Recent Developments in the Aviation Insurance Industry

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Overview

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- We examine the “inner workings” of the aviation insurance industry
- Four main questions are addressed:
  - How do insurers spread the risk in case of a major aviation accident?
  - How has the aviation insurance industry reacted to the events of 9/11?
  - How can airlines insure themselves against deliberate acts of violence? How about crashes caused by war activity? What policies are available to cover these risks?
  - Is the aviation insurance industry prepared for another 9/11 or an even greater disaster?

Literature Review

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- There have been several studies that looked at the stock market reaction to aviation disasters. Most of them concentrate on the affected airlines or the airplane manufacturers. In addition, some studies have looked at the stock price reaction to the events of 9/11:
  - Impact of Crashes on Airline Stocks
    - Chance and Ferris (1987), Davidson et al. (1987)
  - Impact of Crashes on Airline and Airplane Manufacturer Stocks
    - Flouris and Walker (2005), Thiengtham and Walker (2005)
  - On the Stock Market Reaction Following 9/11
    - Carter and Simpkins (2002), Flouris and Walker (2004)

The Aviation Insurance Market

- Fundamental principle: the premiums of the many will pay the losses of the few.
  - The insurance market works to spread the risk between a large number of insurers and re-insurers so that the amount any one insurer is exposed to is kept within acceptable limits.
    - In a typical deal, more than 100 insurance companies share a specific risk.
- The aviation insurance market is unique:
  - Few insurable risks,
  - The insurance class is comparatively small,
  - The industry is exposed to catastrophic events.

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Table 1: Aviation Direct Gross Insurance Premiums

Sector	2003 ($m)[1]	1994 ($m)[2]	1994 adjusted ($m)[3]	2003 increase above inflation
Airlines	$3,000	1,750	2,100	43%
Products & Services	1,000	675	810	23%
Space	650	525	630	3%
General Aviation	2,500	1,960	2,350	6%
Hull (War) & Other	210	180	216	-3%
Total	7,360	5,090	6,106	

[1] Estimates by a leading aviation insurer (name withheld for confidentiality) for the 2003 underwriting year.
[2] Sigma 1/1996, Swiss Reinsurance Company, Economic Research Department.
[3] Adjusted to 2003 $ using US calendar year GDP inflators.

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Table 2: Airline Gross Premiums ($m)

YEAR	ALL-RISK	HULL WAR	EXCESS TP	TOTAL
1988	770	100	-	870
1989	480	80	-	560
1990	340	210	-	550
1991	660	160	-	820
1992	900	150	-	1,050
1993	1,320	180	-	1,500
1994	1,740	190	-	1,930
1995	1,950	180	-	2,130
1996	1,750	120	-	1,870
1997	1,400	50	-	1,450
1998	1,010	30	-	1,040
1999	1,020	30	-	1,050
2000	1,340	50	-	1,390
2001	3,770	410	750	4,930
2002	3,340	300	610	4,250
2003	2,740	180	500	3,420

Table 3: Number of Catastrophic Losses between 1994 and 2003 (Loss > $100 million)

> $100 million	31
> $200 million	18
> $300 million	13
> $400 million	9
> $500 million	6

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The System of Insurance and Re-Insurance

- Aviation risk is spread among insurers through a complicated system of insurance and reinsurance.
  - Insurance:
    - When signing an airline, several co-insurers share the risk. One of them will serve as the lead-insurer and will negotiate the terms and conditions for the cover provided.
    - The London market dominates with over 50% of capacity. Paris comes in second with about 12% of the international market.
    - US Airlines are typically insured by local (i.e. US) insurance companies.

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The System of Insurance and Re-Insurance (cont'd)

- Re-Insurance:
  - Proportional Re-Insurance
  - Non-Proportional Re-Insurance

- Re-Insurance of Re-Insurers:
  - Re-insurers seek re-insurance themselves. That way, risk is spread in a way that no single insurer or re-insurer will risk failure in the event of a catastrophic loss such as 9/11.

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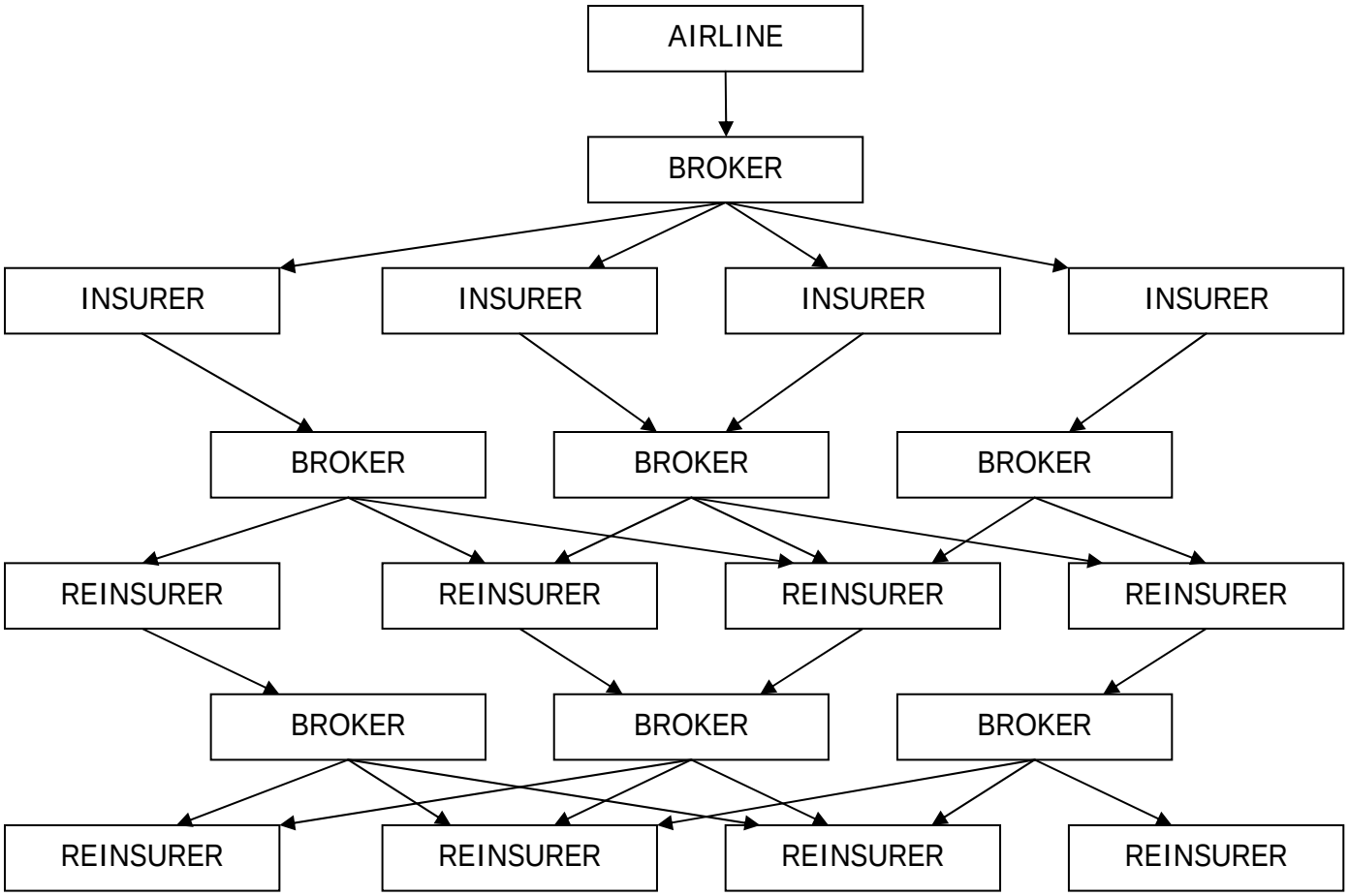
Figure 1: The Insurance 'Chain' for Airline Risk



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The Cover

- The following two are usually combined in a single policy:
  - Hull insurance (cover against loss of or damage to the aircraft itself),
  - Passenger and third party liability insurance.
- Losses resulting from wars and hijackings are typically excluded (‘War Exclusion’), but cover can be purchased through a separate policy.

Changes after 9/11

- The events of 9/11 cost the aviation insurance industry “only” $4 billion (the total insurable losses were approximately $40 billion). Nevertheless, 9/11 presented the largest loss the industry ever experienced.
  - Several capital providers realized that aviation insurance exposed them to potentially large risks while the returns were comparatively small.
    - As a result, many capital providers pulled out of the industry, leading to further consolidation within the market.
  - Insurers acted quickly to protect themselves from similar risks in the future and to ‘re-inflate’ the market.
    - Policies were withdrawn, rewritten and additional surcharges were added.
  - Worst case scenarios were re-specified by Lloyd’s to allow for even larger losses than 9/11.

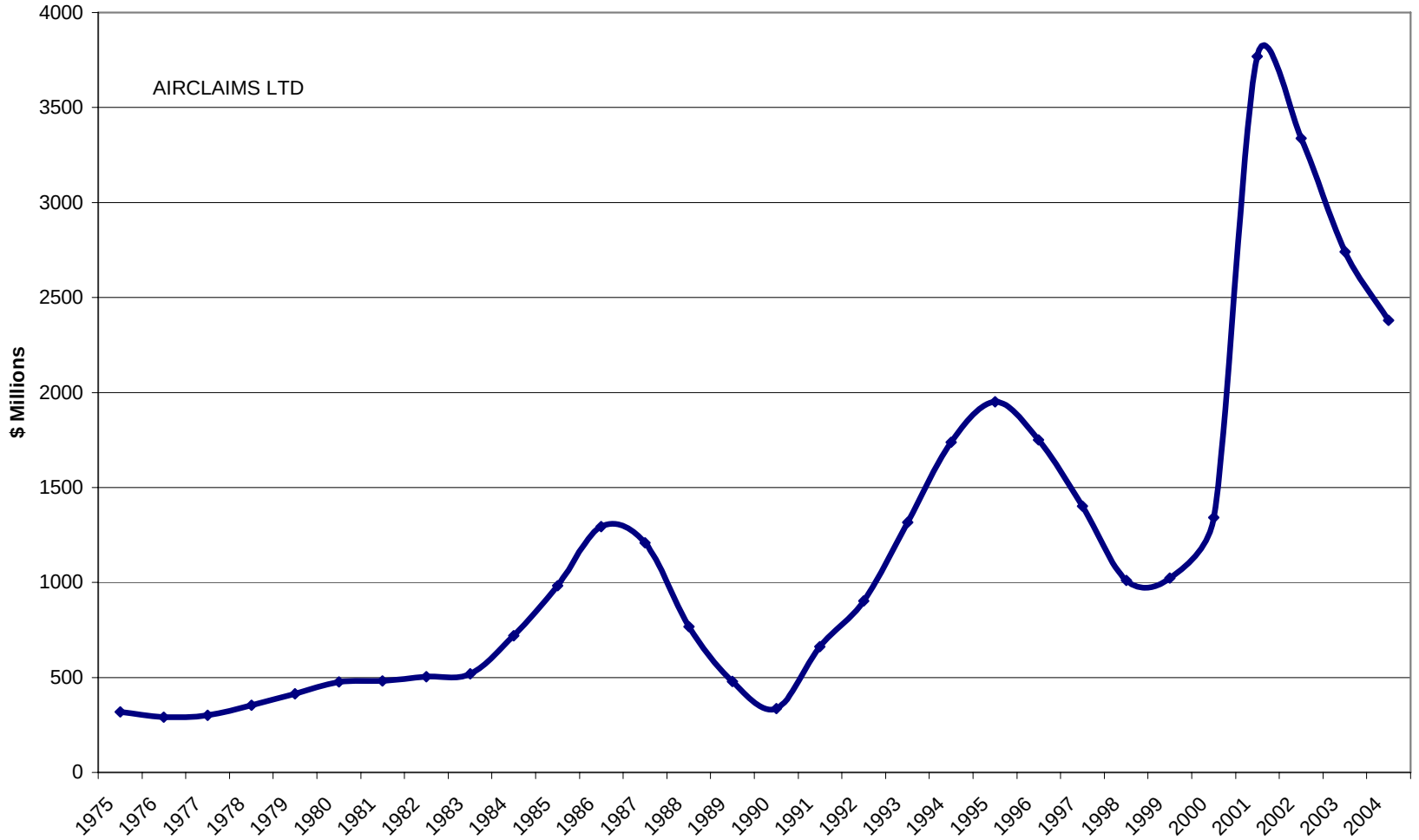
Underwriting

- The critical issue for the aviation insurance market is to find a sustainable level of premium that is both justifiable to buyers and also sufficient to attract and retain high quality capital providers.
- Insurance rates are affected by various factors:
  - (1) Money and insurance market factors
    - The availability of capital (capacity),
    - Interest rates and available rates of return on investments,
    - The availability and price of re-insurance, and
    - Competition within the insurance market.

Underwriting (cont'd)

- (2) Factors applicable to the class as a whole
  - The claims experience for the class as a whole,
  - The size of the risk exposure (e.g. fleet value and number of passengers carried),
  - Type of aircraft operated and their age, and
  - Country/region of the world where the risk is domiciled.
- (3) Factors specific to the risk itself
  - Specific claims experience,
  - Specific exposure profile, and
  - 'Technical factors' such as crew training, maintenance, equipment, safety culture and financial health.

Figure 2: Estimated Airline Premiums (All Risk & AVN52), Excluding Excess Third Party



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Conclusions

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- Aviation risks are insured through a complicated system of insurance and reinsurance that reveals highly sophisticated risk management practices.
- To minimize their risk exposure, large potential liabilities are shared by means of a complicated system among several insurers.
- The insurance market has adjusted to the post 9-11 aviation insurance realities and is reasonably ready to handle events of an even more catastrophic magnitude.