

Structured Products

Credit Derivatives

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Investment Analytics

Credit Derivatives

- Credit Risk
- Credit Assets
- Credit Derivatives
- Applications

Credit Risk

➤ Default Risk

- Loan not repaid in full

➤ Downgrade Risk

- Rating agency reduces debtor's credit rating
- Reduces value of debt

➤ Credit Spread Risk

- If credit deteriorates, spread relative to base index will widen

Credit Risk

- Future bond cash flows not certain - *risk of default*
- Risk measured by *rating agencies*
 - Moody's Investor Services
 - Standard & Poor's Corp.

➤ Rating Scales:

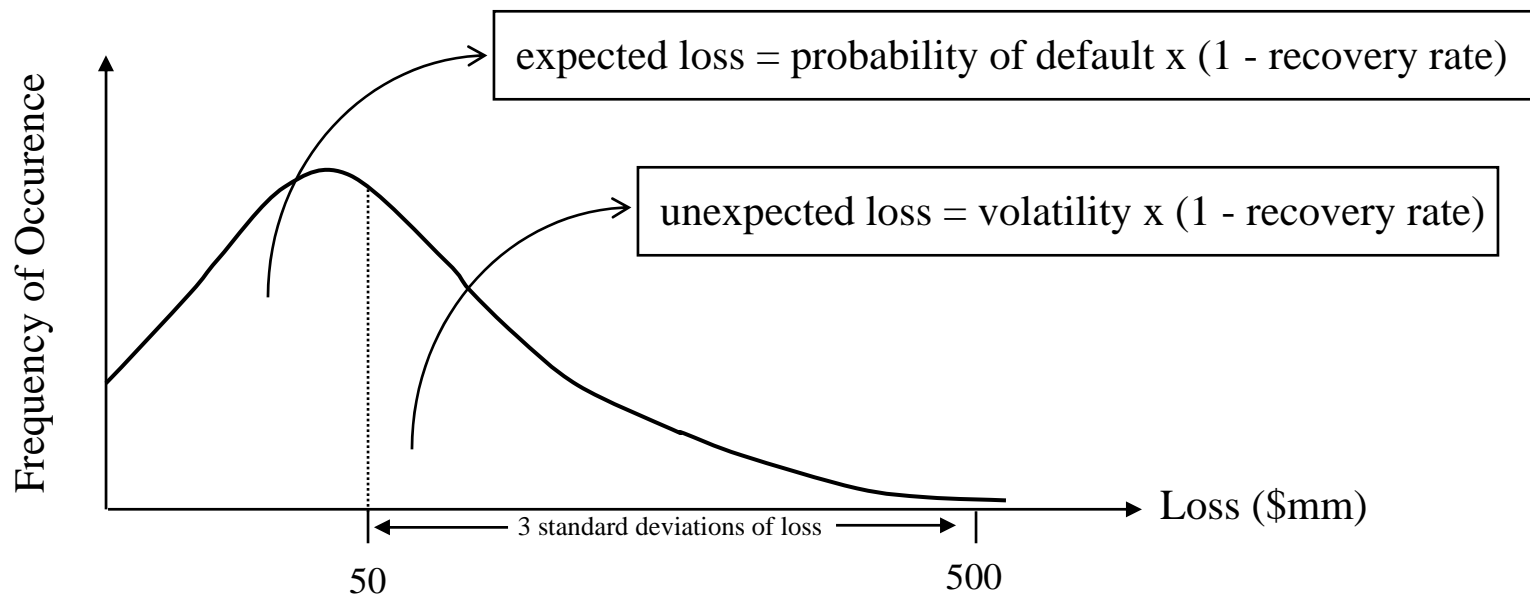
Moody's	S&P	
Aaa	AAA	Highest quality debt.
Aa	AA	
A	A	
Baa	BBB	Min. investment grade
Ba - D	BB - D	High Yield ("Junk")

Credit as an Asset

- Portfolio of Credits can be segregated into baskets of loans
- Portfolio manager uses credit derivatives to:
 - enhance yields
 - diversify credit holdings

Rationale for Credit Derivatives: Credit Risk and Cost of Capital

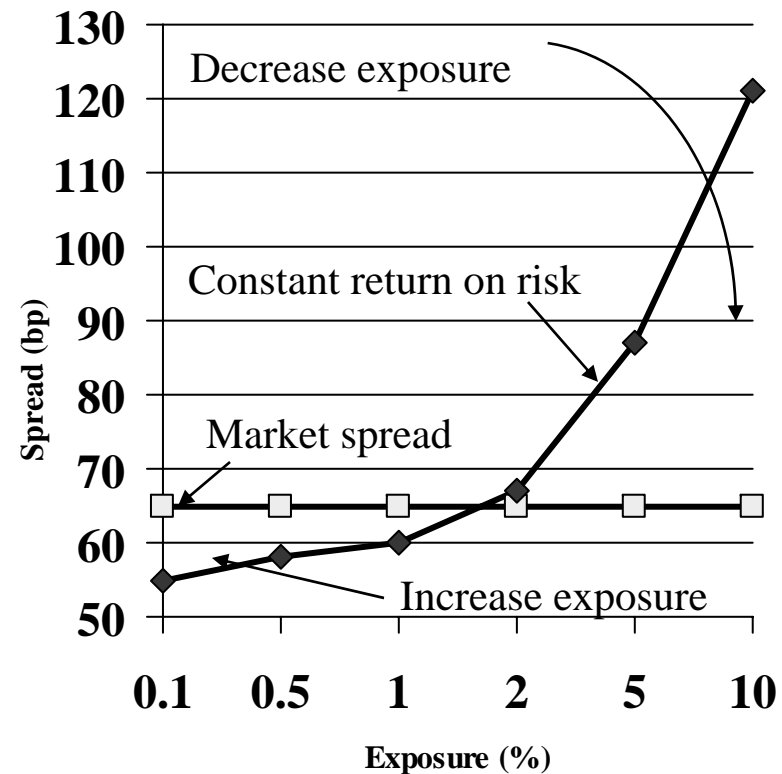
- Spread compensates for expected and unexpected loss
- Spread should fund the loan loss reserve and provide adequate return on capital/reserve



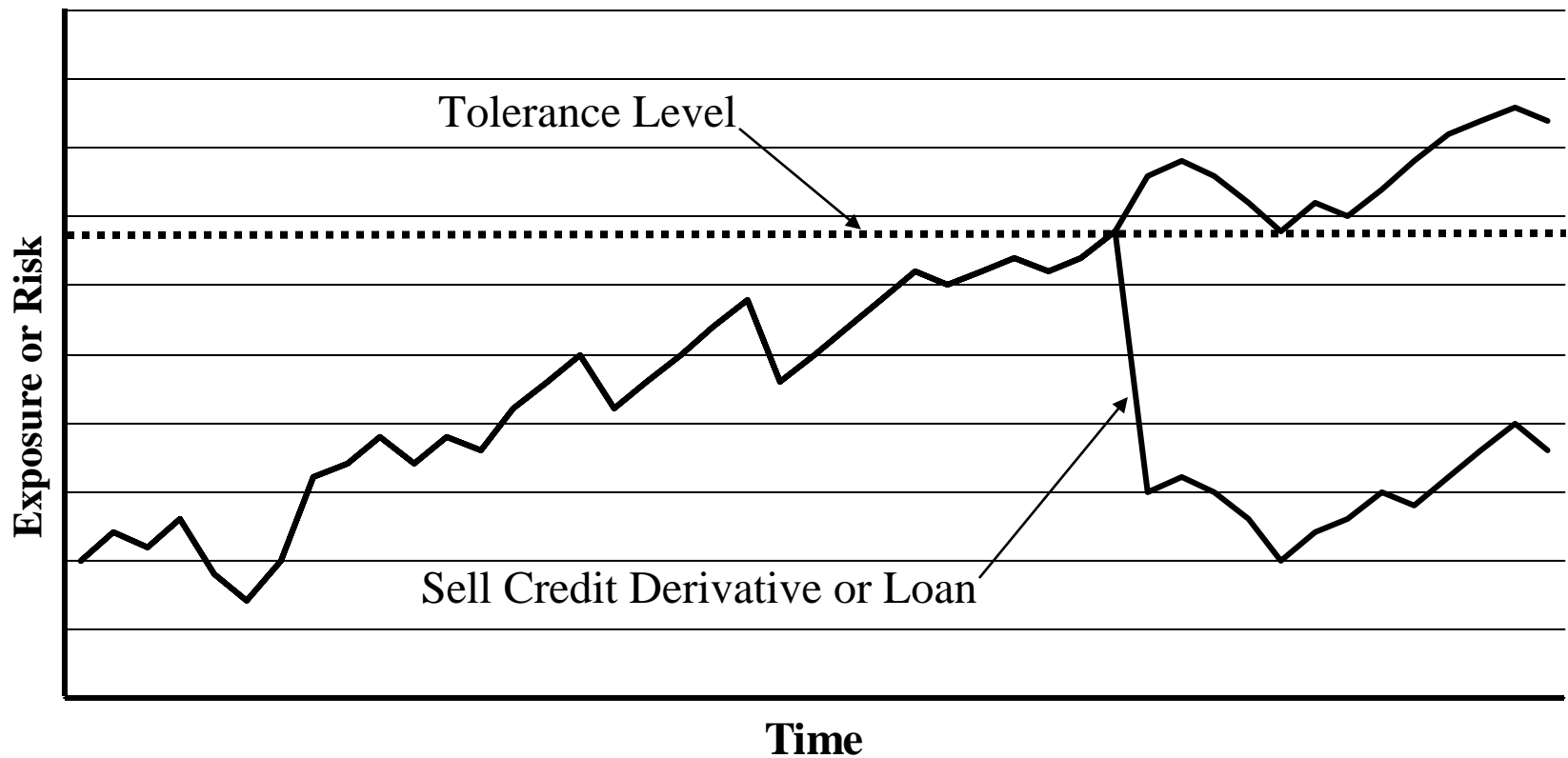
$$\text{Spread} = (1 - \text{recovery rate})[\text{expected default rate} + \text{return on capital}]$$

Rationale for Credit Derivatives: Risk Adjusted Return

- Growing exposure demands increased spread to satisfy return on risk requirement
- Analysis helps identify credit constraints and opportunities
- Active management of credit portfolio is key



Dynamic Management of Credit Risk



Rationale for Credit Derivatives

- Continuing and growing need for funding
- Managing reserve requirements & other constraints
- Enhancing credit characteristics of existing products & portfolios
- Pricing credit risk
- Credit risk and cost of capital
- Risk adjusted return

Applications

- Credit risk = default risk + credit spread risk
- Credit derivatives allow transfer of:
 - Default Risk
 - Credit Spread Risk
- Reasons:
 - Risk mitigation
 - Investment
 - Diversification

Asset management examples

➤ Hedging

- Transfer default risk in a confidential manner
- Investor can short in new markets

➤ Replacement of cash assets

- Leverages return vs cash investment
- Rescue structures

➤ Tax/accounting management

- Can defer/eliminate capital gains and withholding taxes

Defining credit derivatives

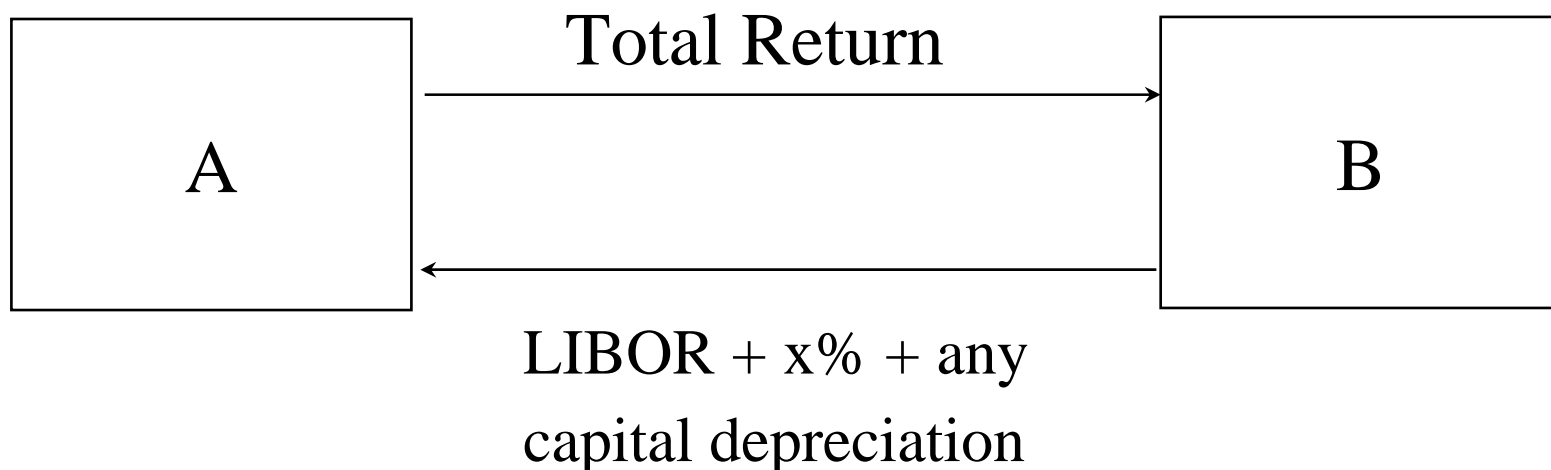
- Financial contracts with a payout linked to:
 - Loan or bond values
 - Default or credit events
 - Credit spreads
 - Credit ratings
- Cash settled, or delivery of underlying
- On single names, baskets, indices
- Delivery as notes or OTC contracts
- Delivery as swaps or options

Basic structures

- First generation
 - Total return swap
 - Default swap
 - Default digital
- Second generation
 - Floating rate asset derivatives
 - Fixed coupon asset derivatives
 - Rating option
- Third generation exotics

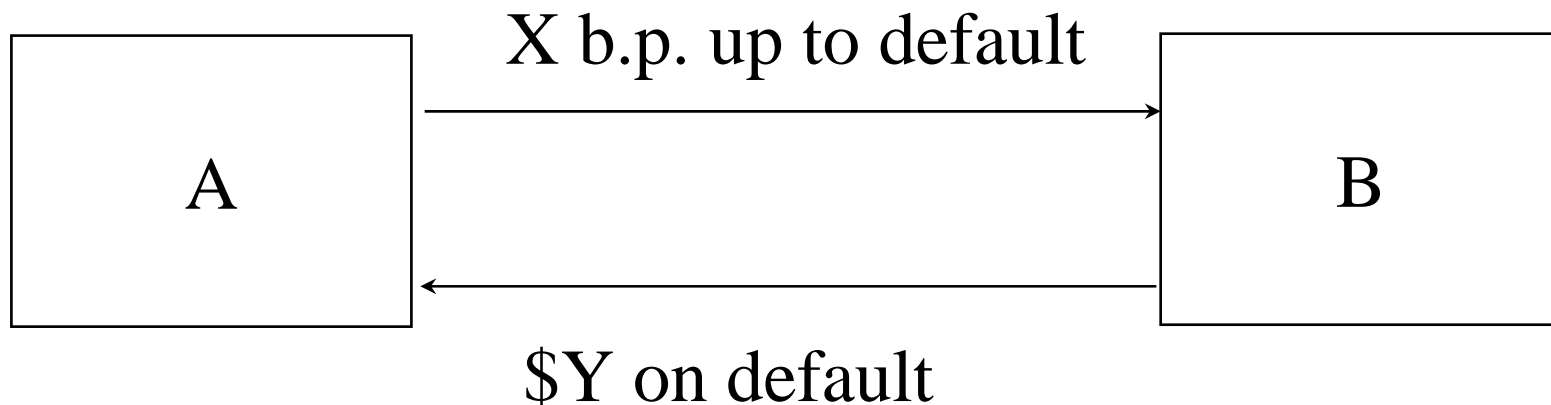
Total Return Swap

- Party A pays total return on underlying asset (including interest and capital appreciation)
- Party B pays funding payment (LIBOR + x%) plus any capital depreciation
- Bank A removes credit risk without selling the underlying



Default Swap

- Bank A pays default premium x b.p. until default
- Bank B pays agreed notional amount on default (relative to underlying reference loan or security)
- B assumes credit risk from A
- Bank A can factor cost of the swap into loan loan and removes credit risk of a valued customer



Limited Recourse Note

- This is a bond whose coupons are linked to defaultable underlying assets S_1 and S_2
- Coupon is contingent:
 - $X_1\%$ until default of S_1 or S_2
 - $X_2\%$ after first default
 - $X_3\%$ after 2nd default

Credit Spread Option

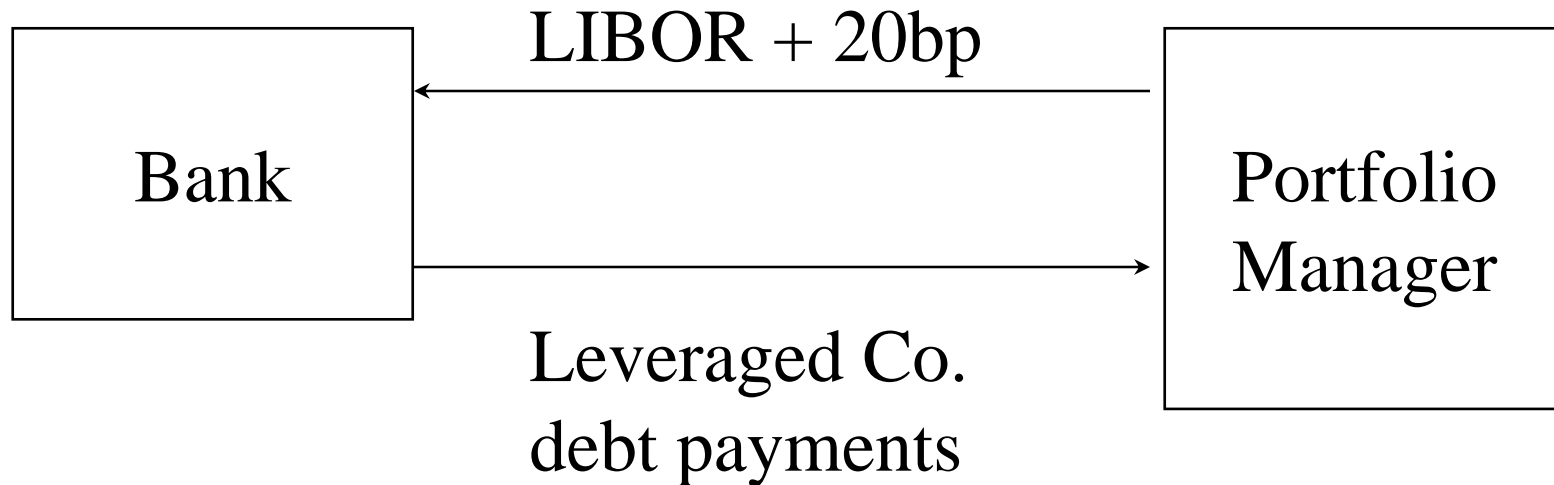
- Pays $N[S-K]^+$ at maturity
 - ◆ where S is the yield spread between the underlying security and US Treasury
 - ◆ K is an agreed strike level,
 - ◆ N is notional.
- This is a straight play on movement of credit spreads.

Credit Swaps: Applications

- Single risk transfer
 - transfer exposure to single credit
- Dual risk transfer
 - exchange of pair of credits
- Yield enhancement
- Gaining market exposure

Credit Swap: Single Risk Transfer

- Hedge default risk
- Diversify portfolio

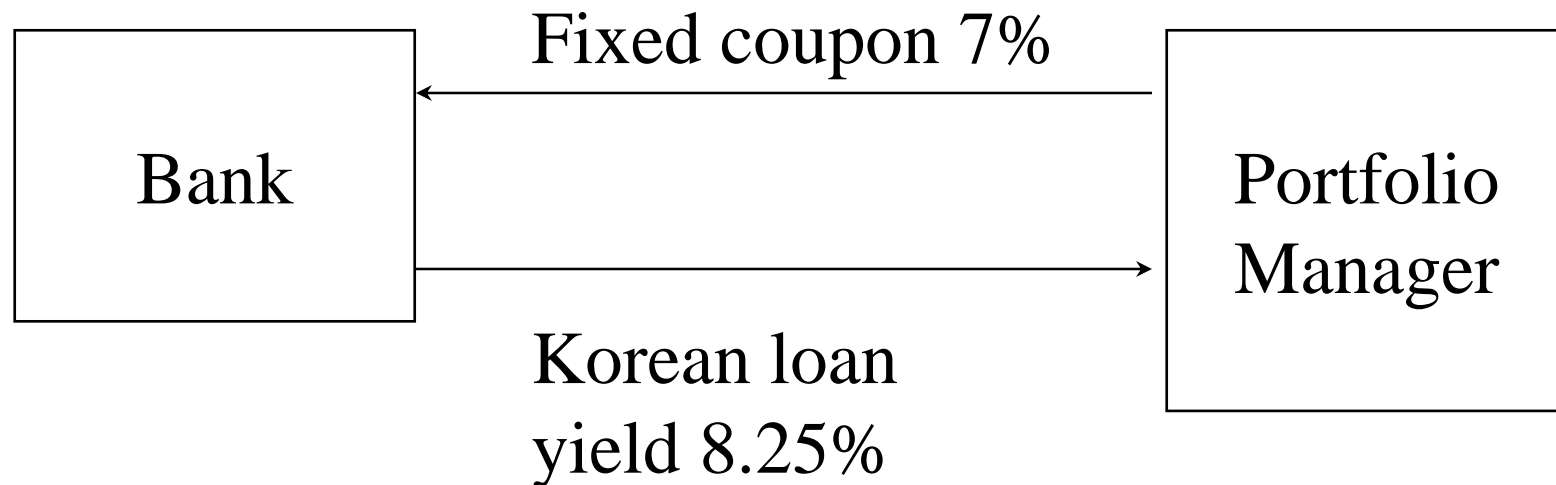


Using Credit Swaps to Gain Exposure

- Fund wants high yield investment
 - Emerging markets

- Problem: investment restrictions
 - Typical: can't invest below BBB grade debt

Emerging Market Credit Swap - Example



Credit Leverage

- Set NP to desired leverage level
 - Previous example: 125 bp spread on \$1MM portfolio
 - Set swap NP to \$10MM: spread is now worth 12.5%
- If credit deteriorates loss is also greater!!

Credit Options

- Allow trading or hedging of changes in credit quality
- Put options
 - Right to sell credit (spread) at specified strike price
- Call options
 - Right to purchase credit (spread) at specified strike price
- Typically achieved by purchasing bond options
 - Put option on bond = call option on yield spread

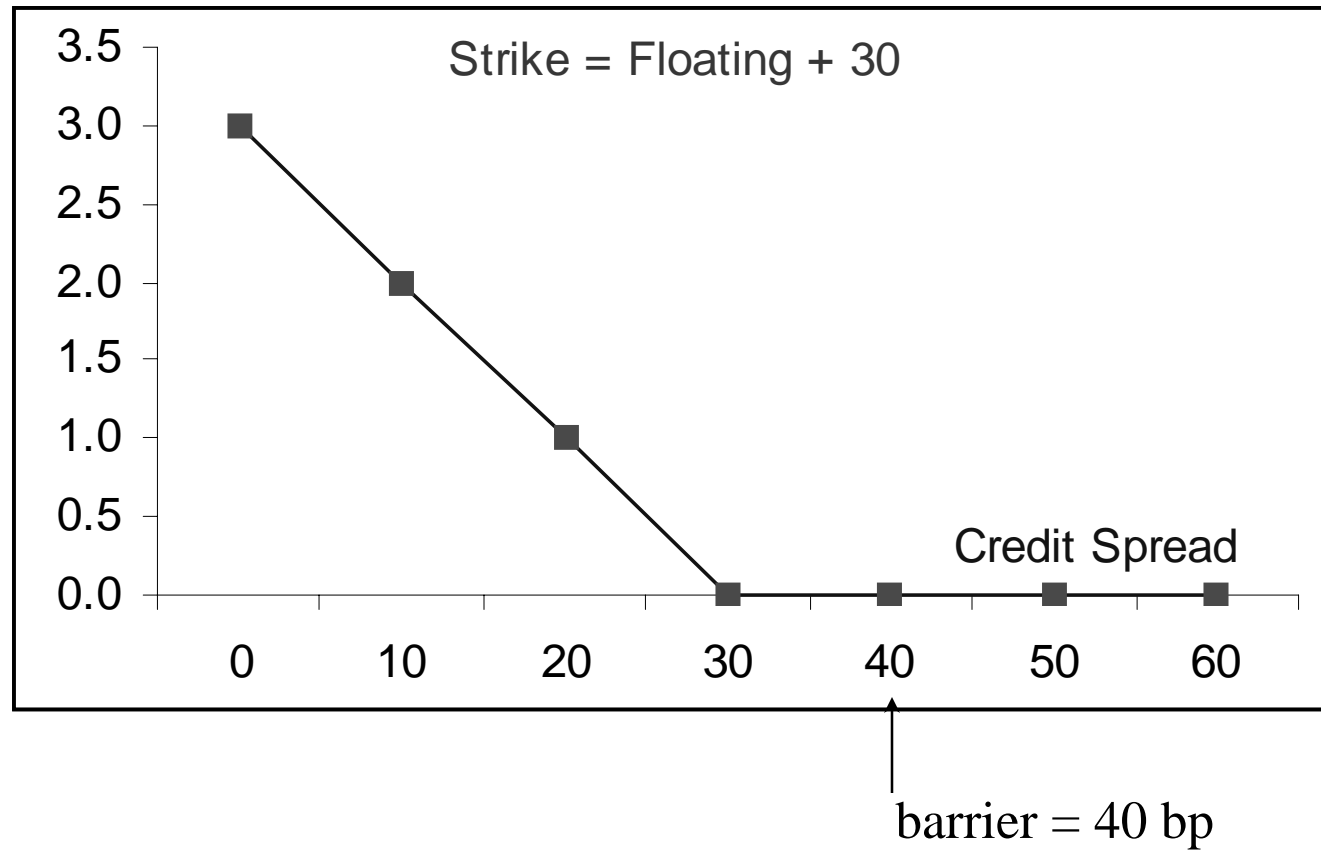
Credit Option - Example

- Portfolio manager holds LDC debt
 - Wants protection against falling credit values
- Purchases put option on Argentinian govt. bond
 - Bond has 5 year term, duration 3.2
 - Strike price, $X = 100$ bp spread
 - Premium = 75bp
- Later: spread widens to $S = 128$
- Option payoff: Duration x $(S - X)$
 - $3.2 \times (128 - 100) = 89.6$ bp
 - Net gain: ~ 14.6 bp

Exotic Credit Options

- Barrier and digital options common
- Example:
 - Portfolio manager bullish on Mexican debt
 - Seeks to profit from narrowing credit spread
 - Purchases up-and-out put on credit spread

Up and Out Credit Put



Other Credit Derivatives

- Credit spread caps
 - Locks in maximum spread on borrowings
- Asset backed notes
 - Bundle of non-investment grade credits
- Principal protected notes
 - Offer up to 100% protection of principal
- Basket instruments
 - Hard to price
- Credit index instruments
 - Not yet widely traded