

Backus/March 11, 1998

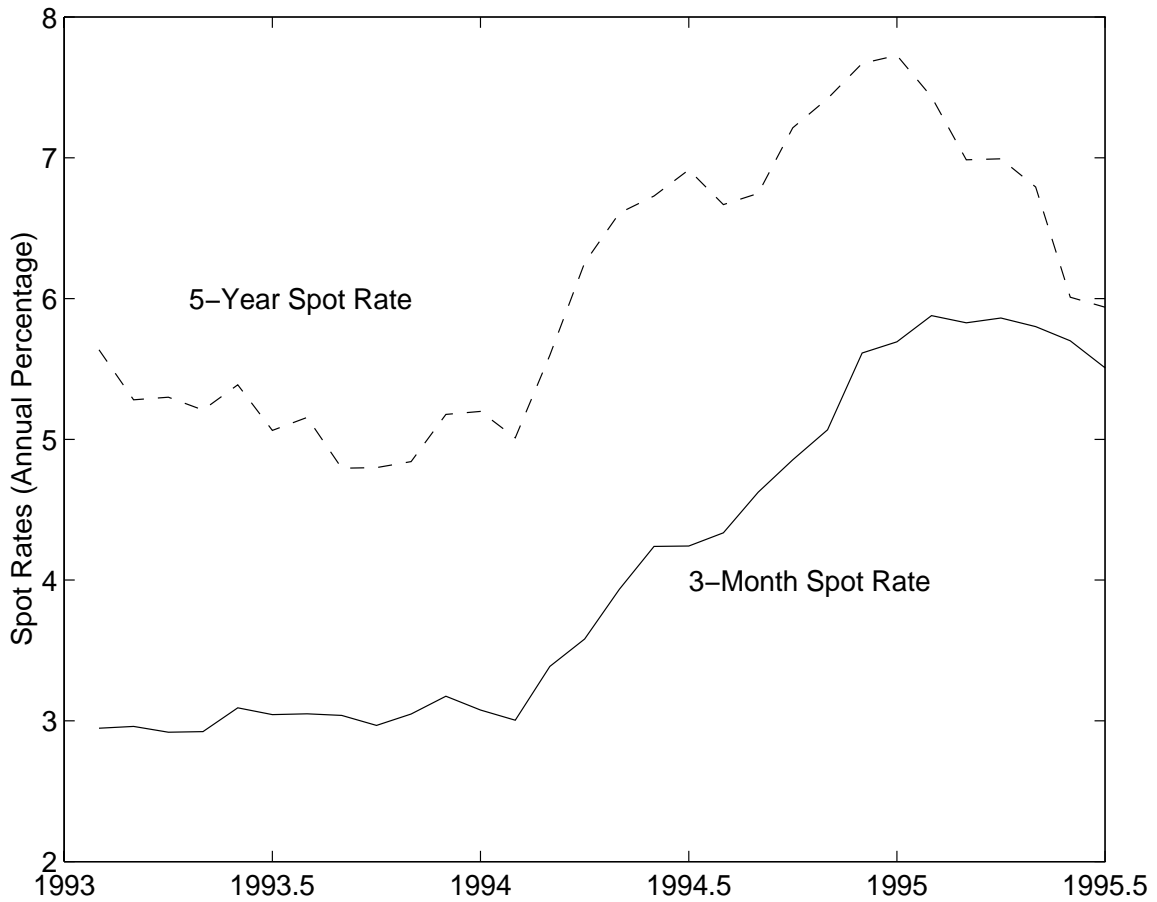
Disasters and Close Calls

0. Overview

- 1994
- Orange County
- Airline turbulence
- Banc One
- Metallgesellschaft
- Risk management checklist
- Lessons

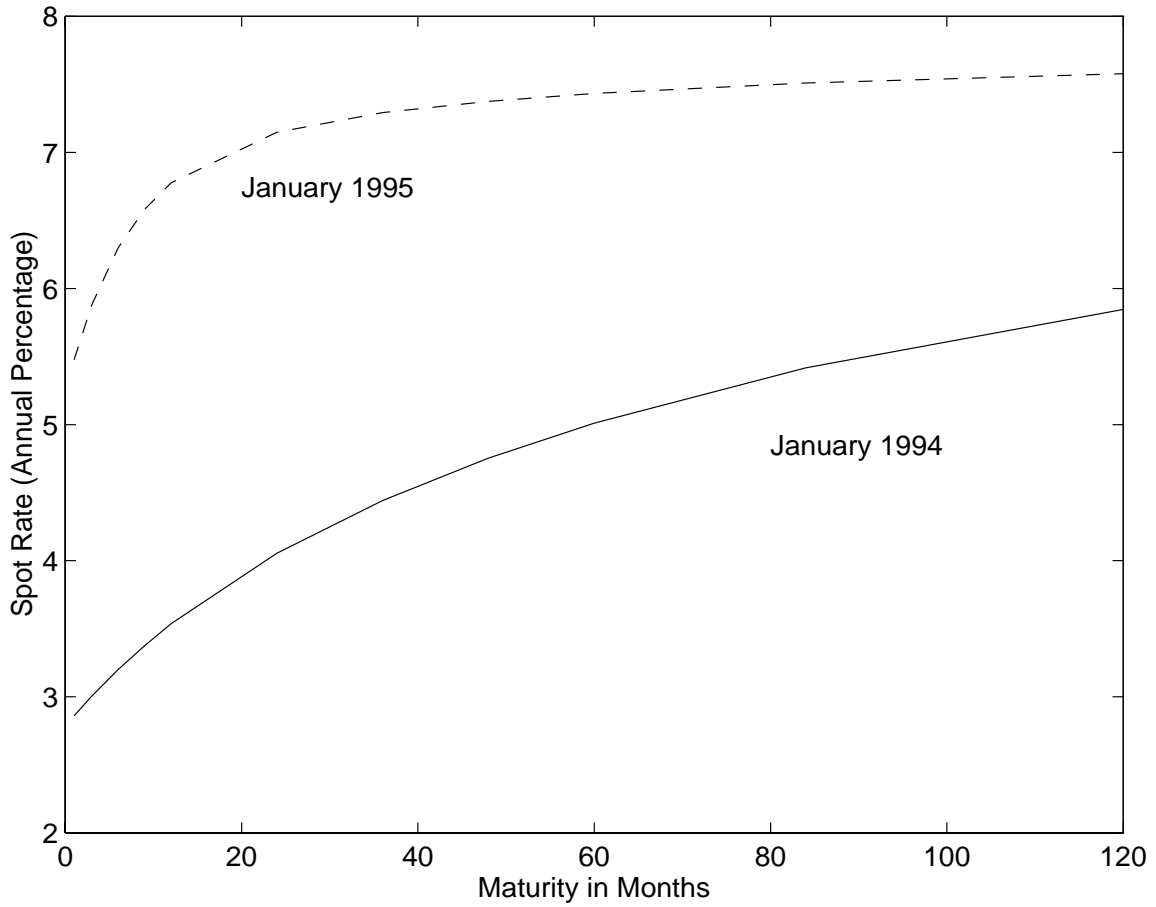
1. 1994: A Good Year for Trouble

Spot rates, January 1992 to June 1995:



1. 1994 (continued)

Spot rate curves, January 1994 and January 1995:



2. Orange County Investment Pool (OCIP)

Overview

- Funds from schools, municipalities
- Managed by Robert Citron, county treasurer
- Invested in treasury and agency issues
- Good track record between 1973 and 1993
- Lost \$1.6b in 1994
- Led Orange County into bankruptcy . . .
- . . . and Merrill Lynch into court

Sources: Jorion, *Big Bets Gone Bad* and internet case; Smith and Walter, *Street Smarts*.

2. Orange County (continued)

- Orange Country political climate
 - High growth clashed with tax aversion
 - Solution: Citron’s “investment acumen”

- Investment summary
 - Funds of \$8b in early 1994
 - Investments in
 - * Treasury notes
 - * Agency fixed rate notes
 - * Agency floating rate notes
 - * Mortgage-backed securities
 - * Short-term paper
 - * *Average maturity under 3 years!*

- Risk management
 - None
 - Very little reporting, either

2. Orange County (continued)

How was so much money lost?

- Rates rose about 300 BPs in 1994
- Apparent duration:

$$-1.6 = -D \times 8 \times .03 \Rightarrow D \cong 6.7$$

- How to do this with short assets:
 - Use repos to create leverage
(8b used to finance investment of 20b)
 - Inverse floaters
 - Mortgages “extended” as rates rose
- Result: effective duration about 7, as estimated

2. Orange County (continued)

Legal problems:

- Merrill's sales to Orange County:
 - Bad advice?
 - Inappropriate investments? (Beware of governments!)

- Merrill's underwriting of mid-1994 OC note issue:
 - Incomplete disclosure of OCIP situation?

- Conflict of interest?
 - Financial institutions often find themselves on both sides
 - Inherent legal morass

- Bottom line:
 - Merrill took hits to reputation and stock price
 - Individuals suffered criminal penalties
 - Higher borrowing costs for municipalities

2. Orange County (continued)

Lessons:

- Risk management matters
- Disclosure is a prerequisite
- If customers lose money, vendor gets sued
- How can we tell whether you're smart or lucky?

3. Airline Turbulence

- Freddie Laker
 - Pioneer in low-price air travel
 - Currency mismatch: pound revenue (tix), dollar expense (fuel, debt)
 - Not hedged
 - Pound fell from \$2.25 in 1981 to \$1.60 in 1982
 - Laker Airways went bankrupt

- Lufthansa (mid-1980s)
 - Hedged currency exposure with forward contracts
 - Year 1: hedge made money, CFO a hero
 - Year 2: hedge lost money, CFO fired
 - Lessons:
 - * Don't work for the government
 - * Hedge with options (limited downside)
 - * "Weld" hedge to position

4. Banc One

- Not a disaster, but interesting nonetheless
- Used swaps to modify interest-sensitivity
- Magnitude substantial: 39b notional on assets of 80b (year-end 1993)
- Investor hysteria drove down stock price (Oct-Nov 93)
- SEC forced detailed disclosure
- Reported “unrealized losses” of 1b at year-end 1994

4. Banc One (continued)

- Balance sheet, year-end 1993 (billions):

Assets	Amount	Rate	Duration
Variable rate loans/investments	31.142	6.90	0.24
Fixed rate loans/investments	40.148	8.78	2.42
Other assets	8.629	0.00	1.34
Total assets	79.919	7.10	1.45
Variable deposits/liabilities	37.729	2.51	1.53
Fixed liabilities	20.003	4.61	1.49
Non-interest bearing DDA	13.667	0.00	3.42
Other liabilities	1.476	0.00	0.06
Total liabilities	72.885	2.57	1.84

- Remarks
 - Note the rates (net interest margin of 4.5%!)
 - Liabilities “longer” than assets
 - Deposits go beyond our standard calculations: eg, “sticky” deposits (how sensitive to rates?)

4. Banc One (continued)

- Derivative positions (billions):

Position	Notional Principal
Receive fixed swaps	6.683
Receive fixed amortizing swaps	15.054
Pay fixed swaps	1.619
Basis swaps	5.556
Forward starting swaps	7.500
Other derivative products	2.598
Total	39.010

- Remarks
 - Mostly receive fixed, which raises duration
 - Linked to specific positions (hedge accounting)
 - Amortizing swaps (synthetic mortgages):
principal declines faster when rates are low
 - Basis swaps: receive LIBOR, pay prime
 - Forward starting: help!
 - Asset duration raised from 1.45 to 1.73
Liability duration lowered from 1.84 to 1.51

4. Banc One (continued)

Post mortem:

- Were they hedging: No!

- Why? Yield spread was too attractive to pass up

- Unrealized loss of 1b on amortizing swaps (end 1994)
 - Nonlinearity makes this worse than duration suggests
 - Omits offsetting gains elsewhere on the balance sheet

- Shifted to duration-neutral position in 1994

- Risk management gains a convert

5. Metallgesellschaft

Background

- Metallgesellschaft AG (MG):
 - Century-old German conglomerate
 - Controlled by institutional investors (Deutsche Bank, Daimler-Benz)
 - 251 subsidiaries across many industries in 1992

- MG Refining and Marketing (MGRM):
 - US subsidiary
 - Energy-related activities

- MGRM marketing strategy
 - Sell fixed-price energy contracts (oil)
 - Wildly successful: 150m bbl by September 1993

5. Metallgesellschaft (continued)

Sequence of events

- Hedging: roll over short-dated energy futures
- Oil price declines in late 1993 led to losses on futures (and gains on fixed-price contracts)
- Margin calls created liquidity problems
- Management sacked by parent
- Futures and sales contracts liquidated
- Losses estimated at 1.3b
- Everyone sues everyone else

5. Metallgesellschaft (continued)

- Interpretation of events
 - Basis risk: in 1993, futures rose relative to spot
 - Magnitude swamped the NYMEX, led to squeezes
 - Liquidity problems
 - * Cost of carry
 - * Margin calls
 - * NYMEX hears rumors, raises margins

- Reinterpretation of events
 - Basis risk: unavoidable
 - Magnitude: a business decision
 - Liquidity management: MG failed to step in
 - Losses:
 - * Liquidation of futures left them unhedged
 - * Fire sale drove down prices
 - * Sales contracts settled free!

5. Metallgesellschaft (continued)

Lessons:

- Basis risk: it's real

- Intellectual risk is when:
 - Your boss doesn't understand what you're doing
 - They fire the people who do

- Accounting: German accounting may have misled the parent

- Liquidity: sometimes hedging requires deep pockets

6. Derivatives Checklist

- Does organization of derivatives activity have
 - clear statement of objectives?
 - clear delineation of responsibilities?
 - oversight and responsibility of top management?

- Controls and confirmation of trades:
 - Are trades confirmed independently?
 - Do traders have clear limits?
 - Are models and prices verified by third parties?

- Risk management:
 - Is top management informed of risks?
 - Does top management set clear overall limits to risk?
 - How frequently is book marked to market?
 - Are catastrophic scenarios explored?
 - What happens if the largest counterparty defaults?

Source: C*ATS via *RISK Magazine*

7. Summary

- High pressure can lead to big mistakes
- Verify trades
- Look gift horses in the mouth
- Make sure your boss knows what you're doing
- Know that extreme events happen — all the time
- Link financial engineering to business strategy