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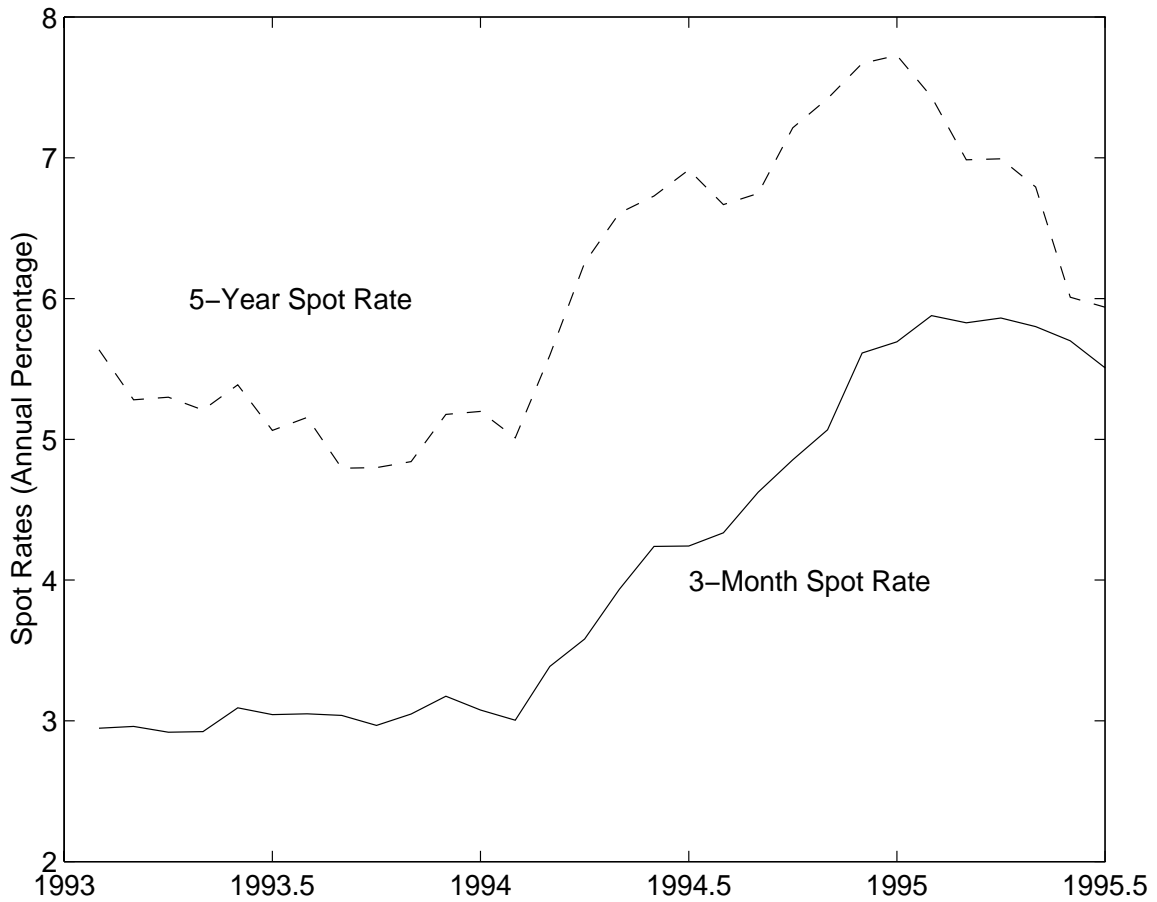
## Disasters and Close Calls

### 0. Overview

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

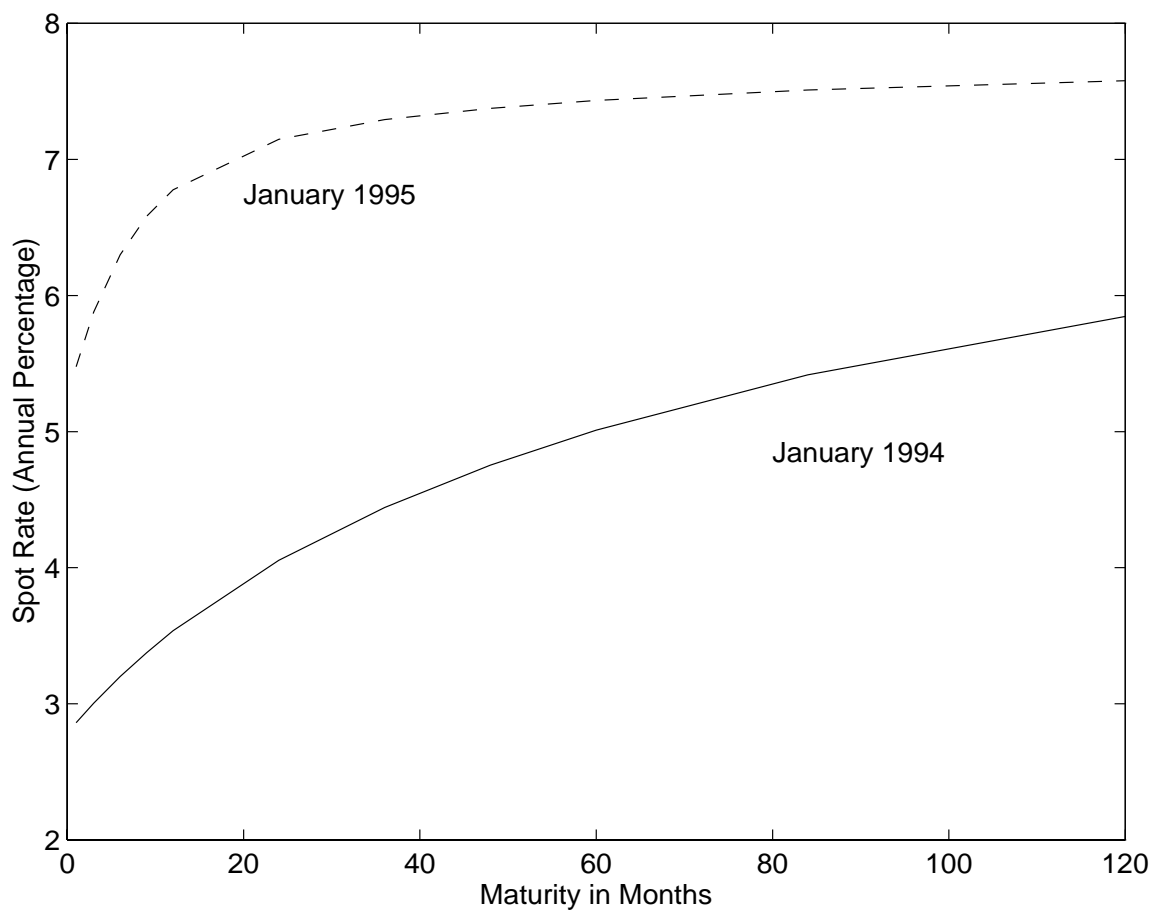
1. 1994: A Good Year for Trouble

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