling explanation will predict a significant and positive coefficient on *HighDA_PHC,* whereas the opportunistic earnings manipulation will predict an insignificant or even negative coefficient on *HighDA_PHC*. Panel B of Table 6 reports the results. We find that the coefficient on *High_DA* is significant and negative, suggesting that high *PMDA* is associated with decreased future performance for non-crisis firms, probably because discretionary accruals are not a sustainable component of earnings and reverse in future periods. The coefficient on *HighDA_PHC* is not statistically significant, but the joint test shows that the sum of coefficients of *HighDA* and *HighDA_PHC* is significantly negative, consistent with crisis firms engaging in opportunistic earnings management.

[Insert Table 6 about here]

5. Additional analyses

Robustness checks: self-comparison within first-time crisis firms

Our main results rely on a pooled sample of both crisis and non-crisis firms based on a two-stage analysis to alleviate the endogeneity issue arising from the omitted unobservable

characteristics driving both the incidence of product harm crisis and income-increasing earnings management. One may be concerned that there are systematic measurement errors associated with *PDMA* for the crisis and non-crisis firms. As a robustness check, we restrict our sample to first-time crisis firms and compare whether *PMDA* significantly increases from pre-crisis period to crisis period within first-time crisis firms. A firm in year *t* is defined as a first-time crisis firm if the firm experienced a product harm crisis in year *t* but does not have any product harm crisis in the 3 years prior to year *t*. For each first-time crisis firm, given year *t* is the crisis year, we define variable *POST* to be zero for the pre-crisis period that includes year *t*-2 to *t*-1, and one for the crisis period that includes year *t* and *t*+1. We then regress *PMDA* on *POST* and other control variables. Following Liu et al. (2017), we adjust all variables by the industry-year median values of non-crisis firms.

We identify 138 (552) unique first-time crisis firms (firm-years) with available information in both pre-crisis and crisis periods. Table 7 reports the regression results. The coefficient on *POST* is significant and positive (coefficient=0.023, *t*-statistic=1.94), suggesting that the *PMDA* of first-time crisis firms significantly increases in the crisis period compared to the pre-crisis period. Because all variables of crisis firms are adjusted against their non-crisis peers, examining whether there is greater earnings management during the crisis period *within* these crisis firms resembles a differences-in-differences design and further mitigates the concern that the result based on the pooled sample may be due to measurement errors in the discretionary accruals.

[Insert Table 7 about here]

We also re-perform the analyses of accounting restatements and future ROA using this sample of first-time crisis firms. Specifically, we discriminate high and low *PMDA within* these crisis firms, and find in the untabulated results that crisis firms with high discretionary accruals

are more likely, in the future, to restate earnings for the crisis year, and their future ROA is lower compared to crisis firms with low discretionary accruals. Overall, the results are consistent with an opportunistic earnings manipulation explanation rather than the signaling explanation.

Other reasons that affect discretionary accruals

In the face of a product harm crisis, managers may take legitimate actions to conserve cash and/or increase earnings to fulfill contractual obligations (such as debt covenants) or settle future contingent liabilities associated with a product harm crisis (such as lawsuits). One may harbor a concern that the high *PMDA* we document for crisis firms reflects these legitimate actions, rather than opportunistic earnings management. To rule out this alternative explanation, we examine two actions that can help conserve cash and increase earnings: decreasing discretionary expenditures and increasing sales of assets.

We replace the dependent variable of discretionary accruals with changes in discretionary expenses (*Chg_DISEXP)* and changes of sales of PPE *(Chg_PPESALE),* and regress them on *PHC*, *HighDA*, and *HighDA_PHC*, respectively. Our goal is to show that the high *PMDA* observed in crisis firms is not significantly related to the other actions that help conserve cash and increase earnings. Table 8 reports the regression results. Column (1) represents the results for the analysis of *Chg_DISEXP*. We find that the coefficients on *HighDA* and *PHC* are significantly negative, representing that, in general, high *PMDA* firms have fewer discretionary expenses and crisis firms have fewer discretionary expenses. However, the interaction term *HighDA_PHC* is statistically insignificant, indicating that the change of discretionary expenses is not significantly different across high *PMDA* crisis and non-crisis firms. Column (2) presents the results for the analysis of *Chg_PPESALE.* The coefficient on *HighDA_PHC* is also insignificant. Overall, our analyses find little evidence that *PMDA* in crisis firms merely reflects other attempts to conserve cash and improve earnings.

6. Conclusion

Product harm crises, which can have significant economic consequences, have been gaining prevalence in recent years. While prior studies investigate managers' strategies to deal with product harm crises from marketing and communication perspectives, we examine managers' reactions to product harm crises from a financial reporting perspective. We identify several incentives for managers to manipulate earnings upward in a product harm crisis and document supporting evidence. Consistent with firms' financial image influencing customers' perceptions of the firms' ability to honor future implicit claims and hence the customers' purchase intention, we find that income-increasing earnings management helps crisis firms retain major customers in the short term. It also reduces the propensity for CEOs to undergo forced turnovers. Our additional analyses rule out alternative explanations that high discretionary accruals of crisis firms reflect signaling, accrual reversal, and legitimate actions taken by the managers. Overall, findings of this study document the implications of product harm crises on firms' financial reporting behavior and financial reporting quality, and suggest that auditors, regulators, directors, and investors should be especially alert under these circumstances.

The study is subject to some limitations. For instance, our sample selection process may have missed some crisis firms. However, our approach was quite comprehensive and ensured that we captured firms which truly faced a 'crisis', not just a serious event. Another limitation is a focus on U.S. firms, which have a particular regulatory and legal environment. However, such an environment implies that events surrounding product harm crises (disclosure, follow-up, etc.) are well-documented and trackable, thus facilitating their analysis. Moreover, the scale of the U.S. economy allows for a sufficiently large sample to be collected. Future research may

consider other aspects of financial disclosure by crisis firms (e.g., use of pro forma non-GAAP

figures), as well as the role of governance mechanisms in preventing or mitigating such crises.

References

Aaker, J., K. D. Vohs, and C. Mogilner. 2010. Non-profits are seen as warm and for-profits as competent: Firm stereotypes matter. *Journal of Consumer Research* 37: 224–37.

Alissa, W., S.B. Bonsall, K. Koharki, and M.W. Penn. 2013. Firms' use of accounting discretion to influence their credit ratings. *Journal of Accounting and Economics* 55: 129-147.

Advisen Insurance Intelligence. 2012. Product Recall: Reducing the Impact of Product Recalls on Financial Statements and Brand Reputation. available at: http://www.acegroup.com/us-en/assets/advisenpaper_reducing-the-impact-of-a-product-recall .pdf

Austin American-Statesman. February 2015. Toyota earnings up 27% despite recalls in U.S." (USA Today, August 2010); "Despite recall woes, GM turns $2.8 billion profit. Available at: http://www.mystatesman.com/business/despite-recall-woes-turns-billion-profit/KlhMEM4yO u0pFgEWKsBdeI/

Baker, G., R. Gibbons, and K. J. Murphy. 2002. Relational contracts and the theory of the firm. *Quarterly Journal of Economics* 117 (1): 39–84.

Ball, R., and L. Shivakumar. 2008. Earnings quality at initial public offerings. *Journal of Accounting and Economics* 45 (2): 324–49.

Bernard, D. 2016. Is the risk of product market predation a cost of disclosure? *Journal of Accounting and Economics* 62 (2): 305–25.

Bolton, P., and D. Scharfstein. 1990. A theory of predation based on agency problems in financial contracting. *The American Economic Review* 8: 93–106.

Botsari, A., and S. G. Meek. 2008. Do acquirers manage earnings prior to a share for share bid? *Journal of Business Finance & Accounting* 35 (5–6): 633–70.

Bull, C. 1987. The existence of self-enforcing implicit contracts. *The Quarterly Journal of Economics*, *102*(1), 147-159.

Bowen, R., L. Du Charme, and D. Shores. 1995. Stakeholders' implicit claims and accounting method. *Journal of Accounting and Economics* 20 (3): 255–95.

Burgstahler, D., and I. Dichev. 1997. Earnings management to avoid earnings decreases and losses. *Journal of Accounting and Economics* 24 (1): 99–126.

Cen, L., F. Chen, Y. Hou, et al. 2017. Strategic disclosures of litigation loss contingencies when customer-supplier relationships are at risk. *The Accounting Review* In press.

Chen, G., S. Q. Luo, Y. Tang, and Y. Tong. 2015. Passing probation: Earnings management by interim CEOs and its effect on their promotion prospects. *Academy of Management Journal* 58 (5): 1389–418.

Chen, Y., S. Ganesan, and Y. Liu. 2009. Does a firm's product-recall strategy affect its financial value? An examination of strategic alternatives during product harm crises. *Journal of Marketing* 73 (6): 214–26.

Chia, Y. M., I. Lapsley, and H. W. Lee. 2007. Choice of auditors and earnings management during the Asian financial crisis. *Managerial Auditing Journal* 22 (2): 177–96.

Choi, J. S., Y. M. Kwak, and C. Choe. 2014. Earnings management surrounding CEO turnover: Evidence from Korea. *Abacus* 50 (1): 25–55.

Cleeren, K., J. Harald, V. Heerde, and M. G. Dekimpe. 2013. Rising from the ashes: How brands and categories can overcome product harm crises. *Journal of Marketing* 77 (March): 58–77.

Cohen, D. A., and P. Zarowin. 2010. Accrual-based and real earnings management activities around seasoned equity offerings. *Journal of Accounting and Economics* 50 (1): 2–19.

Cornell, B., and A. Shapiro. 1987. Corporate stakeholders and corporate finance. *Financial Management* 16 (1): 5–14.

Costello, A. M. 2013. Mitigating incentive conflicts in inter-firm relationships: Evidence from long-term supply contracts. *Journal of Accounting and Economics* 56 (1): 19–39.

Crisis Reputation Preparedness Study. 2011. Available at: https://www.slideshare.net/BMGlobalNews/crisis-preparedness-study-2011

Dawar, N., and M. M. Pillutla. 2000. Impact of product harm crises on brand equity: The moderating role of consumer expectations. *Journal of Marketing Research* 37 (2): 215–26.

DeAngelo, H., L. DeAngelo, and D. J. Skinner. 1994. Accounting choice in troubled companies. *Journal of Accounting and Economics* 17 (1–2): 113–43.

Devin, I., and P. Halpern. 2001. Implicit claims: The role of corporate reputation in value creation. *Corporate Reputation Review* 4 (1): 42–9.

Dou, Y., O.-K. Hope, and W. B. Thomas. 2013. Relationship-specificity, contract enforceability, and income smoothing. *The Accounting Review* 88 (5): 1629–56.

Engel, E., R. H. Hayes, and X. Wang. 2003. CEO turnover and properties of accounting information. *Journal of Accounting and Economics* 36 (1): 197–226.

Filip, A., and B. Raffournier. 2014. Financial crisis and earnings management: The European evidence. *The International Journal of Accounting* 49 (4): 455–78.

Francis, B., I. Hasan, and Q. Wu. 2013. The benefits of conservative accounting to shareholders: Evidence from the financial crisis. *Accounting Horizons* 27 (2): 319–46.

Fudenberg, D., and J. Tirole. 1995. A theory of income and dividend smoothing based on incumbency rents. *Journal of Political economy* 103 (1): 75–93.

Gokalp, O., S. Keskek, A. Kumas, and M. Subasi. 2016. Insider trading activity around auto recalls. *Academy of Management Annual Meeting Proceedings* Vol. Issue 1, p1-1.

Gao, H., J. Xie, Q. Wang, and K. C. Wilbur. 2015. Should ad spending increase or decrease before a recall announcement? The marketing-finance interface in product harm crisis management. *Journal of Marketing* 79 (5): 80–99.

Gong, G., H. A. Louis, and X. Sun. 2008. Earnings management and firm performance following open-market repurchases. *The Journal of Finance* 63 (2): 947–86.

Graham, J. R., C. Harvey, and S. Rajgopal. 2005. The economic implications of corporate financial reporting. *Journal of Accounting and Economics* 40 (1): 3–73.

Hammond, R. G. 2013. Quantifying consumer perception of a financially distressed company. *Journal of Business & Economic Statistics* 31 (4): 398–411.

Heckman, J. J. 1979. Sample selection bias as a specification error. *Econometrica* 47(1): 153-161.

Jarrell, G., and S. Peltzman. 1985. The impact of product recalls on the wealth of sellers. *Journal of Political Economy* 93 (3): 512–36.

Jones, J. J. 1991. Earnings management during import relief investigations. *Journal of Accounting Research* 29 (2): 193–228.

Kashmiri, S., and J. Brower. 2016. Oops! I did it again: Effect of corporate governance and top management team characteristics on the likelihood of product harm crises. *Journal of Business Research* 69 (2): 621–30.

Kim, J. B., R. Chung, and M. Firth. 2003. Auditor conservatism, asymmetric monitoring, and earnings management. *Contemporary Accounting Research* 20 (2): 323–59.

Kothari, S. P., A. J. Leone, and C. E. Wasley. 2005. Performance matched discretionary accrual measures. *Journal of Accounting and Economics* 39 (1): 163–97.

Lee, L. F., A. P. Hutton, and S. Shu. 2015. The role of social media in the capital market: Evidence from consumer product recalls. *Journal of Accounting Research* 53 (2): 367–404.

Lennox, C. S., J. R. Francis, and Z. Wang. 2012. Selection models in accounting research. *The Accounting Review* 87 (2): 589–616.

Liu, A. Z., K. R. Subramanyam, J. Zhang, and C. Shi. 2017. Do firms manage earnings to influence credit ratings? Evidence from negative credit watch resolutions. *The Accounting Review.* In Press.

Maksimovic, V., and S. Titman. 1991. Financial policy and reputation for product quality. *Review of Financial Studies* 4 (1): 175–200.

Mao, Y., and L. Renneboog. 2015. Do managers manipulate earnings prior to management buyouts? *Journal of Corporate Finance* 35: 43–61.

Matsumoto, D. A. 2002. Management's incentives to avoid negative earnings surprises. *The Accounting Review* 77 (3): 483–514.

National Highway Traffic Safety Administration. 2015. *Monthly Recall Reports*, http://www-odi.nhtsa.dot.gov/recalls/recallmonthlyreports.cfm, retrieved 07/02/2015.

Opler, T. C., and S. Titman. 1994. Financial distress and corporate performance. *The Journal of Finance* 49 (3): 1015–40.

Perry, S. E., and T. H. Williams. 1994. Earnings management preceding management buyout offers. *Journal of Accounting and Economics* 18 (2): 157–79.

Pruitt, S. W., and D. R. Peterson. 1986. Security price reactions around product recall announcements. *Journal of Financial Research* 9 (2): 113–22.

Raman, K., and H. Shahrur. 2008. Relationship-specific investments and earnings management: Evidence on corporate suppliers and customers. *The Accounting Review* 83 (4): 1041–81.

Reuters. 2017. Available at: http://www.businessinsider.com/r-samsung-elec-fourth-quarter-profit-jumps-as-record-chip-profit-masks-note-7-failure-2017-1

Rhee, M., and P. R. Haunschild. 2006. The liability of a good reputation: A study of product recalls in the U.S. automotive industry. *Organization Science* 17 (1): 101–17.

Subramanyam, K. R. 1996. The pricing of discretionary accruals. *Journal of Accounting and Economics* 22 (1): 249–81.

The Daily Telegraph. August 2017. Samsung to overtake Apple with record profits despite scandals. Available at: http://www.telegraph.co.uk/technology/2017/07/27/samsung-overtake-apple-record-profits-despite-scandals/

Tian Y., and H. Zhou. 2015. From bottom line to consumers' mind: The framing effects of accounting information. *Accounting, Organizations and Society* 43: 56–66.

Titman, S. 1984. The effect of capital structure on a firm's liquidation decision. *Journal of Financial Economics* 13 (1): 137–51.

Van, H. J., K. Helsen, and M. G. Dekimpe. 2007. The impact of a product harm crisis on marketing effectiveness. *Marketing Science* 26 (2): 230–45.

Yahoo. January 2017. Samsung earnings soar in Q4 despite unprecedented Note 7 recall. Available at: http://bgr.com/2017/01/24/samsung-earnings-report-2016-q4/

Zavyalova, A., M. D. Pfarrer, R. K. Reger, and D. L. Shapiro. 2012. Managing the message: The effects of firm actions and industry spillovers on media coverage following wrongdoing. *Academy of Management Journal* 55 (5): 1079–101.

APPENDIX

Variable definitions

Variable	Definitions
CASH	cash ratio calculated as total cash and short-term investments to total assets
CEOTENURE	CEO tenure calculated as the number of years that a CEO has been in the CEO position
FINANCE	an indicator variable
GROWTH	sales growth ratio calculated as sales in year t minus sales in year t-1 divided by sales in year t-1
HighDA	an indicator variable equal to 1 for crisis firms that have performance-matched discretionary accruals higher than the median value of performance-matched discretional accruals in a year
IO	Percentage of shares owned by institutional shareholders
LEAVE	An indicator variable equal to 1 if a CEO is dismissed, and 0 otherwise
LEV	leverage ratio calculated as total long-term debt to total assets
LogMV	logarithm of total market value
LOSSCLIENT	An indicator variable equal to 1 if a firm loses a major client, and 0 otherwise
MA	managerial ability
MTB	market-to-book ratio calculated as total year-end market value to total book value of equity
NUMCUS	the number of major customers that a firm has in a year
PHC	an indicator variable equal to 1 if a firm experienced product crisis in year t, and 0 otherwise
PMDA	discretionary accruals calculated based on performance-matched Jones model using all firms with available information in Compustat
RESTATE	an indicator variable equal to 1 if a firm's financial restatements are restated in the future and 0 otherwise
RETURN	stock return calculated as stock price in year t minus stock price in year t-1 divided by stock price in year t-1
ROA	return on assets calculated as income before extraordinary items to total assets
SEG	number of total business segments
WC	working capital calculated as total current assets minus total current liabilities divided by total assets

Table 1
Sample distribution

Panel A: Sample distribution by year

Year	Number of Observations without PHC	Number of Observations with PHC
2002	229	34
2003	382	39
2004	434	45
2005	1,037	67
2006	1,066	69
2007	1,067	76
2008	1,099	93
2009	1,180	97
2010	1,196	147
2011	1,213	107
2012	1,252	111
Total	10,155	885

Table 1 – cont'd

Panel B: Sample distribution by industry

Two-Digit SIC	Industry Name	Number of Observations Without PHC	Number of Observations With PHC
10-14	Mining	546	22
15-17	Construction	50	10
20-29	Manufacturing - Part 1	1,665	292
30-39	Manufacturing - Part 2	3,727	316
40-49	Transportation, Communication, Utilities	694	56
50-59	Wholesale and Retail Trade	1,380	98
70-89	Services	2,093	91
Total		10,155	885

This table presents the sample distribution of firm-years with and without product harm crises. Panel A present distribution by year, and Panel B presents distribution by industry.

Table 2
Descriptive statistics and correlation matrix

Panel A: Descriptive statistics of variables used in main regression

Variable	N	Mean	Median	SD	P25	P75
PHC	11,040	0.080	0.000	0.272	0.000	0.000
PMDA	11,040	-0.011	-0.008	0.128	-0.059	0.032
LogMV	11,040	7.372	7.206	1.593	6.228	8.331
SEG	11,040	2.671	2.000	2.060	1.000	4.000
LEV	11,040	0.492	0.485	0.233	0.320	0.630
MTB	11,040	2.925	2.168	3.441	1.355	3.526
CASH	11,040	0.010	-0.024	0.141	-0.070	0.045
MA	11,040	0.746	0.789	0.202	0.641	0.895
IO	11,040	0.347	0.000	0.476	0.000	1.000
FINANCE	11,040	0.323	0.230	0.300	0.089	0.479
ROA	11,040	0.034	0.053	0.124	0.013	0.091
GROWTH	11,040	0.105	0.082	0.228	-0.001	0.181
RETURN	11,040	0.100	0.049	0.476	-0.191	0.295
WC	11,040	0.251	0.225	0.205	0.095	0.384

This table presents the descriptive statistics of variables used in the main regression. See Appendix for variable definitions.

Table 2 – cont'd

Panel B: Correlation matrix

		1	2	3	4	5	6	7	8	9	10	11	12	13
1	*PHC*													
2	*PMDA*	0.02												
3	*LogMV*	0.25	-0.06											
4	*SEG*	0.14	0.03	0.20										
5	*LEV*	0.15	0.02	0.13	0.11									
6	*MTB*	0.02	-0.03	0.20	-0.09	0.05								
7	*CASH*	0.02	-0.11	0.28	-0.04	-0.09	0.14							
8	*MA*	-0.01	-0.06	0.12	0.01	0.01	0.00	0.01						
9	*IO*	-0.08	0.03	-0.13	-0.07	-0.01	0.01	-0.01	0.01					
10	*FINANCE*	-0.11	-0.09	-0.16	-0.22	-0.34	0.21	0.19	-0.03	0.13				
11	*ROA*	0.06	0.11	0.33	0.04	-0.17	0.10	0.20	0.09	-0.21	-0.11			
12	*GROWTH*	-0.05	0.00	0.09	-0.06	-0.07	0.15	0.15	0.04	0.22	0.06	0.15		
13	*RETURN*	0.00	0.02	0.11	-0.01	0.00	0.13	0.02	-0.09	0.02	0.07	0.12	0.06	
14	*WC*	-0.12	-0.01	-0.27	-0.15	-0.54	0.06	0.08	-0.01	0.10	0.71	-0.02	0.05	0.04

This table presents the Pearson correlation between variables used in the main regression. See Appendix for variable definitions.

Table 3
Analysis of discretionary accruals

Panel A: First-stage probit regression of product harm crisis occurrence

Variable	First-Stage Regression Dependent Variable = *PHC*	
	Coefficient	Z-Statistics
LogMV	0.316***	(18.650)
SEG	0.063***	(6.396)
LEV	1.139***	(9.702)
MTB	-0.015**	(-2.436)
MA	-0.271	(-1.602)
IO	-0.142	(-1.162)
FINANCE	-0.146***	(-2.936)
LagCASH	-0.521***	(-3.477)
LagROA	0.729***	(2.953)
LagGROWTH	-0.614***	(-4.913)
LagRETURN	-0.031	(-0.585)
LagWC	0.518**	(2.270)
LagPMDA	-0.120	(-0.661)
IndustryPHC	0.088***	(8.278)
Constant	-3.569***	(-7.541)
Industry Fixed Effects	Yes	
Year Fixed Effects	Yes	
Pseudo R^2	0.284	
Observations	11,040	

Table 3 – cont'd

Panel B: Second-stage OLS regression of discretionary accruals

Variable	Second-Stage Regression Dependent Variable = PMDA	
	Coefficient	*T*-Statistics
PHC	0.034**	(2.248)
LogMV	-0.004***	(-2.690)
SEG	0.002***	(2.878)
LEV	-0.000	(-0.004)
MTB	-0.000	(-0.431)
MA	-0.084***	(-6.445)
IO	-0.026***	(-3.376)
FINANCE	0.010***	(3.557)
LagCASH	-0.008	(-0.854)
LagROA	0.005	(0.174)
LagGROWTH	-0.033***	(-4.429)
LagRETURN	0.017***	(4.969)
LagWC	0.003	(0.215)
LagPMDA	0.080***	(4.808)
IMR	-0.014*	(-1.668)
Constant	-0.025	(-1.021)
Industry Fixed Effects	Yes	
Year Fixed Effects	Yes	
R^2	0.043	
Observations	11,040	

*, **, and *** indicate two-tailed statistical significance at 10, 5, and 1 percent levels, respectively. *Z*-statistics and *t*-statistics are reported in parentheses.
The table presents the results of Heckman two-stage regressions. Panel A presents the results of the probit regression examining the determinants of experiencing product harm crises. Panel B presents the results of OLS regression examining the effect of experiencing product harm crises on discretionary accruals. Standard errors are clustered at firm level. See Appendix for variable definitions.

Table 4
Analysis of losing major clients

Variable	Dependent Variable = $LOSSCLIENT_{t+1}$	
	Coefficient	Z-Statistics
HighDA	0.013	(0.326)
PHC	-0.018	(-0.179)
HighDA_PHC	-0.251*	(-1.808)
LogMV	-0.062***	(-3.130)
SEG	0.039***	(3.756)
LEV	-0.300**	(-2.364)
MTB	0.002	(0.228)
MA	-0.011	(-0.065)
IO	-0.001	(-0.011)
FINANCE	0.041	(0.924)
CASH	0.139	(1.143)
ROA	-0.340	(-1.634)
GROWTH	-0.039	(-0.357)
RETURN	0.154***	(3.334)
WC	-0.044	(-0.214)
CEOTENURE	-0.003	(-1.038)
NUMCUS	0.010***	(2.730)
Constant	-0.031	(-0.042)
Industry Fixed Effects	Yes	
Year Fixed Effects	Yes	
Pseudo R^2	0.034	
Observations	6,298	

*, **, and *** indicate two-tailed statistical significance at 10, 5, and 1 percent levels, respectively. *Z*-statistics are reported in parentheses.
The table presents the results of a probit regression examining the probability of losing major clients in the year immediately after a product harm crisis. Standard errors are clustered at firm level. See Appendix for variable definitions.

Table 5
Analysis of CEO forced turnover

Variable	Dependent Variable = $LEAVE_{t+1}$	
	Coefficient	Z-Statistics
HighDA	0.028	(0.737)
PHC	0.124	(1.447)
HighDA_PHC	-0.229*	(-1.876)
LogMV	-0.035**	(-2.363)
SEG	-0.000	(-0.020)
LEV	0.033	(0.324)
MTB	-0.008	(-1.248)
MA	0.079	(0.561)
IO	0.108	(0.980)
FINANCE	-0.054	(-1.248)
CASH	0.209*	(1.906)
ROA	-0.934***	(-4.913)
GROWTH	-0.187*	(-1.756)
RETURN	-0.167***	(-3.226)
WC	-0.224	(-1.213)
CEOTENURE	-0.016***	(-5.308)
Constant	-0.781*	(-1.918)
Industry Fixed Effects	Yes	
Year Fixed Effects	Yes	
Pseudo R^2	0.034	
Observations	8,349	

*, **, and *** indicate two-tailed statistical significance at 10, 5, and 1 percent levels, respectively. *Z*-statistics are reported in parentheses.
The table presents the results of a probit regression examining the probability of CEO's forced turnover in the year immediately after a product harm crisis. Standard errors are clustered at firm level. See Appendix for variable definitions.

Table 6
Refuting signaling explanation

Panel A: Analysis of restatements

| Variable | Dependent Variable = *RESTATE* | |
	Coefficient	Z-Statistics
HighDA	-0.044	(-1.181)
PHC	-0.152	(-1.303)
HighDA_PHC	0.226**	(1.960)
LogMV	-0.061***	(-2.977)
SEG	0.010	(0.755)
LEV	0.153	(1.193)
MTB	-0.005	(-0.808)
MA	0.199	(1.014)
IO	0.322**	(2.301)
FINANCE	0.057	(1.450)
CASH	0.051	(0.422)
ROA	-0.303*	(-1.677)
GROWTH	-0.017	(-0.214)
RETURN	-0.030	(-0.799)
WC	-0.262	(-1.191)
Constant	-1.069**	(-2.383)
Industry Fixed Effects	Yes	
Year Fixed Effects	Yes	
Pseudo R^2	0.045	
Observations	11,012	

Table 6 – cont'd

Panel B: Analysis of future performance

Variable	Dependent Variable = ROA_{t+1}	
	Coefficient	T-Statistics
HighDA	-0.013***	(-5.909)
PHC	-0.001	(-0.166)
HighDA_PHC	0.001	(0.151)
LogMV	0.009***	(10.814)
SEG	0.000	(0.263)
LEV	0.013*	(1.878)
MTB	0.002***	(3.166)
MA	0.022**	(2.499)
IO	0.002	(0.337)
FINANCE	-0.015***	(-6.507)
CASH	-0.047***	(-6.304)
ROA	0.471***	(21.656)
GROWTH	-0.008	(-1.088)
RETURN	0.024***	(9.485)
WC	0.067***	(5.704)
Constant	-0.048	(-1.628)
Industry Fixed Effects	Yes	
Year Fixed Effects	Yes	
R^2	0.359	
Observations	10,312	

*, **, and *** indicate two-tailed statistical significance at 10, 5, and 1 percent levels, respectively. *Z*-statistics and *t*-statistics are reported in parentheses.

The table presents the regression results used to refute the signaling explanation. Panel A reports the results for the analysis of accounting restatements. Panel B reports the results for the analysis of future performance. Standard errors are clustered at firm level. See Appendix for variable definitions.

Table 7
Analysis of pre- and post-crisis periods for first-time crisis firms

Variable	Dependent Variable = *PMDA*	
	Coefficient	*T*-Statistics
POST	0.023*	(1.940)
LogMV	-0.000	(-0.052)
SEG	0.001	(0.338)
LEV	0.049	(1.020)
MTB	0.000	(0.079)
MA	-0.083	(-1.608)
IO	0.083*	(1.705)
FINANCE	0.039***	(2.803)
LagCASH	-0.070	(-1.512)
LagROA	0.058	(0.590)
LagGROWTH	-0.061*	(-1.898)
LagRETURN	0.024	(1.390)
LagWC	0.060	(0.826)
LagPMDA	-0.090*	(-1.885)
Constant	-0.002	(-0.052)
Industry Fixed Effects	Yes	
Year Fixed Effects	Yes	
R^2	0.156	
Observations	552	

*, **, and *** indicate two-tailed statistical significance at 10, 5, and 1 percent levels, respectively. *T*-statistics are reported in parentheses.

The table presents the results of a regression examining discretionary accruals of first-time crisis firms across pre-crisis and crisis periods. Standard errors are clustered at firm level. See Appendix for variable definitions.

Table 8
Analysis of other strategic actions

	(1)		(2)	
	Dependent Variable = Chg_DISEXP		Dependent Variable = Chg_PPESALE	
Variable	Coefficient	T-Statistics	Coefficient	T-Statistics
HighDA	-0.008***	(-6.493)	-0.000	(-0.754)
PHC	-0.007***	(-2.678)	-0.000	(-1.119)
HighDA_PHC	0.002	(0.713)	0.000	(0.240)
Chg_LogMV	7.445***	(8.982)	-0.110**	(-2.171)
Chg_LEV	4.754**	(2.280)	0.044	(0.632)
Chg_MTB	0.048	(0.916)	0.005	(1.566)
Chg_MA	5.457	(1.593)	-0.234	(-1.206)
Chg_IO	17.775***	(8.010)	0.221*	(1.766)
Chg_CASH	-6.843***	(-4.171)	0.038	(0.628)
Chg_ROA	-11.995***	(-4.941)	0.104	(1.115)
Chg_GROWTH	2.070***	(3.040)	0.069	(1.258)
Chg_RETURN	-3.449***	(-5.680)	0.065**	(2.288)
SEG	-0.002***	(-6.309)	0.000	(0.106)
FINANCE	0.019***	(12.301)	-0.000	(-0.410)
Constant	-0.006	(-0.494)	0.003	(0.982)
Industry Fixed Effects	Yes		Yes	
Year Fixed Effects	Yes		Yes	
R^2	0.229		0.008	
Observations	10,320		10,320	

*, **, and *** indicate two-tailed statistical significance at 10, 5, and 1 percent levels, respectively. *T*-statistics are reported in parentheses.
This table presents the regression results regarding the relationship between discretionary accruals and firms' other strategic actions to reserve cash and improve earnings. Standard errors are clustered at firm level. See Appendix for variable definitions.