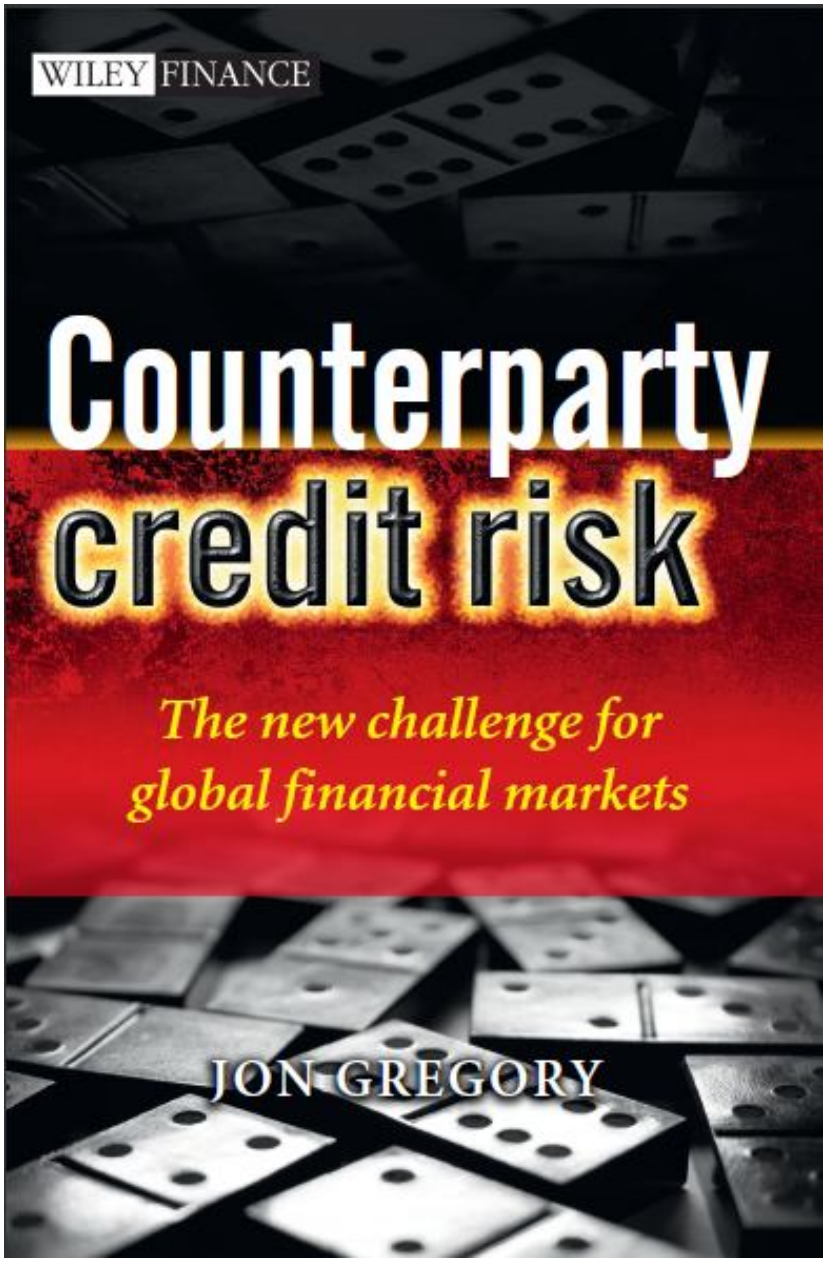
Pros and cons of central counterparty clearing

Dr Jon Gregory

www.oftraining.com


WILEY FINANCE
Counterparty credit risk
The new challenge for global financial markets
JON GREGORY

Some Initial Thoughts

- The case of long term capital management (LTCM)
- LTCM had the following “benefits”
  - Were able to leverage $4.8 bn into $100 billion
  - Were excused collateral on many deals
  - When they collapsed, the Federal Reserve organised a bail-out

“If history repeats itself, and the unexpected always happens, how incapable must Man be of learning from experience.”,

George Bernard Shaw (1856 - 1950)

The Monoline Debacle

- The most recent attempt to create high quality counterparties was not so successful (see www.oftraining.com for these papers)

CUTTING EDGE. CREDIT DERIVATIVES

A trick of the credit tail

*Leveraged super-senior (LSS) trades represent a mechanism for packaging senior credit risk. Many LSS structures have been issued to date and yet there seems to be no formal pricing approach. In this article, **Jon Gregory** discusses the valuation of LSS protection in a model-independent framework. He argues that the 'equivalence' approach to pricing that seems widely used is not appropriate*

The structured credit market has grown rapidly in recent years with the use of synthetic collateralised debt obligations (CDOs), which allow issuers to sell a particular tranche of a portfolio hedged with more simple instruments such as single-name credit default swaps. One problem in the early development of the CDO market was the fact that correlation was a key input to the pricing but was a rather opaque quantity. The development of the index tranche market in 2004 provided a solution to this problem of observability, and has led to correlation trading across the capital structure for corporate credit portfolios and other asset classes such as asset-backed securities (ABSs), leveraged loans and commercial mortgage-backed securities.

problems arising from the market turbulence of July and August 2007, which created significant mark-to-market losses from a position taking super-senior credit risk (a result of spread widening and increases in implied correlation). Our focus will be a robust theoretical pricing study and not other qualitative aspects such as rating agencies' approaches and problems arising from the disruption in the Canadian conduit market.

The leveraged super-senior structure

The premise of the LSS structure is that super-senior spreads in unleveraged form do not have the correct risk-return profile for many investors since their premium is too small and the issuer therefore applies leverage to the product to create a more attractive return. The leverage in a LSS transaction reflects the fact that the investor's cash participation is less than the notional of the super-senior tranche. For example, a $10 million investment may be leveraged 10 times into a super-senior tranche with a notional of $100 million. The investor has sold protection on $100 of protection but posted only $10 initial collateral. Generally, for a leverage of x times, the investor will initially commit $1/x$ units of collateral, as illustrated in figure 1. LSS trades have mostly been structured on corporate credit but also, more recently, on ABS portfolios.

There needs to be a mechanism to mitigate the risk that the LSS issuer retains via the uncollateralised exposure. This is achieved using a 'trigger event', where the investor might have the option to de-leverage by posting more collateral but will otherwise face the structure being unwound by the issuer at prevailing market rates.

To understand the LSS trigger mechanisms, note that the value

CUTTING EDGE. CREDIT DERIVATIVES

A free lunch and the credit crunch

*Monoline insurers act as triple-A guarantors of the senior risks in structured finance. A purchaser of credit insurance or protection from a monoline may argue that they take only a small amount of the counterparty risk that is a common side-effect of trading over-the-counter derivatives products. However, in this article **Jon Gregory** argues that credit insurance purchased in this fashion carries significant counterparty risk and from a quantitative point of view has little or no value*

an LSS being worth the equivalent amount of standard protection minus some 'gap risk', it has a much smaller value corresponding to the collateralised protection plus a complex 'trigger option' arising from the protection buyer's right to unwind the structure via some predetermined mechanism. In this article, we argue that obtaining senior credit protection from a credit derivative product company (CDPC) or monoline can essentially be thought of as executing a more complex and opaque LSS structure. We then argue that the assumption that such protection can be priced via simply assuming a (small) counterparty risk adjustment is incorrect.

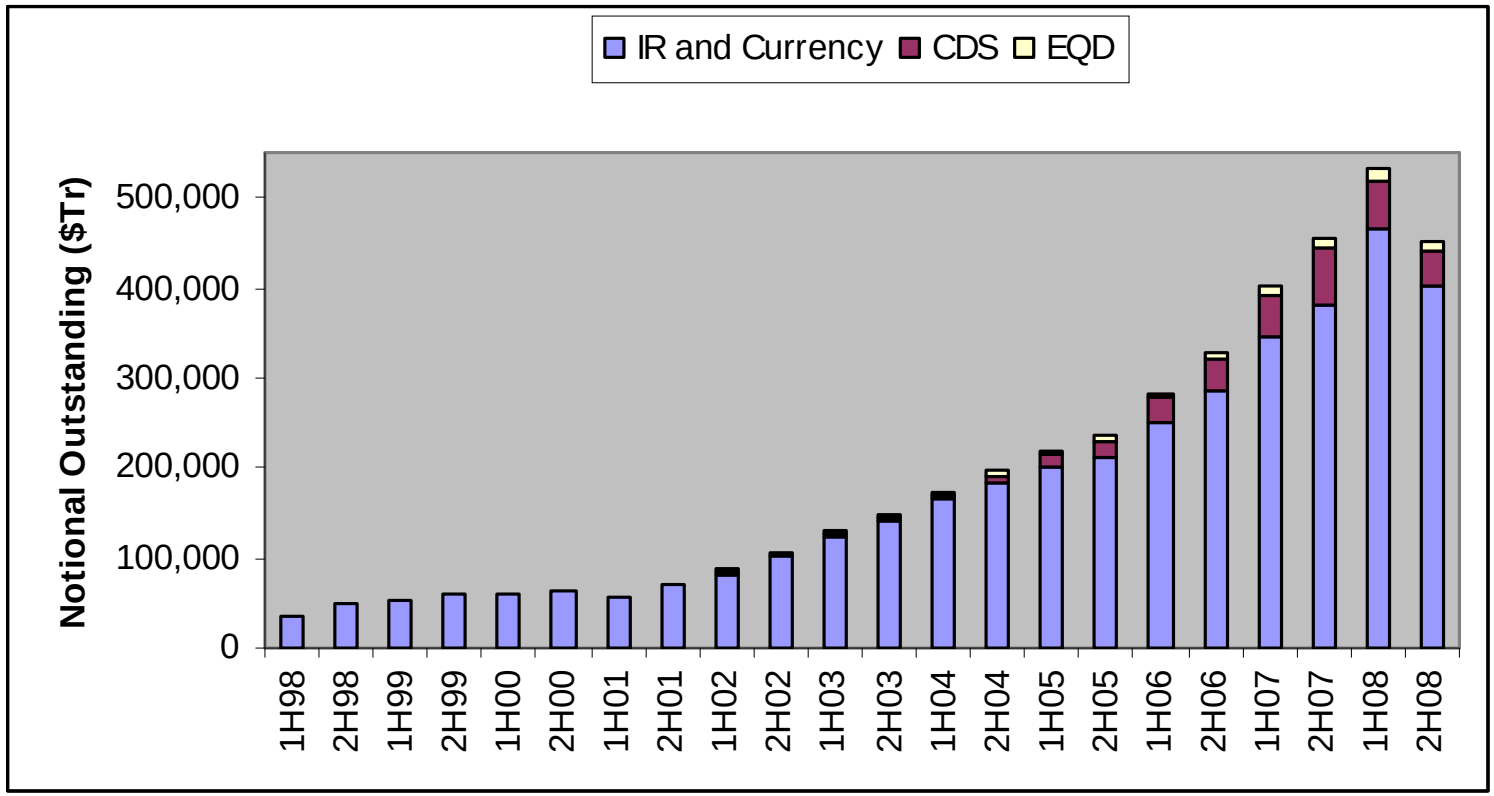
CDPCs and monolines

Monoline insurers are financial guarantee companies that are triple-A rated and provide insurance for investment-grade transactions in structured finance such as asset-backed securities (ABSs) and collateralised debt obligations. CDPCs are similar in concept but take on risk in the form of derivatives rather than insurance

Pros and Cons of Central Clearing

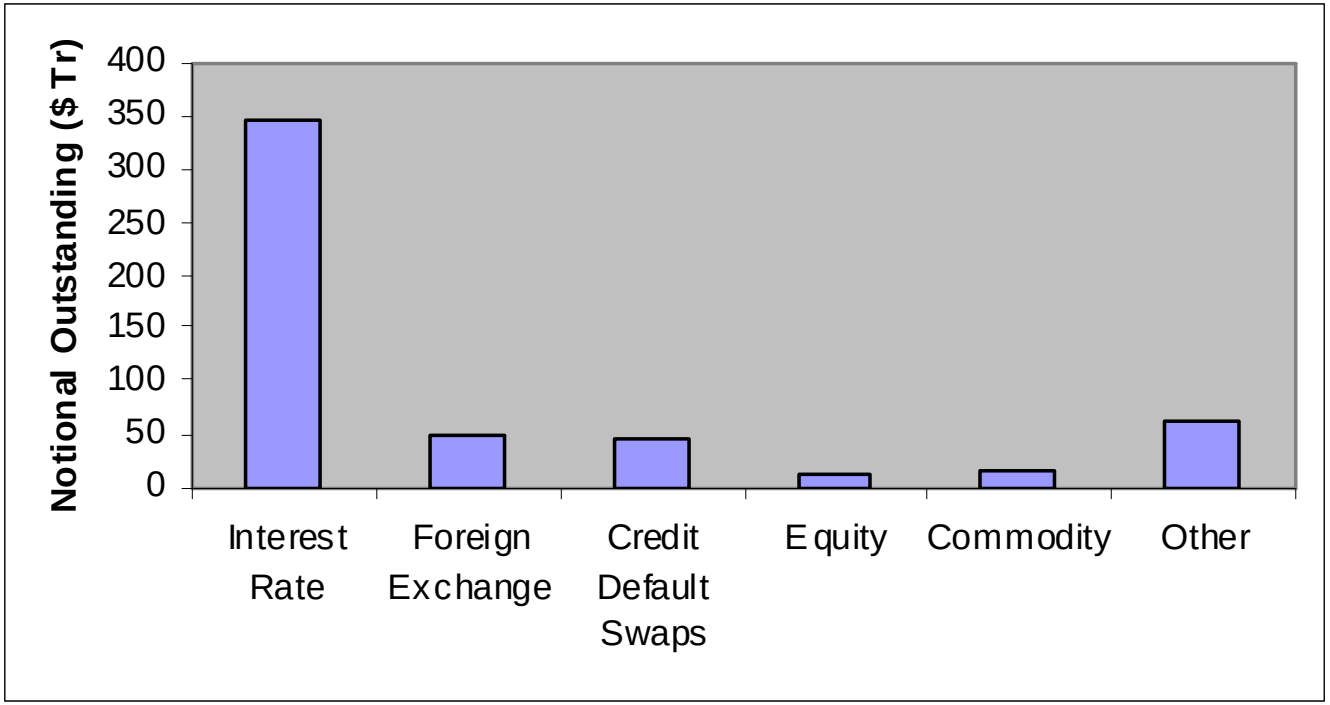
i) Background

The Birth of OTC Derivatives



- OTC dominate exchange traded derivatives
- But credit crisis has curtailed strong growth in derivatives markets

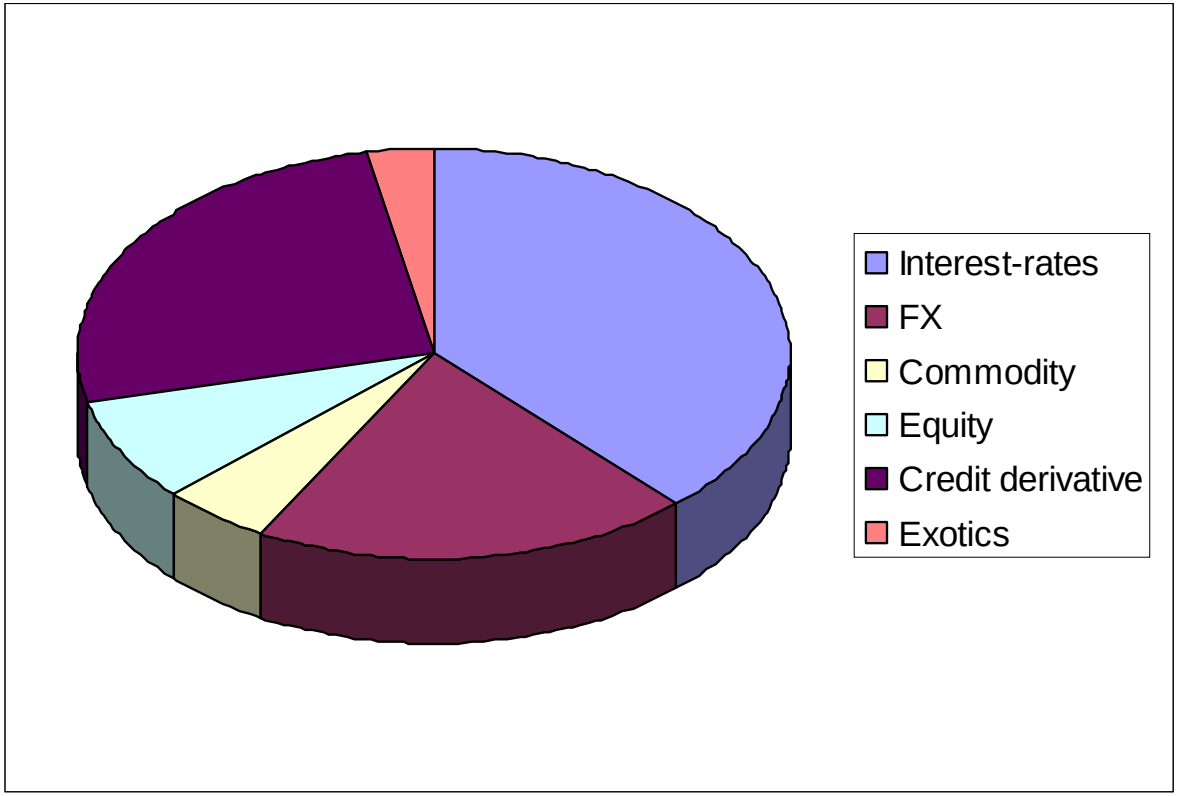
Relative Size of Derivatives Markets



- Interest rate derivatives market is dominant?
- Where is the majority of the counterparty risk?

Counterparty Risk by Asset Class

- *"PLEASE GIVE A BREAKDOWN OF WHERE YOU FEEL YOUR COUNTERPARTY RESIDES IN TERMS OF ASSET CLASS"*



Pros and Cons of Central Clearing

ii) Risk mitigation methods for OTC derivatives

Mitigating Counterparty Risk – Netting

- The ability to offset derivatives contracts with positive and negative value with respect to a defaulted counterparty (netting)
- Advantages
  - Dramatically reduces the overall exposure within the OTC derivatives markets
- Disadvantages
  - Gives OTC derivatives counterparties preferential treatment compared to other creditors of a bankrupt institution
  - Legal risk
  - May allow excessive growth in OTC derivatives markets

Mitigating Counterparty Risk – Close-out

- The right to terminate contracts with a defaulted counterparty immediately
- Advantages
  - Allows derivatives positions to be re-hedged immediately
- Disadvantages
  - Gives OTC derivatives counterparties preferential treatment compared to other creditors of a bankrupt institution
  - Legal risk
  - May allow excessive growth in OTC derivatives markets
  - Walkaway features (non-standard) allow an institution to gain from their counterparty's default

Mitigating Counterparty Risk – Additional Termination Events (ATEs)

- The right to terminate contracts at fair value (mid market) based on a certain trigger (ratings, NAV, key person event)
- Also called liquidity puts and break clauses
- Advantages
  - Allows exposure to be terminated with a counterparty in distress without any loss
- Disadvantages
  - Relationship issues
  - Whether the early termination event kicks in early enough
  - Early termination events with multiple counterparties create a death spiral (AIG)

Mitigating Counterparty Risk – Collateral

- Two way collateral agreements are perhaps the optimal way to reduce credit exposure and counterparty risk
- Advantages
  - Can, in theory at least, completely eradicate counterparty risk (assuming no jumps in market variables)
  - Flexible and can be customised to the particular relationship
- Disadvantages
  - Creates operational, legal and liquidity risks
  - Not ideal to post cash collateral, especially when there are liquidity issues
  - Other collateral types have had other problems – rehypothecation (Lehman)

Mitigating Counterparty Risk – Hedging

- Hedging counterparty risk has become practical with the birth of the credit derivatives market in the last decade
- Advantages
  - Credit default swaps (CDSs) can hedge directly an exposure vis à vie a credit line
  - Contingent CDS can completely remove counterparty risk for a given trade
  - Index CDS can hedge the overall sensitivity of counterparty to market spreads (CVA)
- Disadvantages
  - Insufficient liquidity in credit derivatives products, especially single name
  - Contingent CDS are very limited
  - Credit derivatives themselves have severe counterparty risks

Pros and Cons of Central Clearing

iii) Advantages of central clearing

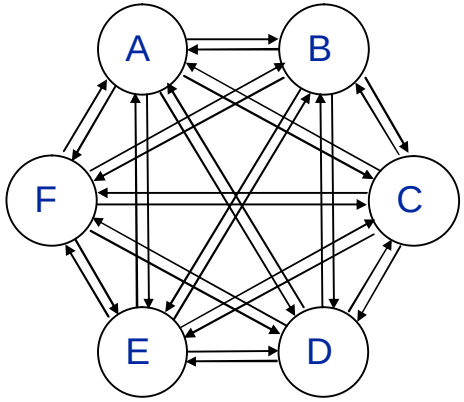
Advantages of Central Clearing

- **Multilateral netting**
- Loss mutualisation
- Standardisation
- Capital reduction
- Legal and operational efficiencies

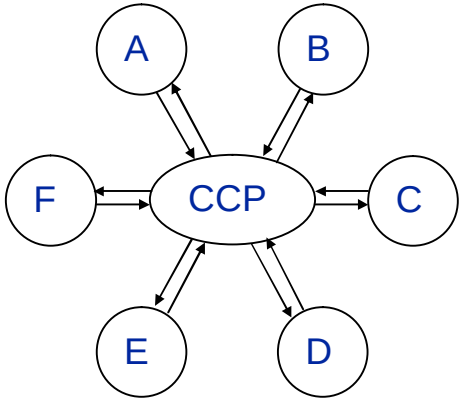
Multilateral Netting (I)

- Multilateral netting

Bilateral netting



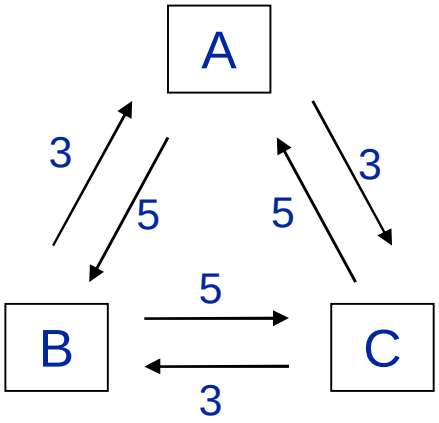
Multilateral netting



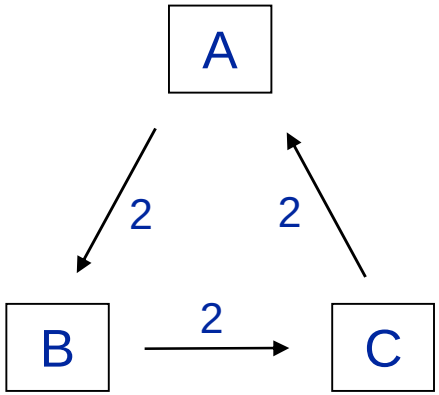
- Potentially reduces overall exposure in the market

Multilateral Netting (II)

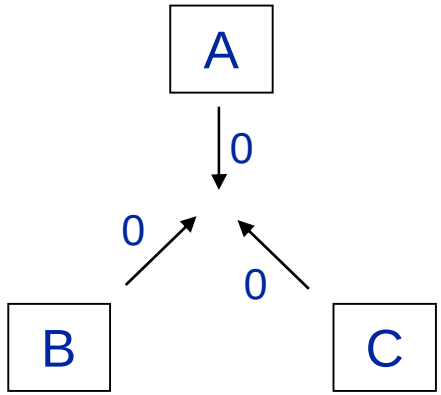
No netting



Bilateral netting



Multilateral netting



Advantages of Central Clearing

- Multilateral netting
- **Loss mutualisation**
- Standardisation
- Capital reduction
- Legal and operational efficiencies

CCP Waterfall

- In the event of default of a CCP member, the following waterfall shows how the losses will be absorbed

1. Close-out and net positions with defaulted counterparty
2. Liquidate collateral
3. Reserve fund (guarantee pool) of CCP
4. Contribution from other clearing members
5. Third party insurance

- Result of this is that a domino effect is unlikely as losses are shared amongst counterparties

Advantages of Central Clearing

- Multilateral netting
- Loss mutualisation
- **Standardisation**
- Capital reduction
- Legal and operational efficiencies

Standardisation

- A CCP will require significant standardisation
  - Products traded through the CCP
  - Pricing models
  - Operational procedures (netting, collateral etc)
  - Legal procedures
- Impact
  - Easier to unwind trades (together with multilateral netting benefits)
  - More counterparties will trade in certain products
  - Reduction in asymmetric information
- Likely to enhance transparency and liquidity

Advantages of Central Clearing

- Multilateral netting
- Loss mutualisation
- Standardisation
- **Capital reduction.** *Potential zero capital weight for CCP counterparties under Basel II*
- Legal and operational efficiencies

Advantages of Central Clearing

- Multilateral netting
- Loss mutualisation
- Standardisation
- Capital reduction
- **Legal and operational efficiencies**

Legal and Operational Efficiencies

- The operation of a CCP requires
  - Settlement
  - Netting services
  - Collateral management
  - Centralisation of rules and mechanisms
- May allow smaller institutions to enter the market
  - For example an institution may not be able to cope operationally with daily margin calls in a bilateral market but can when they have only one counterparty (the CCP)
- Likely also to enhance liquidity

Pros and Cons of Central Clearing

iv) Disadvantages of central clearing

Disadvantages of Central Clearing

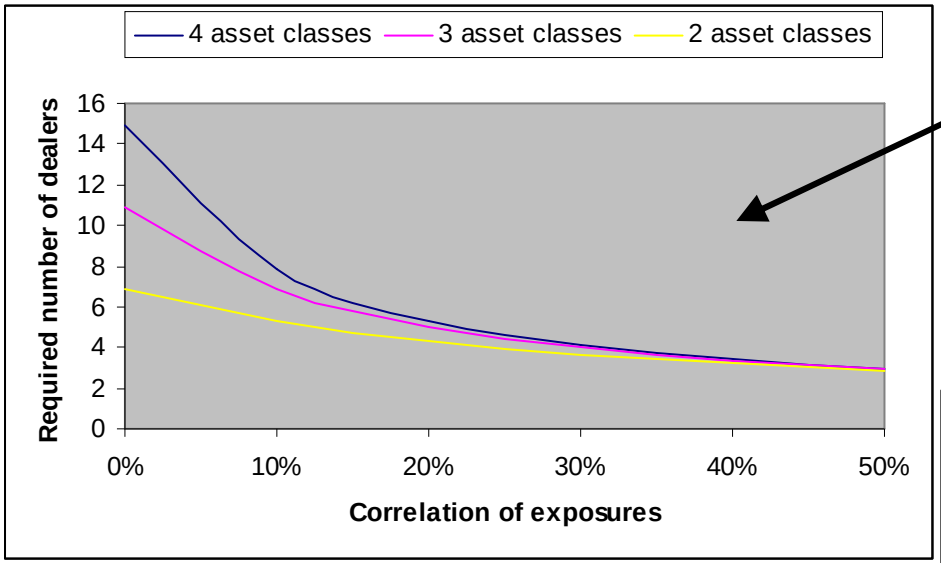
- **Lack of netting benefits**
- Standardisation
- Homogenisation and asymmetric information
- Legal and operational risks
- Competition
- CCP failure

Multilateral vs Bilateral Netting

- Suppose a series of counterparties trade with each other across n asset classes
- Now suppose all products in one asset class are traded through a CCP
- Netting reduction
  - Multilateral netting created by the CCP within a single asset class
- Netting increase
  - Removal of bilateral netting benefits of that asset class
- Overall, there may not be an overall reduction of exposure

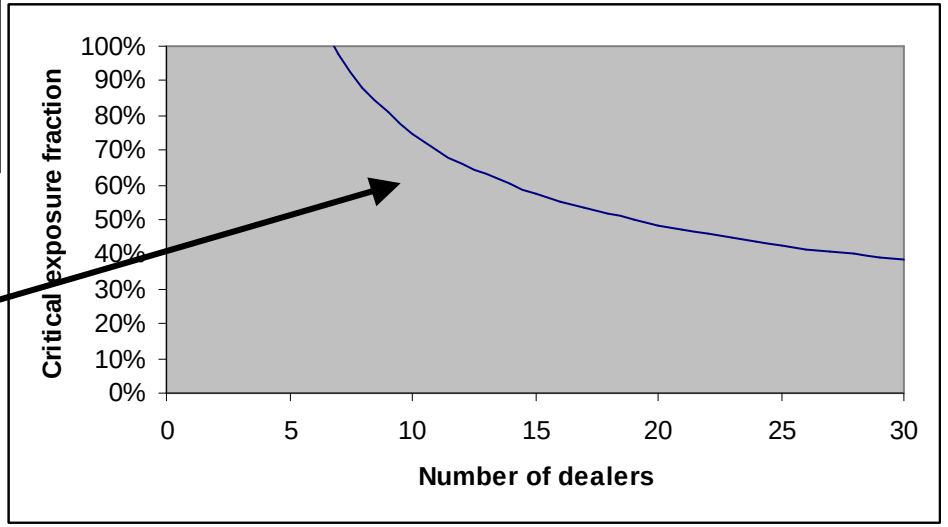
Will Exposure Be Reduced?

- Duffie and Zhu [2009]



Required number of dealers for a single asset class CPP to improve netting efficiency

Required fraction of exposure attributed to a single asset class to make a CCP for that asset class effective



Disadvantages of Central Clearing

- Lack of netting benefits
- **Standardisation**
- Homogenisation and asymmetric information
- Legal and operational risks
- Competition
- CCP failure

Disadvantages of Standardisation

- OTC Derivatives tend to be customised and therefore not easy to trade through a CCP
- Many OTC derivatives are traded in a situation where only one party has a good knowledge of the valuation of the derivative
- Forced standardisation can potentially hinder the market
  - Complexity for the sake of it should not be encouraged BUT
  - Simple customisations (slightly different maturity date for example) are reasonable but would be prevented in a CCP market

Disadvantages of Central Clearing

- Lack of netting benefits
- Standardisation
- **Homogenisation, asymmetric information and winner's curse**
- Legal and operational risks
- Competition
- CCP failure

Risk Homogeneity / Asymmetric Information (I)

- Loss mutualisation creates risk homogeneity reducing systemic risk
- Homogenisation of counterparty risk is not necessarily a good thing
- Bilateral market
  - Institutions carefully monitor their counterparts
  - Weaker credit quality institutions cannot enter the market
  - An institution with a weakening credit quality may be highly incentivised to improve their credit quality (collateral requirements, trading limits)
- Multilateral market
  - ***Credit quality is assessed in a less granular way***
  - No incentive to monitor the credit quality of ones counterparties
  - Weaker credit quality institutions may enter the market
  - An institution with worsening credit quality may be ignored (to a degree)

Risk Homogeneity / Asymmetric Information (II)

- CCP cleared markets may favour weaker counterparties
- Poor quality institutions may build up bigger positions more quickly than in bilateral markets

- Asymmetric information costs may be higher due to the lack of transparency (Pirong [2009])

- Valuing the counterparty risk of a derivatives is always more complex than pricing the derivatives itself
  - Arguably it is better to leave the assessment of counterparty risk with the dealer rather than pass it on to a CCP

Winner's Curse (I)

- In this context, a winner's curse would be a CCP naturally attracting the most risky products
- Key component for deciding the riskiness of a product
  - How volatile is the MtM value of the transaction?
  - Is the exposure asymmetric?
  - Wrong-way risk?
  - The multilateral netting benefit of this trade / open positions versus hedged positions
  - Correlation

Winner's Curse (II)

	Volatility	Asymmetric exposure	Wrong-way risk	Multilateral netting / hedges	Correlation
Interest-rate swap					
Cross currency swap (with notional exchange)	×	×			
CDS (index)	×	×	×		
CDS (single-name)	×	×	×	×	
CDO tranches	×	×	×	×	×

- Products most attractive to trading through a CCP
  - CDS, CDS indices, CDO tranches
- Will a CCP attract the more toxic products?

Disadvantages of Central Clearing

- Lack of netting benefits
- Standardisation
- Homogenisation and asymmetric information
- **Legal and operational risks**
- Competition
- CCP failure

Legal and Operational Risks

- CCPs reduce systemic risk in one sense but may increase it via concentrating legal and operational risks
- Critical that a CCP has complete integrity with respect to
  - Enforceability of netting agreements
  - Collateral requirements
- Operational risk
  - Systems failure
  - Fraud
- A breakdown or crack in the infrastructure of a CCP could be catastrophic whereas for a normal counterparty it may not be as significant

Disadvantages of Central Clearing

- Lack of netting benefits
- Standardisation
- Homogenisation and asymmetric information
- Legal and operational risks
- **Competition**
- CCP failure

The Size of a CCP

- A small number of large CCPs?
  - Excellent for maximising multilateral netting benefits
  - Non-desirable for monopolistic reasons
  - Costs and margin requirements may be prohibitive for some counterparties
- A large number of small CCPs?
  - Netting benefit limited
  - More competition with the danger of CCP fees and collateral requirements being not conservative enough
- This also relates to the “too big to fail” debate

Disadvantages of Central Clearing

- Lack of netting benefits
- Standardisation
- Homogenisation and asymmetric information
- Legal and operational risks
- Competition
- **CCP failure**

CCP Failure

- A CCP is too big to fail?
  - Such a failure could be catastophic
- But what does “too big to fail” mean
  - An institution that will always receive financial support in a crisis
  - An institution that will not be allowed to exist in the first place!

- A stable derivatives market is not one heavily dominated by a few large institutions (all of which are wrongly assumed to be too big to fail) but rather a market with smaller institutions who can and will fail, but with less dramatic consequences. The failure of these small institutions may also be anticipated and acted upon

Stability of a CCP

- CCPs will
  - Have strong margin requirements
  - Have strong risk management capabilities
  - Be subject to prudent supervision
  - Have conservative capital requirements

Pros and Cons of Central Clearing

v) Under what circumstances would a CCP work?

Making a CCP work

- Cover all or most products
  - Not just the potentially toxic ones like CDS
  - Diversifaction of different product types is important - See Gemmill [1994]
- The right number of CCPs in the market
  - Balance between monopolistic effect and competition making CCPs too competitive
  - Cross-border issues?
- Margin requirements
  - Must be set very carefully
  - Failure to post margin must be swiftly acted upon
- Tolerance to extreme (margin exhausting) losses
  - Credit portfolio risk and default correlation
  - Withstanding defaults of several counterparties in a short timeframe (what is several?)

Final Comments

- Counterparty risk has been heavily disguised over the last decade
  - "Too big to fail" institutions representing little or no counterparty risk (Lehman, AIG)
  - Monolines with spurious triple-A ratings
  - Failures of practices such as special purpose entities and collateral (rehypothecation)
  - Bilateral counterparty risk
  - Complex structures such as leveraged super seniors (LSS)
- Will a the CCP idea work and be preferable to bilateral OTC markets?
  - We may not know for many years
  - CCPs must learn from past lessons of risk management failures and not be tempted to become less conservative after long periods of low default rates
  - A CCP failure is one obvious way in which to recreate the extreme nature of the recent crisis