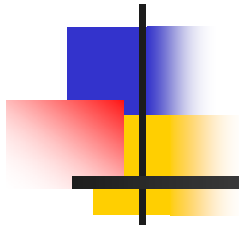


Derivative Instruments and Model Risk



Presentation to Annual Meeting Attendees:
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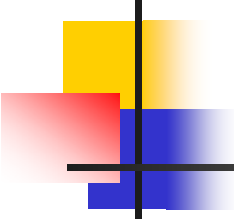
Operating Environment and Model Risk

- **Corporate Governance:** Stock exchange proposals, FASB, shareholder watchdog groups, Sarbanes Oxley Act of 2002
- **Legal:** Litigation, reputation capital
- **Regulatory:** Capital adequacy for financial institutions, SEC MD&A disclosure

Characteristics of a Good Model



- Computationally plausible
- Consistent results
- Cost-effective
- Data availability and quality
- Easy to explain
- Generalized assumptions
- Impervious to extreme values
- Logical

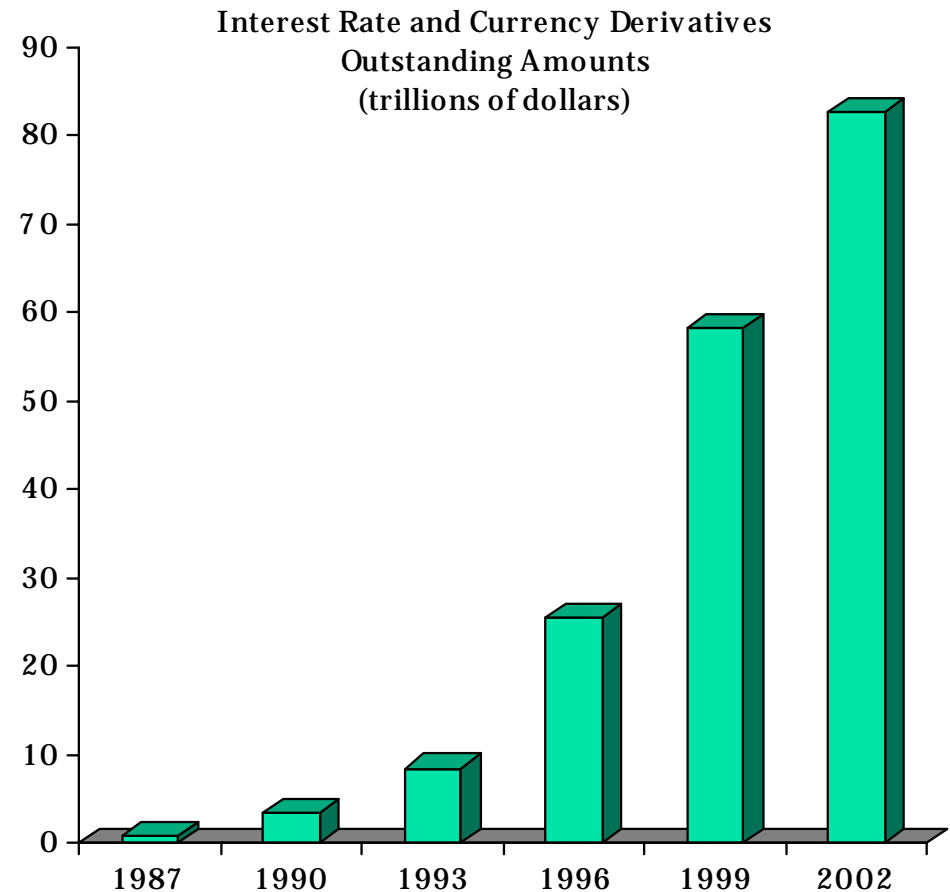


Some Types of Model Risk

	PROBLEM	EXAMPLE
Completeness	Missing variable	Income = function of Education (Ignores Experience)
Consistency	Results vary dramatically as a function of data form or range of data	Price versus return data
Data Quality	Data is hard to get or poor in quality	New product, privately-held company information, regulatory restructuring, Chapter 11 filing
Mathematical Issues	Expensive to compute values or program blows up	Simulations that require many trials or complex algorithms
Use	Inappropriate some or all of the time	Linear regression used for non-linear relationship

Derivative Instruments and Model Risk

- Large and growing derivatives market
- Complex model risk issues for derivatives:
 - Domino effect (risk measurement, valuation)
 - Embedded nature
 - Link with both sides of balance sheet
 - Liquidity
 - Nested models (inputs)
 - Regulation
 - Separate risks (legal, etc.)





Example: Volatility and Option Value

VOLATILITY ASSESSMENT	VOLATILITY RANGE	VOLATILITY MIDPOINT	BLACK-SCHOLES OPTION VALUE
Low	0% to 30%	15%	\$2.49
Medium	30% to 70%	50%	\$7.34
High	> 70%	85%	\$12.10

Assumptions:

1. \$50 stock price
2. \$50 strike price
3. Six month time to expiry
4. No dividends
5. Three percent risk-free rate
6. Volatility in standard deviation form
7. Exercise at one point in time (European style)



Speaker Biography

■ Dr. Susan M. Mangiero combines many years of hands-on capital markets and risk management analysis experience with university and corporate training. She currently authors the *Derivatives Diary* column for the Association for Financial Professionals and has just written an article on model risk for *Investment Lawyer*. Other publications include articles for *Risk Review*, *RISK*, *GT News*, *Bank Asset/Liability Management* and chapter contributions to *Cases in International Finance* and *The Handbook of Interest Rate Risk and Management*. She is currently writing a book about risk management for pensions, endowments and foundations and is a regular presenter at financial conferences. In addition to corporate training in the areas of corporate finance, risk management and quantitative analysis, Dr. Mangiero regularly teaches Level I and Level II CFA courses, is a member of the Financial Risk Manager Exam Curriculum Committee and is developing e-learning courses in risk management.

■ Dr. Mangiero earned her Ph.D. in finance (minor in mathematics) from the University of Connecticut in 1997. Her other degrees include an M.A. in economics from George Washington University, an M.B.A. in finance from New York University and post-graduate computational finance work at Carnegie Mellon University. Dr. Mangiero is a CFA charterholder as well as a certified Financial Risk Manager. She has completed Green Belt Six Sigma training and is currently a candidate for several business valuation designations.

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