



Risk Management: Lessons Learned (or Not)

Professor Mitchell Petersen

Kellogg School of Management

Finance Department

Financial History Matters:

Prof Petersen's View of the World

- History Repeats: Lessons To Learn

"History doesn't repeat itself, but it does rhyme." Mark Twain

- Extracting Lessons With Care

"We should be careful to get out of an experience only the wisdom that is in it - and stop there; lest we be like the cat that sits down on a hot stove-lid." Mark Twain

- Lessons, Stories & Examples

- Suggestions, Thoughts & Inspirations

- Cold calling or warm fuzzy feelings

Lesson 1:

Know Your Objective

- Risk Management Program:
What Should The Objective Be?
- The Objective Is
 - Key to judging success &
 - Avoiding “failure”
- Audience Participation
 - What do you think objective should be?

Lesson 1:

Know Your Objective

- Risk Reduction
 - Taken to the logical extreme
 - Stuck in the ivory tower
 - Does risk reduction ever make sense?
- Speculation - Making Money

Lesson 1:

Know Your Objective

- Risk Reduction
- Speculation - Making Money
 - Efficient markets → Can't be done
 - Real world: What is required to make \$?
 - Examples
 - Confectionary firm: Hershey's favorite holiday
 - Agricultural commodity processor

Lesson 1:

Know Your Objective

- Value Creation – Not Risk Reduction
 - Value creation through less risk
 - Undiversified shareholders (Family business)
 - Managers (Undiversified stakeholders)
 - Funding good projects
 - When do you need the money?
 - Speculation
 - Are the securities cheap?
 - Are you smarter than everyone else?

Lesson 1:

Know Your Objective

- Value Creation
 - Derivatives transfer money across states
 - Derivatives (and risk management strategies) are value increasing when they take money away when money has low value and return it when money has high value

Lesson 2:

Know Your Risk Exposure

- Tale Of Two Gold Mining Firms
 - Completely different derivative strategies
 - Equity exposure is the same (a mystery)
- Matching Revenues To Costs
- Matching CF To Inv Opportunities





Lesson 3: Interpret History & Experience With Caution

- "Don't gamble; take all your savings and buy some good stock and hold it till it goes up, then sell it. If it don't go up, don't buy it." Will Rogers
- "...more things might happen in the future than actually will happen."
Peter Bernstein (Against the Gods: The Remarkable Story of Risk, 1998)



Lesson 3: Interpret History & Experience With Caution

- Small Private Timber Firm
 - Conservative, private, family firm
 - Never used derivatives
 - Derivatives = Gambling
 - An experiment: Hedged 20% of output
 - Profit: \$40,000
 - Lesson?



Lesson 3: Interpret History & Experience With Caution

- Proctor & Gamble
 - Term structure interest rate swap
 - Payments depend upon 5 & 30 yr treasuries
 - Risk exposure: Hedging or speculation?
 - Third time's a charm
 - First time → Small win
 - Second time → Bigger win
 - Third time →
 - Lesson?

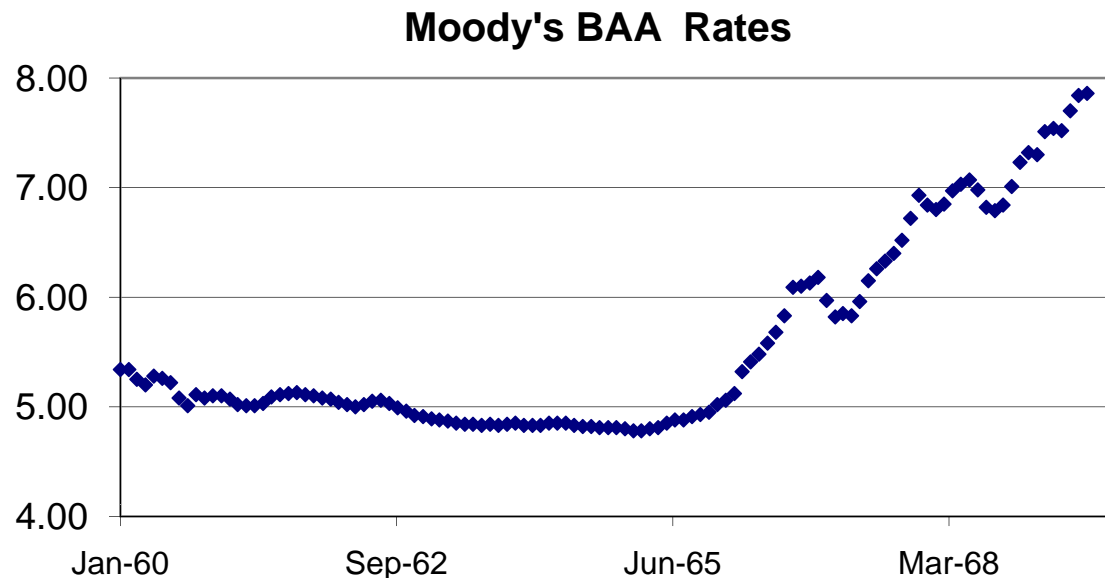


Lesson 3: Interpret History & Experience With Caution

- Large, Publicly-Traded, Retail Firm
 - Global, sophisticated, and big
 - For currency exposure hedged w/ derivatives
 - Exposure is in billions of dollars
 - Importance of hedge accounting
 - Evaluation of success or failure

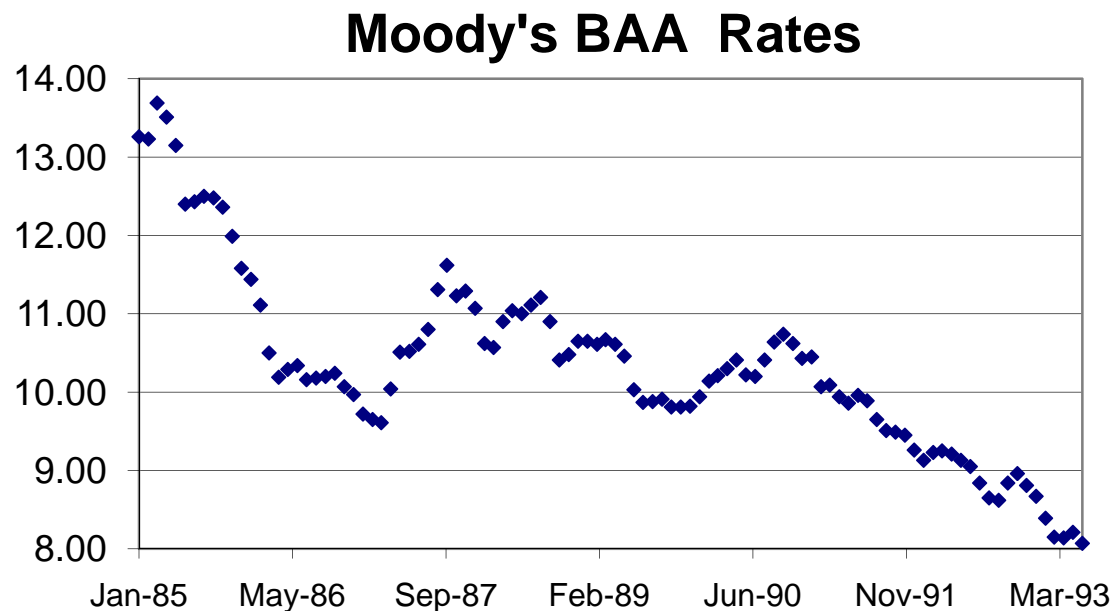
Lesson 3: Interpret History & Experience With Caution

“Interest rates hit historic highs as corporations search for more affordable sources of capital”
(9/1969 – 8.05%)



Lesson 3: Interpret History & Experience With Caution

“Corporations rush to raise cheap debt as interest rates hit new lows.” (6/1993 – 8.07%)



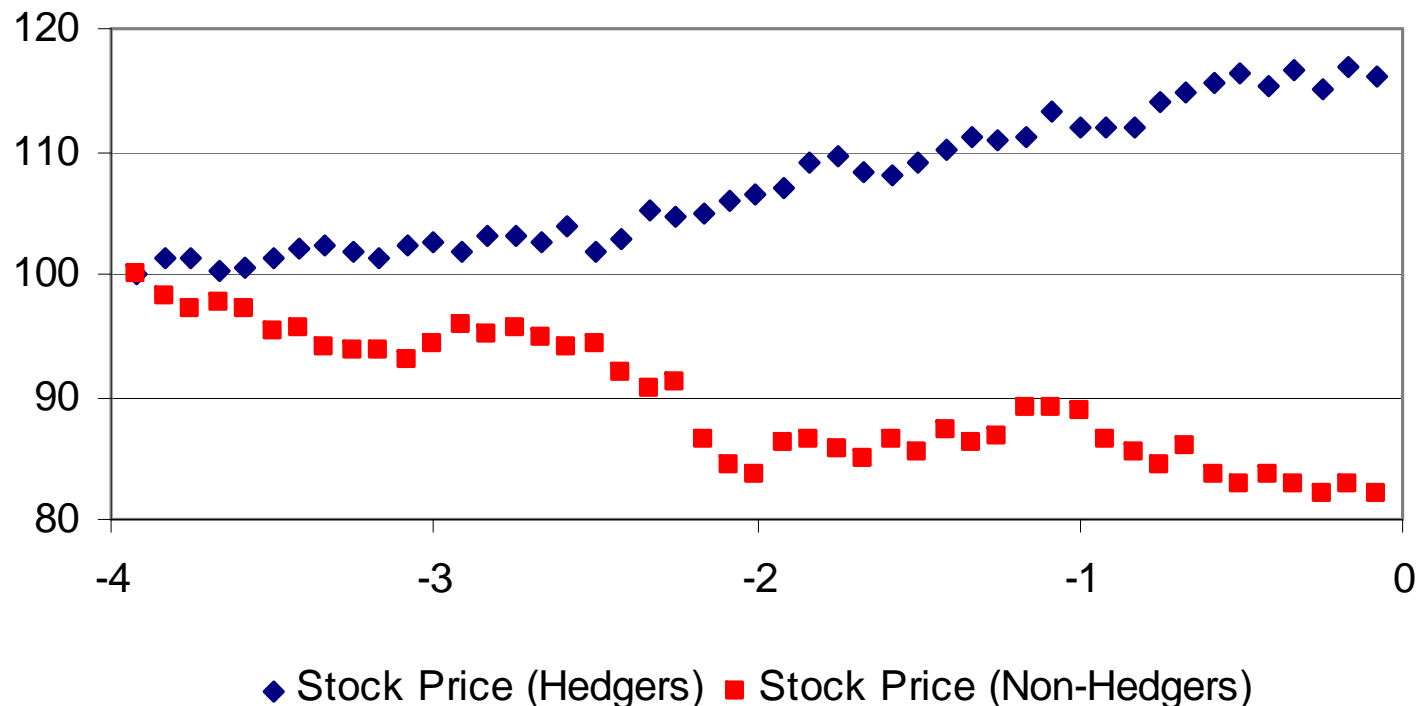


Lesson 3: Interpret History & Experience With Caution

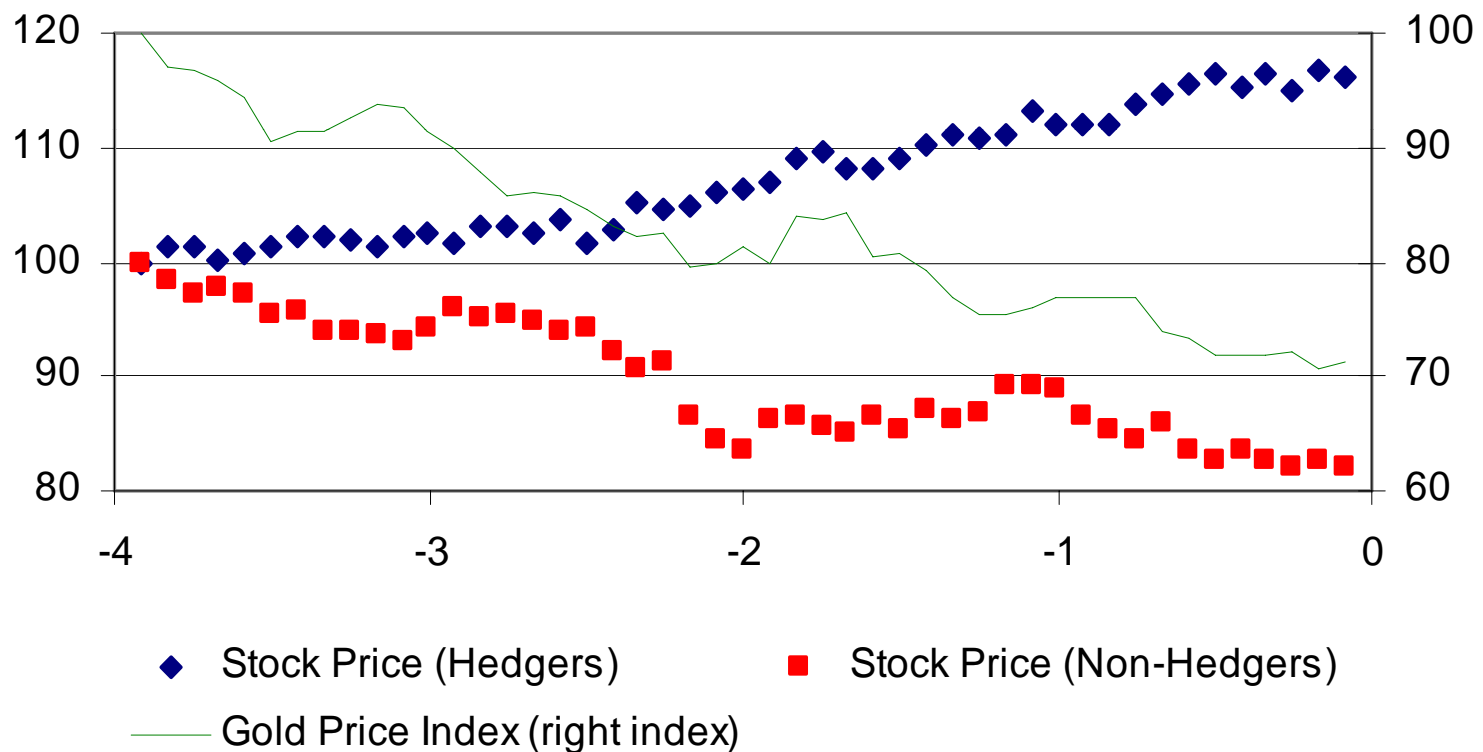
- Forecasting With Recent History
- What Have You Learned In The Last 2 Seconds?:
 - Recorded human history: Old
 - Modern financial markets: New
- Forecasting With Your Cell Number

Lesson 3: Interpret History & Experience With Caution

- Tale of Two Firms: It Was The Best Of Times; It Was The Worst Of Times



Lesson 3: Interpret History & Experience With Caution



Lesson 4:

Question What You Know

- I want you to answer three simple math questions.
 - These are also good to give to your kids to keep them busy
 - Write down your answers

Lesson 4:

Question What You Know

- Question 1:
 - A bat and a ball together cost \$1.10
 - The bat costs \$1.00 more than the ball
 - How much does the ball cost?

Lesson 4:

Question What You Know

- Question 2:
 - If it takes 5 machines 5 minutes to make 5 widgets
 - How long would it take 100 machines to make 100 widgets?

Lesson 4:

Question What You Know

- Question 3:
 - In a lake, there is a patch of lily pads; everyday, the patch doubles in size
 - If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half the lake?

Lesson 4:

Question What You Know

- Question 1:
 - A bat and a ball together cost \$1.10. The bat costs \$1.00 more than the ball. How much does the ball cost?
- Answer: 10 cents or 5 cents

Lesson 4:

Question What You Know

- Question 2:
 - If it takes 5 machines 5 minutes to make 5 widgets. How long would it take 100 machines to make 100 widgets?
- Answer: 100 minutes or 5 minutes

Lesson 4:

Question What You Know

- Question 3:
 - In a lake, there is a patch of lily pads; everyday, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half the lake?
- Answer: 24 days or 47 days

Lesson 4:

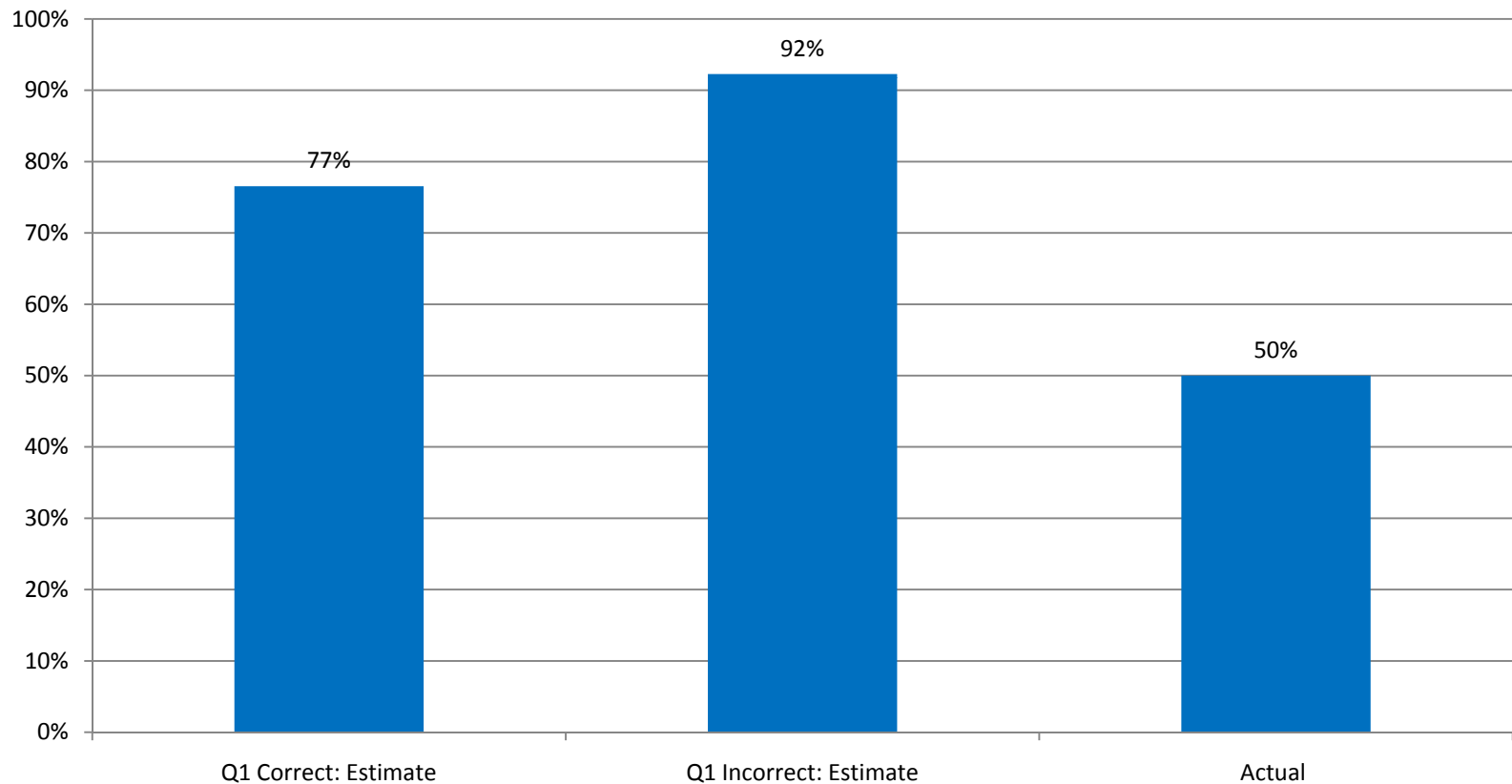
Question What You Know

- Cognitive Reflection Test
 - Not an IQ test – Correlation is low
 - Do you reflect on your conclusions?
- Are The Questions Hard?
 - MIT undergrads (2.18 correct)
 - Kellogg MBAs (2.03)
 - UK money managers (1.99 correct)
 - Boston fireworks (1.53)
 - Harvard University choir (1.43)

Lesson 4:

Question What You Know

■ How Hard Were The Questions?



Lesson 5:

Dangers of Complexity

- Derivatives Are Complex (i.e., Scary)
- Derivation Of Black-Scholes Option Model
 - Solve partial differential equation

$$\frac{\partial V}{\partial t} = -\frac{1}{2}\sigma^2 S^2 \frac{\partial^2 V}{\partial S^2} - rS \frac{\partial V}{\partial S} + rV$$

- Heat transfer equation

Lesson 5:

Dangers of Complexity

- Complexity Makes Risk Management A Difficult Job, Not Just Technically

Lesson 5:

Dangers of Complexity

- How vs. Why Education
- Educational Variance
 - Head of risk management: Pre-74 MBA
 - Three PhDs:
Bio-chemistry, Physics, Music Theory
- The Value Of Crayons: Box Of 8

Lesson 5:

Dangers of Complexity

- P&G Hedge Re-Visited: Very Complicated

$$Spread = \max \left[17.0415 * r_{5yr\ Treas} - P_{30yr\ Treas}(r_C=6.25\%), 0 \right] - 0.0075$$

$$P_{30yr\ Treas}(r_C=6.25\%) = \sum_{t=1}^{60} \frac{0.0625/2}{\left(1 + r_{30}/2\right)^t} + \frac{1}{\left(1 + r_{30}/2\right)^{60}}$$

Lesson 5:

Dangers of Complexity

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- Explanation From The Top
- How Could P&G Have Known?
 - When do you win, when do you lose, and how much do you lose?

Lesson 5:

Dangers of Complexity

- When do you win, when do you lose, and how much do you lose?

5yr\30yr	5%	6%	7%	8%
5%	-0.75%	-0.75%	-0.75%	4.25%
6%	-0.75%	-0.75%	10.85%	21.29%
7%	-0.75%	15.08%	27.89%	38.34%
8%	16.26%	32.12%	44.94%	55.38%



Application to Credit Crisis

- The Securitization Alphabet
 - MBS: Mortgage Backed Securities
 - CDO: Collateralized Debt Obligation
 - CMO: Collateralized Mortgage Obligation
 - SIV: Structured Investment Vehicle
 - TLA: Three Letter Acronym
- Have I Seen This Before?
 - Secret of finance education @ Kellogg
 - SIVs in four easy steps



Step 1: A Levered Firm

Assets			Liabilities		
Gold Mine	10%	10,000	5,000	5%	Debt
			5,000	15%	Equity

Step 2:

A Savings & Loan

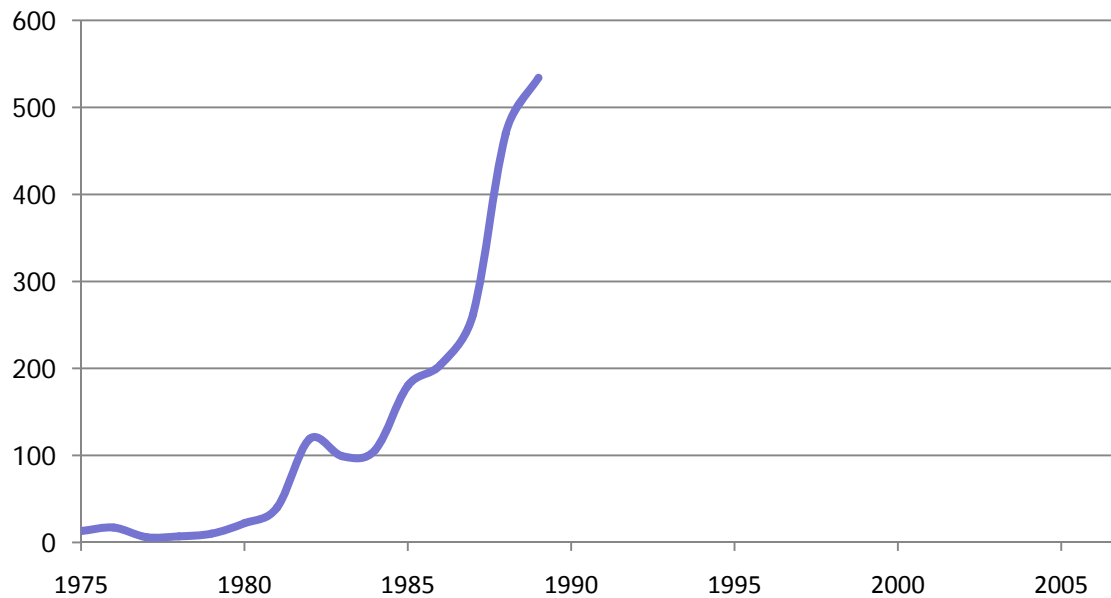
Assets			Liabilities		
Mortgages (long term)	6%	10,000	9,000	5%	Deposits (short term)
			1,000	15%	Equity

- Credit Risk: Small By Today's Standards
- Interest Rate Risk: Not Small
- Liquidity Risk:

Savings & Loan Crisis

- High Interest Rates; Then Recession

Number of Bank and Thrift Failures



Step 3: Collateralized Debt or Mortgage Obligation (CDO/CMO)

Assets			Liabilities		
Loans/Debt (Baa)	8%	10,000	3,500	5.0%	Aaa LT Debt
			3,000	5.3%	Aa LT Debt
			2,500	5.6%	A LT Debt
			1,000	32.6%	Equity

Step 4:

Structured Investment Vehicle

Assets			Liabilities		
Loans/Debt (Baa)	8%	10,000	3,500	4.2%	Aaa CP
			3,000	4.5%	Aa CP
			2,500	4.8%	A CP
			1,000	39.8%	Equity

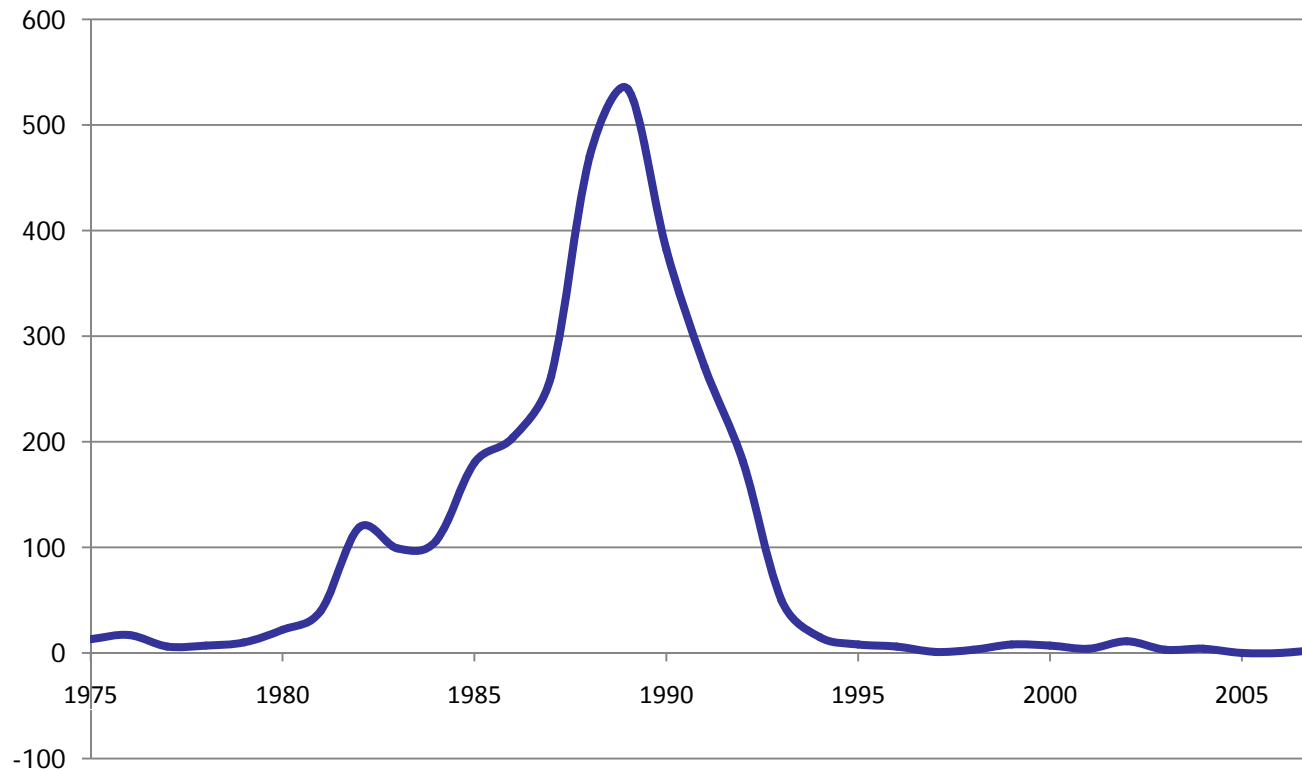


What Went Right: Advantages of CDOs

- Diversification → Less Risk

Securitization Worked? Fewer Failures & Further Away

Number of Bank and Thrift Failures





What Went Right: Advantages of CDOs

- Diversification → Less Risk
- Diversification → Lower Cost of Capital
- Democratization Of Home Ownership



What Went Wrong: Many Things

- Diversification Comes From Correlation
- Complexity & Incentives
 - Show me the model
- History Doesn't Apply
 - Change in pool of borrowers
 - Change in mortgage types (ARN vs.. FRN)
- Ratings (Risk) & Return
 - AAA with higher yields → Free lunch?



Lessons for the Future: Bubbles Past and Present

- Last Crises: There are many investment strategies that work, until they don't
 - Emerging market debt (LTCM – 1998)
 - Dot com equities (2000)
 - Credit market (2007-2010)
- Next Crisis
 - Regulation: Next crisis won't be in AAA CDOs
 - Energy/Commodities (20??)
 - China (20??)



Lessons For The Future: Prognosis For Progress

- Optimistic View: I'm A Professor
- Pessimistic View:
- Good Luck 😊