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Credit Derivatives

27 March 2009

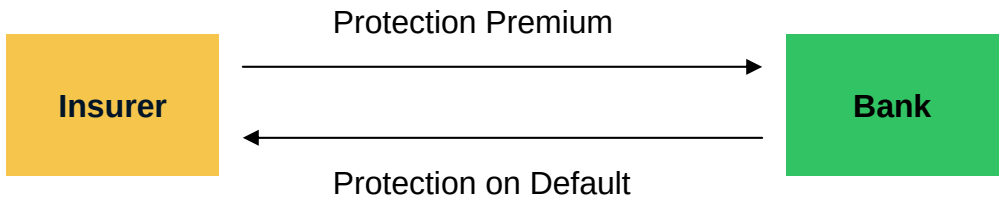
Agenda

- CDS Overview and Market Backdrop
- How Writing CDS May Go Awry
- The Future for Credit Derivatives
- Credit Risk Management
- Other Uses of Credit Derivatives
- Counterparty Risk Management

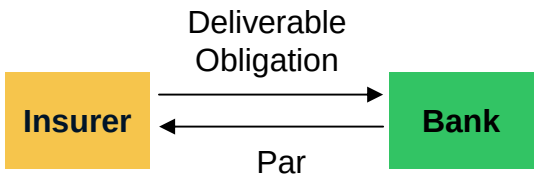
CDS Overview and Market Backdrop

Credit Default Swap Mechanics

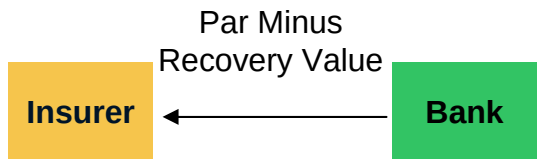
CDS Cashflows Before Maturity/Default



Physical Settlement in the Event of Default

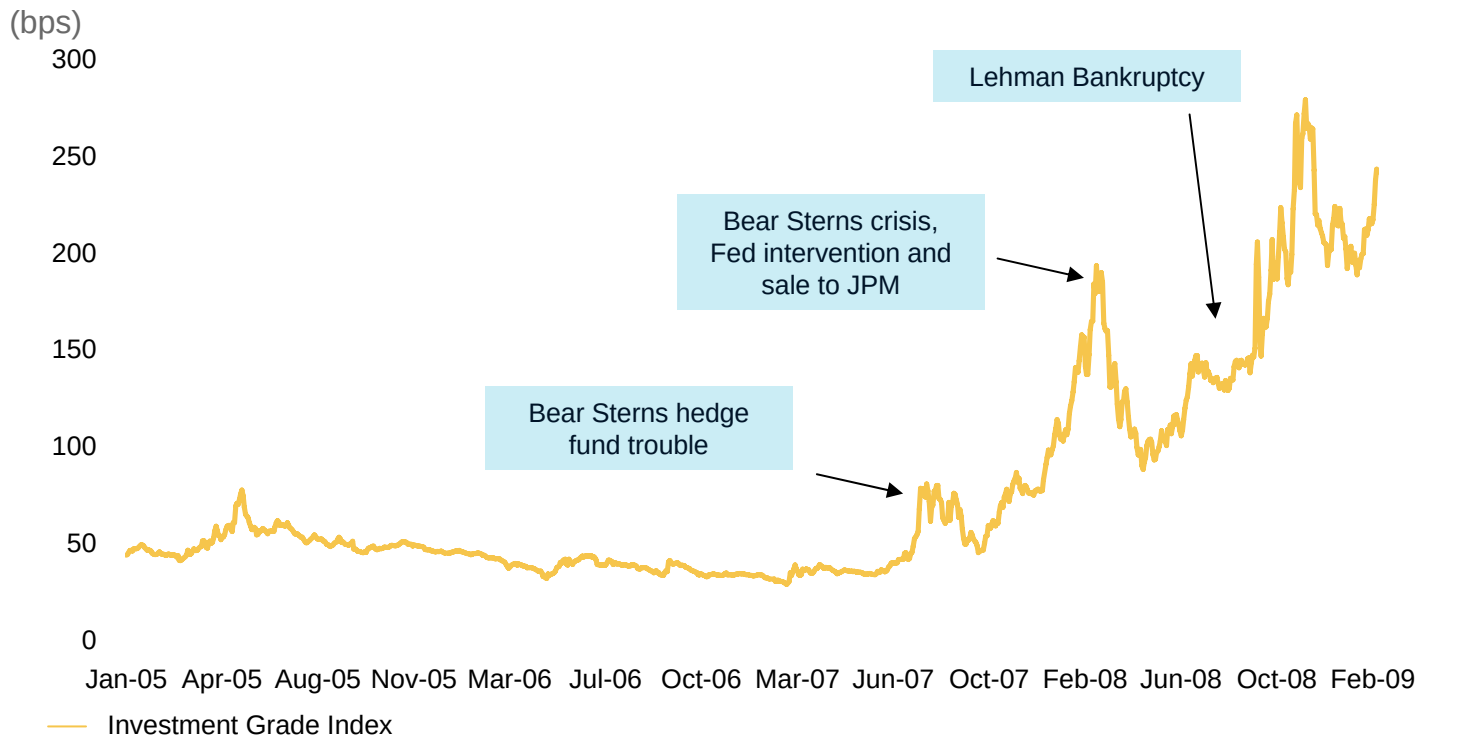


Cash Settlement in the Event of Default



Where Credit Spreads are...

20 Months into the Crisis, Credit Spreads Remain Elevated...



Source: Bloomberg

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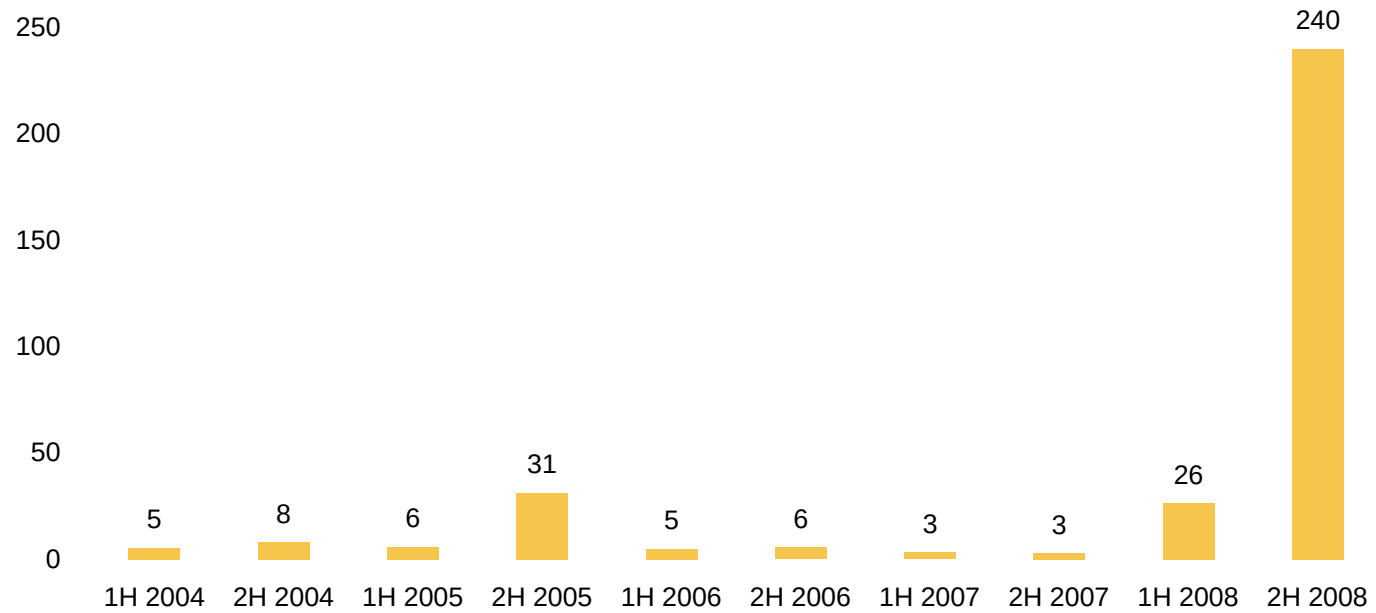
Corporate Default Rates Going Up

Historical Corporate Default Volumes (1)

Last 5 Years
US$Bn

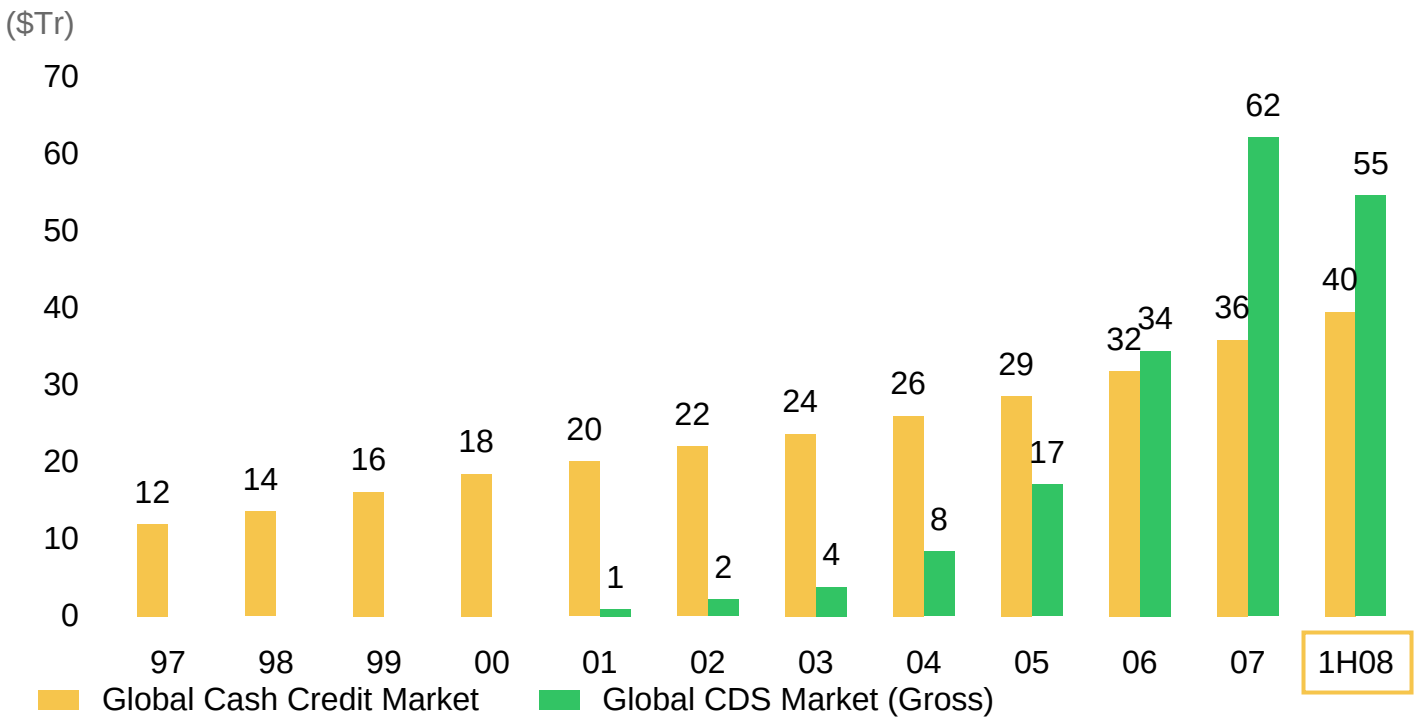


Source: Moody's

(1) Non-Investment Grade

Size of the CDS Market

CDS Notional Outstanding



Source: ISDA, Thomson Financial

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How Writing CDS May Go Awry

“Financial Weapons of Mass Destruction”(1)?

How Derivatives Go Awry – The Case of AIG

- $61.7Bn loss reported this month is the biggest quarterly loss of any company in American history
- $25.9Bn of losses from misplaced bets in credit-derivatives exceed the combined 4Q losses of the two largest banking casualties Merrill Lynch and Citigroup

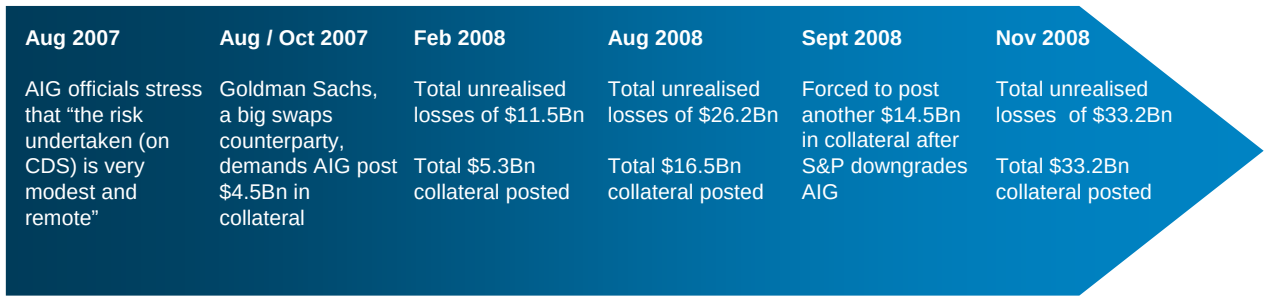
The Culprits

Credit Default Swaps (CDS)

- AIG Financial Product (FP) sold CDS protection to companies that held collateralised debt obligations (CDO) based on subprime mortgages
- The housing bubble burst, CDS holders demanded collateral and payment from AIG when CDO values plunged

Securities lending

- Instead of investing the cash collateral posted by lenders in low risk investments like commercial paper, AIG invested in higher-risk mortgage- and asset-backed securities



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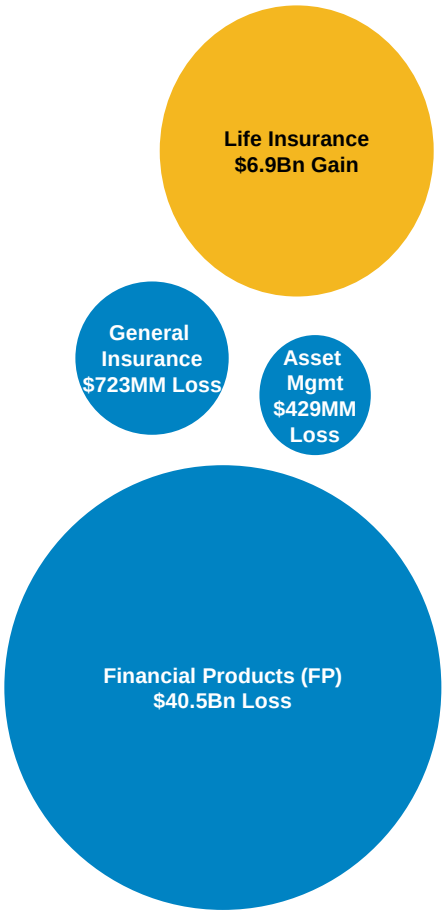
(1) Quoting Warren Buffett

The Hedge Fund Attached to an Insurance Company(1)

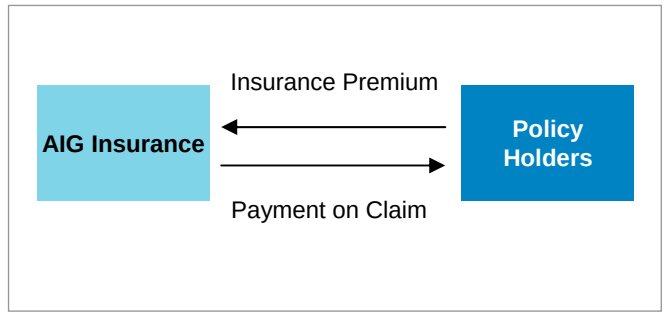
An Analysis of AIG's Financial Products Unit



source : AIG annual report 2008

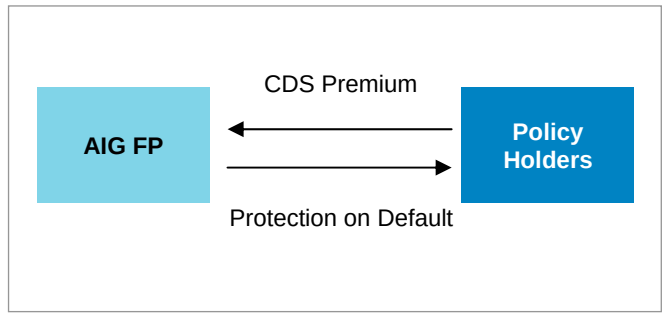
AIG the Insurance Company

- Insurance companies are supposed to avoid excessive risk concentrations, e.g. by setting risk retention limit on a single life



AIG Financial Product - the Hedge Fund

- AIG FP was insuring systemic risk by, e.g. writing multiple CDS protection on the same group of mortgage CDO



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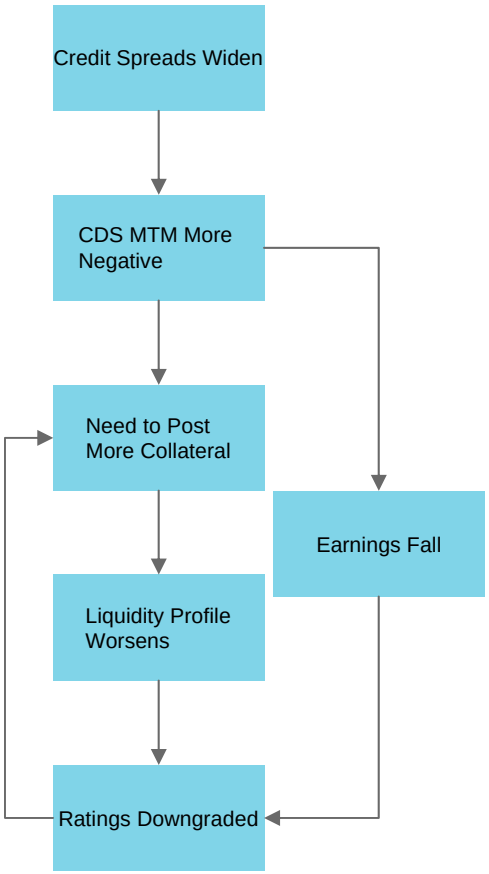
(1) Quoting Ben Bernanke
(2) Circle diagram not drawn to scale

Delving Deeper: 3 Risks Associated with Writing CDS

The Vicious Cycle

The Vicious Cycle



There are three types of risks associated with writing CDS contracts:

(1) Mark-to-market Risk

- As credit spreads widen, protection sellers have a negative mark-to-market on the balance sheet, which will also flow through the profit and loss account

(2) Liquidity Risk

- Depending on the collateral agreement with its counterparty, a negative mark-to-market may require the protection seller to post a large amount of cash collateral to its counterparty, thereby introducing significant liquidity risk

(3) Default Risk

- When defaults occur, the protection seller will have to compensate the protection buyer, thereby incurring actual losses

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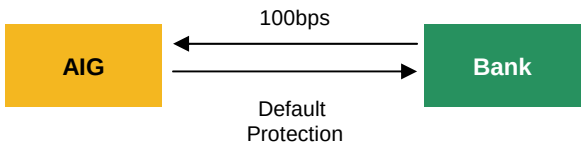
(1) Mark-to-market Risk

Earnings Take the Hit

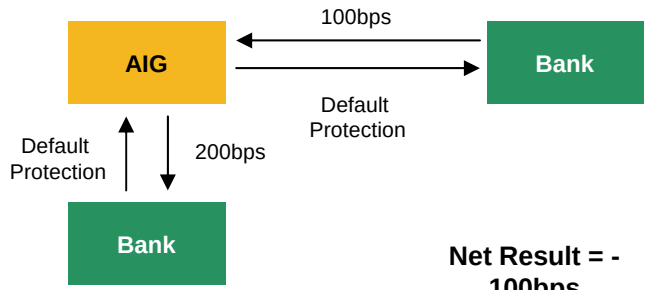
At Inception

Assume CDS Premium is 100bps p.a.



Credit Spread Widens

Assume CDS Premium is 200bps p.a.



- When credit spreads widen, protection seller would have a negative mark-to-market because they now have to pay a higher CDS premium to “buy back” the protection they sold (if they are to close out the contract)
- This negative mark-to-market will flow through P&L, even when no actual defaults have occurred
- In 2008, AIG took a $40.4Bn mark-to-market losses through its P&L

(2) Liquidity Risk

Demand for Collateral as a Results of Negative MTM

- When financial institutions trade with each other, a collateral agreement is normally put in place
  - When the mark-to-market is negative, the protection seller normally have to post collateral to the protection buyer

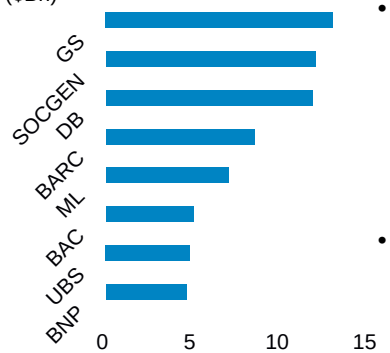
- The amount of collateral will depend on:
  - Ratings: the lower the rating of the protection seller, the higher the amount of collateral needed
  - Mark-to-market: the more negative the mark-to-market, the higher the amount of collateral needed

AIG's Biggest Counterparties

CDS and Securities Lending

(Sep-Dec 2008)

($Bn)



Source AIG

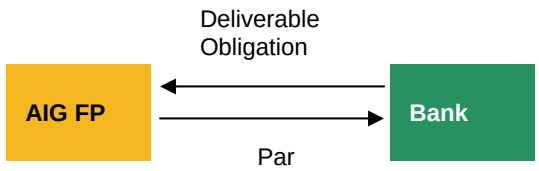
- AIG's collateral posting requirement is high because
  - Credit spread has widened, resulting a massive negative mark-to-market
  - AIG's ratings have been downgraded

- In fact, a large portion of the governments bail-out funds were used as collateral for the CDS contracts AIG has written:
  - Goldman Sachs $12.9Bn, Soc Gen $11.9Bn, Deutsche Bank $11.8Bn, Barclays $8.5Bn, Merrill Lynch, $6.8Bn, etc

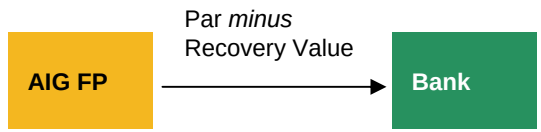
(3) Default Risk

Making the Protection Buyer Whole in the Event of Default

Physical Settlement in the Event of Default

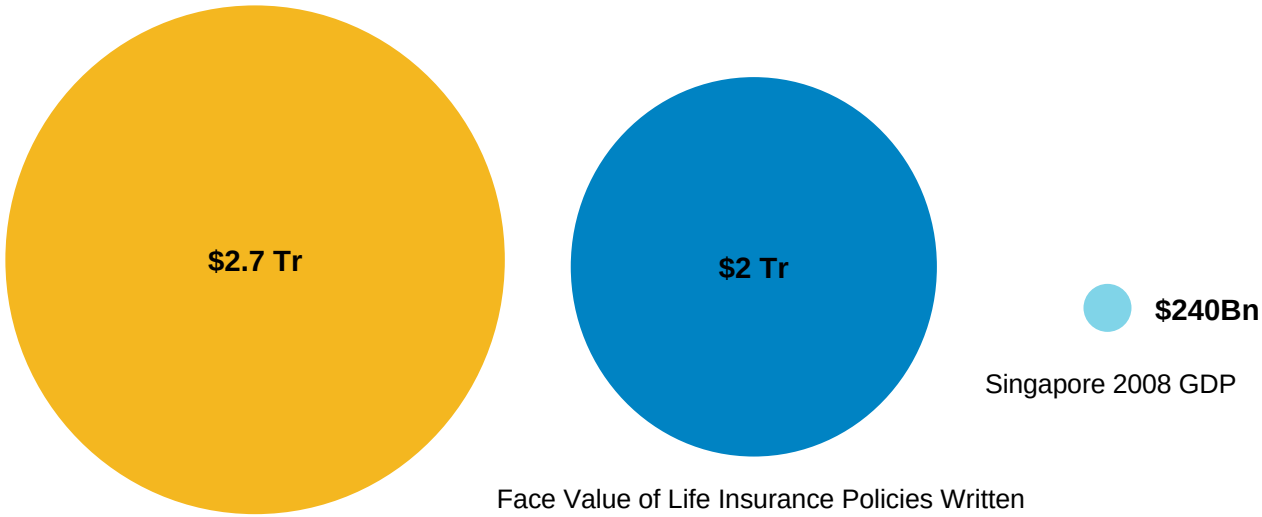


Cash Settlement in the Event of Default



- When the actual defaults happen, AIG FP had to make the protection buyer whole on the reference obligation
- AIG FP has written protection on a large number of mortgage-backed securities, which had very low recovery value
  - Therefore, the losses are very close to 100%

Grasping the Magnitude of the Risks



- AIG Financial Products, established in 1987, has written a huge amount of CDS contracts in the recent years
  - Before the financial crisis, AIG was one of the largest seller of CDS protection

(1) Statistics from Time Magazine and CIA World Book
(2) Circle diagram drawn to scale

The Future for Credit Derivatives

CDS Market Passed the Test of Lehman

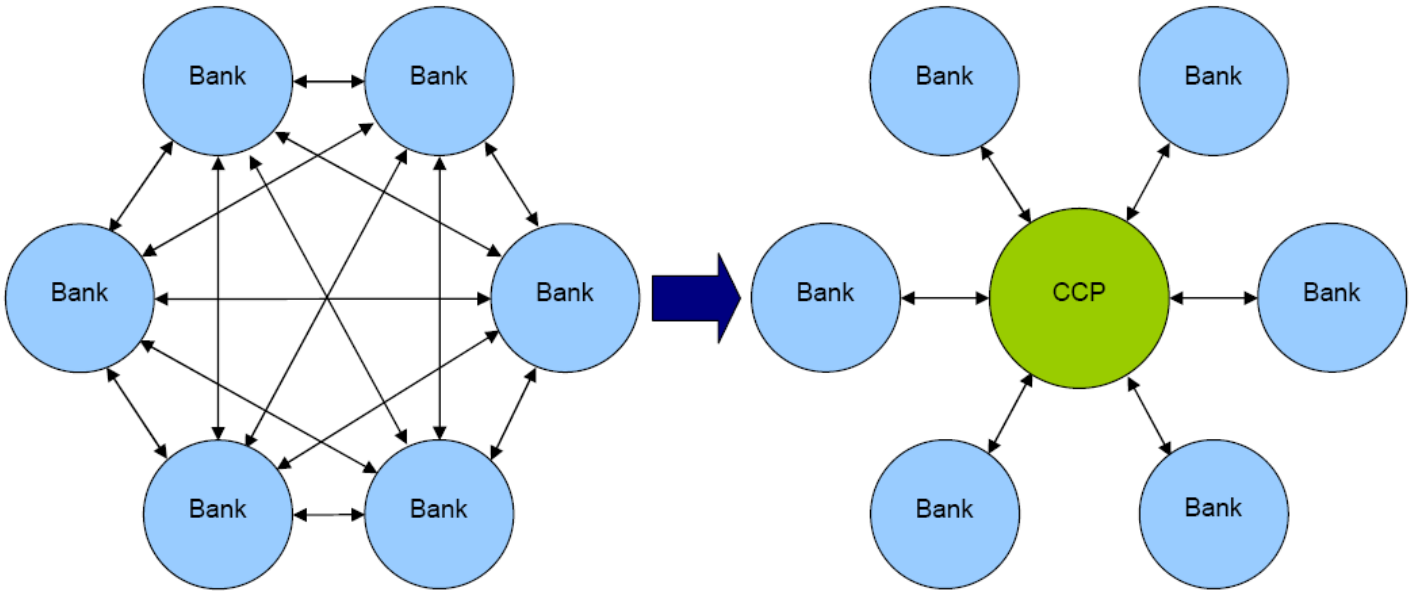
- Significant for the CDS market because it is both:
  - A frequently traded name in the CDS market (hence large volume outstanding)
  - A counterparty to many CDS contracts

- Therefore, Lehman's bankruptcy was a big test for the CDS market

- Positive result because:
  - CDS settlement process went orderly, despite large volume
  - Wall Street banks had the most exposure to Lehman through inter-broker trades but did not experience large losses because CDS was used to hedge these exposures

CDS Market is Evolving

From Over-the-Counter to Centralized Clearing



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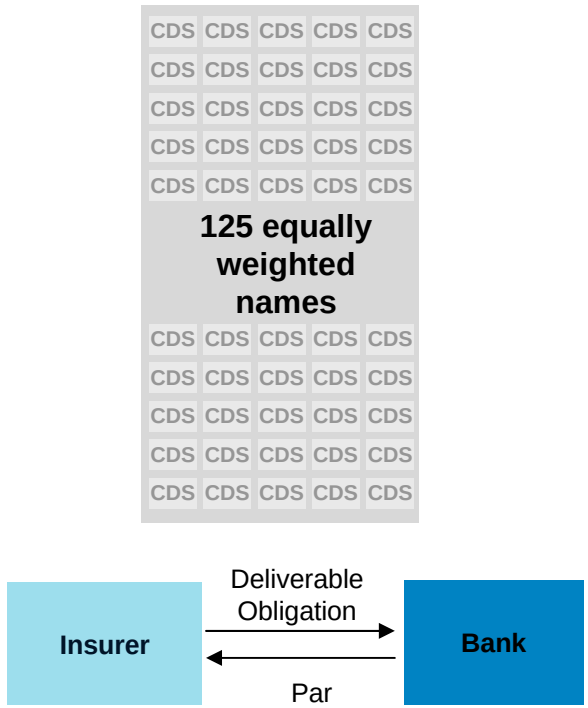
Credit Risk Management

Index Products

Portfolio Hedging

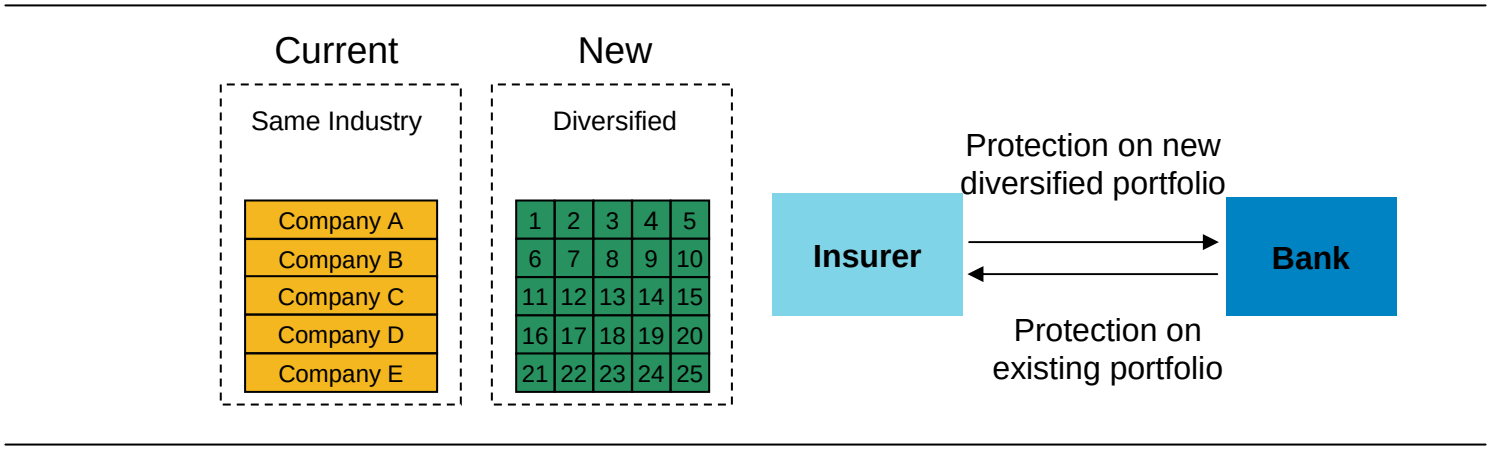
Index Product



- Standardized and very developed
- Available for regional names
- Highly liquid. Typical size per trade:
  - North American IG index: >500MM USD
  - European IG index: >250MM EUR
  - Asian IG index: >50MM USD

Costless Credit Diversification

Synthetic Bond Reallocation

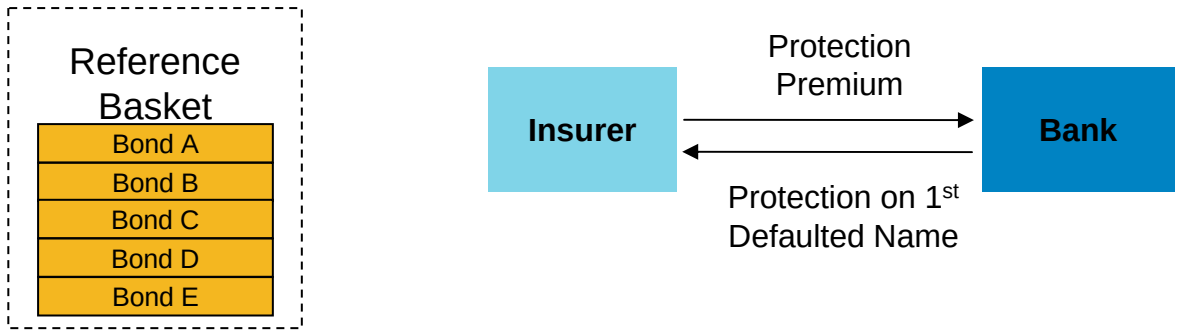


- Insurer buys protection on existing portfolio and sells protection on new diversified portfolio to offset cost
- Achieves diversification effect without buying and selling bonds
- Quick to execute

First to Default Basket (FTD)

Lowering the Cost of Hedging

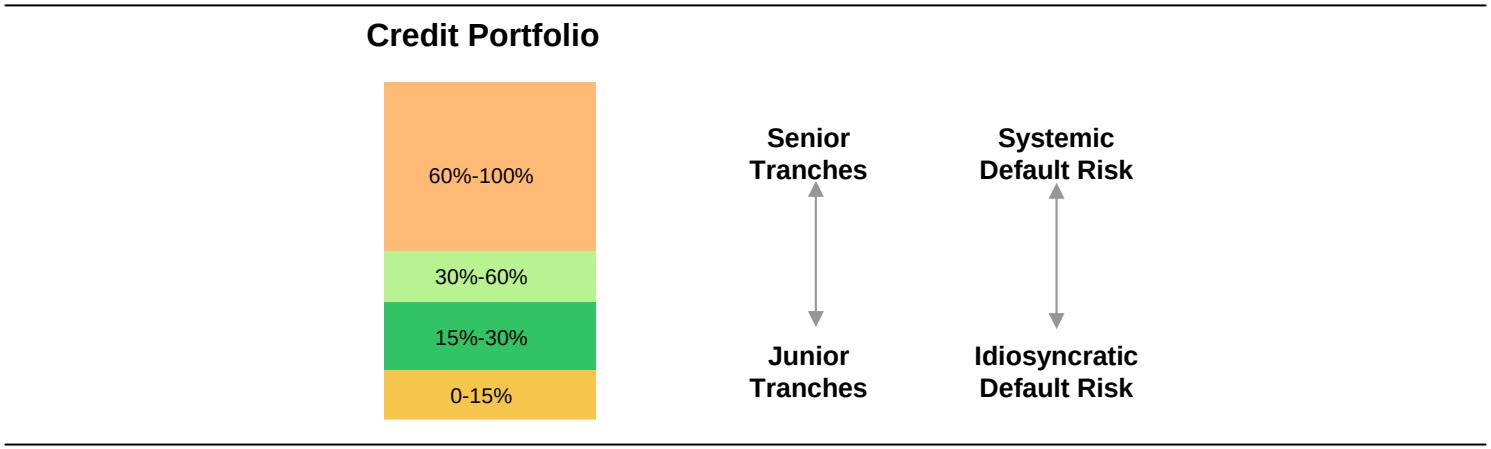
Illustration



- 1st to Default Basket offers protection on the first defaulted name in a basket
- Cheaper than hedging entire basket, but also provides less protection
  - Correlation drives relative cheapness
- Can be altered to Nth to default to increase level of protection

Index Tranches

Extending the Nth to Default Basket

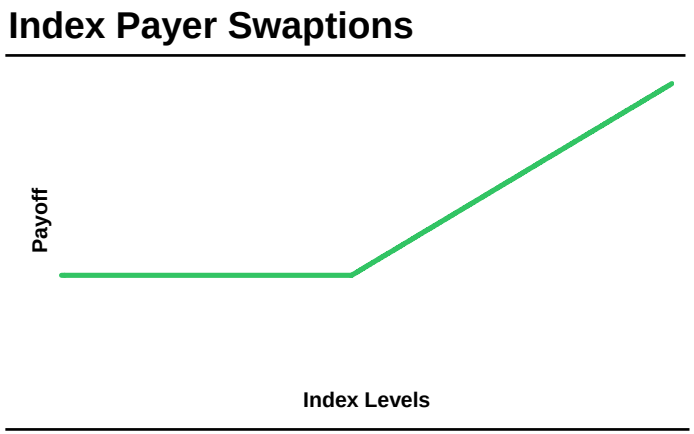


- Protections can be bought on any tranche of a portfolio
  - Protection more expensive for lower (more junior) tranches
  - Cheaper for higher (more senior) tranches

- Allows insurers to retain amount of risk proportionate to their available capital
  - More capital means protection on more senior tranches, i.e., cheaper cost

Index Options

Payer and Receiver Credit Options



- The option gives the buyer the right to buy credit protection at the strike level
- Protection against mark-to-market losses from widening credit spreads
- A payoff is earned if the underlying credit spread widens beyond the option strike level
- The options also generates a payout as index members default

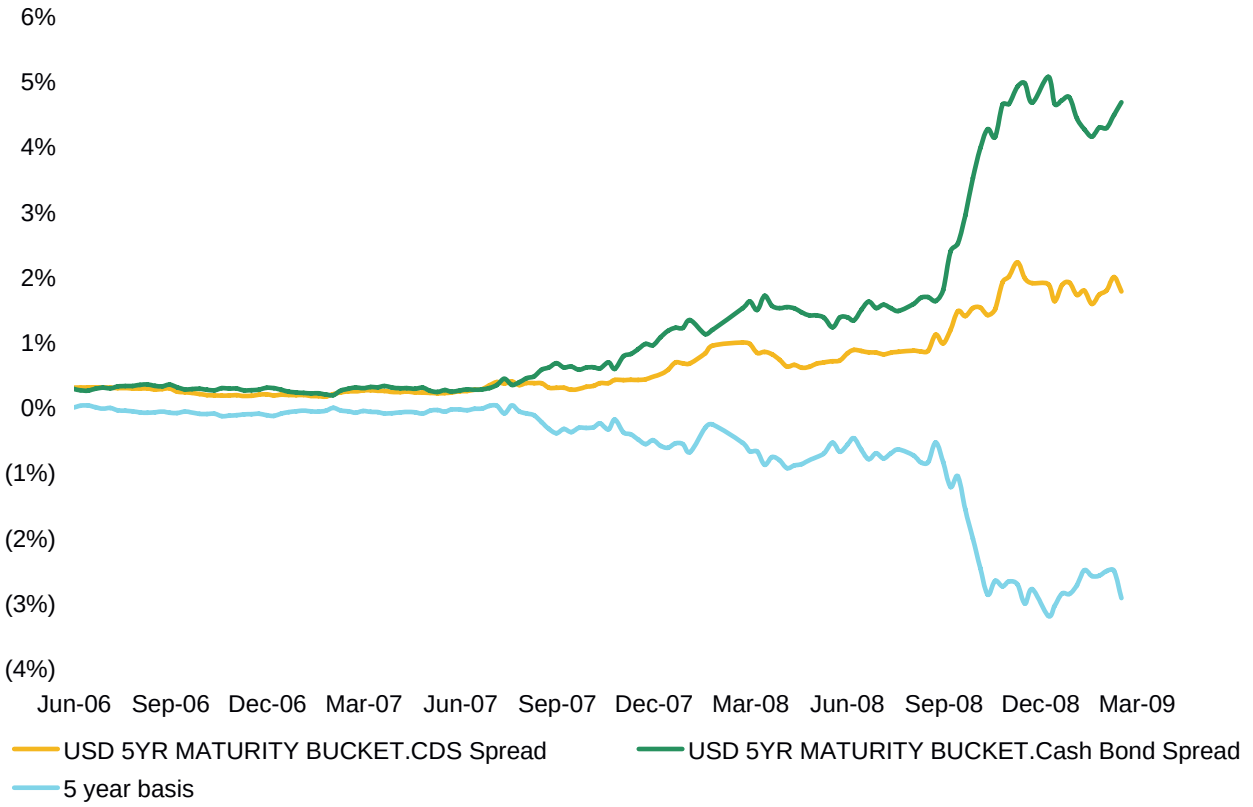
Other Uses of Credit Derivatives

Historical Difference Between Cash and CDS Spreads

- Selling protection via a Credit Default Swap ("CDS") incurs almost identical credit risk to owning a cash bond
  - In "normal" market environments, the credit spread of cash bonds closely track credit default swap spreads
- Over the past 18 months, both CDS and cash bond spreads have widened significantly
  - The widening has not been uniform, with bond spreads widening substantially more than CDS spreads
- This "negative basis" (CDS spread – bond credit spread) has been driven by technical factors
  - Investors' increased funding costs mean they demand a higher return from cash investments
  - CDS contracts are derivatives which do not incur any funding costs

Historical Trend of Cash Bond and CDS spread

from mid 2006 to-date



Source Morgan Stanley

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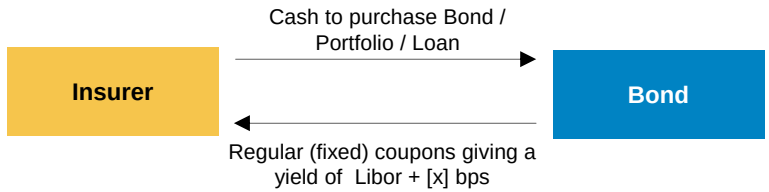
Negative Basis Trade Mechanics

- It is possible for investors with access to funding (e.g insurers) to capitalise on the Negative Basis by buying the relatively "cheap" corporate bonds, and selling the relatively "expensive" CDS
  - Buying corporate bonds and buying protection via CDS securities with similar maturity dates enables a positive spread to be earned with minimal risk

- CDS contract with Morgan Stanley will be collateralised, hence there will be no counter-party risk towards Morgan Stanley.

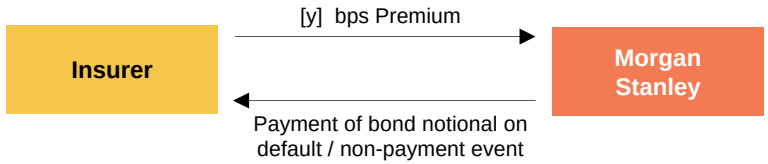
Step 1

Insurer purchases Bond / Portfolio / Loan



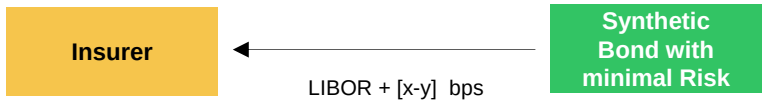
Step 2

Insurer purchases CDS protection (1) on Bond / Portfolio / Loan



Net Position

Insurer holds a synthetic risk-free bond earning LIBOR plus return



(1) CDS will be fully collateralized to remove the

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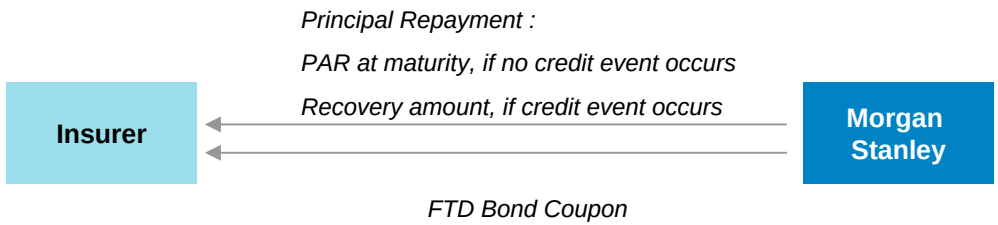
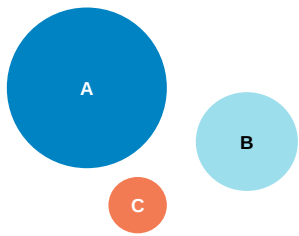
First-to-default Bond

- Many investors are interested in products that enable them to earn additional yield while taking exposure to familiar names.
- A first-to-default (FTD) Bond allows an investor to achieve this goal.
- The additional yield comes from “structural” leverage: the FTD gives simultaneous exposure to the entire portfolio, without having to invest in the entire portfolio name-by-name

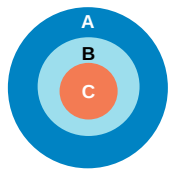
First-to-Default Bond Mechanism



1) Low Correlation Perceived by Markets
High FTD Bond Coupon



2) High Correlation Perceived by Markets
Low FTD Bond Coupon



Counterparty Risk Management

The Practicality of Executing Derivatives

- FX, interest rate and credit derivatives are executed “over the counter” and on a bespoke basis rather than traded on an exchange
- Well-established and standardised documentation should be minimal legal or credit risk associated with these bilateral contracts

Legal Documentation

- Each Individual Trade
  - Trade Confirm
  - Details terms of the transaction (notional, tenor, rate, etc)
  - Avoids ambiguity in the event of a dispute
- Governing Entire Portfolio
  - ISDA Master Agreement
  - Outlines legal rights and requirements of counterparties
  - Allows for trade ‘netting’
  - ISDA – International Swaps and Derivatives Association
  - Addresses legal risk associated with derivatives trades
  - Credit Support Annex (CSA)
  - Details terms of collateral agreement (threshold, frequency of posting)
  - Included as part of ISDA
  - Standard practice for sophisticated financial counterparties
  - Addresses credit risk associated with derivatives trade

How Credit Risk Arises

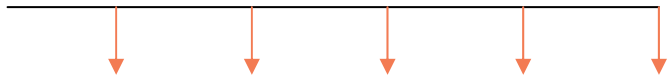
- The mark-to-market of a derivative is the profit or loss that would be realised if the position was unwound (i.e. cancelled) at the prevailing market rates
- If the derivative has a positive mark-to-market, the position is an asset to the Insurer
- The Insurer is exposed to a default by its derivative Counterparty
  - Upon default, the Insurer has an unsecured claim for the value of the mark-to-market and will likely recover less than 100%

Derivative Mark-to-Market = Cost Incurred / Benefit Realised If Trade Were Unwound

T0 – Company X CDS Spread = 200bps

Insurer Buys 5Y Credit Protection on Company X at 200bps per year

Contracted CDS Cash Flows

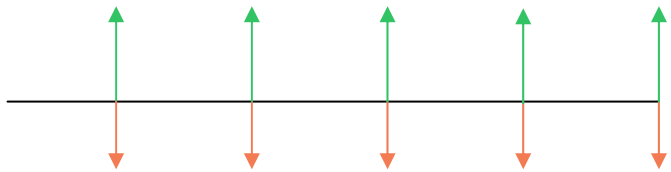


Insurer pays 2% per year to bank; bank provides default protection

T1 – CDS Spread Widens to 300bps

Insurer Unwinds Existing Position by Selling Credit Protection on Company X at 300bps per year

Contracted CDS Cash Flows



Insurer receives 3% per year from bank; Insurer provides default protection

Net, Insurer receives 1% per year; MtM = unwind value = 5%(1)

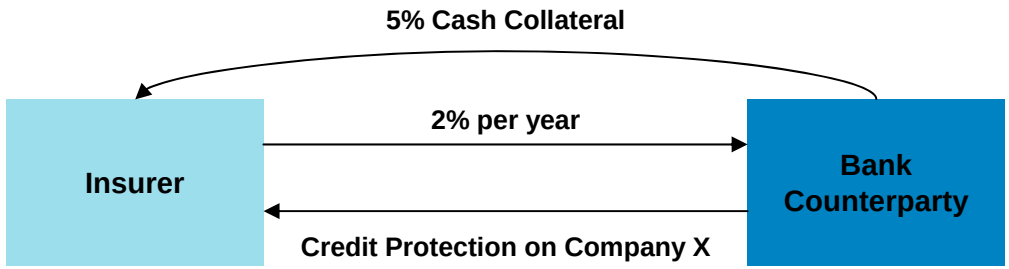
Insurer pays 2% per year to bank; bank provides default protection

1. Calculation ignores discounting for illustrative purposes

Collateralisation – The Principles

- Under a collateral agreement, the "out-of-the-money" party posts cash collateral to the "in-the-money" party equal to the derivative mark-to-market
  - This is a direct cash transfer
- If the out-of-the-money counterparty defaults, the derivatives contract is cancelled and the collateral is simply not returned
- No credit losses are sustained even if there is a default

Company X Market CDS Spread = 200bps



Ongoing Basis	***Ongoing Basis***
Derivative MtM +5	Derivative MtM -5
Collateral Position +5	Collateral Position -5
Upon Default of Bank Counterparty	***Upon Default of Bank Counterparty***
Derivative MtM chg. -5	Derivative MtM chg. +5
Cash Position +5	Cash Position -5
Net Impact 0	Net Impact 0

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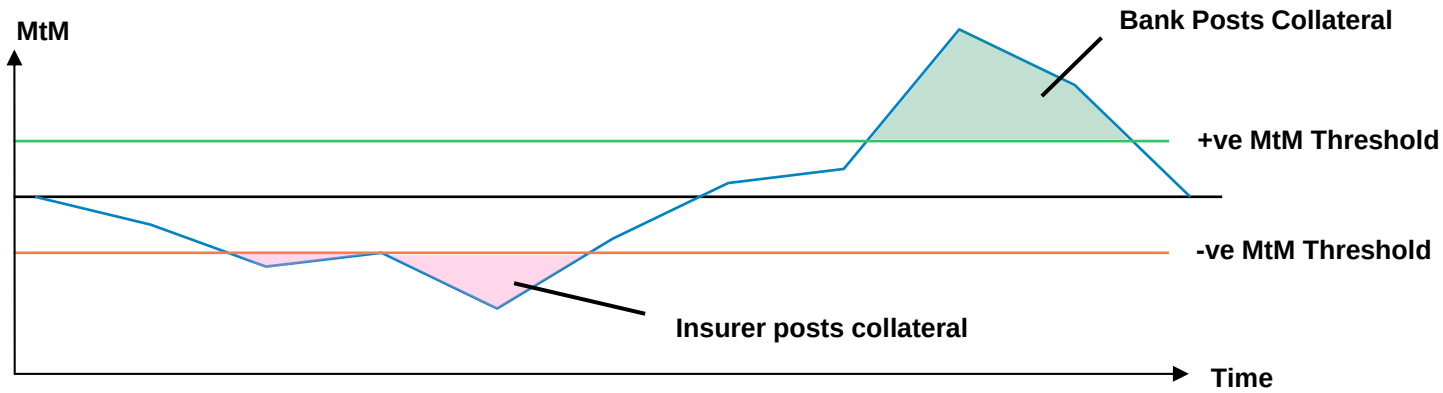
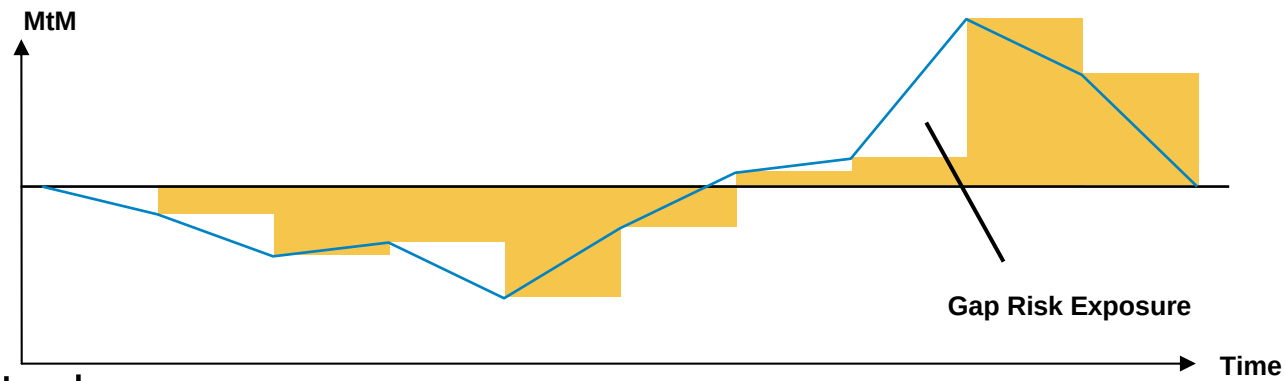
Regular Collateral Rebalancing

Collateral Thresholds May be Applied



Periodic Margining - 'Gap Risk' Remains an Exposure



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Thank You