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:

\[-1.6 = -D \times 8 \times .03 \implies D \approx 6.7\]

- 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):

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

- 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):

<table>
<thead>
<tr>
<th>Position</th>
<th>Notional Principal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receive fixed swaps</td>
<td>6.683</td>
</tr>
<tr>
<td>Receive fixed amortizing swaps</td>
<td>15.054</td>
</tr>
<tr>
<td>Pay fixed swaps</td>
<td>1.619</td>
</tr>
<tr>
<td>Basis swaps</td>
<td>5.556</td>
</tr>
<tr>
<td>Forward starting swaps</td>
<td>7.500</td>
</tr>
<tr>
<td>Other derivative products</td>
<td>2.598</td>
</tr>
<tr>
<td>Total</td>
<td>39.010</td>
</tr>
</tbody>
</table>

- 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