

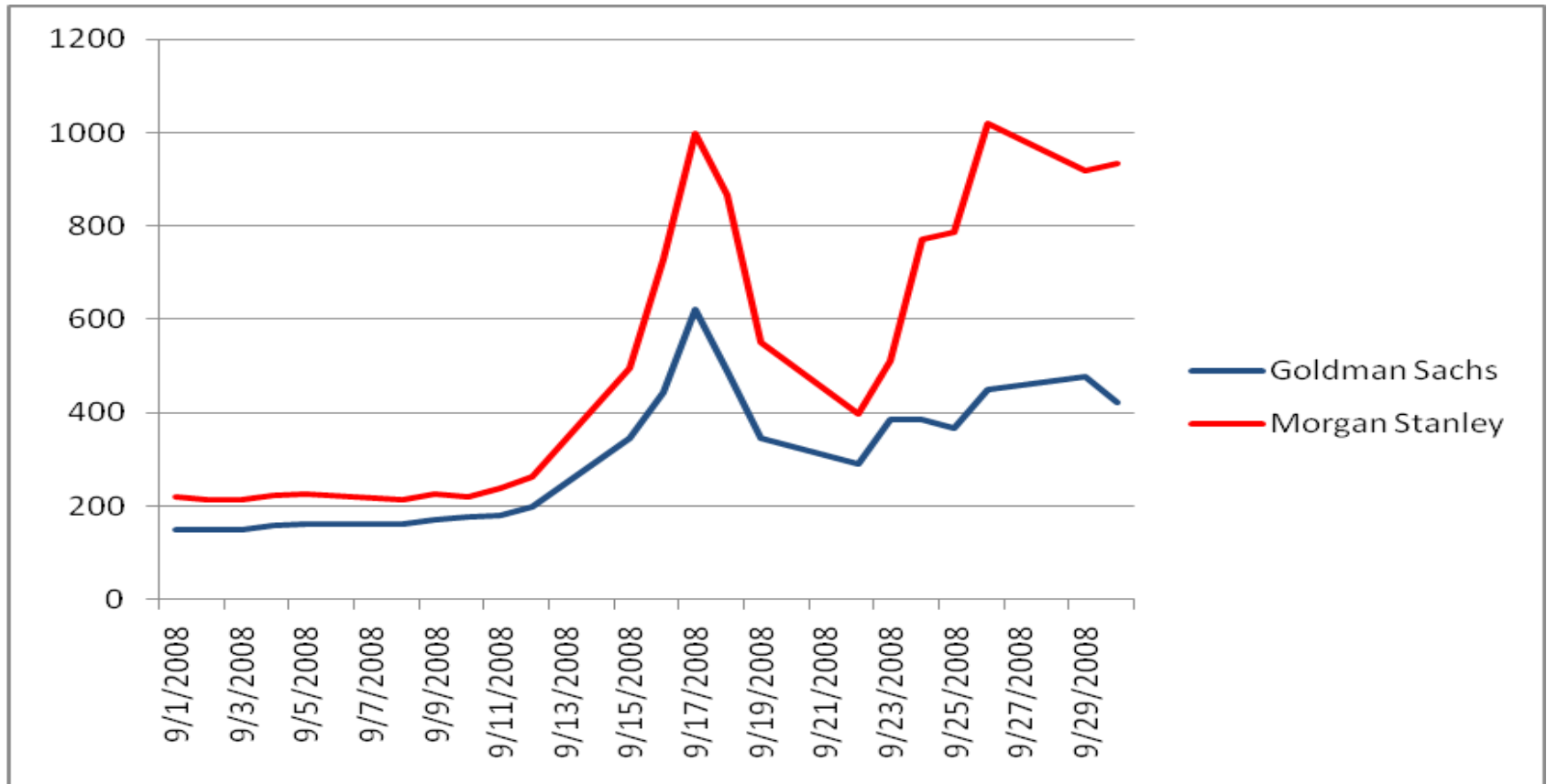
Single-name Credit Derivatives

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NYU-Stern and London Business School (LBS), and LBS

Credit Risk Elective
Spring 2009

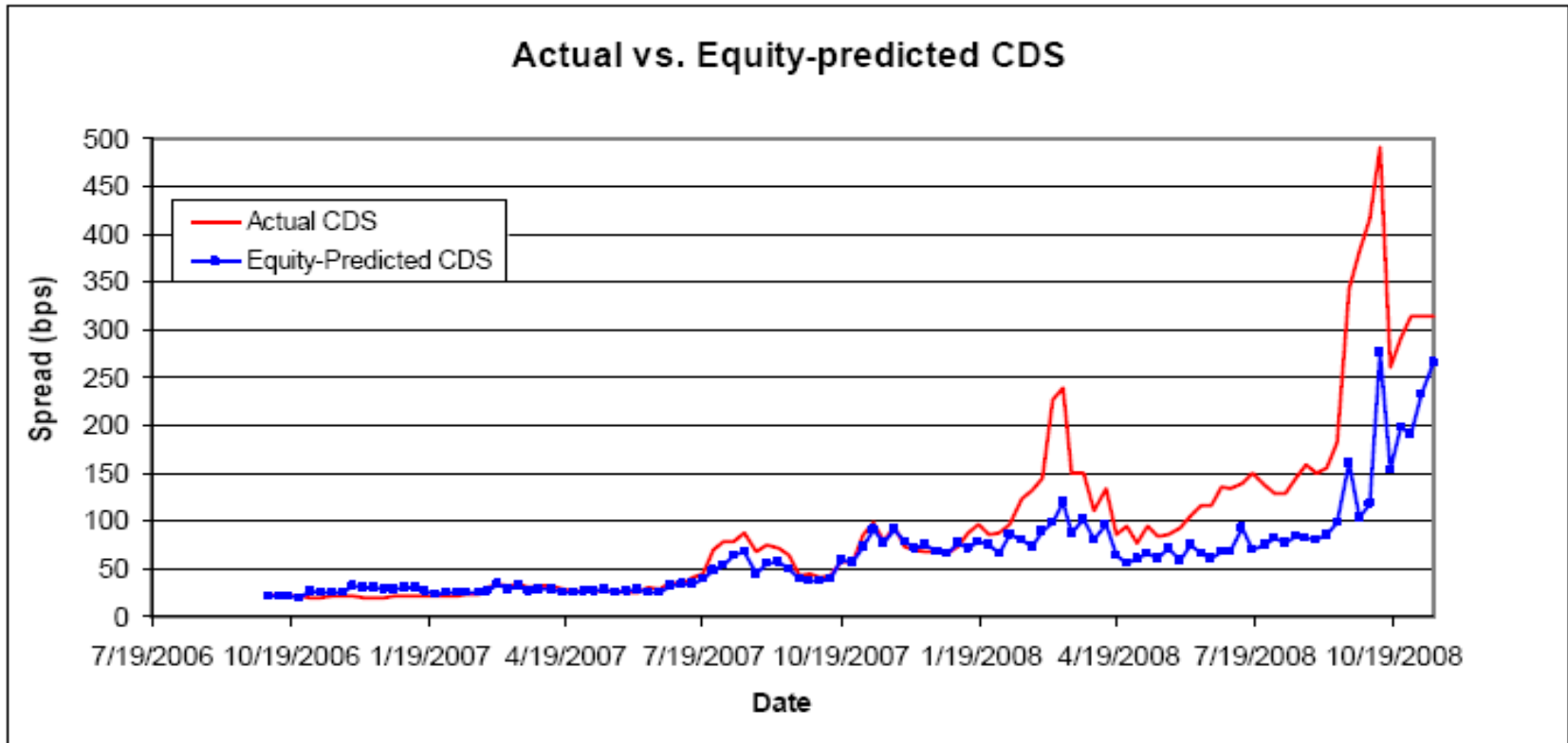
Recent stress in credit default swaps



5-year senior unsecured CDS spread for Goldman Sachs and Morgan Stanley in September 2008

Source: Datastream

Recent stress in credit default swaps



The relative behavior of CDS spread and equity-implied CDS spread for Goldman Sachs during the sub-prime crisis; Source: Leland (2008)

Outline

- Types of single-name credit derivatives
- Credit default swaps (*CDS*)

Main Credit Derivative Products: Single Name

- *single name credit default swap* is a contract that provides *protection against a default event on the part of a single issuer (“name”)*
 - ✓ protection buyer pays premium and, in event of ‘credit event’, receives par in exchange for eligible obligation of “name”

Single Name Products, contd.

- *credit-linked note* – is a bond where the payment to the buyer is reduced in the event of default of the reference entity.
 - ✓ in essence the buyer is selling credit protection but in a “funded” way: by buying the bond (s)he puts up the compensation for default in advance.

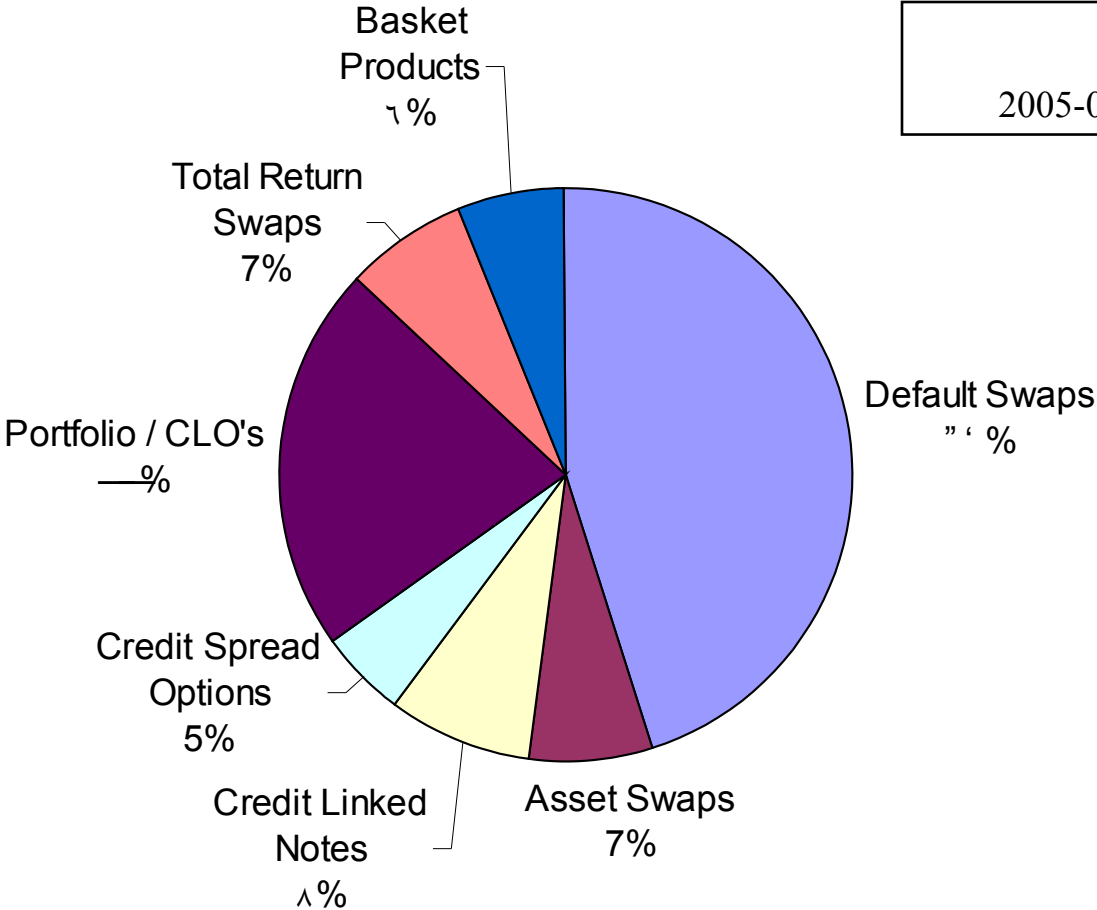
Single Name Products, contd.

- *step-up bond* – the coupon paid is increased if the credit rating of the issuer falls to specified threshold
 - ✓ European Telecoms industry: around 65 issues with over Euro 100 billion outstanding
 - ✓ Deutsche Telekom and France Telecom – largest issuers
 - ✓ **Example**: DT 5.75% Feb 12 2008 (Euro 1 billion) – coupon steps up 50 basis points (one-off) if rating falls to Baa2/BBB

Single Name Products, contd.

- *Total-rate-of-return swaps:*
 - ✓ pays difference between between total mark-to-market rate of return on
 - credit risky bond
 - and (e.g.) government bond
- *Credit spread options*
 - ✓ gives right to trade bond at a given spread over reference yield such as Treasury yield or LIBOR

Credit Derivatives Product Mix

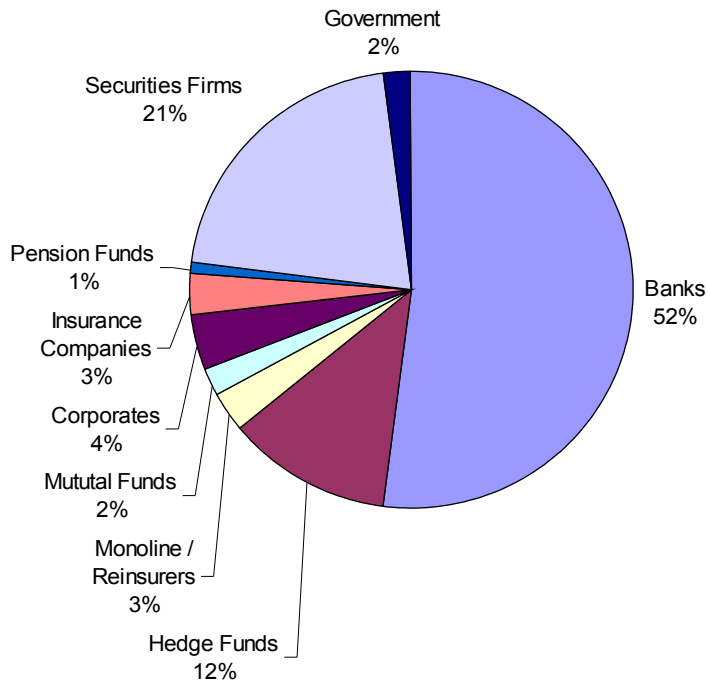


BBA Data to 2004:
2005-06: Index contracts grew rapidly

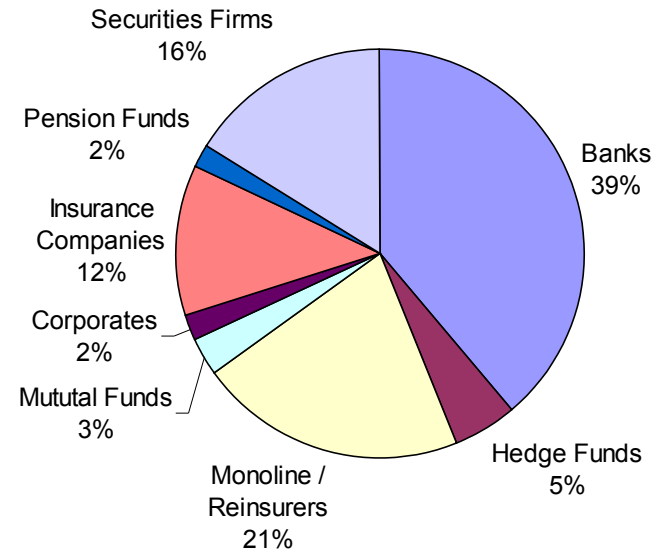
Source: British Bankers Association (BBA)

Who uses credit derivatives?

Buyers of Protection



Sellers of Protection



Source: British Bankers Association

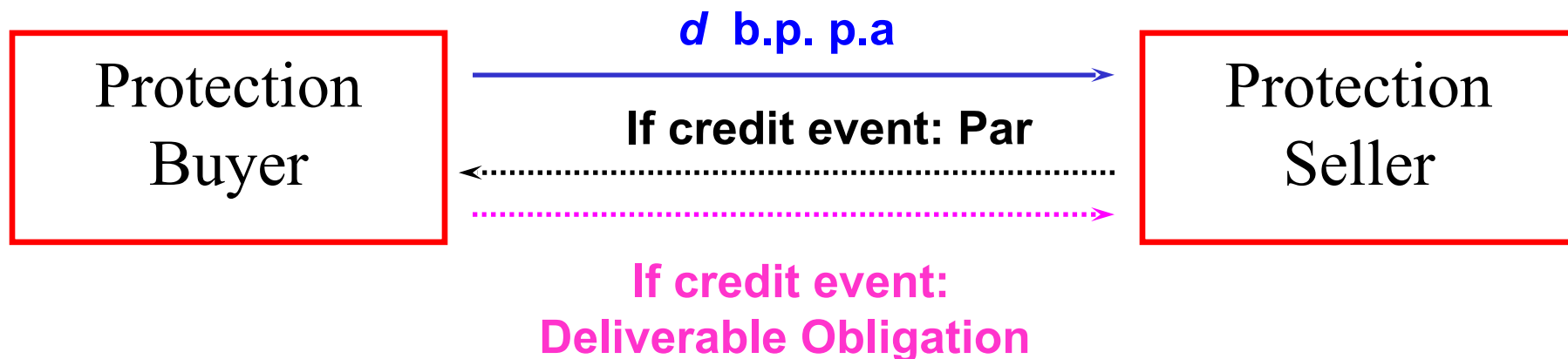
How do Investors use Credit Derivatives?

- reduce (or increase)
 - ✓ credit *exposure*
 - ✓ *credit concentrations* (company, industry or country)
- *customise* exposure to particular credits or credit maturities
- take *short positions* in defaultable bonds (easier than in cash market)
- *change distribution* of credit quality:
 - ✓ e.g., from portfolio of average credit quality bonds / loans to combination of higher credit quality and lower credit quality issues

Single Name Credit Default Swaps

- the buyer of protection pays
 - ✓ a *constant premium per year* (d) until the maturity of the contract **OR** the occurrence of the default event (whichever comes first)
- the seller pays
 - ✓ if the *default event does occur*: the difference between the promised (face) value of the underlying issue (100) and the market value of the defaulted bond (Y)
 - ✓ if the *default event does not occur*: zero

Credit Default Swap: Mechanics



- if **no default**: only cash flow is premium of d b.p. p.a
- if **default**: transaction stops and transaction settled either physically or in cash:
 - ✓ **physical**: buyer delivers defaulted obligation to seller and seller delivers 100% of nominal to buyer. (Physical is market standard)
 - ✓ **cash**: Mechanism to establish (“final price”) and seller delivers notional of transaction x (100 – Final Price) to buyer

CDS: Critical Items in Contract

- *Reference entity*: **company / country** on which contract is written
- *Reference obligation*: identifies relevant **seniority** of claims (i.e, point in the capital structure)
- *Credit events*: describes what **events** can trigger default (see next page)
- *Obligation category*: describes what **types of obligation** can trigger default
- *Deliverable obligations*: describes what **obligations** can be **delivered** to the seller in settlement

The Default Event

- ISDA documentation (2003) defines **SIX** trigger events:
 1. bankruptcy
 2. obligation acceleration
 3. obligation default
 4. failure to pay
 5. repudiation / moratorium
 6. Restructuring
- In practice **THREE** principal credit events:
 1. bankruptcy
 2. failure to pay
 3. Restructuring
- The tough one is **restructuring**

Why is Restructuring Difficult?

- Restructuring is a “*soft*” *credit event* – loss to owner of reference securities is not always obvious
- Post restructuring debt will often have *wide variety of maturities*
 - ✓ Means that “*cheapest-to-deliver*” (CTD) *option* may be *valuable*
 - ✓ However ... in bankruptcy or default debt is accelerated, outstanding debt becomes relatively homogeneous and CTD option has little value

Restructuring

- **Full Restructuring (FR):** under this option any restructuring is a credit event and any bond (with maturity up to 30 years) may be delivered
 - ✓ Standard contract up to 1999
- **Example: Conseco Finance (Insurance):**
 - ✓ Restructured to increase coupons – not disadvantageous to debt holders
 - ✓ Some banks delivered long-dated, lower priced bonds and received par in return
 - ✓ Seen as distortion to CDS market

Restructuring contd.

- **Modified Restructuring (MR):**
 - ✓ 2001 ISDA modified restructuring clause: limits opportunistic behaviour by protection buyers
 - ✓ limits deliverable obligations to bonds with maturity of less than 30 months after a restructuring.
 - ✓ has become common practice in **North America** in last few years
- **Modified Modified Restructuring (MMR):** “modified” version of the modified restructuring option
 - ✓ 2003 further modification of restructuring clause
 - ✓ resulted from criticism that modified restructuring was too strict with respect to deliverable obligations.
 - ✓ under the modified-modified restructuring – more popular in **Europe** – deliverable obligations with maturity of up to 60 months after a restructuring are allowed

Restructuring Contd.

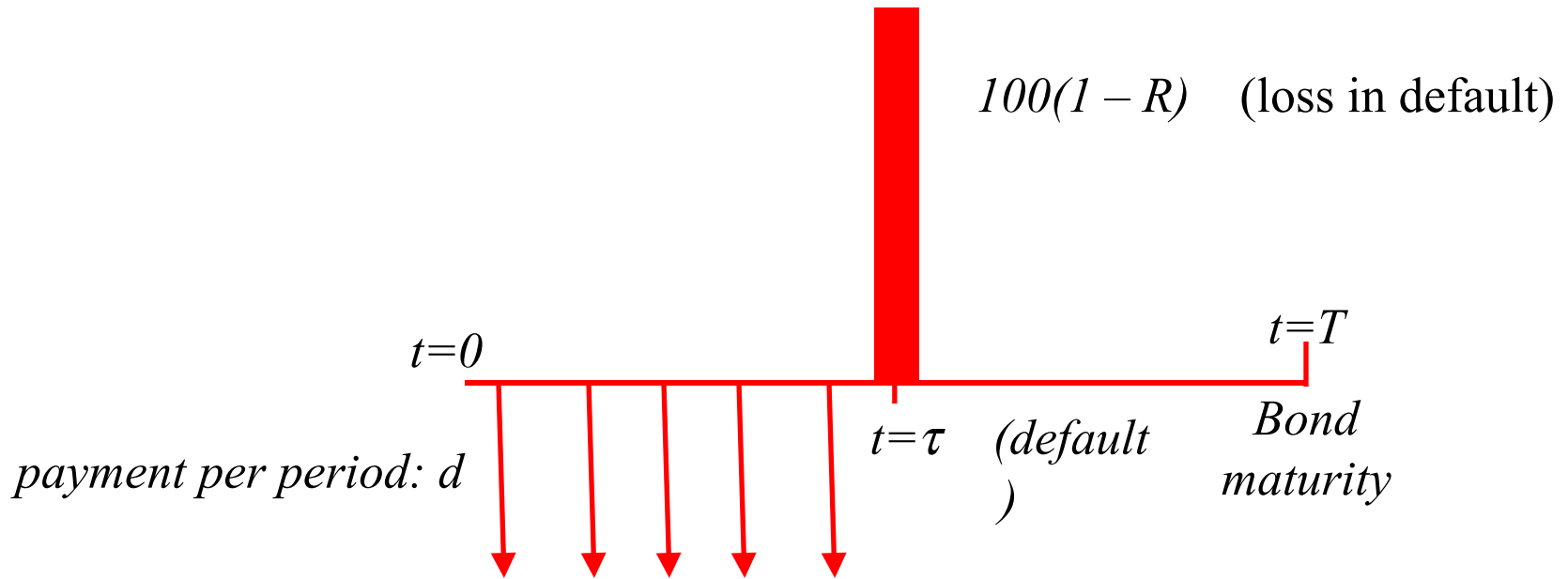
- **No Restructuring (NR):** This option excludes restructuring altogether from the contract:
 - ✓ eliminates possibility that protection seller loses in “soft” credit event that does not necessarily result in losses to the protection buyer
 - ✓ August 2002: J P Morgan announces it would no longer include restructuring in some non-sovereign contracts
 - ✓ most popular CDS indices are traded under no-restructuring contract

Impact of Restructuring on Pricing

	Median Difference in Basis Points
FR – MR	1.7
MM – MR	0.7
FR – NR	4.6
MR – NR	2.6

Source: Packer and Zhu, “Contractual Terms and CDS Pricing”,
BIS Quarterly Review, March 2005

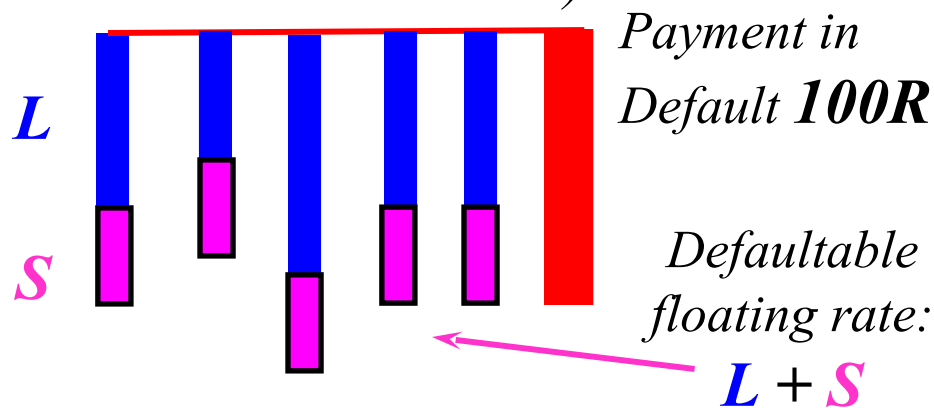
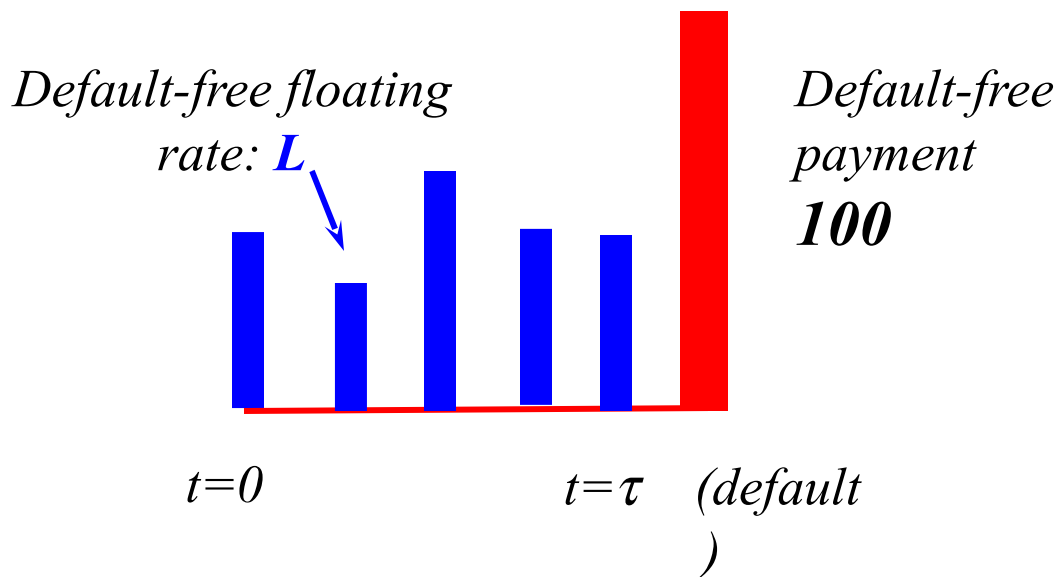
Credit Default Swap Cash Flows



- Buyer of protection pays d per period until default when he receives face value (100) minus market value of underlying note $100 * R$

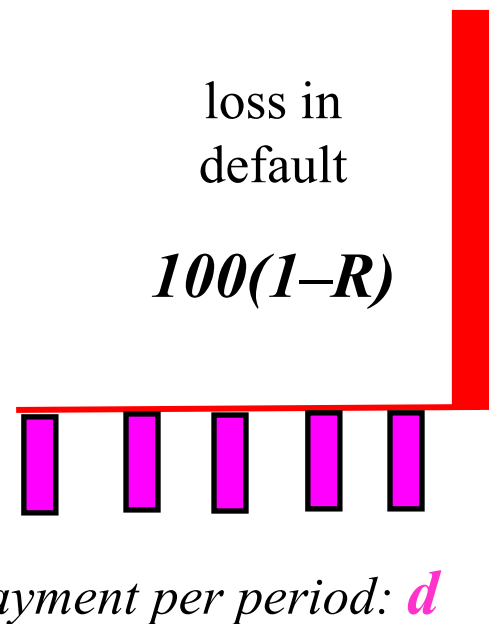
Synthetic Credit Default Swap

Default-free floating rate note (long)



Defaultable floating rate note (short)

Credit Default Swap



- Even though time of default is unknown value of default-free floater will equal 100 at each coupon date

Pricing Default Swaps I: Supply (Dealer Perspective)

Transaction	Cash Flow		Default Event Payment	Cash Flow at Maturity
	Now	Period		
Write default protection	0	d	-100(1-R)	0
Borrow bond and sell	100	-(L+S)	-R*100	-100
Invest Proceeds	-100	r	100	100
Total	0	$d - [S + (L-r)]$	0	0

repo

R: recovery rate; L: Libor rate; S: floating rate spread; r: repo rate; d: CDS rate

$$\text{CDS rate (ask)} = \text{Spread} + (\text{Libor} - \text{repo rate}) \Rightarrow d = S + (L - r)$$

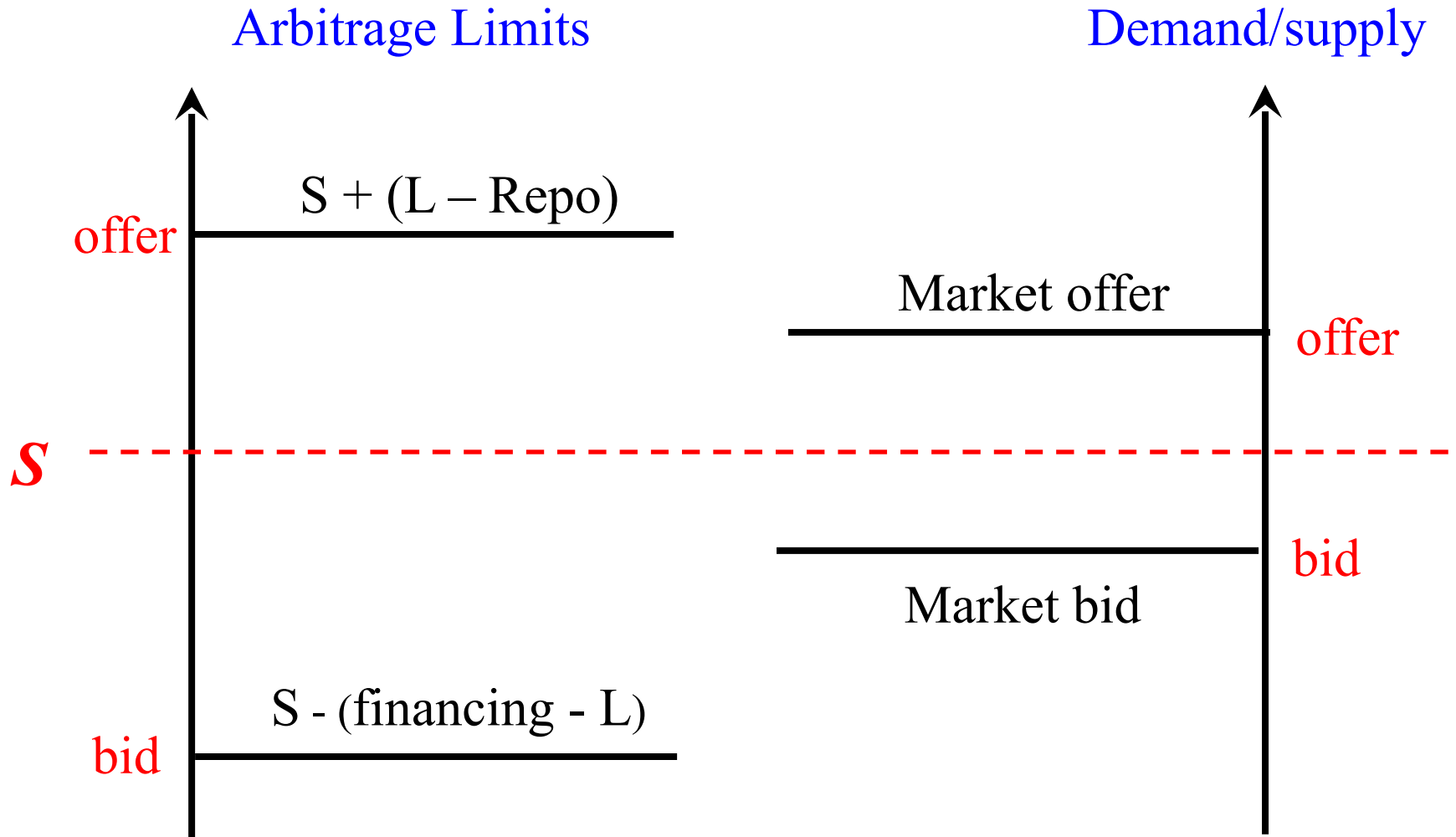
Pricing Default Swaps II: Demand (Dealer/ Investor Perspective)

Transaction	Cash Flow		Default Event Payment	Cash Flow at Maturity
	Now	Period		
Buy default protection	0	-d	+100(1-R)	0
Buy bond	-100	+(L+S)	+R*100	+100
Finance bonds	+100	$-r_B$	-100	-100
Total	0	$-d + [S + (L - r_B)]$	0	0

R: recovery rate; L: Libor rate; S: floating rate spread; r_B : financing rate; d: CDS rate

$$\text{CDS rate (bid)} = \text{Spread} - (\text{financing} - \text{Libor}) \Rightarrow d = S - (r_B - L)$$

CDS Pricing – Arbitrage Limits vs. Supply/Demand



CDS Basis: may be positive or negative

$$\text{CDS basis} = \text{CDS rate} - \text{Spread}$$

$$CDS = S + \frac{L - \text{repo}}{L - r_B} \frac{\text{ask}}{\text{bid}} \quad \text{basis} = CDS - S = \frac{L - \text{repo}}{L - r_B} \frac{\text{ask}}{\text{bid}}$$

Reasons for positive basis

- high demand for credit protection
- difficult / expensive to short bonds (repo rate low)
- funding below par
- cheapest-to-deliver option

Reasons for negative basis

- large supply of credit protection
- Financing rate above libor
- counterparty risk

Average CDS Premia and Average Bond Spreads (US Corporates)

	Average CDS Premium	Average Bond-Swap Spread
AAA - AA	38	19
AAA - AA	66	60
BBB	160	172
BBB	475	495
B	1016	977
CCC	1944	1242

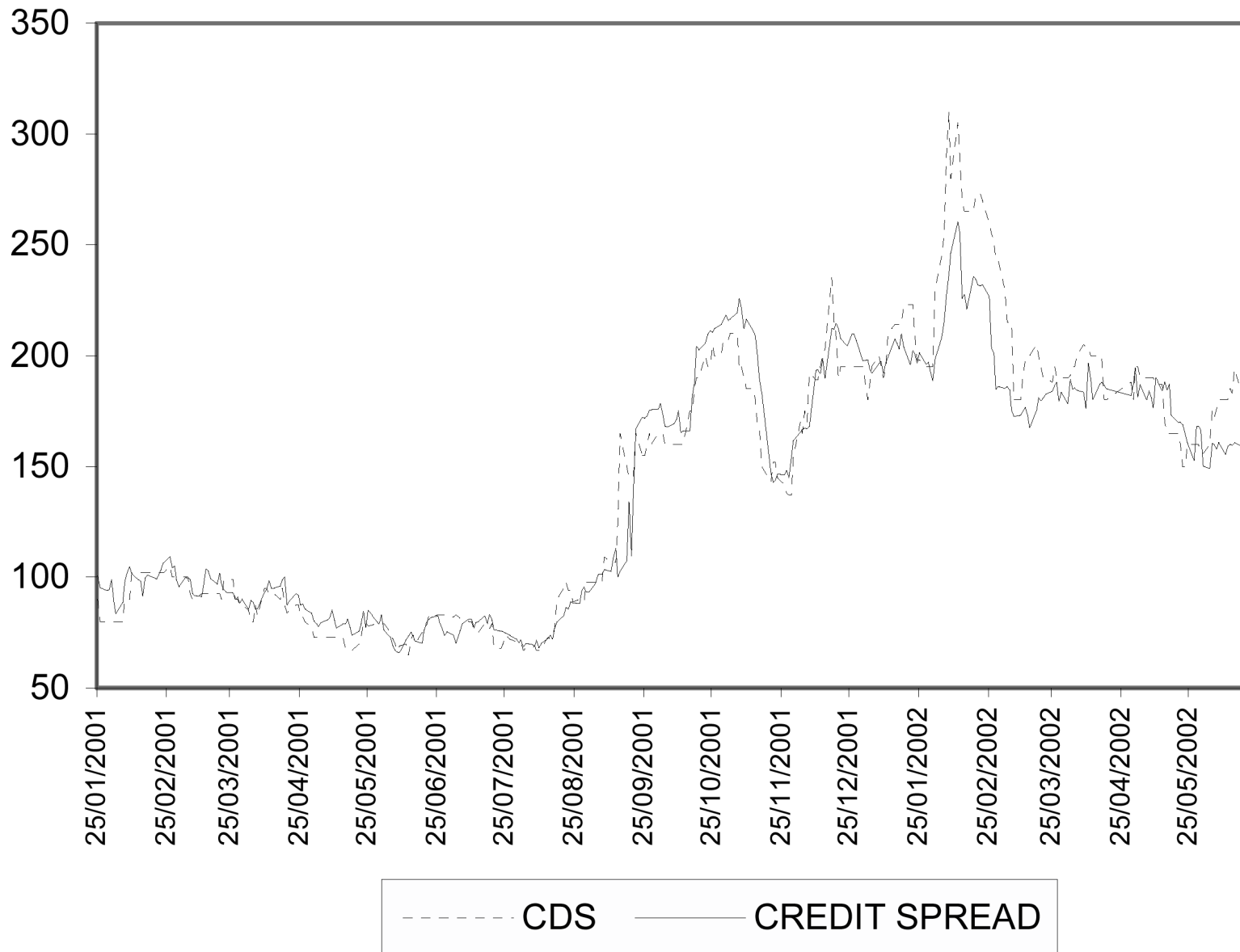
Notes:	
1	Source - own calculations
2	Data: 5-year CDS premia;
3	Bond spreads to swaps
4	500 issuers; 18,000 observations

The Average CDS Basis: Jan 01 – June 02

	Average CDS Basis vs. Swap Rate
AOL	13.0
Bank of America	-3.6
Ford Motor Credit	2.6
Goldman Sachs	-3.8
Daimler Chrysler	7.9
France Telecom	64.2
Average	5.5 ← small

Source: Blanco, Brennan & Marsh, An Empirical Analysis of the Dynamic Relation between Investment Grade Bonds and Credit Default Swaps, Working Paper, Bank of England, May 2003.

Ford MC bonds relatively liquid: CDS basis was small



France Telecom bonds very difficult to borrow in 2002 – repo rate very low: CDS basis high and positive

