Financial Impact of Commercial Airline Crashes

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Honors Thesis in Finance
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Research Abstract

Stock prices of airline companies adjust quickly after a crash occurs, and the S&P 500 index reflects the general stock market. To test the hypothesis that airlines’ equity value would be significantly affected after crash dates, I chose a sample of 29 airplane crashes from nine publicly traded airline companies in the United States since 1988. I then gathered 45 daily returns of those airline companies before, 45 daily returns after each crash dates, and the S&P 500 returns of same ranges. I ran the revised Sharpe capital asset pricing model and analyzed the result. The conclusion is that there is no abnormal stock fluctuation following airplane crashes for airlines publically traded in the United States after 1988.

Methods

I used the Sharpe capital asset pricing model $R_{jt} = \alpha_j + \beta_j R_{mt} + \epsilon_j$ to examine the effect of an airline accident on the equity value of the airline. $\beta_j$ measures the sensitivity of the jth firm's return, $R_{jt}$, to movements in the market index, $R_{mt}$. $\beta_j R_{mt}$ is the portion of return to security j on day t that is due to marketwide factors, while $\alpha_j$ is the portion that is not due to market movement.

I also created five dummy variables ($\gamma_1, \gamma_2, ..., \gamma_5$) for stock prices on the five days after each airplane crashes. The final regression model is $R_{jt} = \alpha_j + \beta_j R_{mt} + \delta_1 \gamma_1 + \delta_2 \gamma_2 + \delta_3 \gamma_3 + \delta_4 \gamma_4 + \delta_5 \gamma_5 + \epsilon_j$. After I ran the model with returns of airlines and the market (2639 observations in total), I got the coefficients and the t-statistics for each dummy variables. I then calculated the z-statistics, which explain how “far” stock returns on the five days after each crashes are from the means in general, for each dummy variables to see whether the result is statistically significant.

Results

The z-statistics I got for the five dummy variables are -0.1170257, -0.03375321, 0.161736833, 0.079670418, and -0.075236769. The p-values for the five dummy variables are -0.1170257, -0.03375321, 0.161736833, 0.079670418, and -0.075236769. We can see that although one of the distributions is skewed, all coefficients are very close to zero.

Interesting Observation

I have observed an outlier of returns among the 29 airline accidents, which has an relatively large stock rise on the first day after the crash – the US airways flight 1549 that crashed on January 15th, 2009. After researching, I found that the crew of flight 1549 made an unpowered emergency water landing in the Hudson River after multiple bird strikes caused both jet engines to fail, and all 155 occupants were rescued before the airplane sank into the river. The incident was known as the "Miracle on the Hudson", and Captain Sullenberger was regarded as a hero by the public. This fact explains the rising of the airline's stock after the accident.

Conclusion

Based on the statistical results, the conclusion would be airplane crashes in the United States after 1988 do not affect the airline companies’ stock prices. This may be due to the fact that airlines are insured to reduce the loss. Another explanation could be that people’s perception about the safety of airlines does not change significantly when accidents happen. Furthermore, the public may see an airline accident as the airline manufacturer’s fault, not the airline company’s.

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A complete listing of works cited can be acquired by emailing yuan-fang@uiowa.edu