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Stock market and deterrence effect: A mid-run analysis of major environmental and non-environmental accidents[☆]



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ABSTRACT

We analyze the stock market reaction to 161 major environmental and non-environmental accidents, reported on the front page of the New York Times for half a century. To determine if the market induces a real deterrence effect, we extend the event windows up to one year. On average, the market reacts negatively and enduringly to the announcement of an accident. However, this average effect is largely driven by the airline industry and by government interventions. The estimated average compounded abnormal return following environmental accidents does not differ from zero after one year. This does not exclude, in severe events affecting large firms, huge losses in equity value, but the significant negative cumulative abnormal returns estimated immediately after an environmental accident in previous studies do not persist. Our results suggest that in a market driven by institutional investors, the deterrence effect is likely to be weak.

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Introduction

The extent to which the stock market can motivate firms to adopt better corporate safety or environmental behavior remains a fundamental question (Karpoff et al., 2005). If a severe market penalty follows evidence of corporate weaknesses in controlling hazards, then the market could be seen as a complement or a substitute to the regulatory actions (Dasgupta et al., 2001). Moreover, mandatory disclosure requirements such as toxic release inventory (TRI) and 'green labels' might become effective regulatory mechanisms for controlling safety or environmental hazards (Konar and Cohen, 1997; Khanna et al., 1998; Capelle-Blancard and Laguna, 2010; Oberndorfer et al., 2013). To evidence a possible deterrence effect, researchers have scrutinized the market reaction following 'negative incidents' including accidents, lawsuits and misconduct announcements (Jones and Rubin, 2001; Ambec and Lanoie, 2008). We focus on major accidents that should significantly modify the agent's perception of the firm's compliance with security and environmental standards and that should cause a drop in market value. In turn, this drop should lead the shareholders to force management to put more effort into controlling security and environmental hazards.

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Previous evidence remains limited. Since 1988, seven papers have been devoted to airline and other transportation accidents and seven to other industries (Table 1). Moreover, results relative to the deterrence effects are still controversial and incomplete along several dimensions. First, five papers fail to detect a significant effect of accident announcement on stock prices. Second, previous research focuses on the few days surrounding the announcement. Third, some arguments and evidence suggest that environmental negative events should have a lesser impact on stock prices than non-environmental events. Fourth, following some accidents, government actions can induce significant complementary effects on stock prices that should be considered. This paper completes and extends previous findings along these dimensions.

Several studies fail to report a significant drop in market price following accidents (Mitchell and Maloney, 1989; Knight and Pretty, 1999; Jones and Rubin, 2001). The mixed results are probably attributable to the heterogeneity of the events analyzed. Several papers group together very large and publicized major accidents, minor incidents that hardly reach shareholders, and even product recalls (Knight and Pretty, 1999). To really determine the extent of a deterrence effect, a focus on major accidents is warranted. We study transportation and industrial accidents large enough to appear on the front page of an influential newspaper.

Previous research on the impact of accident announcements on stock markets has used the event study approach. The abnormal return during the few days following the announcement is the difference between the observed returns and a normal return, estimated using the market model as described by Capelle-Blancard and Laguna (2010). The estimated cumulative abnormal return over a given event window represents the hypothetical rate of return of an investor who buys the stock of a firm at the closing price the day before the event and sells the stock at the end of the window. Previous analyses generally report estimated average cumulative abnormal return for the two days following the accident, ranging between -1% and -5% . Investors' wealth is thus negatively affected by the accident (Walker et al., 2006; Capelle-Blancard and Laguna, 2010; Ho et al., 2013). This observation supports the assertion that financial markets may provide incentives for firms to change their environmental and safety behavior (Konar and Cohen, 1997; Dasgupta et al., 2001; Engelen and van Essen, 2011). However, as underlined by Ambec and Lanoie (2008), a real deterrence effect can exist only if the announcement of a negative event is associated with a persistent effect on stock prices, consistent with an increase in the cost of equity. If the drop in market value following an accident is limited to a few days, and is followed by a strong recovery, the deterrence effect should be weak. Institutional investors, whose investment horizon is longer than a year, are probably not very concerned about such a short-term effect. Every basic book in corporate finance, such as Ehrhardt and Brigham (2013, p. 9), states that managers should maximize shareholders' wealth in the long run, and not focus on the current market price. Accordingly, the shareholders would not really be affected, or be prone to pressure firm management, if the accident effect on firm value is observed only for a few days. Previous research evidences a stock price reversal following the drop observed shortly after the accident announcement (Borenstein and Zimmerman, 1988; Jones and Rubin, 2001; Walker et al., 2006), and the lack of significant accident impact after a few weeks or months (Knight and Pretty, 1999; Capelle-Blancard and Laguna, 2010). Table 1 illustrates the scarcity of results related to this dimension. When provided, the estimated one-year average cumulative abnormal returns do not differ significantly from zero. Even large-scale events such as Bhopal or the Exxon Valdez oil spill have not decreased the stock value significantly in the mid-term (Salinger, 1992; White, 1996). Moreover, the four studies reporting mid-run results fail to address the numerous methodological challenges

Table 1

Stock market reaction to accidents. Event windows for the estimated average cumulative abnormal returns are presented between brackets when they differ from the classical windows. NA stands for not available.^a Env. (acc.) means environmental (accident).

Authors	Sample	[0–2]	[0–10]	6 Months	1 Year
Ho et al. (2013)	133 Air crashes, 1950–2009	$-4.60\%^{***}$	$-2.95\%^{***}$	NA	NA
Sabet et al. (2012)	BP Deepwater	$-2.62\%^{***}$	NA	NA	NA
Capelle-Blancard and Laguna (2010)	64 Chemical disasters, 1990–2005, 10 countries	$-1.09\%^{***}$	-0.60%	-2.70%	NA
Walker et al. (2006)	26 Major railroad events, 1993–2003, US–Canada	$-1.90\%^{***}$	-0.27%	0.57%	0.28%
Karpoff et al. (2005)	478 Env. violations, including accidents 1980–2000	$-1\%^{***}$	NA	NA	NA
Walker et al. (2005)	107 Airline disasters, 1962–2003, US	$-3.10\%^{***}$	$-3.18\%^{***}$ [0 + 14]	-2.93%	5.74%
Jones and Rubin (2001)	73 Negative env. events, 1970–1992	-0.15%	0.44%	NA	NA
Knight and Pretty (1999)	15 Major corporate catastrophes, 1982–1993	NA	-6.652%	-0.608%	-0.58%
Nethercurtt and Pruitt (1997)	Valujet Flight 592, 1996, US	NA	-0.6731%	NA	NA
Klassen and McLaughlin (1996)	18 Env. crises, 1989–1990, US	$-1.50\%^{***}$ [0 + 3]	NA	NA	NA
Salinger (1992)	Bhopal, Union Carbide, 1984, India	NA	$-31.5\%^{***}$ [0 + 20]	$-22\%^{**}$	8.90%
Broder and Morrall (1991)	86 Fatal acc., 1963–1986, US and other	$-1.95\%^{**}$	$-2.57\%^{**}$	NA	NA
Mitchell and Maloney (1989)	24 Fatal airline crashes, 1964–1987, US	-2.27%	-2.51% [0 + 5]	NA	NA
Borenstein and Zimmerman (1988)	74 Airline crashes, 1960–1985, US	-0.873%	-0.234%	NA	NA

^a We exclude the studies of spillover effects of accidents because the deterrence effect is unclear in these cases; see Capelle-Blancard and Laguna (2010 p.194) for a survey. All studies use the market model, but Sabet et al. (2012) add a factor related to oil prices and a GARCH adjustment to consider the specificities of the Oil and Gas industry. Salinger (1992), who studies the Bhopal accident, adjusts the returns for both the market and a portfolio of chemical stocks.

** Denote statistical significance at the 5% level, respectively.

*** Denote statistical significance at the 1% level, respectively.

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