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Swaps, Derivatives and Structured Products

DAY ONE

**Welcome and Introductions**

*Participants introduce themselves to the group*

**Structured Finance - An Introduction**

*Corporate needs, investor appetites the bankers and the rocket scientists*

- \* Risk management for corporations
  - Mismatch between assets and liabilities
  - As corporations expand to new markets they become exposed to many new risks
  - Bundling risks: exposure to one risk factor vs. exposure to a basket
  - How do risks effect shareholder value?
- \* The investors
  - Democratization of finance: information is available to everyone, data is very simple to obtain
  - Globalization of finance: investment opportunities are available throughout the world
  - The relentless search for value
- \* The bankers
  - Increasing competition between the big brokerage houses
  - The two main principles of financial engineering
  - Slicing and dicing risk and return
- \* The "rocket scientists"
  - Computers are becoming more powerful each year
  - Switching careers: from academia to corporate finance
  - Clients are demanding more and more and becoming more sophisticated
  - What does a "quant" do?

**Structured Finance after Enron**

**NEW**

*What are the reactions of each side?*

- \* What happened at Enron, WorldCom and Global Crossing?
- \* How to avoid such catastrophes in the future?
- \* What are the interests of the CEO, the CFO and other senior management personnel?
- \* Early signs of trouble that the Board should look out for
- \* What should investors watch out for?
- \* How can investors protect themselves?
- \* Best practice in corporate governance
- \* Misuses and correct uses of structured finance

### **How Companies Hedge**

*Stories from the front line*

- \* Examples of how companies hedge their risks
- \* We examine companies such as Gillette, Abitibi Price, RJR Nabisco, Alumax and others
- \* What strategies were used?
- \* Were they successful?

### **Premium Reduction Strategies**

*Companies hedge continuously so they are interested in zero and low cost hedging*

- \* The goals of hedging and risk management
- \* Is it cheaper to hedge several risks with one structure or hedge them separately?
- \* How averaging can reduce option premiums
  - Use options on baskets
  - Use average rate options
  - Use Asian options on baskets
- \* Companies expect more from their bankers
- \* How can banks help?

### **The Term Structure of Interest Rates**

*We discuss many types of interest rates and how they are derived from each other*

- \* Par bond yield curve
  - Construction with benchmark bonds and linear interpolation
  - Construction with a universe and exponential cubic splines
- \* The zero coupon curve
- \* Corporate curves and spreads
- \* What does the spread really measure?
- \* Forward curve
- \* The Libor interest rate curve
- \* Does volatility affect the curve?
- \* Commercial paper rates
- \* Derivation of one curve from another
  - Bond stripping and reconstitution
  - Gap and Multigap analysis

### **Fixed and Floating Rate Instruments**

*Fixed and floating rate instruments are discussed and compared in this section*

- \* Some popular indices

- Libor
- Constant maturity treasuries (CMT)
- Fed Funds
- Other indices
- \* Inverse floating rate notes
- \* How fixed coupon bonds are related to interest rates
- \* How are floating rate notes related to interest rates

### **Duration and Convexity**

*Duration and convexity analysis for structured notes*

- \* Duration
- \* Convexity
- \* Key rate duration
- \* Duration with respect to the discounting rate
- \* Duration with respect to the index
- \* Determination of the relevant index

### **The Building Blocks**

*We will introduce the following products with specific examples and discuss how they are priced and hedged*

- \* Forward rate agreements (FRAs)
- \* Caps and floors
- \* Collars and zero cost collars
- \* Interest rate swaps
  - Fixed to floating
  - In arrears
  - Floating to floating (e.g. basis swaps)
- \* Equity swaps
  - Fixed notional
  - Variable notional
- \* Currency swaps

## DAY TWO

### **Interest Rate Models: a Survey**

*For interest rate options, there are many models currently in use. Rather than focus on the precise "academic" assumptions and mathematical formulas, we look at the practical issues: Advantages and shortcomings of the models. How are they calibrated? How difficult are they to implement and use?*

- \* Why are models important?
- \* The models (a partial list)
  - Hull & White
  - Heath Jarrow Morton
  - Cox Ingersoll Ross
  - Jamshidian
  - Vasicek
  - Merton
  - Black Derman and Toy
  - BGM models
- \* Interest rate trees: binomial and trinomial

### **Interest Rate Models: How Are They Used in Practice**

- \* Choice of Models
  - Why can't they come up with a single "best" model?
  - Speed and simplicity vs. accuracy
  - What do you want the model to do?
- \* Should you purchase software or develop it internally?
- \* The calibration of a model
  - Some parameters change in "real time" while others are changed once a day or even once a week
  - How to estimate unobservable parameters? (e.g. the mean reversion rate)

### **Volatility**

*State of the art techniques in volatility estimation*

- \* Historical volatility
  - What term should be used
  - What historical period should be used
- \* Implied volatility
  - What causes volatility
  - "Volatility days"
- \* Different methods of volatility estimation
  - Using closing prices
  - Using daily high and low prices
  - Using high, low, open and close prices
  - The "Parkinson" rule
  - Using exponential moving averages
- \* Volatility smile and smirk (statistical study, before '87 vs. after '87)
- \* Pricing using a binomial tree (review)
- \* Tree with a volatility term structure
- \* Implied volatility trees
- \* Volatility insensitive products

### **From Concept to Cusip**

*Following a structured note on Wall Street as it is created*

- \* The sales team identifies a possible need

- \* The desk works to come up with ideas
- \* Comparing the various approaches:
  - Can we do them?
  - How will they generate revenue for us?
  - How about the risk profile?
- \* How do we hedge the risks?
  - Do we enter them into our book?
  - Do we do them "back to back"?
  - The impact of each decision
- \* Convincing the risk committee
  - Market risk
  - Credit risk
  - Liquidity risk
- \* Legal and tax departments
- \* Marketing:
  - Creating an appealing term sheet (fax page)
  - Convincing a client to purchase the structure
  - Overcoming their objections
- \* Pricing
  - An indicative price
  - A firm price
  - Negotiating with the client
- \* The use of a product prototype
  - Is this a "one off" type of deal
  - Do we expect more of them?
- \* Do we need to reprogram our entire risk management system?

#### **Evaluating the Credit Derivatives Market and the Rationale for its Development**

- Current and future potential of credit derivatives market
- Assessing the size of the market in terms of capacity and liquidity
- The size of the market and the distribution among product lines and underlying instruments
- Difficulties in developing a true "two way" market
- Evaluating the potential for a secondary market in credit derivatives
- How the Euro will impact on the credit derivatives market
- Credit derivatives: the US experience
- The recent credit crunch and its implications on the market

#### **Different Structures and Assessing their Risks to Ensure Successful Implementation**

- Default Swaps & Options
- Total return swaps
- Credit linked notes
- Put credit spreads on asset swaps
- Credit spread notes
- Demystifying the risks: cross, equity, term structure, settlement, legal and basis risk
- Collateralized Bond Obligations (CBOs) and collateralized loan obligations (CLOs)
- Downgrade options and their uses

#### **DAY THREE**

### **Advanced Structures**

*We will introduce the following advanced products and discuss their rationale from the investor perspective as well as from the issuer. We also talk about issues in pricing, hedging and risk management*

- \* Options on swaps: Swaptions
- \* Captions and floortions (floptions)
- \* Extendible swaps
- \* Ratchet swaps
- \* Barrier knock out caps
- \* The Quanto option

### **Structured Floating Rate Notes (FRNs)**

*Here we introduce several types of structured notes and talk about their issuers and buyers. How do these notes behave when rates change? What about volatility and correlation affects*

- \* Inverse floaters
- \* Libor squared notes
- \* Deleveraged CMT FRN
- \* Spread products (e.g. Prime - Libor)
- \* Range floaters: the two basic types
- \* Accrual notes
- \* A ratchet floater
- \* Index amortizing notes
- \* Currency indexed notes
- \* Commodity linked notes
- \* Total return index notes

### **Introduction to Convertible Bonds**

*Covering these products from the points of view of the issuer, the investor and the banker*

- \* Why use them
- \* Why they are not a bond plus an equity option
- \* Two factor model valuation techniques
- \* What are their special features
- \* The special risks of convertible bonds

### **Coping with the Risks**

*Structured notes create special risks for the investor, issuer and financial intermediary*

- \* Market risk
  - The case of "busted range floaters"
  - The case of "capped floaters"
  - What can happen in extreme cases?
- \* Credit risk
  - What is "netting"
  - How does it mitigate credit risk
- \* Liquidity risk
  - Will there always be a secondary market for my product
- \* Model risk
  - Is my pricing software correct?
- \* Does the client understand the product?
  - What is the responsibility of the banker?

### **Structured Notes and Reverse Engineering Workshop**

*In this workshop, we examine actual term sheets from Wall Street. For each structure we cover*

- \* Definition - what is the structure called
- \* Example - using a real life example
- \* Motivation - why would a borrower issue the note? why would an investor purchase the note? under what conditions, views or interest rates?
- \* Pricing - how is this structure priced
- \* Sensitivity - how will the note perform under various scenarios (parallel shifts, flattening or steepening of the yield curve etc.) What about volatility swings?
- \* Hedging - how can the bank hedge the option embedded in the note? What solution can the bank provide to a client who has purchased this structure?
- \* Alternatives - what other structures are there which offer similar behavior under various possible market conditions?

**Some of the products covered**

- Index amortizing Note
- Range floater
- Puttable Libor Note
- Yield Curve Flattening Note
- Callable Libor Note
- Multi Step Up Callable Bond
- Pay as you go Rally Cap
- Principal Protected Cap
- Strypes, Decs, Elks and Perks
- The E-Signs

**Course Ends**

- Conclusions