Credit Derivatives

1. What are the cash market constituents of debt capital? How do credit derivatives allow for the unbundling of these constituents?

2. What instruments can a commercial bank use to hedge the credit risk exposure associated with a pool of corporate loans? What advantages are there from using credit derivatives to hedge such risk?

3. For pure hedging purposes, which is the more appropriate instrument to use, a credit default swap (CDS) or total return swap (TRS)? How can a TRS be used to facilitate funding of a bond market-making book?

4. Consider the following corporate (financials) CDS premiums taken from page WCDS on Bloomberg on 20 April 2008

Reference name	*Fitch rating*	*Spread*
ABN Amro	AA-	67.00
Abbey National plc	AA-	70.00
Alliance & Leicester plc	A+	267.50
Banca Monte dei Paschi di Siena SpA	A+	62.50
Banco Popolare SC	A	90.00

(a) For hedging purposes, suggest why one might use a portfolio CDS product as opposed to using single-name CDS for each name in the above basket.

(b) Relative to the single-name prices above, where do you expect a Basket CDS to trade? (Assume the notional amount of each reference name is the same).

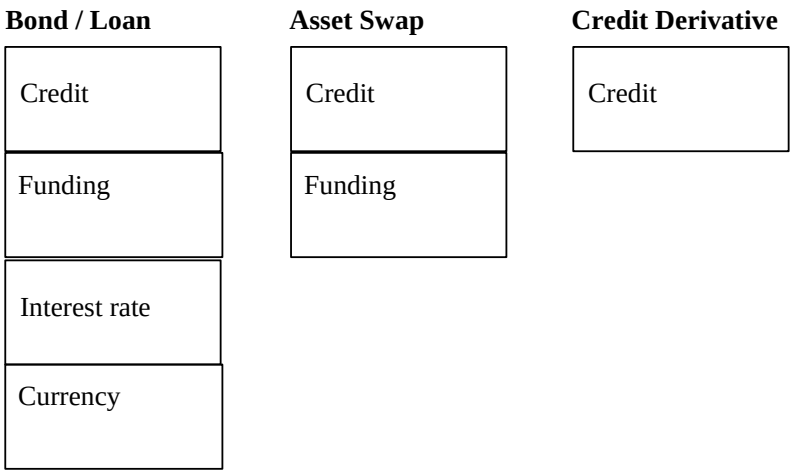
(c) How does the *N*th-to-default CDS differ in its mechanics from the basket CDS? Where should the *N*th-to-default price trade relative to the basket CDS price, and why (assume some level of correlation)? Are there any applications where a First- or *N*th-to-default portfolio CDS of the above names might be used rather than a basket CDS?

(c) Why do you think the Alliance & Leicester name is trading at such a premium over names of equivalent or lower rating?

5. What is the "NOP" with regard to a CDS contract? Describe its mechanics.

Module 5.1 Problem sheet – Answers

1. The diagram below shows the cash market constituents, and how they can be unbundled.



Credit derivatives value pure credit, with no connection to funding or interest-rate considerations, hence enabling the isolation of credit as an asset class and risk element in its own right.

2. A bank can hedge corporate loans with cash deposits in the other direction from similar-rated corporations. This will be an inexact hedge. The advantage of the credit derivative is that the hedge can be tailor-made to suit specific requirements; for example the hedge can be for as short or as long a tenor as required, and at the required credit rating. Credit derivatives also allow short-term hedges to be put on to meet short-term market contingencies, and as they are synthetic instruments they can be unwound with ease.

3. In theory, either instrument can be used to hedge credit risk. The CDS is more straightforward from an administrative and operational point of view. A TRS can be used to obtain liquidity for a bond trading book by being used as a synthetic repo. A bond is swapped out to the TRS counterparty, who advances funds against it. The bondholder pays the TRS Libor-rate, and the TRS counterparty pays the “total return” (coupon plus capital appreciation) to the bondholder. The cashflows are netted. This is economically identical to a classic repo trade.

4.

(a) A basket CDS may be easier to use for operational, settlement and administrative reasons. The iTraxx CDS will be the most straightforward hedge.

(b) The total premium using single-name CDS would be 557 bps, which is an average premium of 111.4 bps. The basket CDS would be expected to trade at the duration-weighted average price (here we assume equal duration) of 111.4 bps.

(c) The basket CDS notional amount is adjusted down in the event of default of one of the names, and the same premium is then paid until expiry on the reduced notional amount. An *N*th-to-default CDS will pay out on occurrence of credit event in one of the constituent names and then terminate. The exposure of the *N*th-to-default CDS protection seller will only be to the notional of one name. The price will be below the average level of 111.4 bps due to the impact of "default correlation" in the price calculation.

CDS may be preferred for investment purposes rather than hedge purposes, unless the hedger has a specific view on the names being hedged.

(d) In a word (or two words): Northern Rock. This is related to sentiment rather than rational analysis. All such former building society names have been marked down since last summer, even though they remain solvent and are rated higher than some contemporaries (and, arguably, have an implied government underwriting since Northern Rock was not allowed to go bankrupt last summer).

5. There are two ways in which CDS contracts are settled on occurrence of credit event:

-- Physical Settlement: when the protection seller takes delivery of the defaulted bond and pays the protection buyer par value, and

-- Cash Settlement: where the protection seller pays the difference between the par value and the recovery value of the bond

To be triggered, Physical Settlement requires a Credit Event Notice, a Notice of Physical Settlement (NOP) and, if specified in the related Confirmation, a Notice of Publicly Available Information. After a credit event has occurred, the protection buyer must send the NOP to the seller no later than 30 days after the other notices are delivered. This notice confirms that the protection buyer will physically settle the credit derivative transaction and contains a detailed description of the Deliverable Obligations that the Buyer of Protection will deliver to the seller, including their nominal value and accrued but unpaid interests.

Module 5.4 Problem Sheet

CDS pricing and the basis

1. From first principles, derive an expression for calculating the implied probability of default (*PD*) from the market yield of a company's debt, assuming 0% recovery value. Then derive the modified expression to allow for a credit-risky asset has some recovery value *R*.

2. Calculate the 1-year *PD* given a one-year risk-free rate of 5.00% and a risky rate of 5.50%

   What is the new *PD* if we now introduce *R* of 40%?

3. With regard to the market approach to CDS pricing, how does *PD* feed into calculating the CDS premium?

4. A trader who previously used *R* of 30% to calculate CDS prices adjusts this value upwards to 40%. All else being equal what impact will this have on the CDS term structure? Briefly explain what is behind this impact.

5. The CDS Basis

(a) Define the CDS basis

(b) Why does the basis exist? Suggest factors that drive the existence of the basis.

(c) The screen shot below shows the asset-swap spread (the graph that touches the y-axis on left) and the CDS spread for Alliance & Leicester plc 2-year bond as at 21 April 2008, for the period Nov 2007 – Apr 2008. What sort of trade can be put on to exploit this movement in cash and synthetic spreads?