Mark to Market II:
Credit Valuation Adjustments

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Melbourne Money and Finance Conference, Melbourne, May 2009

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Quality In Everything We Do

“Accounting Tricks Boost Bank Profits”

May 8, 2009 (Associated Press) – New York

Article discusses impact of recent Accounting rule changes in US that have involved use of credit value adjustments resulting in significant increases in income

The article notes the following about credit value adjustments:

“It’s not the kind of stuff you’d point to in earnings and say “now that’s sustainable income”. You would want to exclude it from earnings in evaluating how well a company performed”

Regulatory interest

September 2008 SEC “Dear CEO Letter”

“Entities should consider disclosing how credit risk affected the valuation of their derivative portfolios and the resulting gains and losses included in earnings related to changes in credit risk when material to the results of operations”

2008 AICPA National Conference on Current SEC and PBAOB developments

“In management discussion and analysis clear discussion should be presented on how counterparty and own credit risk is estimated when measuring the fair value of derivatives.”

Overview of presentation

- *Understanding credit exposure important for risk management*
- *Modelling CVA is important for pricing and hedging*

- **CVA is a market estimate of the measurement of counterparty credit risk arising in OTC derivatives.**

- **Brief credit risk overview**
- **Credit risk and derivatives**
- **Measurement alternatives**
- **Issues in application**
- **Impacts and consequences**

Credit risk

5 year mid CDS spread on senior debt (basis points)

	Aug-07	Dec-07	Dec-08	Feb-09
Lloyds	22	30	109	177
Barclays	46	47	164	188
RBS	32	55	137	174
HSBC	29	39	102	147
Credit Suisse	47	48	182	215
ING	28	44	127	137
BNP	32	28	72	95
Dresdner	40	43	87	101
Morgan Stanley	75	100	413	395
Merrill Lynch	81	125	155	330
Goldman Sachs	73	68	290	280
Santander	36	45	104	145

- Spreads above Libor in August 2007
- Widened significantly since then
- Other factors affect CDS spreads – liquidity for instrument, credit rating of CDS counterparty

Note: USD spreads for MS; ML and GS; Euro spreads for all other currencies

Credit risk

- Credit risk represents the possibility that trading counterparties may fail to deliver on financial obligations in a timely manner.
  - default
  - credit downgrade
  - principal loss vs. contract replacement

- As current mark-to-market contract values represent the potential loss today, there is a need to factor in the potential exposure from today until maturity of the contract.

- Accurately measuring these exposures are necessary in order to manage capital levels better but also to enable the more efficient use of capital.

Credit risk in fair value instruments

Credit risk incorporated in the fair value measurement will vary depending on the exposure as follows:

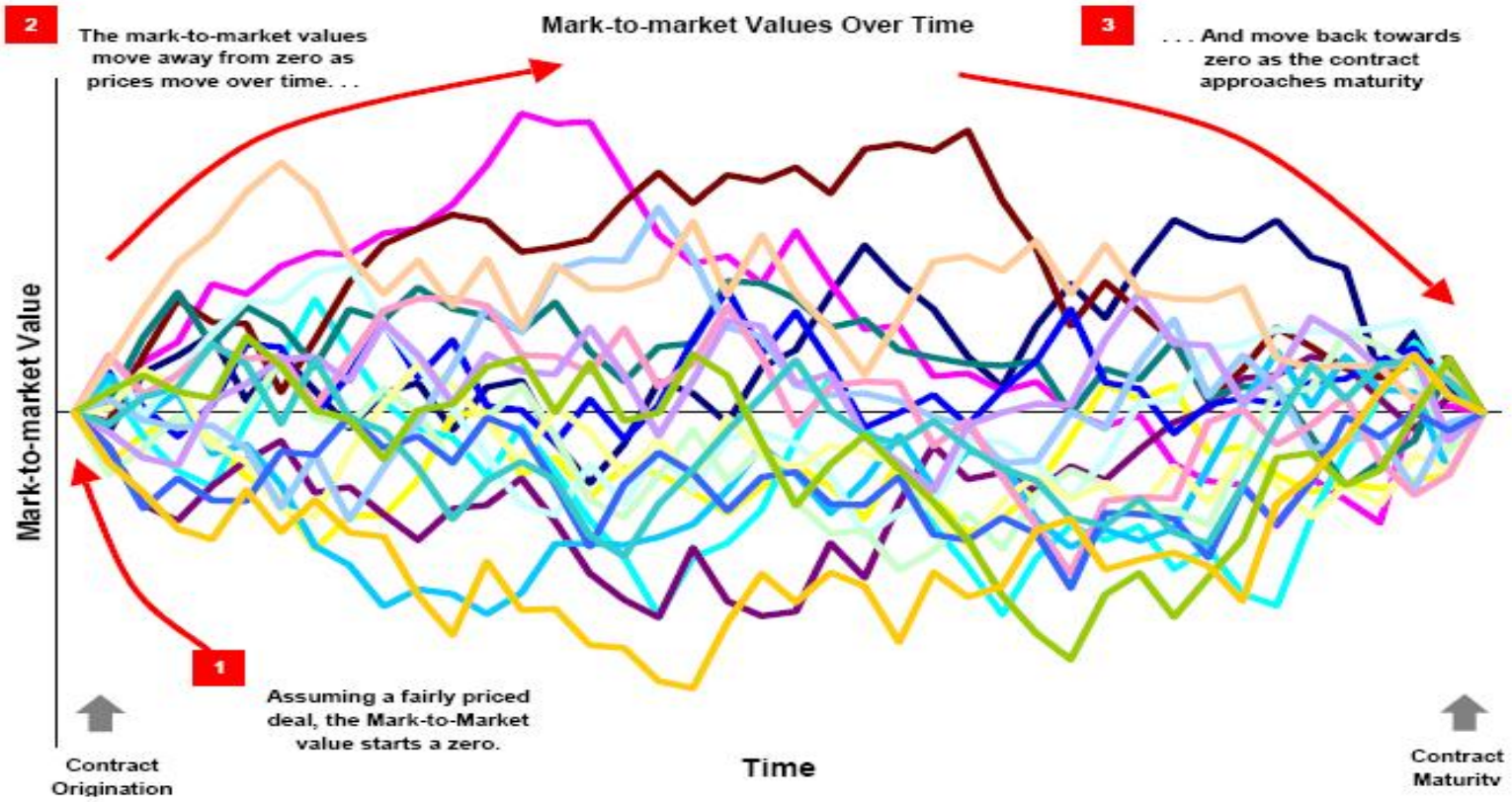
- Asset position (positive or in the money)
  - The credit risk of the counterparty should be incorporated into the calculation of the credit risk adjustment
- Liability position (negative or out of the money)
  - The reporting entity should incorporate its own credit risk into the calculation of the credit risk adjustment

No adjustment required in the cases of:

- Exchange traded instruments
- Publicly traded equity instruments

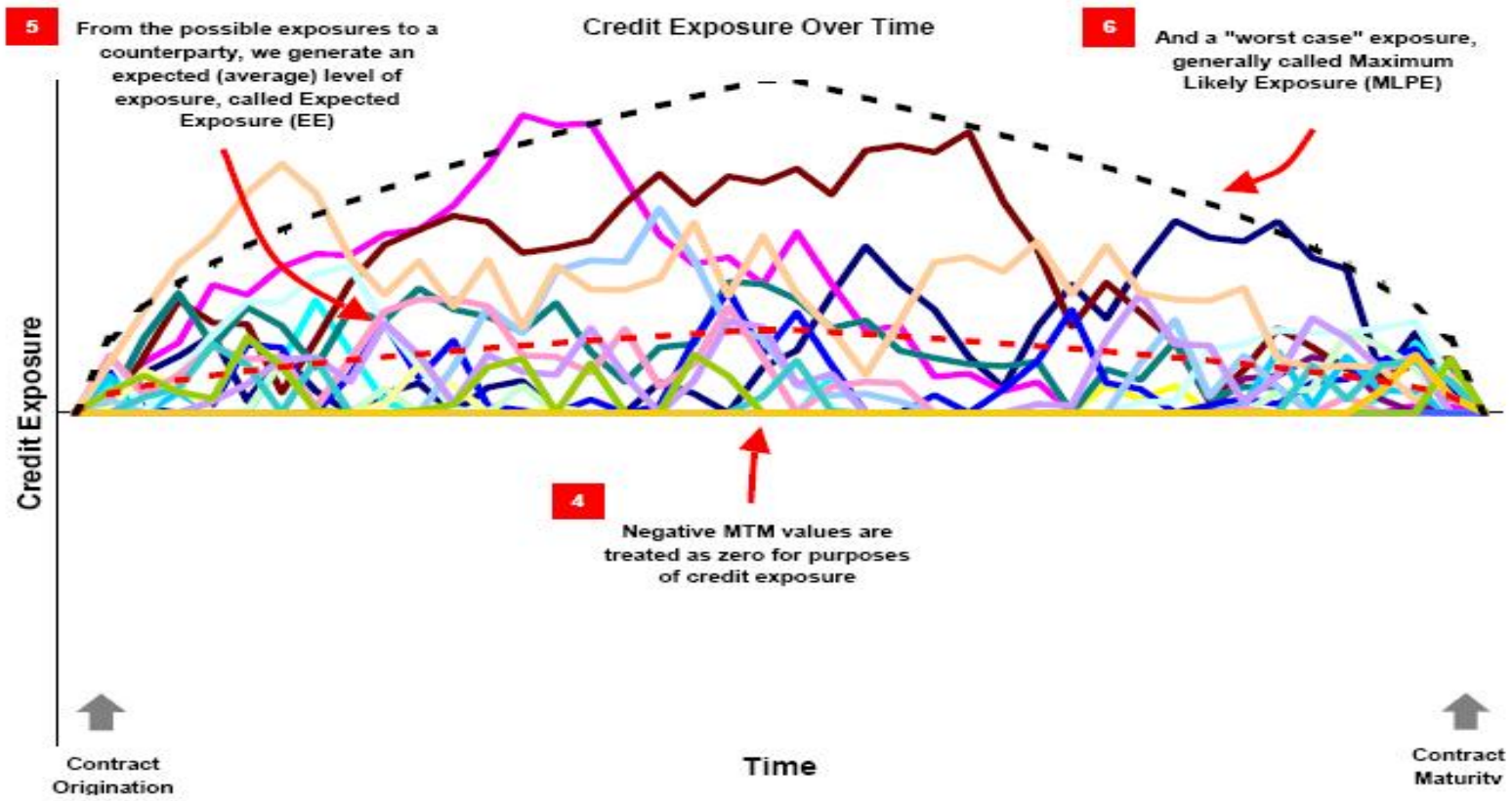
Example Swap Contract

Figure 3: Swap contract MTM values over time



Example Swap contract

Figure 4: Swap contract positive potential credit exposures over time



Derivative valuations and credit risk

Exposure impacts

- Two primary impacts – diffusion and amortisation
  - Single period instrument – FEC, FRA
  - Multi - period instrument – swaps

- Yield curve impacts
  - Upward sloping yield curve – payer swap has greater exposure than receiver swap
  - Downward sloping yield curve – receiver swap has greater exposure than payer swap
  - Humped curve – potentially equally risky

Derivative valuations and credit risk

Derivatives must be held at full fair value in the balance sheet- this must include the impact of credit

What is credit risk in a derivative contract?

- The risk that either party may fail to perform on its contractual obligations
- Default loss is cost of replacing the existing contract
- Market perspective - not an individual assessment of whether expect a derivative counterparty to fail or not

Derivative valuations and credit risk

- Derivatives can *fluctuate from asset to liability position*, hence both parties may face credit exposure over time
- Variability of future cash flows means future credit exposures will *vary over time*
- When derivatives are an *asset position* then consider counterparty's credit rating – exit price concept
- When derivatives are a *liability position* then consider own credit rating – transfer concept
- How would the market price the derivative position?

Fair value disclosures

Hierarchy, by class, for financial instruments at fair value:

- Three levels are:
  - Level 1: quoted prices (unadjusted) in active markets
  - Level 2: observable inputs other than quoted prices
  - Level 3: not based on observable market data
- Instrument should be classified in its entirety based on basis of lowest level that is significant to fair value
- The hierarchy is the same under US GAAP FAS 157

Fair value hierarchy

Level	Definition	Examples
Level 1	► **Quoted price** (unadjusted) in an active market for identical assets or liabilities that the reporting company has access to (i.e., price x quantity)	► **Exchange traded derivatives**
Level 2	► Quoted price for **similar** assets/liabilities in an active market ► Quoted price for identical or similar assets or liabilities in **inactive markets** ► Valuation model using **observable inputs** ► Valuation model using inputs from or **corroborated by observable market data**	► **Most derivatives, i.e. those not classified as L3 or L1** ► Issued structured notes ► Convertible preferred stock; Preferred stock ► Hedge fund investments, trust units and asset backed notes ► Equities listed in inactive markets
Level 3	► **Valuation model using unobservable inputs:** Entity's own assumptions about assumptions of market participant in pricing the asset or liability, including assumptions about risk, developed based on the best information available in the circumstances; may include the entity's own data; discounts for liquidity can be applied.	► **Where impact of any non-observable input is significant to FV, e.g. credit valuations** ► **Certain exotic or long-dated derivatives** ► **Certain options** ► Private equity, non-listed equities and investments valued using cash flow valuation model based on significant unobservable inputs ► Convertible debt ► Privately held operating companies ► Commodities baskets and Heat Rate options ► Synthetic CDO (non-scorecard)

Derivative valuations and credit risk

What has been the practice to date ?

- Most corporate entities valued their OTC derivatives using a discounted cash flow model based on a market swap or forward curve
- Changes in their derivative counterparties' credit worthiness not included – argument was that already built into BBSW curve, or immaterial
- Some financial institutions have used credit valuation adjustments for their derivative portfolios, although few considered own credit risk

Derivative valuations and credit risk

Are those arguments and practices still valid?

- Financial institution bankruptcies
- Does BBSW mean the same as it did 12 months ago ?
- Credit concerns can vary widely
  - From entity to entity
  - From day to day
- Credit spread information (such as CDS spreads) show that most financial institutions' credit ratings are widely divergent from market swap or forward curves

Derivative credit risk measurement approaches

What approaches can be used to price in credit into derivative valuations?

- Net cash flows (DCF Approach)
  - For each cash flow date, calculate net cash flow – then discount with credit adjusted discount factor – depending on net receivable or payable cash flow
- Current exposure (DCF Approach)
  - Adjust market curve by including an additional credit spread – either entity or counterparty– depending on net asset or liability position
- CVA models (approach typically used by banks)
  - Potential future credit exposure (PFCE) at counterparty level
- Buy credit default protection
  - For each cash flow date, calculate discounted cash flows – calculate cost of purchasing credit default protection – depends on whether net asset or liability position after cash flow occurs

Issues for consideration in selecting measurement approach

- Materiality of the entity's derivatives carrying value in its balance sheet
- The number and type of derivative instruments in a portfolio
- The extent to which the instruments are in or out of the money
- The existence and terms of credit mitigation arrangements

Derivative valuations and credit risk

Example

Interest rate swap with one year remaining to maturity, pay fixed quarterly 6% receive floating rate 3 month BBSW. AUD1 million notional. Assumption 3 month BBSW is flat at 4% for the next year.

As net liability fair value position – entity's credit spread of 100bp (diff = $117).

Quarter	Pay fixed 6%	Receive 3m BBSW	Net Cash flow	BBSW discount factor	BBSW discount factor + 100bp	BBSW discounted cash flow	BBSW + 100bp discounted cash flow
1	(15,000)	10,000	(5,000)	0.9901	0.9877	(4,950)	(4,938)
2	(15,000)	10,000	(5,000)	0.9804	0.9756	(4,902)	(4,878)
3	(15,000)	10,000	(5,000)	0.9709	0.9639	(4,854)	(4,819)
4	(15,000)	10,000	(5,000)	0.9615	0.9524	(4,808)	(4,762)
					Total Fair Value	(19,515)	(19,398)

Potential future credit exposure (PFCE)

Alternative PFCE approaches:

- Static add-on (Notional *add-on%)
- MTM + Potential future credit exposure
- Analytical credit exposure factors
- Confidence banding or profiling through multiple scenarios
- Monte Carlo simulation

Issues in determining credit risk on derivatives

Obtaining credit spread data

- Credit default swap spreads – downside factors; liquidity, credit risk of CDS counterparty term available
- Published credit rating data – out of date
- Bond spreads
- Specific to the actual legal entity derivative is transacted with, not just the counterparty name
- May use a combination of relevant credit spread data to derive appropriate spread – e.g. bond spreads, CDS spreads, recent transactions

Issues in determining credit risk on derivatives

Technology Infrastructure Challenges

- System applications to enable credit exposure calculations
- Implementation of netting rules and collateral agreements

Impact of collateral or netting arrangements

- Collateral/ netting enforceability
- Master netting arrangements
- Collateral, nature of collateral, and/or other credit enhancements
- Threshold amounts

Issues in determining credit risk on derivatives

Other considerations

- Break clauses in derivative contract
- Counterparty Government owned?
- Movements since balance sheet date
- Waterfall – how will the derivative rank in the event of default event
- No one right way of calculating credit. Methodology needs to be appropriate for portfolio entity and counterparty

Impacts

Valuation and capital impacts

- Movements in fair value of derivatives impacted by not only market risk factors but also credit risk factors
  - Liability vs. Asset status impacts
  - Procyclicality impacts

Impact on hedge accounting

- Movements in fair value from changes in credit risk is likely to result in hedge ineffectiveness for both assessment and measurement
  - appropriately considered in effectiveness assessment?
  - apportion CVA to hedge relationships

Default of hedging instrument counterparty

- If hedging instrument terminated
  - hedge accounting ceases prospectively
  - previous hedging gains/losses in hedge reserve/fair value adjustment
    - remain in equity if hedged transaction expected to occur
    - reclassified to P&L immediately only if hedged transaction not expected to occur
    - start amortising fair value adjustment
- Replacement hedging instrument
  - new hedge relationship
  - if non-zero fair value – potential effectiveness issues

Questions

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