Fixed Income Investment

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Credit Derivatives

Credit Default Swaps

Mortgage-backed Securities

What is a credit derivative ?

Traditionally derivatives protect from, or facilitate exposure to:

• interest rate, equity, commodity risk etc, etc.

Credit derivatives protect from, or facilitate exposure to credit risk, stemming from:

- corporate loans
- corporate bonds
- general exposure to credit worthiness of another organisation/entity

Role of credit derivatives

Credit derivatives can be used to:

- facilitate access to, or to hedge credit exposure
- transfer credit risk
- enhance yield by generating leverage
- separate risks embedded in securities
- manage regulatory capital requirements

Separating credit risk from underlying cash market

Credit derivatives growth (ISDA)



Composition of market



Credit default swaps

What is a single name CDS?

A bilateral OTC agreement that transfers a defined credit risk on a single credit risky entity from one party to another

Similar to an insurance contract – but with a subtle difference:

- One can insure one's car
- But one cannot insure someone else's car this is illegal
- One cannot insure the same property for the full amount with two different insurers
- With CDSs one can insure someone else's "property" with multiple 'insurers'

CDS as insurance

Investors may buy the CDS (insurance) to protect against default by entity - selling credit risk

- Can equally be used to gain access to credit exposure by selling the CDS (insurance) - buying credit risk
- Initially, credit risk is transferred via a CDS without exchanging the underlying bond or loan
- Banks are the main buyers of protection (buyers of CDSs)
- Insurance companies are the main sellers of protection (sellers of CDSs) ...

Market participants



What are the cash flows ?

Buyer of protection pays regular premium to seller of credit risk (similar to insurance premium) to protect against a Credit Event on the Reference Entity

No exchange of underlying asset

Premium is usually paid on a quarterly basis in the absence of a Credit Event

If Credit Event occurs protection seller makes payment to protection buyer; protection buyer delivers a qualifying debt instrument

Protection buyer then stops paying premium

Credit events

Terms of contract specify range of credit events:

- Failure to pay reference entity does not pay commitment
- Bankruptcy reference entity becomes bankrupt
- Debt restructuring alteration of terms of obligation; this is the most controversial "credit event"

Any of these would activate payment from protection seller to buyer

Subtly different from default in 'cash market'

Reference entity

Which entity's credit risk is being transferred?

Large corporations have complex debt and subsidiary structures

Some subsidiaries benefit from a parental guarantee, others do not, while for others the guarantee is not worth the paper its written on!

Will the reference entity have deliverable debt for the duration of the CDS ? [France Telecom]

After corporate restructuring – mergers, acquisitions etc – who is the successor reference entity ?

Common CDS structure



Periodic premium can be thought of as insurance premium

In event of 'credit event' protection seller pays protection buyer and buyer passes of reference obligation(s)

Following credit event



At this point protection seller experiences loss; the difference between the cash compensation and the value of the delivered bond/obligation

Size of loss depends upon recovery rate

Example

ABC pension fund sells protection on notional €10m France Telecom to Big Bank plc

Transaction term (length of insurance cover): 5 years

Bank agrees to pay ABC pension fund: fixed fee of 1.6%pa (payable quarterly)

Settlement is physical

Should Credit Event occur ABC pension fund gives €10m to Big Bank; Big Bank delivers any qualifying senior unsecured France Telecom debt to pension fund

After this all payments terminate

Pre-event:





RBS's CDS spreads



Terminating a CDS

Three ways of terminating CDS:

- Reaching compensation agreement with counterparty
- One of counterparties finds another counterparty to take their place in the deal
- Entering equal and opposite CDS position

They are effectively equivalent

Trading CDSs

CDSs used increasingly by traditional, long only fund managers

Seller of protection benefits if spreads contract – just like holder of a corporate bond

Example:

- Sell at 50bps
- Buy back at 40bps
- For remaining life of contract:
- Net: Receive 50bp and pay 40bp = 10bp profit x (notional)

Opposite is true if spreads widen

Advantages of CDSs

A way of 'risk sharing' – sharing credit risk

Increased liquidity – access to credit risk without having to deal in less liquid underlying bond market

Access to maturity exposures unavailable in the cash market

Can take short positions easily

Exchange rate risk

Biggest and most liquid CDS market is in USD

Although sterling credits comprise the majority of European CDSs and the vast majority of credit derivative activity is in London, sterling CDS market is small

Most CDS contracts are traded/quoted in either USD or in €s

Sterling-based protection sellers may wish to hedge premiums

More difficult to hedge compensation payments, since their timing is unknown

Counterparty risk

As with most conventional swaps there are two legs to a CDS and two counterparties

Protection buyer is committed to fixed, regular payments and protection seller to contingent payment

At beginning value of two sets of payments are equal, but changes in credit conditions change relative value of legs

Collateral flows between two counterparties to protect both sides against default of the other

Collateral management is additional complication compared with managing portfolio of corporate bonds

CDS Indices

Credit derivative markets have developed and standardised to such an extent that CDS indices now available

Allow investors to obtain credit exposure, or to hedge credit exposure to wide pool of CDS names

CDS indices are moving towards cash settlement which should help to improve liquidity further in the future

Why use them ? For much the same reasons that one might wish to use equity index futures

CDS Indices

Two providers:

- CDX (North America, Emerging markets)
- iTraxx (Europe and Asia)

Indices comprise sub-indices based on:

- geography
- industrial sectors
- Rating

Index members selected on 6 month rolling basis based upon CDS liquidity

Example: iTraxx high grade index

- 125, equally weighted members
- All reference entities are European investment grade

Traded in 4 benchmark maturities: 3, 5, 7 and 10 years

Members selected based on traded volume of CDS in previous 6 months

Pay out on three credit events: failure to pay, bankruptcy and "rescheduling"

Example: iTraxx high grade index (Industry)



Example: iTraxx high grade index (Country)



Example: iTraxx high grade index



Pros and cons of CDS indices

Pros:

- Efficient access to diversified portfolio of credit
- Moving towards cash settlement
- Less complex to manage than a portfolio of bilateral single name CDSs

Cons:

- Most liquid CDSs are not necessarily the most desirable credits
- Sectoral and rating profiles of indices may not coincide with desired risk/return characteristics

All you ever wanted to know about MBSs, CMOs, ABSs and CDOs!!

Mortgage-backed securities The Agencies

Many different types of fixed income security that are backed by other financial assets and cashflows. However, one of the oldest and largest markets is for repackaged US residential mortgages

Central to market are the agencies - Federal National Mortgage Association, known as Fannie Mae, and the Federal Home Loan Mortgage Corporation, known as Freddie Mac

Fannie Mae is the oldest of these agencies, being established in 1938. Freddie Mac was created in 1970, with much the same remit, and the capital markets also equate lending to Freddie Mac with lending to the US government

They are now THE mortgage market in the US

The agencies and the capital markets



Why did the agencies get into trouble?

Many US homeowners defaulting on mortgages

The agencies have to pay up in spite of losses

The Agencies need to raise capital to cover these losses

But investors are now unwilling to lend at low rates

Shareholders fear the agencies will be nationalized and they will lose all capital

Were an agency to fail, this could be catastrophic for some institutional investors and would lead to a credit crunch of almost unimaginable proportions in the US mortgage market

Mortgage pass-throughs (MBS)

Created when mortgage issuers pool mortgages and sell "certificates/shares" in the pool

US is the largest market

Various US agencies – Ginnie Mae, Freddie Mac, Fannie Mae – can guarantee these issues, effectively buying from the mortgage originators

Guaranteeing:

- Only timely payment of interest (modified pass through)
- Timely payment of interest and principal payments (fully modified)

Cashflow characteristics

Directly based on cashflow of underlying mortgages:

- interest payments
- scheduled principal payments
- prepayment of principal

Minus:

- Servicing fees
- Cost of any guarantees
- Other fees etc

Net cashflow then distributed on a pro-rata basis

Cashflow characteristics



WAC – weighted average coupon (mortgage interest) rate

WAM – weighted average maturity of mortgages

Non-agency MBSs

Not all pass-throughs are issued by US agencies

Commercial banks, specialist mortgage lenders can also issue

These issues do not benefit from the implicit state guarantee, so credit risk is a more important consideration

Issuers use a range of techniques to "credit enhance" their issues – usually a higher rating than the issuer

External credit enhancement

External credit enhancement is a kind of third party guarantee that usually takes care of pre-specified first loss to a maximum amount

- corporate guarantee
- letter of credit
- bond insurance (AMBAC, American Municipal Bond Assurance Corporation, MBIA, Municipal Bond Insurance Association, etc)

Rating of third party has to be at least as high as rating sought for issue

The obvious danger is that the issue is susceptible to a downgrade in the guarantors credit quality

Internal credit enhancement

Internal guarantees do not rely on a the credit quality of a third party:

- creation of reserve funds, created from underwriting fees and from excess interest income
- over-collateralisation, for example, principal amount of mortgages is \$520m, but principal of bond is \$500m
- senior/subordinated structures

The latter is the basic principle behind CMOs (Collateralized Mortgage Obligation)

Prepayment

We need to project the cashflow from the mortgage pool to value it, this is easy for a normal bond

It is harder when households can pre-pay principal on their mortgages as a result of:

- sale of their home (moving, divorce etc)
- general economic environment
- level of prevailing interest rates
- seasonality

"Modelling" prepayment

Assume some portion of principal is repaid every month known as a conditional prepayment rate (CPR)

The PSA (Public Securities Association) produce a prepayment benchmark based upon historic experience

This benchmark is changed according to the characteristics of the mortgage pool, but in a very simplistic manner

The prepayment schedules look like this ...

CPR and PSA prepayment



Default risk for non-agency MBSs

Must also assume a default rate on the pool, clearly based upon the pools basic characteristics

Again there are standard industry assumptions (SDA) analogous to the standard pre-payment schedules



Prepayment risk

Suppose an investor buys a 7% coupon Fannie Mae, when mortgage rates are close to 7%

Now suppose that mortgage rates fall to 4%

- Price of bond rises, but there is a ceiling to the increase, as households re-mortgage (call the debt back)
- This is called "contraction risk" as the average maturity of the bond falls

Investors looking to use the bond to hedge longer-duration liabilities would therefore not like this risk

Prepayment risk

- Suppose an investor buys a 7% coupon Fannie Mae, when mortgage rates are close to 7%
- Now suppose that mortgage rates rise to 9%
 - Price of bond falls, and households prepayments slow up since they will not remortgage and they may be struggling financially
 - The bond's maturity rises, and since long maturity bonds fall by more than short-maturity bonds when interest rates rise it falls at an increasing rate
 - This is called "extension risk" as the average maturity of the bond increases

Investors looking to use the bond to hedge shorter-duration liabilities would therefore not like this risk

Contraction/extension risk

