

International Transmission of Shocks in the Airline Industry

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Motivation

- To examine the channels through which shocks may be transmitted across countries
- Borrowing from the macroeconomics literature on financial crises but using firm level data
- What was the incremental effect of September 11 on a subset of airlines facing financial challenges?
- Do alliances benefit carriers as well as increase risk?

Trade and Alliance Effects

- Crises spread through international trade linkages
- This could also be thought of as an income effect which reduces demand in the crisis country due to a negative shock and affects all firms that sell to that market
- In the Airline industry, Alliances could be another source of transmission

Credit Crunch

- A crisis in one country could make it difficult for firms in other countries to obtain new financing or renew existing loans – increasing risk exposure and foreign ownership constraints are issues.
 - Generally more relevant to banking crises but in this context it can be thought of as the ‘New York’ effect

Wake-up Call

- This can be thought of as a country re-evaluation effect, or a crisis in one country could induce investors to re-evaluate other similar countries or countries that have links to the crisis country
 - Sometimes called a herding or information cascades effect but in this context can be thought of as a regional/country effect

Market Model

- Estimate 54 such equations using ordinary least squares for the period 1.9.2000 to 10.9.2001

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it}$$

- This is the standard event study method where daily (normal) stock returns are regressed on the respective country market return

Calculate Abnormal Returns

- Next use the parameters of the market model to forecast returns for the event period / window
 - Cumulative abnormal returns are also calculated for graphical analysis

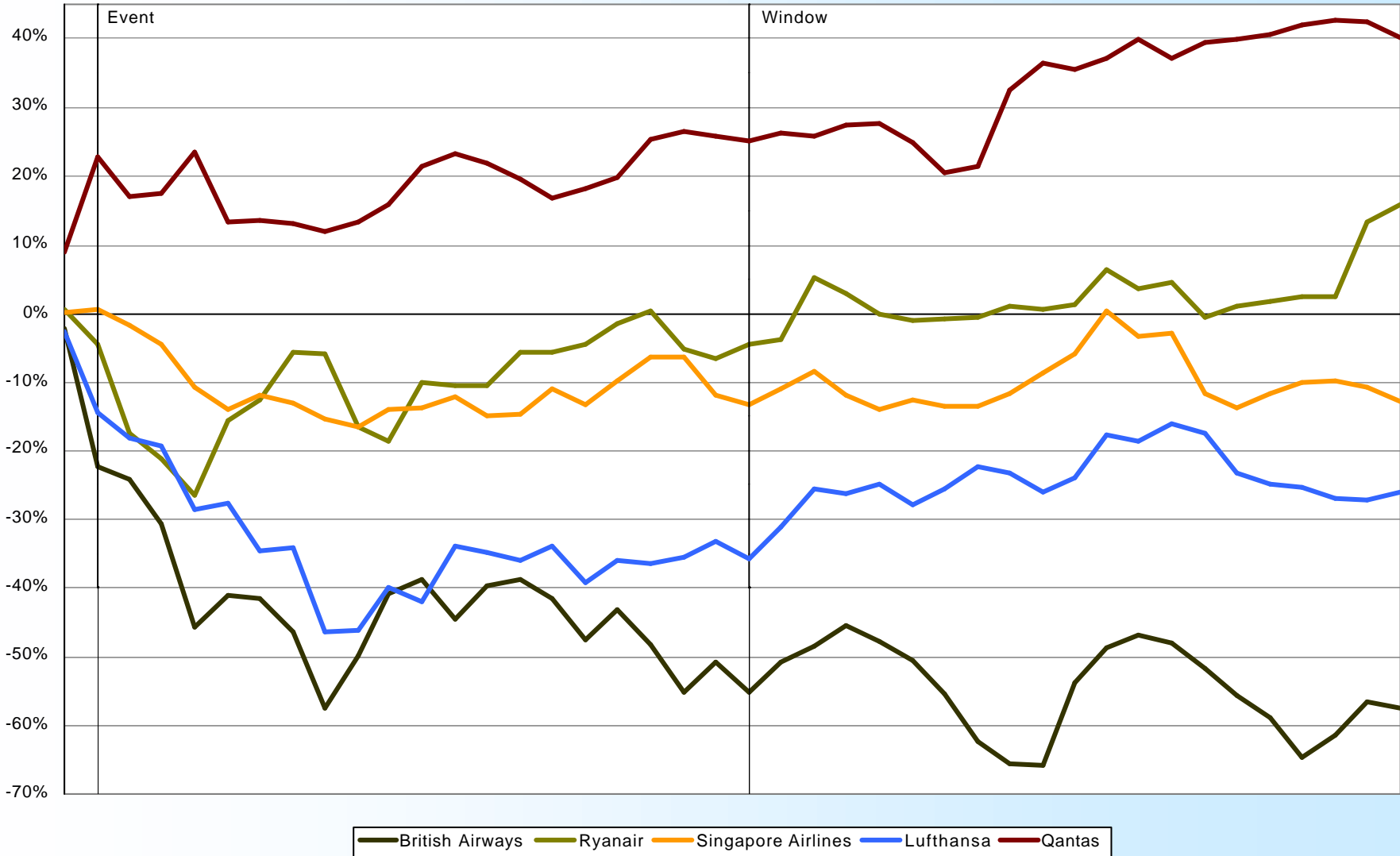
$$R_{in}^F = R_{in} - (\alpha_i + \beta_i R_{mn})$$

$$CAR_{iN} = \sum_{n=1}^N R_{in}^F$$

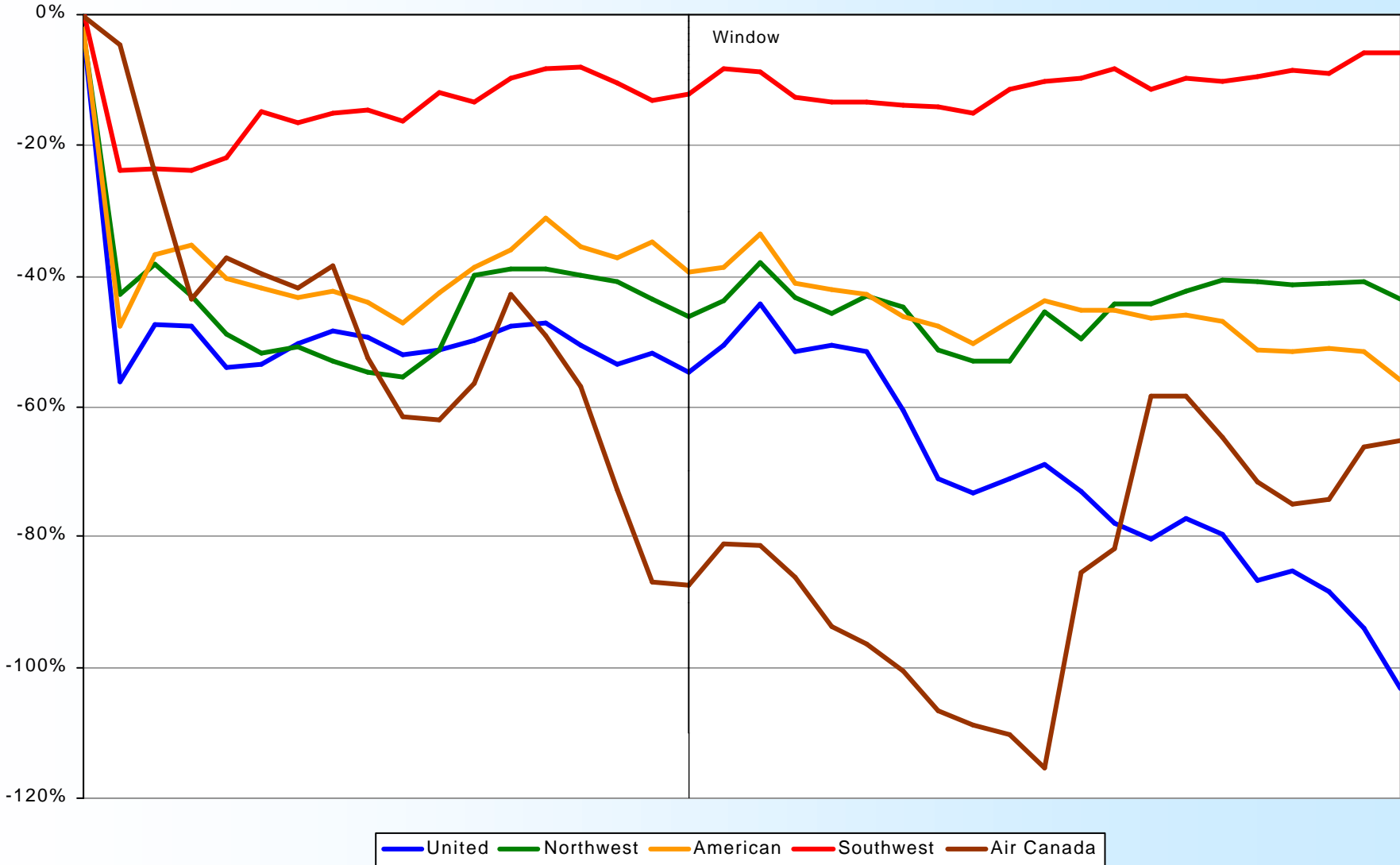
Window Dates

- The first window is from 10.9.2001 to 9.10.2001
 - One day after FAA announces new security measures for US airlines and airports
- The second window is from 10.9.2001 to 6.11.2001
 - One day after FAA Administrator Jane F. Garvey announced the agency would begin hiring additional security employees to supplement the FAA's security agent forces and to increase security at US airports

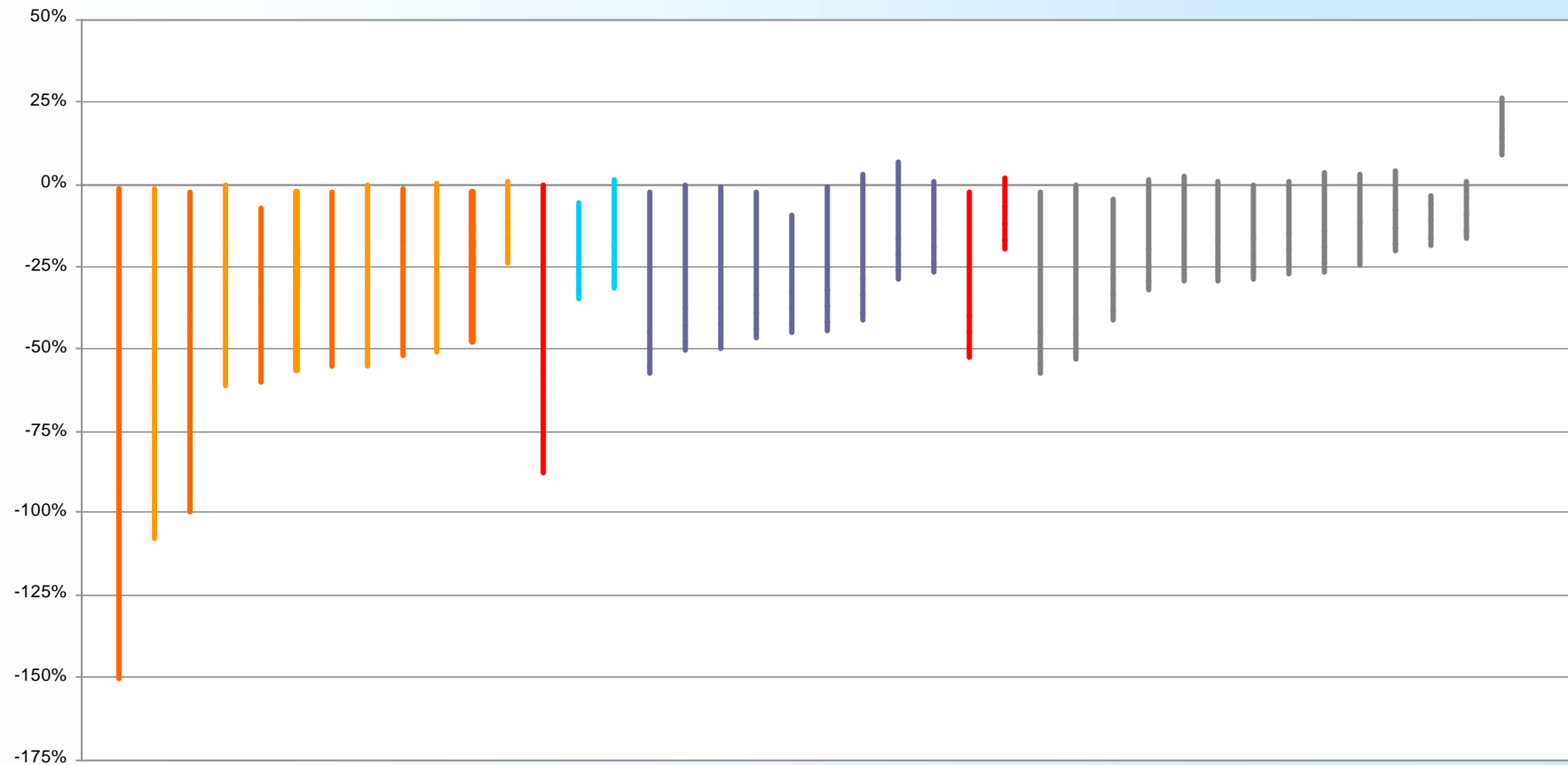
Cumulative Abnormal Returns



Cumulative Abnormal Returns

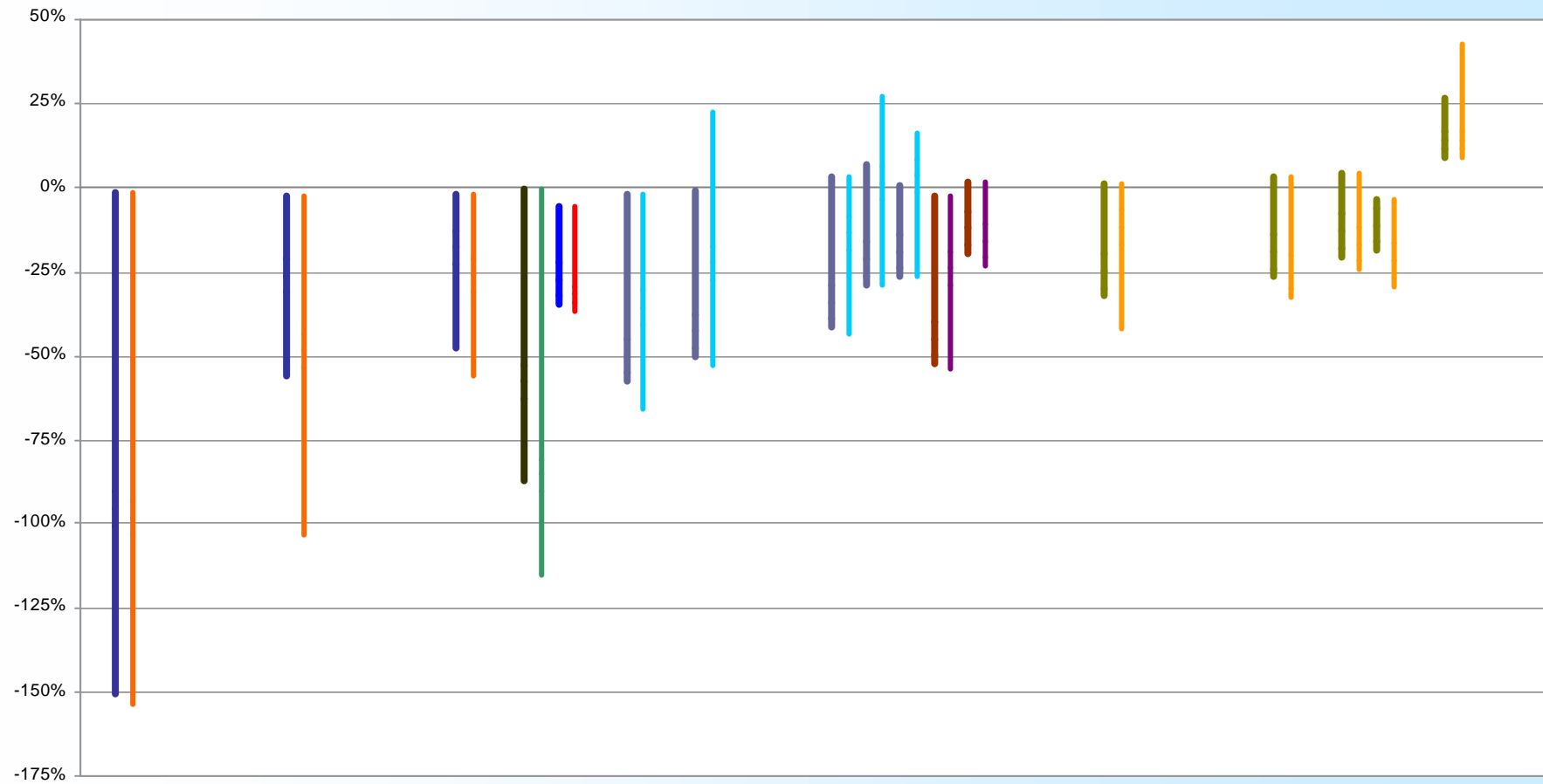


Bounds of Cumulative Abnormal Returns - Window 1



America West	Continental	US Air	Airtran	Midwest	United	Northwest
Delta	Alaska	Frontier	American	Southwest	Air Canada	Lan Chile
Varig	British Airways	EasyJet	Gandalf	Lufthansa	KLM	Air France
Austrian Airlines	Alitalia	Ryanair	Turkish Airlines	Cyprus Airways	Eva Air	China Airlines
Thai Airways	Malaysian Airlines	China Eastern	China Southern	All Nippon Airways	Cathay Pacific	Korean Air
Asiana Airlines	Japan Airlines	Far Eastern Air	Singapore Airlines	Qantas		

Bounds of Cumulative Abnormal Returns Both Windows



America West	America West 2	United	United 2	American	American 2	Air Canada
Air Canada 2	Lan Chile	Lan Chile 2	British Airways	British Airways 2	Gandalf	Gandalf 2
Austrian Airlines	Austrian Airlines 2	Alitalia	Alitalia 2	Ryanair	Ryanair 2	Turkish Airlines
Turkish Airlines 2	Cyprus Airways	Cyprus Airways 2	Malaysian Airlines	Malaysian Airlines 2	Korean Air	Korean Air 2
Japan Airlines	Japan Airlines 2	Far Eastern Air	Far Eastern Air 2	Qantas	Qantas 2	

Cross-Sectional Analysis

- The second step involves regressing the mean abnormal return during the event period on firm specific variables
- There are 37 Airlines in this step
 - 15 Airlines were dropped because the first stage regression model did not pass statistical tests
 - Two other firms: Gandalf and USAirways were dropped because of poor financials

Variables

- The following independent variables are used for 26 non-US carriers
- Trade effect – Proportion of US traffic
- Alliance effect – Indicator variable which equals 1 if the airline belongs to an affected alliance (Star or One World)

Variables

- Credit crunch effect – Short term debt to total assets which is proxied by a coverage variable (quick ratio) in the sensitivity analysis
- Wake-up call effect – Indicator variables for regions/countries

Control Variables

- Proportion of international traffic
- Following financials
 - Valuation: Price to Book
 - Profitability: Return on Assets
 - Size: Market Capitalization
 - Leverage: Total debt to total assets

Estimation Issues

- Use generalized least squares
 - Generate a covariance matrix from the estimation period which accounts for the fact that the error terms are not independent across firms and the variance of the market returns in the forecast period may differ from those in the estimation period
 - Use White's heteroscedastic-consistent standard errors

Results- International

- The credit crunch effect is not in evidence
 - this is not surprising given foreign ownership constraints
- The Trade effect is always significant mostly at the 1% level and otherwise at the 5% level
 - In window 1 this leads to a reduction of about 3.25 to 4.75 percentage points in the mean daily returns
 - In window 2 the effect is about half or between 2 to 2.4 percentage point

Results- International

- The wake-up call effect is always significant mostly at the 5% level and otherwise at the 1% level
 - This result is not sensitive to redefinitions of the country/regional indicator variables
 - This involves a joint test that all the regional/country indicator variables are together significantly different from zero

Results - International

- The alliance effect
 - This is generally insignificant but is sensitive to a re-definition of the country/regional indicator variables – more so in window 1 than in window 2
 - In window 1 it reduces mean daily returns by about 0.6 to 0.9 percentage points and in window 2 by about 0.45 percentage points

US carriers

- There are 11 US carriers
 - Retain credit crunch effect
 - Retain proportion of international passengers
 - Include indicator variable for affected carrier
 - Include indicator variable for low cost carrier
 - Drop valuation control as it is correlated with some other financial variables

Results - US

- Not particularly robust due to small sample size and problems with financial variables
 - Credit crunch is non existent
 - Both Low cost carrier effect (Eastern Seaboard Effect) and proportion of international travel are significant usually at the 10% level
 - In window 1 the former leads to a 4-5 percentage point reduction in daily returns and the latter by about 17-20 percentage points
 - Dropping the credit crunch variable improves statistical significance

Summary & Conclusions

- Consistent with the macro-literature – credit crunch effect is non-existent.
- Trade is the most important transmission channel
- Alliances when significant are not as important as trade channel – in terms of their effect on the stock returns