Credit Derivatives Explained

Market and Products

- History

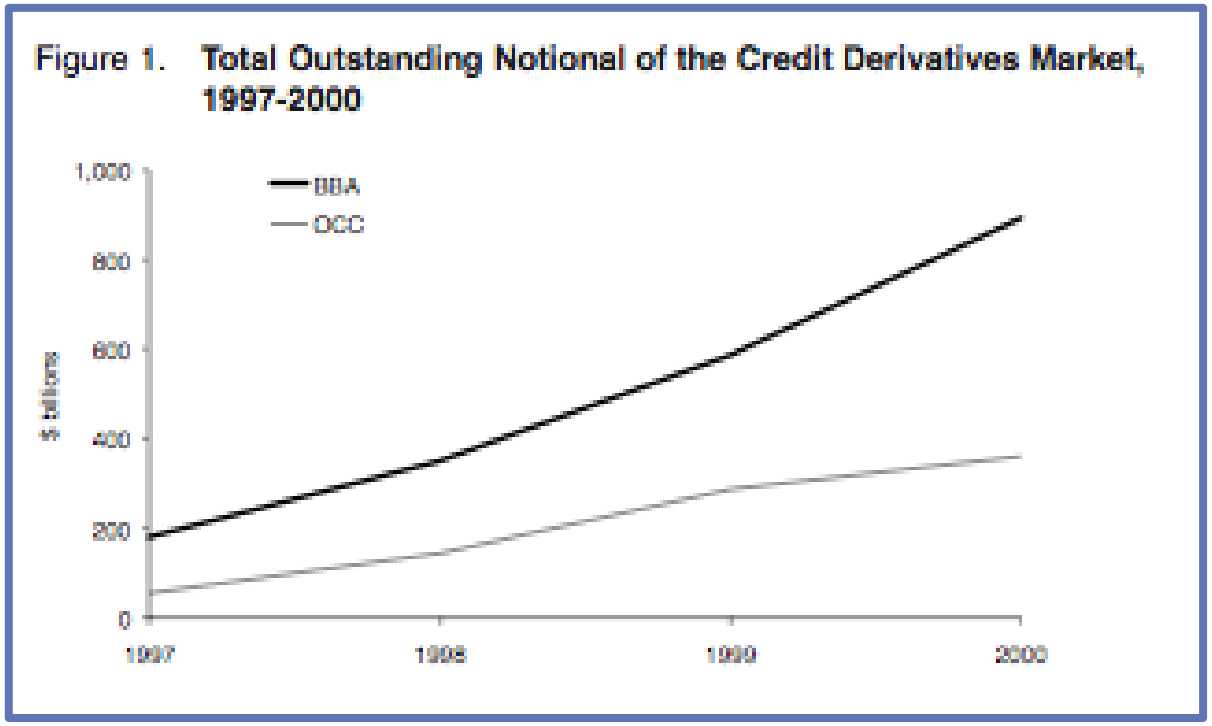
From 1995 until 2001, derivatives markets experienced a considerable growth, from almost nothing to US$1tri. The growth was driven by the advantages from cash alternative, such as: efficient transfer, concentration, dilution and repackaging of credit risk.

Banks, in particular, use derivatives to hedge credits risk, reduce credit risk and free up regulatory capital requirements.

Another key factor in its development, was the use of LIBOR or Euribor as an interest rate benchmark, reflecting a good credit quality.

- Growth

The growth of the credit derivatives market has been recognized by a number of different surveys. The British Bankers' Association numbers were derived by polling international member banks through their London office and asking about their global credit derivative business. It was also studied the results of the U.S. Office of the Comptroller of the Currency (OCC) based on reports filed by U.S. The graphic below shows its development.



- Market Breadth and Participants

The credit derivative market spans across banks, corporates, high-grade sovereign and emerging market sovereign debt.

The wide variety of applications of credit derivatives attracts a broad range of market participant. Historically, banks have dominated the market as the biggest hedgers, buyers and traders of credit risk. However, over the time new players have been entering in the market.

Figure 2. **A Breakdown of Who Buys and Sells Protection by Market Share at the Start of 2000.**

Counterparty	Protection Buyer (%)	Protection Seller (%)
Banks	63	47
Securities Firms	18	16
Insurance Companies	7	23
Corporations	6	3
Hedge Funds	3	5
Mutual Funds	1	2
Pension Funds	1	3
Government/Export Credit Agencies	1	1

Source: British Bankers' Association Credit Derivatives Report 2000.

- Products

There are a number of different products that may be classified as credit derivatives, ranging from the simple asset swap to the synthetic CLO.

Dominating the market, Credit Default Swaps account for more than twice as much of the market as the second most popular product. It is believed that after this sudden development, credit derivative has become the most effective and efficient way to commoditize credit risk.

Figure 3. **Market Share of Outstanding Notional for Credit Derivative Products**

Credit Derivative Instrument Type	Market Share (% Notional) at End 1999
Credit Default Products	38%
Portfolio/CLOs	18%
Asset Swaps	12%
Total Return swaps	11%
Credit Linked Notes	10%
Baskets	6%
Credit Spread products	5%

Source: British Bankers' Association Credit Derivatives Report 2000.

- Credit Risk Framework

Price of the bond:

$(P_{risky}) = 1/(1+r)\ (\ p \times 100 \times R + (1-p) \times 100\ )$

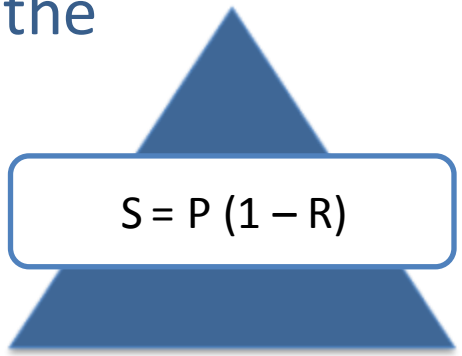
Where r is the one-year risk-free rate, p the probability of defaulting and R the recovery rate. The market usually uses the LIBOR swap curve as the risk-neutral default-free interest rate, since that is the level at which most market participant fund their hedges.

Credit Spread:

The credit triangle formula stated that the annualized

Compensation for assuming a credit risk, the credit spread S, is equal to the probability of default times the

loss in the event of default.



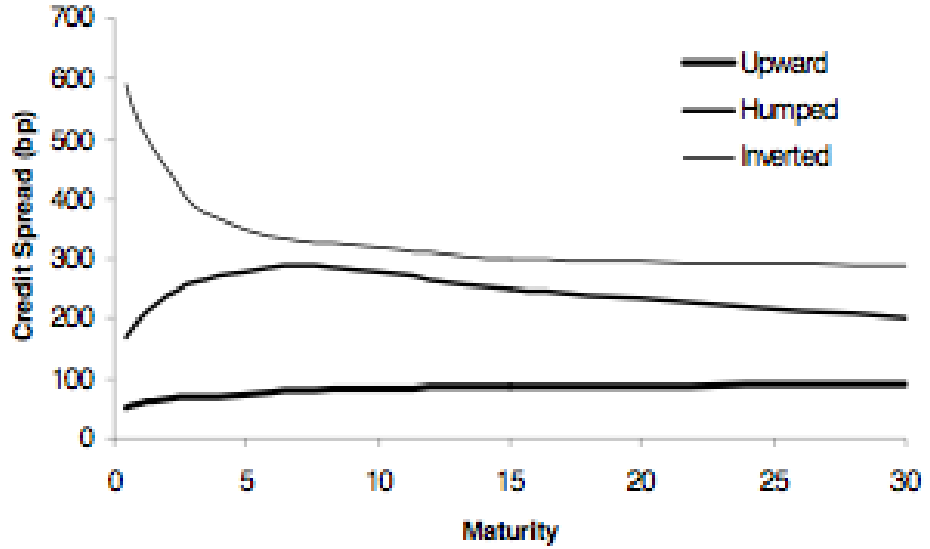
- Credit Curves

Upward Sloping: most of the cases. Within the short term, the qualityof the credit is expected to remain constant while during the long run, the less we can be certain that the credit will not deteriorate. The credit spread increases in order to compensate the investor from taking this risk.

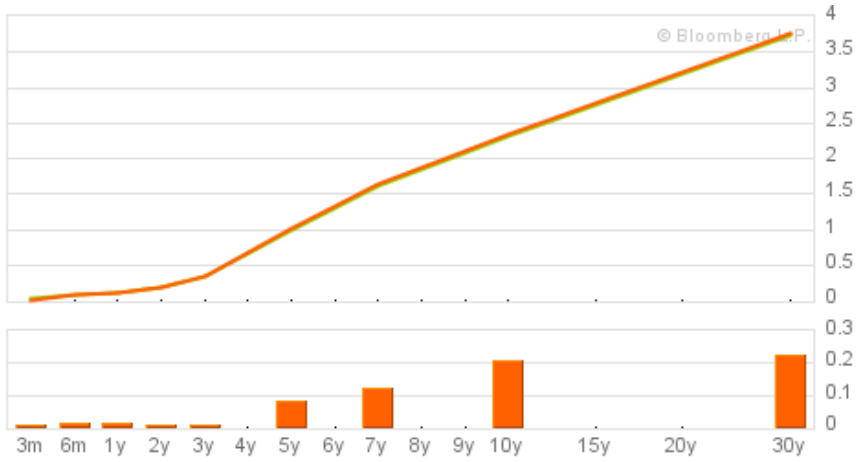
Humped: when credits are viewed as likeley to worsen in the medium term.

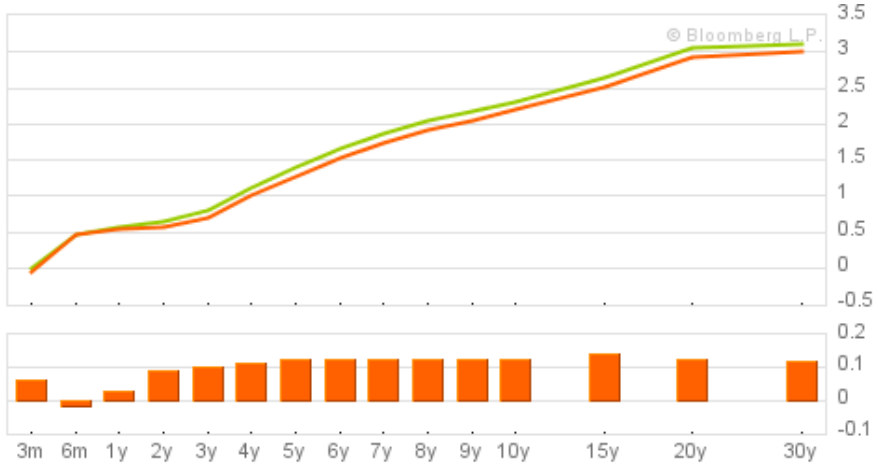
Downward Sloping: associated with credits that have experiencied a significant deterioration to the extent that a default is probable.

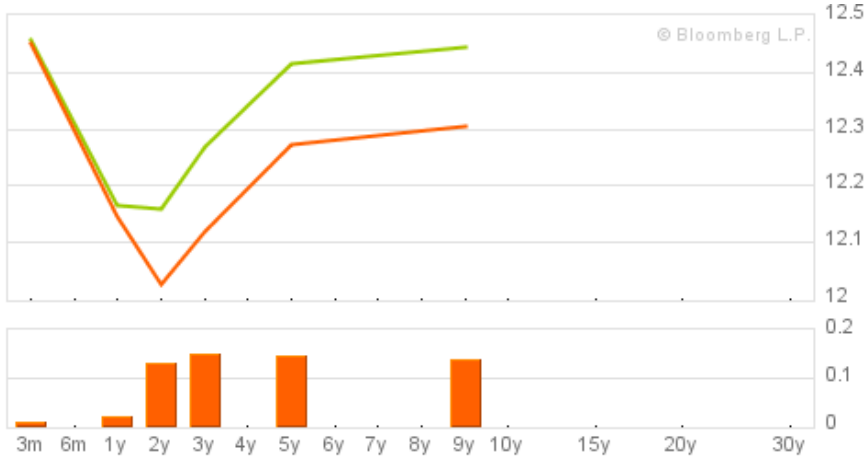
Figure 8. **The Three Main Credit Spread Curve Shapes.**



- Yields:







Treasuries, Brazilian Bonds and Australian Bonds.

YIELD CURVE CURRENT PREVIOUS CLOSE

- Floating Rate Notes

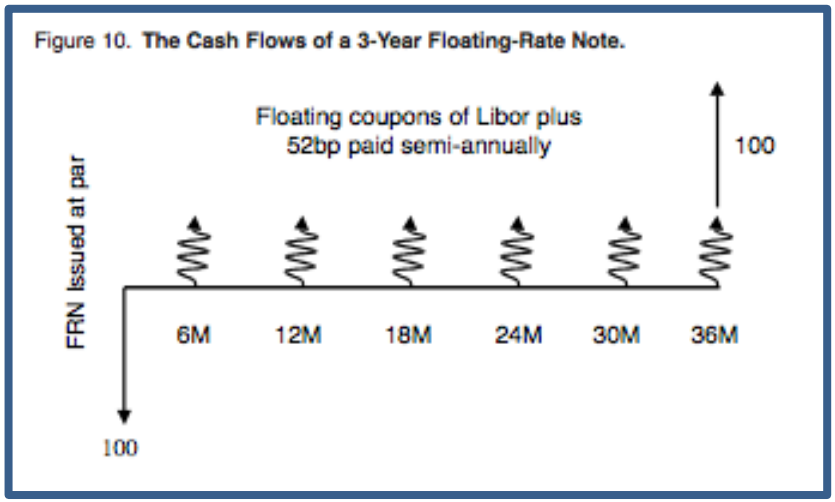
Although not a credit derivative, FRN has a huge importance as an instrument whose pricing is driven almost exclusively by credit, serving as a benchmark for much of credit derivative pricing.

It's a bond that pays coupon linked to a variable interest rate index.

In order to issue the note at par, coupon on the floating-rate note must be set at a fixed price over LIBOR. Its spread is known as the **par floater spread**. It can be seen as the market-perceived credit risk of the note issuer.

A large proportion of the FRN is issued by banks to satisfy their bank capital requirement and may be fixed maturity or perpetual. Also a large number of corporate and emerging market bonds are issued in floating rate format (i.e. Brady Bonds offered in Mexico)

Investors take exposure to a credit without taking exposure to interest rate movements, making possible for credit investors to take a view about the credit quality of the issuer.



- Asset Swaps

It is a specially created package that enables an ivestor to buy a fixed-rate bond and then hedge out almost all of the interest rate risk by swapping the fixed payment to floating. The investor takes on a credit risk that is economically equivalent to buying foating-rate note issued by the issuer of the fixed-rate bond. For assuming the credit risk, the investor earns a corresponding excess spread known as **asset swap spread**.

If the bond that the asset swap buyer defaults he has to continue paying the fixed side on the interest rate swap hat can no longer be funded with the coupons from the bond, also having a default contingent exposure to the market-to-market on the interest rate swap.

Forward asset swaps: if the bond defaults before the froward date is reached, it terminates at no cost.

Cross-currency asset swap: investor buys a bond denominated in a foreign currency, paying for it in their base currency, pay on the swap in foreign currency, and receive the floating-rate payments in their base currency. Investor fain exposure to a foreign currency with minimal interest rate and currency risk provided the asset does not default.

Callable asset swap: when the bond issuer has the right to call back the bond at pre-specified price, asset swap buyers need to be hedged against any loss since they will no longer be receiving the coupon.

- Asset Swaps

Figure 11. **Mechanics of a Par Asset Swap**

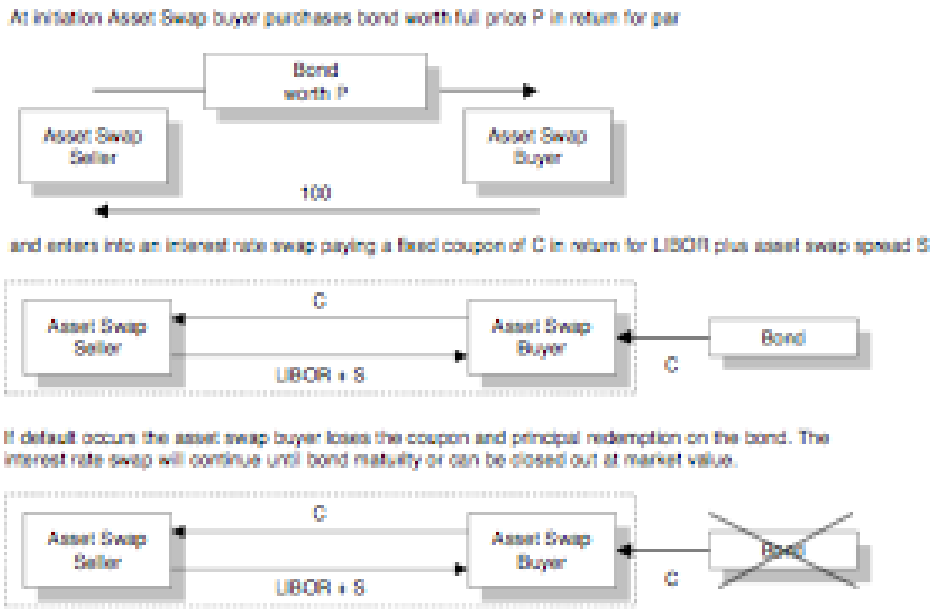
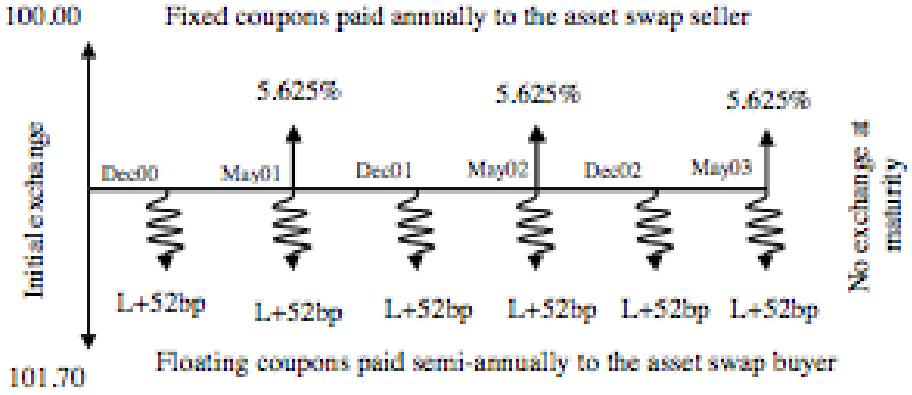


Figure 12. **Cash Flows for 3-Year Tecnost Par Asset Swap Trade**



- Default Swaps

The default swap has become the standard credit derivative (38% of the market). Its appeal is its simplicity and the fact that it presents to hedgers and investors a wide range of possibilities that did not previously existed in the cash market.

It is a bilateral contract that enables an investor to buy protection against the risk of default of an asset issued by a specified reference entity. Following the default, the buyer of protection receives a payment intended to compensate against the loss on the investment. In return, the protection buyer pays a fee.

DS is a par product: it does not totally hedge the loss of an asset that is currently trading away from par. The payments of a default swap can be statically hedged by purchasing a par floater with the same maturity as the protection or by ourchasing a fixed rate asset trading a par on asset swap, paying “Libor+F”.

Sometimes, CDS can be more liquid than cash (Korea 1997) or can be totally dried up (Russia 1998).

So, it can be used to hedge concentrations of credit risk, to take a view on both the deterioration or improvement in credit quality of an reference credit, buying protection is easier than sorting the asset, gains of arbitrage...

- Default Swaps

Figure 16. **Mechanics of a Default Swap**

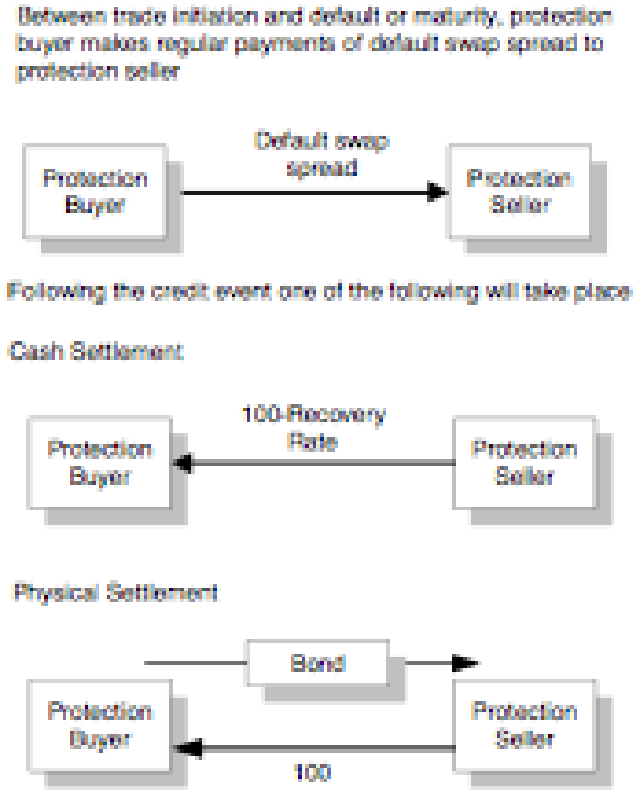
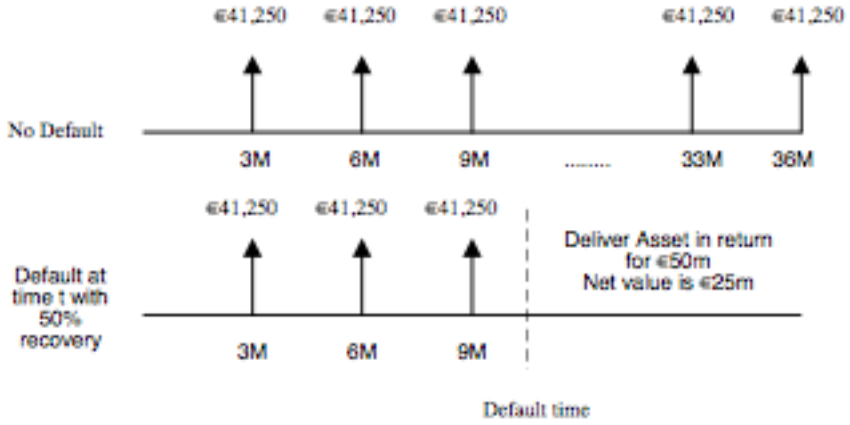


Figure 18. **Cash Flows on a Typical Default Swap.**

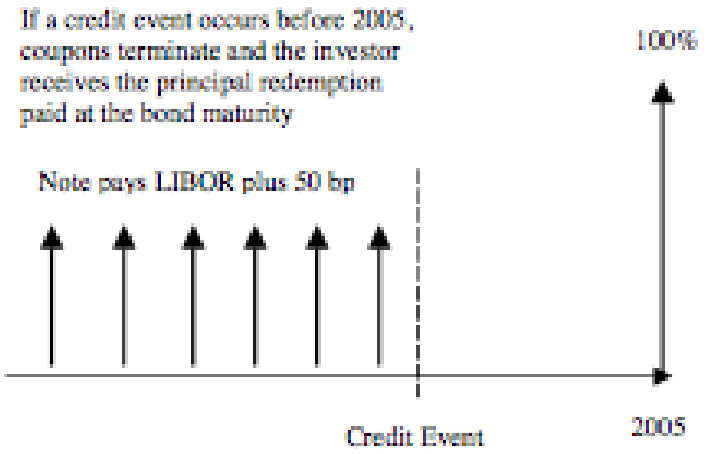


- Principal Protected Structures

Investors who prefer to hold high-grade credits like to hold principal protected structures that guarantee to return the investor's initial investment of par. This protection can be provided through a principal protected credit-linked note which can be issued by a highly rated entity.

Adding principal protection enables the investor to protect their principal at the cost of a reduced sprad.

Figure 23. **Principal Protected Note**



- Credit Spread Option

Is an option contract in which the decision to exercise is based on the credit spread of the reference credit relative to some strike spread. The spread may be the yield of a bond quoted relative to a Treasury or may be a LIBOR quoted. As with standard option, one must specify whether the option is a call or put, the expiry date of the option, the strike price or strike spread and the style: European (single exercise date), American (continuous exercise period) or Bermudan (multiple exercise dates).

The decision to exercise has no dependency on the interest rate. It simply depends on where the credit spread of the reference is relative to the strike spread.

A credit spread put is a put option whose payoff increases as the yield spread on a specified bond rises above a specified spread. A credit spread call is a call option whose payoff increases as the yield spread falls further. The credit spread option is typicall calulated as the spread between the yield on the reference marketable security and a LIBOR swap of the same maturity.

- Bond Option

Usually traded by hedge funds taking proprietary positions.

For many investors, it is cheaper to buy a call option on the bond rather than fund the bond on balance sheet.

They are typically physically settled. For example, when a call option is exercised, the option seller delivers the reference asset to the option buyer in exchange for the strike price.

An investor may sell an out-of-the-money call to earn some premium. If the bond rises sufficiently, the option is exercised, and the investor sells the bon at the option strike.

- Index Swaps

Total return swaps don't necessarily have to be linked to a single security. One may wish to link the total return to an index, creating what is known as an index swap. It gives investors exposure to the total return of a broad universe of corporate securities without exposing them to the default of any one issuer.

The buyer of the index receives the gain or loss in the value of the index plus any coupon accrual in return for the floating-rate payment of "LIBOR+s".

Buying and selling index swaps may be more liquid than trading all of the underlying assets, investors can gain access to asset classes from which they might otherwise be precluded, clients can use the index swap to benchmark their portfolio to standard fixed income index…

- Basket Default Swaps

It is similar to a default swap in

which the credit event is the default of some combination of the crrdits in a specified basket of credits. In the particular case of a **first-to-default basket**, it is the first credit in a basket of reference credits whose default triggers a payment to the protection buyer. In return for protection against first-to-default, the protection buyer pays a basket spread to the protection seller as a set of regular accruing cash flow. These payments terminate following the first credit event. It enables investors, who sell it, to leverage their credit risk without increasing their downside risk.

Baskets are essentially a default correlation product. Basket spread depends on the tendency of the reference assets to default together.

A lack of default means that default correlation is very difficult to measure.

A **second-to-default** basket is a simple extension of the first one in which the triggering credit event is the default of two of the assets n the basket. Following this event, is the second-to-default that is delivered in return for a payment par. They are part of the “second-loss product”, because they require two or more defaults to trigger a credit event.

The become increasingly popular over the past few years as investors have realised how they can be used to enchance yield while being exposed to familiar credits.

Portfolio Dafault Swaps will typically cointain 40-100 names.

- Collateralized Debt Obligation

A collateralized debt obligation (CDO) is a structure of fixed income securities whose cash flows are linked to the incidence of default in a pool of debt instru- ments. These debts may include loans, revolving lines of credit, other asset-backed securities, emerging market corporate and sovereign debt, and subordinate debt from structured transactions. When the collateral is mainly made up of loans, the structure is called a Collateralised Loan Obligation (CLO), and when it is mainly bonds, the structure is called a Collateralised Bond Obli- gation (CBO).

- Cash Flow CLOs

In general, the purpose of a cash flow CLO is to move a portfolio of loans off the balance sheet of a commercial bank. This is done in order to free up the regula- tory and/or economic capital that the bank would otherwise be obliged to hold against these loans. This allows banks to use this capital to fund other higher- margin business, new product lines, or share repurchase plans. It furthermore transfers the credit risk of these loans to the investor, thereby reducing the bank's concentrations of credit risk..

- Synthetic CLOs

The synthetic CLO is also used to transfer the credit risk from the balance sheet of a bank. As in a cash flow CLO, the motivations are regulatory capital relief, freeing up capital to grow other businesses, and the reduction of credit risk. In the case of a synthetic CLO, this is achieved synthetically using a credit derivative. It therefore avoids the need to transfer the loans, which can be problematic. Instead, the bank retains the loans on balance sheet and uses a portfolio default swap structure to transfer out the credit risk to an SPV, which issues notes into the capital markets. Another factor in favor of the synthetic CLO is the flexibility of default swaps, which can be tailored to create the required risk-return profile for the bank.