Are government initiated recalls more damaging for shareholders? Evidence from automotive recalls, 1973–1998

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Received 13 June 2000; accepted 10 January 2001

Abstract

Due to the increased frequency of recalls, this paper examines the stock market returns to both manufacturer and government-initiated automotive safety recalls. The equity response is shown to be independent of which entity (the government or the manufacturer) initiates the recall. © 2001 Elsevier Science B.V. All rights reserved.

Keywords: Recall; Event study; Liability; Quality

JEL classification: G14; L15

“Prompted by a federal investigation, Chrysler yesterday said it would pay to fix the antilock-brake systems on about 275 000 1991–1993 model minivans and another 75 000 cars, including New Yorkers, Imperials and Dynasties” (Wall Street Journal, April 16, 1996).

1. Introduction

Despite the recent surge in manufacturer and government-initiated automotive safety recall campaigns, few studies make a distinction between which entity (the manufacturer or the government) initiates a recall. A recent paper by Rupp and Taylor (1999) models the recall initiation process; it does not, however, estimate the equity response on the basis of recall initiator. Theory suggests that government-initiated recalls may signal a low-quality producer and subsequently damage the reputation of the firm, whereas, a manufacturer-initiated campaign may indicate that the firm is standing behind the product and enhancing the reputation of the firm. Therefore government-initiated recalls are expected to be associated with larger equity losses than manufacturer-initiated recalls.

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While previous empirical papers by Barber and Darrough (1996), Hoffer et al. (1987), and Jarrell and Peltzman (1985) have extensively examined abnormal returns due to automotive recalls, this paper is the first to employ automotive recall data to quantify the equity impact on the basis of recall initiator. This paper estimates the abnormal returns of GM, Ford, Chrysler, Honda, Toyota, and Nissan pursuant to both types of recalls during 1973–1998. Unlike the Davidson and Worrell (1992) study, which examined the equity response of voluntary and mandated non-automotive recalls, this study employs automotive data for numerous reasons. First, auto manufacturers frequently conduct recalls, providing a larger sample. Second, auto manufacturers have an incentive to self-monitor product quality to protect valuable market capitalizations worth billions of dollars, ranging from $7.5 billion (Nissan) to $101 billion (Toyota) on December 31, 1998. Third, one government organization, the National Highway Traffic Safety Administration (NHTSA), is responsible for tracking automotive safety recalls, providing a single source of recall data. Finally, since the NHTSA provides a hazard rating for every automotive safety recall, we are able to examine the equity response to government and manufacturer-initiated recalls holding the hazard level constant.

The objective of this paper is to test the hypothesis that government-initiated recall campaigns are a signal of a low-quality producer and hence are more damaging to shareholders. The next section discusses the data, followed by the methodology, results, and conclusion.

2. Data

The NHTSA has tracked automotive safety recalls since its founding in 1966. From its inception to 1998, the NHTSA has overseen 6862 recalls involving more than 248 million vehicles.1 Almost all of these recalls are considered ‘voluntary’ since the manufacturer agrees to conduct a recall overseen by NHTSA. Recalls are rarely ordered by the government; in only nine cases since 1966 has the NHTSA taken a manufacturer to court to force a recall.2 This paper uses the term ‘initiate’ to indicate which party (manufacturer or NHTSA) first discovers the safety defect.

Data for car and truck safety recall announcements in the United States are collected from the *WSJ* Index for the sample companies.3 These announcements are then matched with the corresponding NHTSA safety recall campaign. The NHTSA data are obtained from the safety agency’s web site,4 which lists every US motor vehicle recall and includes the initiator of the recall and the defect hazard rating. The NHTSA assigns each recall campaign a defect hazard rating, A, B or C from most hazardous to least hazardous. Examples of high hazard ‘A’ campaigns include defects involving loss of vehicle control, stalling, or fire. All other defects (ratings B and C) are considered less hazardous (e.g., problems related to windshield wipers, headlights, and seat belts).

The beginning of the sample in 1973 marks the first complete year that stock returns for the Japanese auto makers in the form of American Depository Receipts (ADRs) are available. In addition, for a thorough discussion of the automotive recall process see Rupp and Taylor (1999).

1The most recent case occurred on June 4, 1996 when the NHTSA ordered Chrysler to recall 91 000 1995 Chrysler Cirrus and Dodge Stratus models. A Federal Appellate court sided in favor of Chrysler and overturned the recall order (*Wall Street Journal*, November 2, 1998).

2We thank Brad Barber and Masako Darrough for making their *Wall Street Journal* (1973–1998) recall data available.

because many smaller foreign auto makers are not listed on the US security exchanges, the sample is limited to the six largest manufacturers of cars and light trucks, which held a combined 1997 US market share of 90.4% (Ward’s Automotive Yearbook, 1998).

During the 26-year sample period from 1973 to 1998, the WSJ published 734 safety recalls involving more than 132 million vehicles. Only once during the 26-years did the government initiate more recalls than manufacturers. The government initiated 208 recalls involving 90 million vehicles. These recalls are typically larger (averaging 433,789 vehicles) than manufacturer-initiated campaigns (79,966). Manufacturers had more than twice as many recalls (526) for less than half as many vehicles (42 million). Fig. 1 shows that the frequency of both types of campaigns increased during the sample.

To isolate the equity response to the recall announcement, 240 recalls are eliminated due to event overlap problems. The sample (n = 494) is free of overlap between manufacturer and government-initiated announcements during the 2-day window. The following firms comprise the non-duplicating sample: Ford (184), General Motors (173), Chrysler (75), Nissan (35), Honda (15), and Toyota (12).

### 3. Methodology

To estimate the financial impact of recalls, abnormal returns are calculated using the market model methodology for each type of recall announcement (MacKinlay, 1997). Since this methodology is
widely used, only a summary is provided here. An appendix containing the details of this estimation is available upon request of the author.

Daily stock price and number of shares outstanding data come from the Center for Research in Security Prices (CRSP) at the University of Chicago. Let $t$ index the time in trading days relative to the WSJ announcement at date 0. We estimate the market model parameters $(\alpha, \beta)$ for the one hundred days of trading prior to the announcement from $t = -101$ to $t = -2$. The CRSP value-weighted index represents the return to the market portfolio ($R_{mt}$) at time $t$. The abnormal return ($A_{jt}$) for firm $j$ using the market model is calculated as follows,

$$A_{jt} = R_{jt} - (\hat{\alpha}_j + \hat{\beta}_j R_{mt})$$

where $R_{jt}$ is the equity return of firm $j$. In other words, the abnormal return is the change in the stock price of firm $j$ that cannot be explained by the overall movement of the market.

Since the information contained in the Wall Street Journal story may have been released before the close of trading on the previous day, the 2-day WSJ window ($t = -1$ and $t = 0$) includes the prior trading day. The cumulative average abnormal return (CAR) is the 2-day sum of daily average abnormal returns from Eq. (1). We calculate $t$-statistics using the cross-sectional standard deviation of the abnormal returns.

### 4. Results

Table 1 presents the 2-day average abnormal returns and $t$ statistics for both manufacturer and government-initiated recall announcements. Manufacturer-initiated campaigns are associated with significant equity losses of $-0.28\%$. On the other hand, abnormal returns for government-initiated recalls were not different from zero. The market reaction to manufacturer-initiated recalls, however, is not significantly different from government-initiated campaigns (see Table 2).

This finding seems counter-intuitive since the hypothesis was that government-initiated recalls signal a low-quality producer and as such are expected to be more damaging to a firm. Yet manufacturer-initiated recalls have larger losses. The Rupp and Taylor (1999) model of the recall initiation process indicates that manufacturers are more likely to initiate the most hazardous recalls when the expected reduction in liability payments is greater than the cost of repair. In the sample almost half (47.5\%) of all manufacturer-initiated recalls received the high hazard rating while hazardous recalls comprised only one-third (33.7\%) of the government-initiated sample.

To determine whether this difference in hazard composition is driving the results, we re-estimate the equity response, holding the level of hazard constant. Using only the NHTSA designated high...
Table 1

<table>
<thead>
<tr>
<th>Recall initiator</th>
<th>n</th>
<th>Recall hazard</th>
<th>Mean abnormal returns</th>
<th>t Statistic</th>
<th>Percentage &lt;0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer</td>
<td>343</td>
<td>All</td>
<td>−0.28</td>
<td>−2.23</td>
<td>57.4**</td>
</tr>
<tr>
<td>Government</td>
<td>151</td>
<td>All</td>
<td>−0.11</td>
<td>−0.55</td>
<td>57.0</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>163</td>
<td>High</td>
<td>−0.43</td>
<td>−2.21</td>
<td>57.1*</td>
</tr>
<tr>
<td>Government</td>
<td>55</td>
<td>High</td>
<td>−0.57</td>
<td>−1.90</td>
<td>63.6*</td>
</tr>
</tbody>
</table>

*a* The Market Model calculates the abnormal returns for Chrysler, Ford, General Motors, Honda, Nissan, and Toyota for the day of and the day prior to the WSJ recall announcement. The Center for Research in Security Prices NYSE-AMEX value-weighted index represents the market return. All stock returns are in US dollars. The *t* statistic is the cross-sectional standard deviation of the abnormal returns.

**Significance at the 10 and 5% levels, respectively, for a sign test (the proportion of abnormal returns significantly different from 50%).

5. Conclusion

Using automotive safety recall data for 26 years, 1973–1998, this study shows that the market reaction to government-initiated recalls is not associated with larger shareholder losses. This result is robust to the hazard composition since our findings are similar for both the universe of safety recalls and the subset of high hazard campaigns. These results suggest that the recall initiator (either the government or the manufacturer) does not serve as a reliable signal of product quality. Automotive investors should not make equity trading decisions on the basis of who initiated the safety recall.

Table 2

<table>
<thead>
<tr>
<th>Hypothesis tested</th>
<th>Answer</th>
<th>t-Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the market reaction to manufacturer-initiated recalls different from government-initiated recalls?</td>
<td>No</td>
<td>−0.72</td>
</tr>
<tr>
<td>Is the market reaction to high hazard manufacturer-initiated recalls different from government-initiated recalls?</td>
<td>No</td>
<td>0.39</td>
</tr>
</tbody>
</table>

*a* The *t* statistic is the cross-sectional standard deviation of the abnormal returns.
Acknowledgements

Special thanks to Brad Barber and Masako Darrough for making their Wall Street Journal recall data available. Curtis Taylor provided valuable assistance. Support from the Bradley Fellowship of the Private Enterprise Research Center at Texas A&M University is gratefully acknowledged.

References

Ward’s Automotive Yearbook, 1998. Detroit, MI.