



The Economics of Collateral

An academic study into the current and projected collateral supply and demand as well as challenges facing the industry by Ronald Anderson and Karin Jõeveer of the London School of Economics and Political Science

ABSTRACT

This academic study analyses how the use of collateral is evolving under the influence of regulatory reform and changing market structure. It consists of two parts: an in-depth literary review and a modelling exercise, where theoretical alterations are made to dominant model for OTC derivatives trading. With the onset of the financial crisis in 2007-2008 market participants sought safety by demanding more and better collateral to support their transactions. This change in behaviour has been reinforced by changes in regulation (e.g. Basel 3) and by structural initiatives to increase the use of centralized trading platforms and CCPs. This has given rise to an interest in the prospect of a scarcity of collateral that might inhibit economic growth. There have been various attempts to estimate the extent of this scarcity, but little agreement on the numbers.

The authors of this study argue that it is unlikely that there is an overall shortage of collateral. It is, however, possible that there may be bottlenecks within the system due to weaknesses in infrastructure which mean that the available collateral is immobilized in one part of the system and unattainable by credit-worthy borrowers. These bottlenecks are identified in the literary review as issues relating to central bank policy, willingness of investors to make assets available for re-use, contractual and regulatory restrictions on re-use, and CCP risk management techniques. In the modelling exercise they are identified as issues relating to market depth, inter-bank market liquidity, intra-regional market liquidity and level of CCP specialisation. The authors state that problems relating to collateral access can be overcome by improved information systems and collateral transformation.

LITERATURE REVIEW

A review of past studies into collateral scarcity and how structural changes affect collateral produced general agreement that:

- Structural changes are having an effect on the comparative strengths and weaknesses of banks, CCPs and other institutions. Higher capital charges have affected the risk/return trade-offs for many lines of business and banks will feel more strongly the effect of increased collateral demand resulting from centralized clearing. At the same time, the increasing scale of operations of some CCPs means they can develop new products that were uneconomic at a smaller scale.
- Netting benefits of centralised clearing could be substantial if there is a consolidation of trades across geographies and product classes. This would translate into smaller counterparty exposures among intermediaries and their clients but a higher degree of systemic risk concentrated in CCPs. The application of bank exposure limits to CCPs may conflict with the G20 goal of reducing systemic risk because it may impede consolidation of multilateral exposures through centralized clearing.
- Consolidating clearing in order to achieve netting efficiency implies that the dominant CCPs would become systematically important due to a higher degree of systemic risk concentrated in CCPs. A possible advantage is that regulators will know that they need to focus their attentions on the risk management practices of these important institutions.



- Increased collateral demand and the relative scarcity of the highest quality acceptable collateral will increase the need for collateral transformation. Currently, the repo market is the most important means of collateral transformation. Developing that market further to assure its smooth functioning can contribute significantly to increasing the elasticity of collateral supply. Collecting and disseminating better information about this market can contribute significantly to more effective global financial supervision.

A BENCHMARK STUDY: STRUCTURAL VARIATIONS TO THE DOMINANT MODE OF TRADING

The study introduces a theoretical model of an OTC derivatives market based on the dominant mode of trading OTC derivatives through 2007 consisting of investors and banks arrayed in several regions or market segments. The authors simulate this model under alternative forms meant to capture the implications of moving to mandatory CCP clearing and mandatory initial margin requirements for non-cleared OTC derivatives.

The modifications include a move to centralised clearing where there is one CCP or interoperability between all CCPs and where all inter-bank trades, both intra and inter-regional, are required to be centrally cleared and require posting of global collateral as initial margin; where centralised clearing takes place between some but not all regions, clearing of inter-regional bank trades but not intra-regional and complete disintermediation through mandatory clearing of trades. It considers a mixed system where large global banks which are active in all regions can net trades using internal systems before hedging their net exposures first in regional markets and then through inter-regional trades. And finally, alternative structures for variation margin movements and associated operational risks and required liquidity management capacity.

KEY FINDINGS

- The take-up of central clearing will depend on the cost of global collateral, the fraction of intra-regional bilateral trading (which is also linked to the degree of specialization in collateral value) and the depth of the regional inter-bank market.
- Total bank exposure reduces with the number of investors and the number of banks per region. The demand for collateral increases with the number of banks, but is a decreasing function of the number of investors per bank. If the regional market is deep, there is less need for global collateral. Central clearing increases the collateral demand in particular when there is a large interbank market and a low number of investors.
- Centralized clearing with CCPs specialized along geographic or product lines can greatly increase the numbers of margin movements thus increasing operational risks and placing greater demands on participants' liquidity.
- Under certain conditions, the number of margin calls could increase significantly. Calls for variation margins could be as frequent as five times a day. The need to support additional variation margin fluctuations will trigger operational risks.
- The central clearing model sacrifices the benefits of multi-product netting. A system relying principally on centralised clearing to mitigate counterparty risks creates increased demand for liquidity to service frequent margin calls. This can be met by opening up larger liquidity facilities.
- The notion that greater reliance on collateral will eliminate credit risk is illusory. Changing patterns in the use of collateral will have implications for who will bear risks. Changing structures can eliminate risks at the cost of not seeing the associated investment undertaken.
- In the hope that worthwhile risky investment projects will be undertaken, there is a collective interest in seeing that credit risks are borne by the agents that are best placed to acquire and assess information relevant to managing risks intelligently.
- The search for new methods of achieving economical collateral transformation is giving opportunities to market infrastructures and others to provide much needed support for credit creation.



FOR MORE DETAILED INFORMATION

SUMMARY OF LITERARY REVIEW

Previous studies to assess collateral scarcity:

- BIS OTC derivatives survey (2012) estimated the gross notional outstanding OTC derivatives for major dealers at \$632tn. If initial margin is at 1/1000, this suggests a demand for liquid collateral at \$632bn. This does not take netting and compression into account.
- Morgan Stanley & Oliver Wyman (2012) estimated that starting from an initial OTC derivative collateral demand of \$450bn, additional collateral needed to back outstanding trades would be \$3100bn, but netting would offset \$2500bn. It estimates the net new collateral requirement at \$700bn. With suitable assets estimated at \$240bn, there would be a shortfall of \$460bn. One approach to understanding if it would be difficult for relevant participants to acquire the additional collateral needed is to take a high-level macroeconomic view. For example, at the end of 2011 the total amount of US Treasury securities outstanding stood at some \$10.4 trillion. So making some 4 percent of Treasuries accessible for use as collateral for derivatives transactions may not seem beyond the capability of the financial sector.
- Benoît Coeuré (2012) stated that based on official data, the stock of assets acceptable as Eurosystem collateral was €14.3tn. Collateral submitted to support ECB liquidity provision was €2.5tn. Coeuré argues that market price of collateral naturally plays a role in allocating scarce collateral supplies to increasing collateral demands. Implicitly, some of these demands may result in the immobilization of collateral assets, in particular through the central bank asset purchase programmes, exacerbating collateral scarcity. For this reason, there is a public interest in structural reforms that would increase elasticity of collateral supply.
- Levels & Capel (2012) analysed the supply of collateral based on Basel 3 categories. Assuming a linear upwards trend of the private repo market, that two thirds of OTC derivatives contracts would be centrally cleared, and an additional €923bn of demand resulting from Basel 3 liquidity standards imposed on banks - they estimate the demand for collateral within the euro zone would rise by €1.8tn between 2010 and 2012. Analysis based on limited aggregative data available suggests the total stock of high quality assets accepted as collateral exceeds the documented demand for collateral. Taking into account regulatory changes, it seems the increased demands for collateral will out-strip the growth in generally accepted collateral assets. Relative cost of high quality assets is therefore likely to rise.
- The effects of an increasing relative scarcity of collateral might be mitigated by increasing reuse of collateral. Manmohan Singh (2011) analysed this issue by studying the velocity of collateral. He identifies a number of frictions: not all collateral can be reused, settlement delays, and reused collateral may become immobilized by long term investors. His analysis highlights the crucial role of repos and securities lending in the mobilization of collateral. The ability of the financial system to respond to a need for collateral depends on: the willingness of owners to make them available (based on their assessment of trade-off risk versus return), and the contractual arrangements that constrain the reuse of collateral. Changes in investors' willingness to seek short-term yield enhancements of their long-term assets and the rate of rehypothecation mean that collateral supply need not change in step with changes in the stock of underlying suitable assets. The problem of scarcity could therefore become severe and linked to the level of confidence in economic recovery, which is cyclical.

ANALYSIS OF HOW STRUCTURAL CHANGES AFFECT COLLATERAL USAGE

- Duffie & Zhu (2011) analysed the impact of the introduction of CCPs on netting efficiency and counterparty risk based on the activity of six US derivatives dealers. They conclude that if there is one CCP in one derivatives asset class and the rest of the activity is done bilaterally, netting efficiency decreases, collateral demand increases and counterparty default exposure increases (except if the number of participants of the CCP is higher than the number of bilateral participants). A system with a single CCP is more efficient than several CCPs. If each product class has one CCP, there is less efficiency than with one CCP covering all product classes. If we move to several CCPs, there could be a loss of netting efficiency, unless we have interoperability. However this is limited by national fragmentation.



- Cont & Kokholm (2012) analysed the correlation of assets and demonstrated that in the CDS and interest rate markets, if exposure volatility of an asset class is high or positively correlated with other asset classes, clearing of the asset class is beneficial even if the number of clearing participants is small. A single CCP is more beneficial to reduce exposure. Netting efficiency increases with a high degree of CCP consolidation but systemic risk increases.
- Heller & Vause (2012) estimated how much collateral was required to clear IRS and CDS of the largest 14 dealers, considering three degrees of volatility. With three CCPs, the level of initial margin could increase significantly for the 14 dealers.
- Sidanius & Zikes (2012) also studied collateral demand in the CDS and interest rate swap markets based on BIS data. They conclude that reform will be gradual but IRS will be impacted quicker.
- Heath, Kelly & Manning (2013) analysed how agents, products and clearing arrangements affect collateral needs and exposures. Central clearing benefits more banks than other institutions. Central clearing has smaller exposures and collateral demands than bilateral clearing while increasing collateralization reduces the risk of default but increases the contagion risk due to reduction in asset liquidity.
- Duffie, Scheicher & Vuillemeys (2014) analysed real data on CDS bilateral exposure. They conclude that OTC reform will largely impact the CDS market. Assuming no dealer to dealer margin is used today, the move to CCPs would increase the collateral demand by 29 percent. If there is initial margin in bilateral trading, the move to central clearing will decrease collateral demand by 27 per cent.
- Anderson, Dion & Saiz (2013) stated if the number of domestic clearing members is small, a model with unlinked CCPs is preferred for netting benefit, because additional netting gains are not covering the additional exposure from the foreign CCP.

ABOUT DTCC

With over 40 years of experience, DTCC is the premier post-trade market infrastructure for the global financial services industry. From operating facilities, data centers and offices in 15 countries, DTCC, through its subsidiaries, automates, centralizes, and standardizes the post-trade processing of financial transactions, mitigating risk, increasing transparency and driving efficiency for thousands of broker/dealers, custodian banks and asset managers worldwide. User owned and industry governed, the firm simplifies the complexities of clearing, settlement, asset servicing, data management and information services across asset classes, bringing increased security and soundness to the financial markets. In 2013, DTCC's subsidiaries processed securities transactions valued at approximately US\$1.6 quadrillion. Its depository provides custody and asset servicing for securities issues from 139 countries and territories valued at US\$43 trillion. DTCC's global trade repository processes tens of millions of submissions per week. To learn more, please visit www.dtcc.com or follow us on Twitter @The_DTCC.

ABOUT THE LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE (LSE)

LSE is a specialist university with an international intake and a global reach. Its research and teaching span the full breadth of the social sciences, from economics, politics and law to sociology, anthropology, accounting and finance. Founded in 1895, the School has an outstanding reputation for academic excellence. Sixteen Nobel prize winners have been LSE staff or alumni. For more information, please visit www.lse.ac.uk.

