Single-name Credit Derivatives

Viral V. Acharya and Stephen M Schaefer NYU-Stern and London Business School (LBS), and LBS

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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)

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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



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 <u>OR</u> the occurrence of the default event (whichever comes first)
- the <u>seller</u> 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



Deliverable Obligation

- 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
- **<u>Example</u>: 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
 - \checkmark 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 norestructuring 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*



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Pricing Default Swaps I: Supply (Dealer Perspective)

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

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

CDS rate (ask) = Spread + (Libor – repo rate) => d = S + (L - r)

rebo

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

		Cash Flow	Default	Cash Flow at	
Transaction	Now	Period	Event Payment	Maturity	
Buy default protection	0	-d	+100(1-R)	0	
Buy bond	-100	+(L+S)	+R*100	+100	
Finance bonds	+100	- <i>r</i> _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

CDS rate (bid) = Spread - (financing – Libor) => $d = S - (r_B - L)$

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CDS Pricing – Arbitrage Limits vs. Supply/Demand Arbitrage Limits Demand/supply S + (L - Repo)offer Market offer offer bid Market bid S - (financing - L) bid

CDS Basis: may be positive or negative

CDS basis = CDS rate - Spread

$$CDS = S + \begin{array}{c} L - repo & ask\\ L - r_{B} & bia \end{array}$$

basis =CDS
$$-S = \frac{L - repo}{L - r_B}$$
 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	Average Bond-	
	Premium	Swap Spread	
AAA - AA	38	19	
AAA - AA	66	60	
BBB	160	172	
BBB	475	495	
В	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 obervations

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



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

