International Review of Law and Economics 37 (2014) 51–65

Contents lists available at ScienceDirect

International Review of Law and Economics

The role of aviation laws and legal liability in aviation disasters: A financial market perspective

Thomas John Walker[a,*], Marcus Glenn Walker[b], Dolruedee Nuttanontra Thiengtham[c], Kuntara Pukthuanthong[d]

[a] Laurentian Bank Professor in Integrated Risk Management, Concordia University, Canada
[b] Fin-Consult, Griesheim, Germany
[c] Department of Finance, University of Exeter, UK
[d] Department of Finance, San Diego State University, United States

ARTICLE INFO

Article history:
Received 25 February 2011
Received in revised form 3 July 2013
Accepted 12 July 2013

JEL classification:
G14
L93

Keywords:
Aviation law
Information and market efficiency
Event studies

ABSTRACT

Legal liability claims against airlines and airplane manufacturers following an aviation disaster are determined through a myriad of international treaties, intercarrier agreements, and federal and state laws. Which law applies in a specific situation depends on various circumstances surrounding the accident. As a result, pecuniary and non-pecuniary damage awards for the families of the accident victims may vary substantially from case to case. Our study examines how aviation disasters affect the short and long-term performance of US airlines and US airplane manufacturers and explores the factors that drive the performance differences. While prior research has largely focused on brand name effects and rising insurance premiums as possible determinants of stock price losses, our results suggest that the regulatory environment that applies to a given aviation accident has a significant impact on how the market reacts to its announcement. Ceteris paribus, we find that accidents that are governed by state laws which place no limit on damage claims entail particularly large stock price declines. Accidents for which federal laws or international treaties restrict claimable damages, on the other hand, are associated with smaller stock price drops.

1. Introduction

This paper examines the short-term and long-term stock price performance of airlines and airplane manufacturers following aviation disasters in the US. Although air travel safety has improved significantly in recent years and flying represents one of the safest modes of traveling large distances,[1] accidents occasionally do happen. Once an accident occurs – whether caused by human error, mechanical failure or deliberate criminal or terrorist activity – it is often severe and may entail the loss of many human lives. As a result of an airplane crash, airlines are frequently the target of a plethora of legal liability claims filed by the surviving relatives of the disaster victims. In addition, in cases where design flaws or manufacturing errors are believed to have caused the accident, airplane manufacturers are often sued as well.

The rights of the victims' families to recover damages from the airlines are limited by a veritable thicket of legal obstacles: the Warsaw Convention, the Death on the High Seas Act, various state and federal laws, and intercarrier agreements. As a result, monetary damages that the victims' families may claim can literally vary from zero to millions of dollars (Kolczynski, 2001).

While the extant literature provides ample evidence of a significant stock price decline for airlines and airplane manufacturers following airplane crashes, the source of the stock price reaction is still under debate.[2] Airlines are generally insured against hull losses and damages to third party property. In addition, aviation insurers provide coverage for most legal liability claims that may be brought against airlines and airplane manufacturers by the

* Corresponding author at: Department of Finance, Concordia University, 1455 de Maisonneuve West, Montreal, Quebec H3G 1M8, Canada.
E-mail address: twalker@jmsb.concordia.ca (T.J. Walker).

[1] See Rose (1992) who observes a significant decline in accident rates per million departures during the period 1955–1990 and Brown (1998) who points out that fatalities have remained static over the past 40 years, despite a large increase in passenger numbers.

[2] Studies that examine the consequences of airplane accidents for airlines include, for example, Chance and Ferris (1987), Davidson et al. (1987), Borenstein and Zimmerman (1988), Mitchell and Maloney (1989), Bosch et al. (1998), Carter and Simkins (2004), Kaplanski and Levy (2010). The impact on airplane manufacturers has previously been examined by Chalk (1986, 1987) and Chance and Ferris (1987).

0144-8188/$ – see front matter © 2013 Elsevier Inc. All rights reserved.
http://dx.doi.org/10.1016/j.irle.2013.07.004

victims of a crash.[3] Because insurable losses should have no effect on a company's future cash flows, academic research has largely focused on uninsurable losses resulting from increased regulatory oversight (Rose, 1992), loss of consumer goodwill (Borenstein & Zimmerman, 1988; Bosch, Eckard, & Singal, 1998; Chance & Ferris, 1987; Mitchell & Maloney, 1989), and rising insurance premiums (Mitchell & Maloney, 1989; Rose, 1992).[4]

Borenstein and Zimmerman (1988) argue that an airplane crash may affect demand in two ways. First, if passengers perceive that air travel safety has declined system-wide (e.g. as a result of terrorist threats or the revelation of regulatory oversight failures that are believed to affect the entire industry), the aggregate demand for flights may decline as travelers use other modes of transportation instead. This spillover (or externality) effect is likely to have an impact on all firms in the aviation industry.[5] Second, if passengers attribute the fault only to the airline that operated the crashed aircraft, they may avoid flying with that airline and switch to one of its competitors.[6] This would leave aggregate demand for flying unchanged but would cause intra-industry demand shifts away from the crashed airline to its rival firms, i.e. a positive spillover effect.

Borenstein and Zimmerman test both hypotheses using a sample of 67 fatal accidents between 1962 and 1985. While they find some evidence of a demand decline for the affected airline, their results do not support a spillover effect. In a more recent study, Bosch et al. (1998) note that Borenstein and Zimmerman failed to properly distinguish between different types of non-crash airlines based on how they might be affected by a competitor's crash. To account for this, Bosch et al. employ a sample of 25 crashed airlines and 250 non-crashed airlines, the latter of which are further divided into two groups based on the degree of overlap their routes have with those of the crashed airline. Bosch et al. argue that this procedure allows for a better separation into rivals and non-rivals. Their results suggest the presence of both types of externality effects: rivals that compete directly with the crashed airline because they have a large number of shared routes experience increased demand as passengers switch to them, while non-rivals experience a reduction in bookings as aggregate demand declines. Kaplanski and Levy (2010) show how market sentiment impacts asset pricing using aviation disasters. They document average market losses of more than $60 billion per aviation disaster while the estimated actual loss is not more than $1 billion. A reversal occurs two days later and this effect is stronger for smaller and riskier firms.

In addition to demand effects, some authors suggest that rising insurance premiums are responsible for a company's stock price decline. Mitchell and Maloney (1989) employ a sample of 56 crashes that occurred between 1964 and 1987 and investigate the impact of accidents on an airline's equity value and insurance premiums. They observe a statistically significant increase in insurance premiums following an airplane crash which helps explain about 38% of a crashed airline's loss in equity value. Similarly, Hayes, Flouris, Pukthuanthong-Le, Thiengtham, and Walker (2009) document a significant increase in insurance premiums for the entire airline industry in the aftermath of 9/11. The repercussions of accidents for airplane manufacturers have previously been studied by Chalk (1986, 1987) and Chance and Ferris (1987). Chalk (1986) studies the effect of a single accident – the May 25, 1979, American Airlines DC-10 crash in Chicago – and observes that McDonnell-Douglas lost about $200 million in market value following the crash. He attributes the associated stock price decline to the market anticipating a reduction in future sales of McDonnell-Douglas aircraft. In his 1987 study, Chalk employs a sample of 76 accidents, 23 of which were likely due to defects in the aircraft ("suspect cases"), and 53 that were caused by other factors. He finds significant stock price declines for manufacturers in the 23 suspect cases but no significant price reaction in the remainder of his sample.[7] He further separates the 23 suspect cases into 19 that involved airplanes still in production and 4 that involved airplanes that were no longer produced at the time. The stock price declines are not significant in the latter group from which Chalk tentatively concludes that expectations of lost future sales are in part responsible for the decline in firm value. Rose (1992) mentions a direct cost of increased insurance premium and an indirect cost of decreased in demand are two costs of insurance companies. Mitchell and Maloney (1989) project an additional insurance cost of about $10 million for the next five years after a disaster.

Our study extends this literature in several ways: First, we provide the first comprehensive analysis of both the short- and long-term stock price performance of airlines and airplane manufacturers following aviation disasters using a sample that covers almost the entire history of civil aviation from 1950 to 2009. Second, unlike prior studies that primarily draw their conclusions from univariate comparisons of abnormal performance measures between two or three subsamples, we employ a series of regression models that control for possible interactions between a variety of explanatory factors. What interests us particularly is whether investor reactions depend on the laws and regulations that govern a given accident. Although the extant literature has largely ignored the regulatory environment when examining stock price reactions – likely because legal liability claims are generally covered by insurance – we find strong evidence that suggests that differences in legal frameworks help explain a considerable part of the abnormal stock price reaction following an accident. While legal liability costs may not be directly associated with a stock price loss, we argue that they are indirectly reflected in future insurance premiums. As such, our results also provide support for Mitchell and Maloney's (1989) hypothesis that a large part of an airline's stock price reaction can be attributed to rising insurance costs. Finally, we examine whether investors react rationally to disaster announcements. We fully expect airline and airplane manufacturer stocks to drop after a disaster. What interests us from an academic point of view is whether investors are able to quickly predict the fair price of an airline stock after a crash, as is suggested by the efficient market hypothesis of Fama (1970, 1991). Our results indicate otherwise, i.e. we find that the initial stock price declines for airlines during the first day of trading are consistently followed by additional declines during the following week. Our results are thus consistent with the recent findings by Kaplanski and Levy (2010) who examine investor

[3] See, for example, Hayes et al. (2009) who provide a detailed analysis of insurance payments made in connection with the 9/11 terrorist attacks.

[4] In addition, an airline typically incurs revenue losses as a result of reduced scheduling capacity following a crash. Although such losses have been noted in the literature (see Borenstein and Zimmerman, 1988; Mitchell and Maloney, 1989), their costs have not yet been empirically measured. While the effect is likely small for large carriers, smaller carriers that operate a limited number of airplanes may be more affected.

[5] Such negative spillover effects were documented by Bosch et al. (1998) following the July 1996 mid-air explosion of TWA flight 800 for which initial news reports speculated on a "surface-to-air missile fired from below" as a possible cause (see, for example, Matthew Purdy, "Little Hard Evidence is Found – Death Toll is Put at 230", New York Times, July 19, 1996, p. 1). Fears of another terrorist attack also led to a considerable drop in demand and significant stock price declines across the entire aviation industry following the 9/11 terrorist attacks (see Carter and Simkins, 2004; Flouris and Walker, 2005).

[6] See also Mitchell and Maloney (1989) who distinguish between accidents for which the airline was found to be at fault and those attributed to other causes. Their results suggest a significant stock price decline only for at-fault cases, but not for accidents that were outside of the airline's control.

[7] In a similar study, Chance and Ferris (1987) observe no significant stock price declines for airplane manufacturers following an accident. Their sample is smaller, however, and does not distinguish between different types of accidents.