

Bank Lending BFC5914

Monash Business School

Monash University

Week 11

- 1 Review of Last Lecture
- 2 Introduction
- 3 Products of Credit Derivatives

- Loan Default
- Causes of Loan Default
- Business Cycle
- Provisions
- Dealing With Defaults

Regulations in Bank Lending

- Aims of Regulations
- Causes of Banking Problems
- Possible Solutions of Regulations

Topic 10 : Fundamental Credit Derivative Products

Reading : Saunders and Allen, Chapter 12

Credit Derivatives

- **Credit derivative (CD)** contracts are financial instruments that transfer between two parties the **risk and return** characteristics of a credit-risky reference asset
- The underlying assets may or may **not** be **owned** by either party in the transaction
- Though CD are relatively new compared to other derivatives, but now are already widespread and growth rates are impressive
- Innovation and expansion show no signs of slowing, suggesting that the sector should continue to remain vital and vibrant.

Overview of Products

- Credit spread contracts pay off based on the creditworthiness of the reference asset ; default is thus just one state in a continuum of creditworthiness
- Credit deterioration may occur as a result of weakness in the obligor's financial position
 - This leads to **credit rating downgrades** and a **widening of the credit spread** versus a risk-free benchmark
 - Even if the obligor does not default on its obligations, the holder of the derivative will receive a payment related to the differential between the credit spread at trade date and maturity date

Overview of Products

- CD have evolved considerably over the past decade and the market now features a range of core default and spread products, along with certain 'second generation' variations
- The most common structures are as follows :
 - **Asset swaps**
 - Asset swaps, Callable and Puttable Asset Swaps and Asset swap switches and asset swaptions
 - **Credit default swaps** (Company reference, index)
 - **Credit spread forwards**
 - **Total return swaps**
 - **Basket swaps**
 - **Credit spread options**
- These core products can be used to create other types of structured credit instruments, which we classify broadly as :
 - Credit linked notes
 - Synthetic collateralized debt obligations

An Important note

- It should be noted that GFC has taught us (yet again), that Credit Derivatives are only as good as the credit worthiness of the **party writing the derivatives**
 - In effect one type of credit risk is changed into a **different type** of credit risk ; in that the effectiveness of the credit derivative depends on the ability of the writer of the derivative to honour its part of the contract
 - During the pre-GFC period many holders of risky securitised housing loan portfolios thought that they had hedged their credit risk via credit derivatives. Ultimately many of these contracts were found to be with **AIG** which defaulted on its obligations.

The Response to the GFC

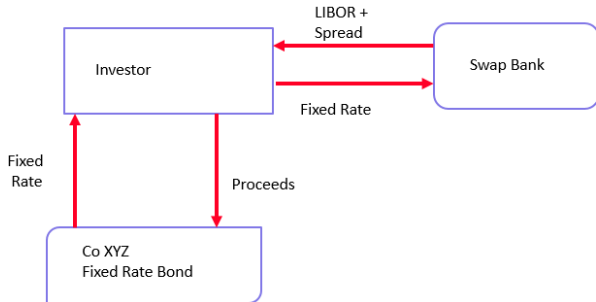
- Today the preferred counter-parties tend to be with major banks, under the assumption that the national regulators will **not allow** the banks to default on these obligations
 - However, moves toward ringfencing are aimed at reducing the obligations of regulators to bail out contracts of this type
- Credit risk management contracts such as Credit Default Swaps are now required to be centrally cleared via an exchange (even if OTC) to prevent a repeat of the AIG problems
 - In the lead up to the GFC it was not well understood the AIG had such a disproportionate exposure.

Asset Swaps

- If an investor seeks to invest in Company XYZ's bonds on a floating-rate basis, but XYZ has only issued fixed-rate liabilities, the intermediary can sell the investor fixed-rate bonds and attach a swap that converts the fixed-rate coupons into LIBOR.
- In practice the swap flows are adjusted to provide investors with a **synthetic investment** trading at par with a stated yield. Though no specific floating-rate XYZ asset actually exists, the intermediary synthesizes one by combining the fixed bond and the interest rate swap.

Asset Swaps

a Synthetic FRN Investment Package

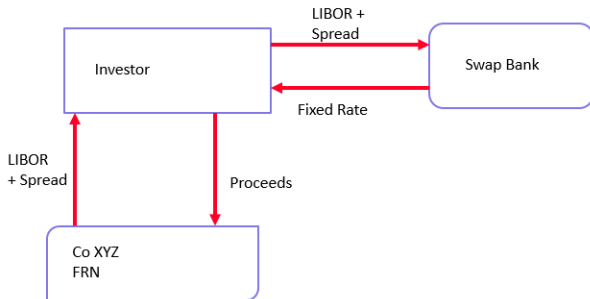


Asset Swaps

- The reverse transaction is also possible :
if XYZ only features LIBOR-based liabilities and an investor seeks a fixed-rate return, the investor can buy the FRN and enter into an associated swap where it receives fixed and pays LIBOR plus a spread

Asset Swaps

b Synthetic Fixed Rate Investment Package



Asset Swaps

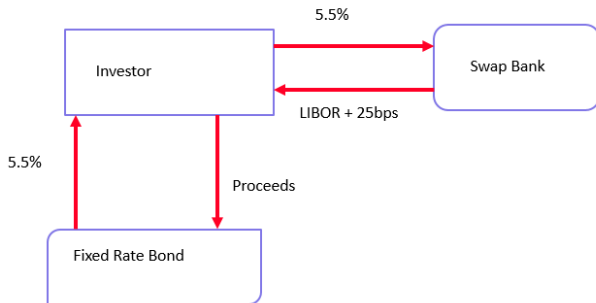
- The same concept applies to asset swaps created with **currency**, rather than *interest rate swaps*; in such cases the transaction also involves **initial and final exchange of principal**, as in any conventional currency swap
- Regardless of the specific structural details, the intent is to provide the investor with an opportunity to benefit from XYZ's credit spread levels and movements
- Asset swaps are typically arranged on **notional amounts** ranging from \$5 million to several hundred million, with maturities extending from approximately 1 year up to 10 years.

Asset Swaps

- Investors use asset swaps because they are motivated by **arbitrage opportunities** :
 - Option 1 : Investor invests in $\text{LIBOR} + x \text{ bp}$ assets
 - Option 2 : Same as option 1 but seeking arbitrage opportunities by using an asset swap :

Fixed payments under the swap are less than payments received from a fixed asset, then $\text{LIBOR} + x \text{ bp}$ spread is created. If this spread is greater than the spread on a direct FRN purchase then the asset swap arbitrage is effective
 - Eg : Investor can receive 5.5% on a three-year, fixed-rate bond and $\text{LIBOR} + 15\text{bps}$ on a three-year FRN, and can enter into a three-year pay fix/receive LIBOR where the net return on the synthetic asset is $\text{LIBOR} + 25\text{bps}$, or 10 bps more than the direct purchase.

Asset Swaps Arbitrage



- Option 1 : LIBOR +15bps on a 3-year FRN or + Bond
- Option 2 : Using Swap and receiving LIBOR +25bps or + Bond

Callable Asset Swaps

- A callable asset swap is similar to the asset swap package, except that the Swap bank selling the package **retains a call option** on the underlying asset, allowing it to repurchase the asset at a given spread at some future time
- The total package can therefore be regarded as a an ordinary asset swap combined with a fixed-floating swap and an underlying fixed or floating-rate bond
- The **strike spread** is typically set equal to the spread at which the asset is placed with the investor.

Callable Asset Swaps

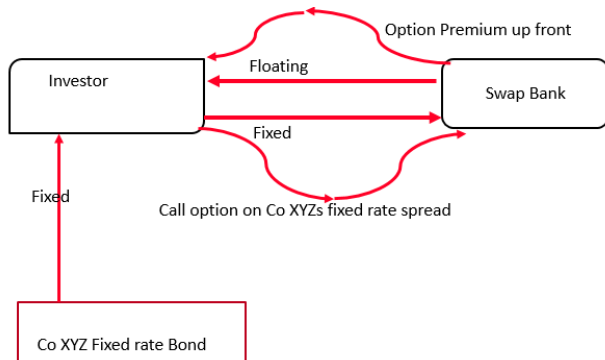
- If the spread tightens during the life of the transaction (e.g., the price of the asset rises as a result of specific or general credit improvements) the SWAP bank **calls** the package (the underlying asset) **away** from the investor, delivering cash proceeds equal to the strike spread times invested principal
- The Swap bank can then **sell** the underlying asset in the **market place** at a profit, or enter into a new callable asset swap with a new investor at the tighter market spread
- This process helps the bank realize the mark-to-market value arising from credit improvement
 - Naturally, if the spread widens instead of tightens, the swap bank will abandon the option and the investor will preserve its asset swap package until the contracted maturity date

Callable Asset Swaps(Continued)

- In exchange the Swap bank has the right to call away the package, the investor receives an **incremental yield** that represents the premium from selling the option
- This synthetic structure gives both parties specific benefits :
 - The Swap bank preserves the ability (on an off-balance sheet basis) to efficiently crystallize value (cash benefit) by liquidating or selling the structure if asset spreads tighten,
 - While the investor earns an incremental yield for granting the option.

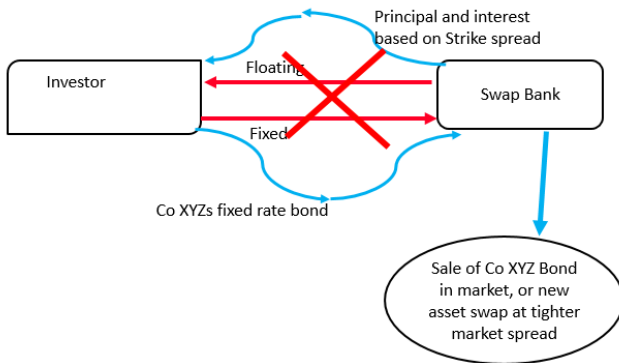
Callable Asset Swaps

a Initial and ongoing flows assuming no exercise



Callable Asset Swaps

b Terminal Flows Assuming Swap Bank exercises



Puttable Asset Swaps

- A puttable asset swap functions in a similar way except that the **investor** rather than the Swap bank, retains the option. The investor acquires a package comprised of **an asset** (fixed bond or FRN) and a **puttable swap**, where the put allows the investor to sell the asset swap package back to the bank at a predetermined strike spread
- The strike spread is typically set equal to the investor's original purchase spread
 - If the **spread widens** (the price of the underlying asset falls) during the life of the transaction, the investor **puts** the package to the bank, receiving principal and interest defined by the strike spread
 - The bank may then retain the asset in its portfolio, sell it in the market-place, or attempt to arrange a new asset swap structure with another investor at the new (wider) spread level.

Puttable Asset Swaps

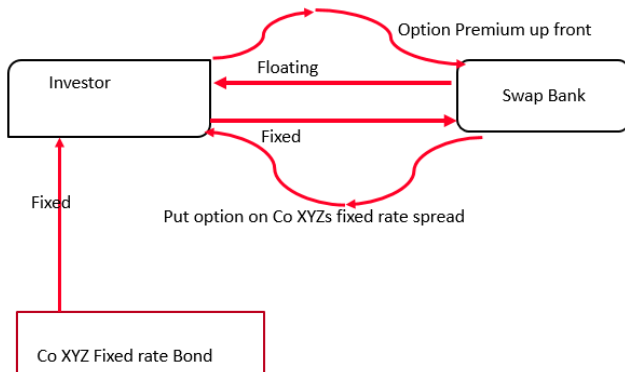
- Depending on carrying value, the Swap bank may or may not post a mark-to-market loss. If the spread **tightens**, the investor will choose **not to exercise** the option, thus preserving its package until the contracted maturity date
- The investor, in gaining the right to put the package back to the bank, pays an option premium in the form of an up-front payment or a lower yield on the asset swap coupon
- A puttable swap where the **payer** of the variable or floating rate has the right, but **not the obligation**, to end the contract before expiration.

Puttable Asset Swaps

- Both parties obtain benefits through the synthetic structure :
 - The Swap bank receives incremental income from selling the put option (temporarily or permanently removing the underlying asset from its balance sheet)
 - The investor obtains de facto downside protection against spread widening on the underlying asset
- The puttable asset swap structure is also an essential element of callable bond investing, as investors must be assured that they can terminate the swap component of an asset swap strategy if the underlying bond is called back by the issuer.

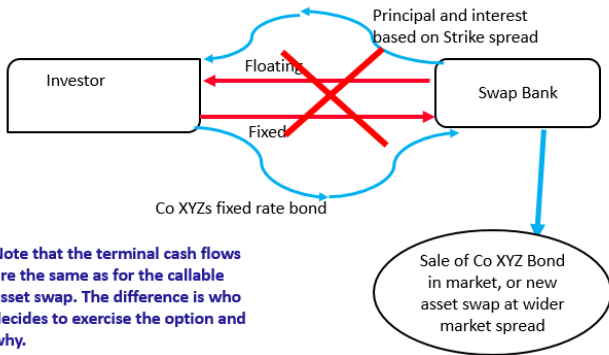
Puttable Asset Swaps

a Initial and ongoing flows assuming no exercise



Puttable Asset Swaps

b Terminal Flows Assuming Swap Bank exercises



Asset Swap Switches and Asset Swaptions

- Example : An investor may own an asset swap package on credit reference ABC at $\text{LIBOR} + 30\text{bps}$ and agrees with Bank D to exchange it for an asset swap package on reference XYZ, (currently trading at $\text{LIBOR} + 50\text{bps}$), if XYZ's trading spread widens to $+70\text{ bps}$. Bank D has the right to put the XYZ package to the investor while simultaneously calling back the ABC package
- In order for this transaction to function from an economic perspective, the investor and the bank must have **different views** on the current and future creditworthiness of ABC and XYZ
- The investor must believe that XYZ represents good value at $+70\text{bps}$, but is too expensive at $+50\text{ bps}$
- The bank is exposed to 20 bps of spread widening before it can trigger the swap, but effectively acquires default protection through the structure.

Credit Default Swaps (CDS)

- The **CDS** functions like an **insurance policy**, with the swap buyer paying the swap seller a premium to protect against losses resulting from a **defined credit event** such as bankruptcy, moratorium etc
- The swap purchaser (beneficiary) '**swaps**' the credit risk with the provider of the swap (the insurer or guarantor) receiving a compensatory payment if the credit event is triggered
- If the defined credit event occurs, the CDS seller must either :
 - Accept delivery of the reference asset and pay par value
 - Compensate the buyer for the difference between par and the post default price through a process known as cash, or financial settlement.

Credit Default Swaps

- Note that while these products are called 'swaps' they really function more like an option or insurance
- Note that as discussed in Saunders and Allen (pages 250 to 252) a large scale default (e.g. Lehman Brothers) can result in an auction process to arrive at market prices for settlement
- Though the CDS appears to be a form of insurance, it is distinct in two respects :
 - The swap is an **OTC contract** (OTC = over the counter, i.e. a tailored financial product not quoted or traded on an organised exchange)
 - Note that as these contracts are OTC then the credit worthiness of the writer is an important consideration.

Credit Default Swaps

- Though the CDS appears to be a form of insurance, it is distinct in two respects :
 - Contracts can be arranged by a party not exposed to the underlying risk, i.e. speculators and hedgers can participate without needing to demonstrate proof of insurability
 - E.g. prior to Enron's default, many hedge funds speculated on Enron's default to the point where the volume of CDS on Enron's debt considerably exceeded the actual amount of debt outstanding
- CDSs are generally written for maturities ranging from **6 months to 5 years**, with trading size of \$10-\$50 mn
- Generally the value of CDS traded globally **exceeds** the global value of relevant corporate debt
 - Reason for this include (i) speculation (ii) creation of synthetic asset portfolios with the need to write loans, and (iii) changes in views of the future resulting in trading to change already hedged positions

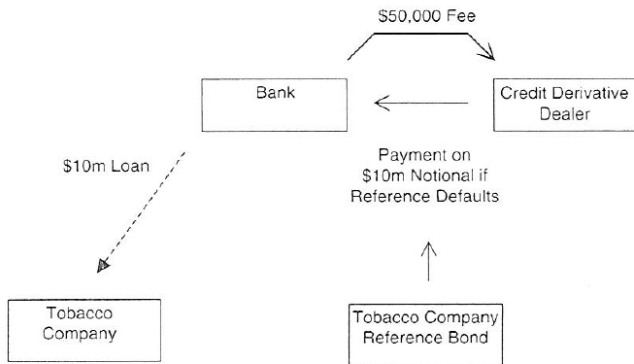
Factors Affecting The Price of a CDS

- **Time To Maturity** : The longer the maturity, the greater the likelihood of default, the higher the premium
- **Default Probability Reference Credit** : The higher the probability of default, the higher the premium

Factors Affecting The Price of a CDS

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- **Default Probability Reference Credit** : The higher the probability of default, the higher the premium
- **Credit Rating of CDS Counter-party (as Seller)** : The lower credit rating of the CDS counter-party, the lower the premium

CDS on Tobacco Company Reference



CDS on Tobacco Company Reference

- The Bank is concerned about pending litigation that may result in a deterioration of credit quality of its tobacco company exposure; It has extended a \$10 million loan
- The Bank is eager to **reduce its default exposure**; it enters into a 5 yr CDS with a credit derivative dealer for \$10 mn
- The reference under the transaction is the tobacco co's publicly traded 10-yr bond; The transaction fee for the CDSs is 50 bp, or \$50,000 per year
- If the Tobacco co defaults on its bond and the reference bond drops to a price of 60, the dealer pays 40 or \$4mn.

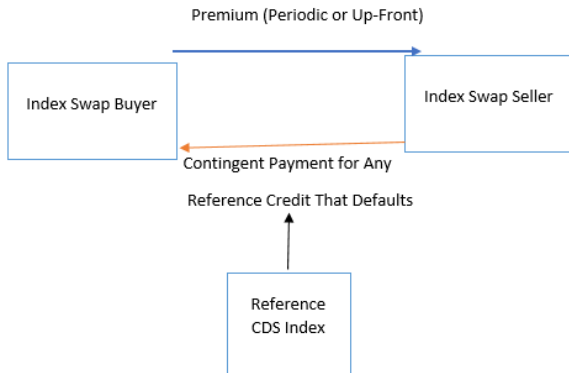
CDS on Tobacco Company Reference

- This provides coverage for the bank's own \$10mn loan. (e.g. if my loan falls in value from \$10mn to \$6mm, the \$4mn from the CDS pays for the loss)
- The bank is exposed to the credit risk of the tobacco company and the credit derivatives dealer as **counter-party**
- The correlation between the reference and the dealer must be understood : High correlations between the dealer and the tobacco co will allow the bank to pay a lower premium (**but bear more counter-party risk**).

CDS Index Swap

- A **derivative contract** covering a broad pool of credits that together comprise a standardized index ; The CDS Index swap uses a market index as its benchmark
- Example : the **DJ CDX** consists of a basket of 125 CDS contracts on U.S. firms with liquid, investment-grade corporate debt
- The buyer of an index swap pays the seller a premium in exchange for a compensatory payment if a credit event happens **within the index**
- If a credit event occurs, the reference asset is removed from the index and the contract continues based on the remaining reference assets
- The buyer is obliged to pay the same fixed premium on the remaining references

CDS Index Swap



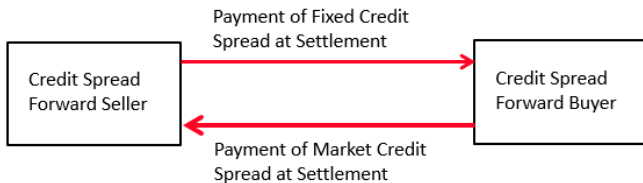
CDS Index Swap

- Assume the index price is 35bp, payable by the buyer quarterly for the life of the trade
- If the fair price widens 1 month later 55bps, a protection buyer entering the trade at that point must pay an up-front fee equivalent to the present value of the 20bps for the life of the trade and then continue paying the fixed 35bps every quarter
- If one of the 125 reference entities defaults, the protection seller pays the protection buyer \$1mn
- The trade then continues at a premium of 35bps on the remaining 124 credits and the lower notional amount.

Credit Spread Forwards

- CSF is a **forward contract** on a risky credit spread that allows the purchase or sale of a credit spread at a forward price for settlement at some future date
- The **seller** agrees to **pay** the buyer a fixed credit spread and **receive** a market spread
- The fixed spread is set at the trade date (today) and the evaluation against the market spread occurs at transaction maturity (in the future)
- The buyer agrees to pay the market spread in exchange for the fixed spread
- This provides a mechanism to lock in a fixed spread on a risky loan.

Credit Spread Forwards



Credit Spread Forwards Example

- If a bank agrees to pay a fixed 100bps for the spread on Company ABC's reference bond and receive ABC's market spread, it will generate a gain as ABC's market spread widens beyond 100 bps and will post a loss as it tightens (i.e. improves); the bank's counter-party faces the opposite scenario.
- If ABC defaults, the bank will receive a payment related to ABC's post-default spread level.
- The payout on the forward is computed as the difference between the fixed and market spreads.

Total Return Swaps (TRS)

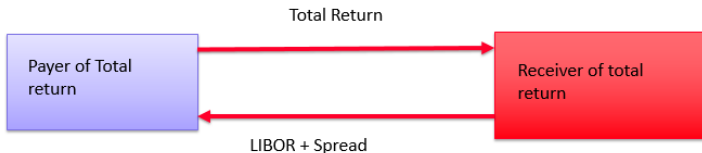
- TRS is a **bilateral contract** that transfers the economics of a credit reference between two parties ; the contract covers the entire spectrum of pay-offs, from credit strengthening to credit deterioration and default
- Under a standard contract, the TRS **receiver** is entitled to the total return on the reference asset in exchange for periodic floating payments
- The TRS **payer** in turn is entitled to any depreciation that occurs in the security along with a LIBOR spread
- If the price of the reference asset rises as a result of credit improvement, the receiver benefits ; if it declines as a result of depreciation or default, the payer benefits.

Total Return Swaps

- The TRS can be arranged on a **funded** or **unfunded** basis
 - A **funded TRS** requires the TRS receiver to purchase a risk-free or low- risk floating asset that yields the LIBOR stream payable to the TRS payer

An example of such an asset would be a AAA rated bond paying LIBOR
 - The receiver holds **no** such asset in the **unfunded TRS** , so the LIBOR stream must be sourced from cash flow, this means that the TRS position is leveraged.
- Total Return Swap may be applied to **any** underlying asset but is most commonly used with equity indices, single stocks, bonds and defined portfolios of loans and mortgages.

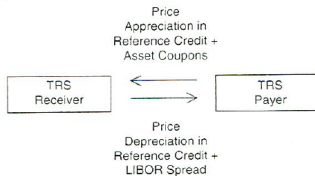
Total Return Swaps



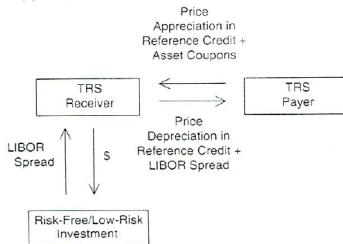
- $\text{Total Return} = \text{Interest Flows} + (\text{Final Value} - \text{Original Value})$
- Total return receiver is long both the price and default risk of the reference asset
- Total return payer is the legal owner of the reference asset and has changed to credit risk of the reference asset into credit risk of the total return receiver.

Total Return Swaps

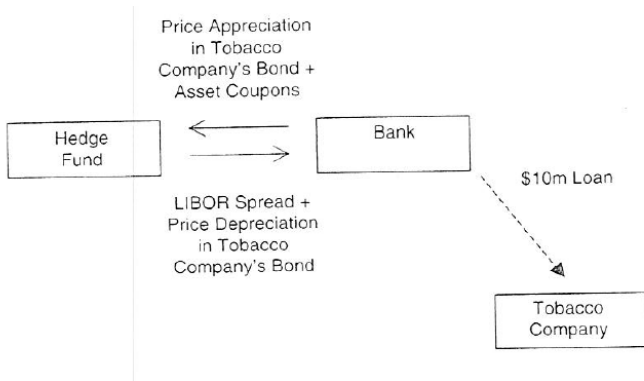
(a) Unfunded TRS



(b) Funded TRS



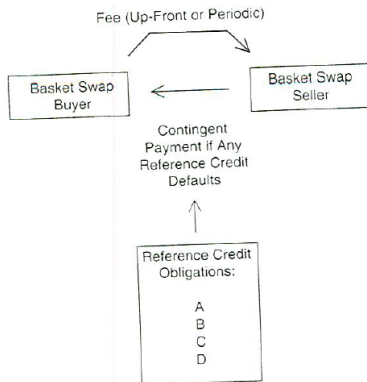
TRS on Tobacco Company Reference



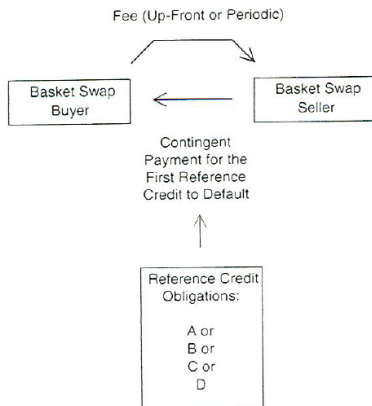
Basket Swap Structure

- Basket swaps are **credit derivatives** that allow for the risk transfer of **a pool of** reference credits; this creates an efficient and cost effective way of dealing with multiple credit exposures
- A basket swap can be set up to include the credit risks you nominate
 - The seller **may or may not** own the underlying credit risks when they sell the basket swap
- Baskets effectively give institutions the chance to manage/hedge portfolios of reference credit risk exposures and investors an opportunity to earn premium from the creation of diversified portfolios of credit-risky assets.

Standard Basket Swap



First-to-Default Basket Swap



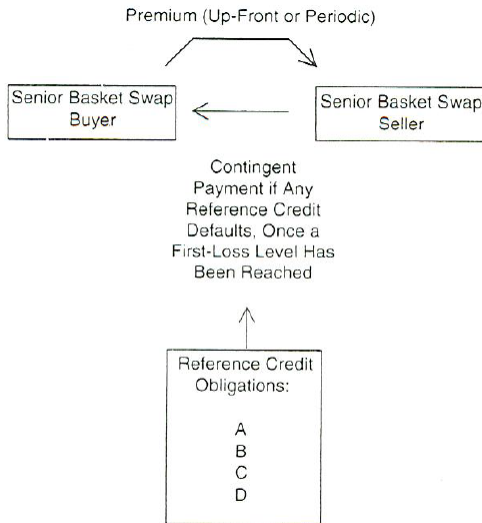
First-to-Default Basket Swap

- Under a **first to default structure** the buyer receives a payout upon the **first default** of one of the assets in the basket
 - The basket swap then terminates
 - This has the advantage of a lower premium
- Alternatively the basket swap can be structured so that the a payout only occurs **after** the **second (or nth)** default
 - In a second to default structure the buyer would receive no compensation for the first default and get compensation for the second default
 - After the second default the contract terminates
 - Such a structure is **cheaper** than a first to default swap.

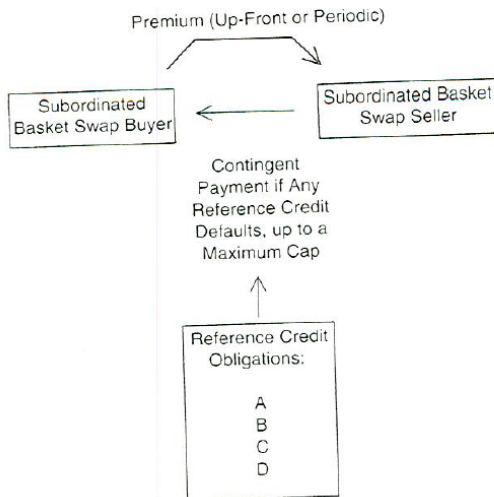
Senior Basket Swap

- In this case the buyer is paid for **any** credit defaults that occur, but only after a nominated loss threshold has been reached
- **Subordinated Basket Swaps**
 - A payout occurs for **every default** in the reference basket, but there is a cap on the **maximum** payout to the buyer of the credit protection.

Senior Basket Swap



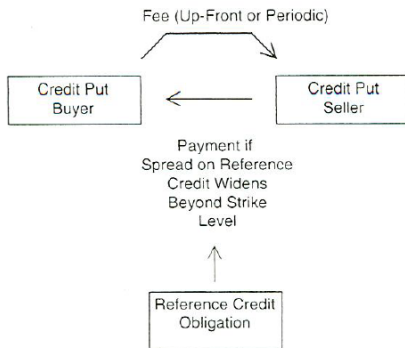
Subordinated Basket Swaps



Credit Spread Option

- The **credit option** grants the **buyer** the right, but not the obligation to purchase (call) or sell (put) the **credit spread** of a reference credit at a particular strike level ; in exchange for this right, the buyer pays the seller an up-front premium payment
- This mechanism provides protection against the deterioration on credit risk in the case of a credit spread put.

Credit Spread Option



Lecture Recording

- Although lectures are recorded and available on-line, it is highly recommended and encouraged for you to attend face-to-face lectures.