



IMF Working Paper

Making OTC Derivatives Safe—A Fresh Look

Manmohan Singh

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Monetary and Capital Markets Department

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Prepared by Manmohan Singh¹

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Abstract

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Recent regulatory efforts, especially in the U.S. and Europe, are aimed at reducing moral hazard so that the next financial crisis is not bailed out by tax payers. This paper looks at the possibility that central counterparties (CCPs) may be too-big-to-fail entities in the making. The present regulatory and reform efforts may not remove the systemic risk from OTC derivatives but rather shift them from banks to CCPs. Under the present regulatory overhaul, the OTC derivative market could become more fragmented. Furthermore, another taxpayer bailout cannot be ruled out. A reexamination of the two key issues of (i) the interoperability of CCPs, and (ii) the cost of moving to CCPs with access to central bank funding, indicates that the proposed changes may not provide the best solution. The paper suggests that a tax on derivative liabilities could make the OTC derivatives market safer, particularly in the transition to a stable clearing infrastructure. It also suggests reconsideration of a “public utility” model for the OTC market infrastructure.

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Author’s E-Mail Address: msingh@imf.org

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I. INTRODUCTION

The financial crisis following Lehman's demise and AIG's bailout has provided the impetus to move the lightly regulated over-the-counter (OTC) derivative contracts from bilateral clearing to central counterparties (CCPs). The debate about the future of financial regulation has heated up as regulators in both the United States and the European Union seek legislative approval to mitigate systemic risk associated with systemically important financial institutions (SIFIs).² Proposed regulatory changes now require the offloading of standardized OTC derivatives to CCPs. In order to mitigate systemic risk that is due to counterparty credit risks and failures, either the users of derivative contracts will have to hold more collateral from bilateral counterparties, or margin will have to be posted to CCPs.

There are several initiatives to move the systemic risk from SIFIs' derivative books to CCPs, including the Dodd Frank Act in the United States and proposals by the European Union that are pending legislative approval. However, there has been very little research that looks at the overall costs to SIFIs of offloading derivative contracts to CCPs. Much of the initial discussion and research on risks associated with derivatives was focused on credit derivatives (or the CDS market), which now represents only about 6 percent of the overall notional OTC derivatives market, as reported in Bank for International Settlements (BIS) data.³ One of the most cited papers in this context is Duffie and Zhu (2009), which was the first to address the risks in the overall OTC derivatives market. Their numerical estimates show that one global CCP (or, the fewer the better), covering all OTC derivatives contracts would provide the most efficient allocation of capital. However, they do not use actual data to determine the overall costs to SIFIs in moving such risks to CCPs, nor do they address the underlying economics of creating new SIFIs.

Two recent IMF papers on counterparty risk stemming from OTC derivatives find that a large part of the counterparty risk in the OTC derivatives market is under-collateralized relative to the risk in the system (Singh and Aitken, 2009b and Singh, 2010). Moving this risk to CCPs will require posting sizable collateral—it is estimated that under-collateralization may be up to \$2 trillion—although the figure may vary depending on the assumptions made.⁴ Furthermore, especially after Lehman's collapse, the demand for high quality collateral has increased significantly, while the supply of collateral has been reduced

² SIFIs include the largest banks who are the major dealers active in the OTC derivatives market.

³ The OTC derivatives market has grown considerably in recent years. According to BIS surveys, notional amounts of all categories of the OTC contracts stood at \$583 trillion at the end-June, 2010. These include foreign exchange (FX) contracts, interest rate contracts, equity linked contracts, commodity contracts, and credit default swap (CDS) contracts.

⁴ Neither the notional value of OTC contracts nor the gross market value of these contracts (essentially the total value of all the derivatives that are in-the-money) provides a basis for the measurement of counterparty risk (see Annex I).

due to the hoarding of (unencumbered) collateral by SIFIs as reserves (Singh and Aitken, 2009a).

This paper contributes to the ongoing policy debate and shows that recent regulatory efforts may not be conducive to achieving the initial goal of reducing systemic risk by moving OTC derivatives to CCPs. Through the adoption of end-user exemptions and (perhaps) not moving certain products like the foreign exchange OTC derivatives to CCPs, the overall objective may not only not be achieved, but actual outcomes may be sub-optimal relative to the status quo.⁵ Furthermore, it is possible that systemic risk may increase if the large banks offload only standardized contracts that are clearable (or eligible) at CCPs. Offloading only standard contracts will adversely impact the net exposure on their books as this will ‘unbundle’ netted positions; the ‘netting’ between standard and nonstandard contracts will not take place if only nonstandard contracts remain on SIFIs’ books.⁶

The rest of the paper is organized as follows. Section II discusses the original intent to offload all derivative risk to CCPs, so that the taxpayer would not be required to repeat the bailouts stemming from under-collateralization in the derivatives market (e.g., AIG). Section III provides some insights to what is actually happening in the regulatory environment and why the present approach may give rise to substantial risks. Section IV provides some alternatives to get back on track so that taxpayers will not have to provide a bail-out for the systemic risk stemming from OTC derivatives positions that SIFIs transfer to CCPs. Section V focuses on some non-economic arguments that support the present regulatory agenda. Section VI concludes with a comparison of moving derivatives to CCPs relative to a complementary route that does not involve CCPs.

II. WHAT WAS ENVISAGED BY MOVING OTC DERIVATIVES TO CCPs

Since Lehman’s demise and AIG’s bailout, regulators have been searching for a way to unwind SIFIs, but as yet, with limited success. Some new institutions, or CCPs, are being proposed that will inherit the bulk of derivative portfolios of existing SIFIs. It is envisaged that a critical mass of SIFI’s derivative-related risks will be moved to CCPs so that this regulatory effort can bear fruit. A key incentive for moving OTC derivatives to CCPs is higher multilateral netting, i.e., offsetting exposures across all OTC products on SIFIs’

⁵ See Morgan Stanley’s study on Intercontinental Exchange (December 15, 2009), which suggests that about 60 percent of all OTC derivatives outstanding may be centrally cleared in two to three years. If a critical mass of derivative contracts is not offloaded to CCPs, SIFIs will continue to pose systemic risk from such positions since the multilateral netting benefits of a CCP may not be fully attained.

⁶ For example, a SIFI may have a positive position (so-called “in-the-money”) via a standardized derivative contract with a hedge fund and a negative position (so-called “out-of-the-money”) via a nonstandard derivative with the same hedge fund. Thus, if a SIFI offloads an interest rate swap contract to LCH.Clearnet/Swapclear, a CCP, and a CDS contract to ICE, another CCP (and these two contracts presently net down to almost zero on a SIFI’s books), more collateral will be needed.

books. Intuitively, the margin required to cover the exposure of the portfolio would be smaller in a CCP world. However, if there are multiple CCPs that are not linked, the benefits of netting are reduced, because cross-product netting will not take place (since CCPs presently only offer multilateral netting in the *same* asset class and not *across* products).

Present market practices result in residual derivatives payables and receivables, based on International Swap and Derivatives Association's (ISDA) netting agreements, because:

- Sovereigns, AAA insurers/corporates/large banks/multilateral institutions (e.g., EBRD), and the “Berkshire Hathway” types of firms do not post adequate collateral since they are viewed by SIFIs as privileged and (presumably) safe clients; and
- SIFIs (i.e., dealers) have agreed, based on the bilateral nature of the contracts, not to mandate collateral for dealer to dealer positions. In fact, dealers typically post no initial margin/default funds to each other for these contracts.

A single CCP with an adequate multicurrency central bank liquidity backstop that is regulated and supervised and spans the broadest range of derivatives would have been an ideal “first-best” solution. Barring this, cognizant of the political realities (and subtleties of market organization), fewer CCPs would be better than a proliferation of CCPs from an exposure, netting, and collateral standpoint.

III. WHAT IS ACTUALLY HAPPENING AND WHY DOES THIS GIVE RISE TO SUBSTANTIAL RISKS?

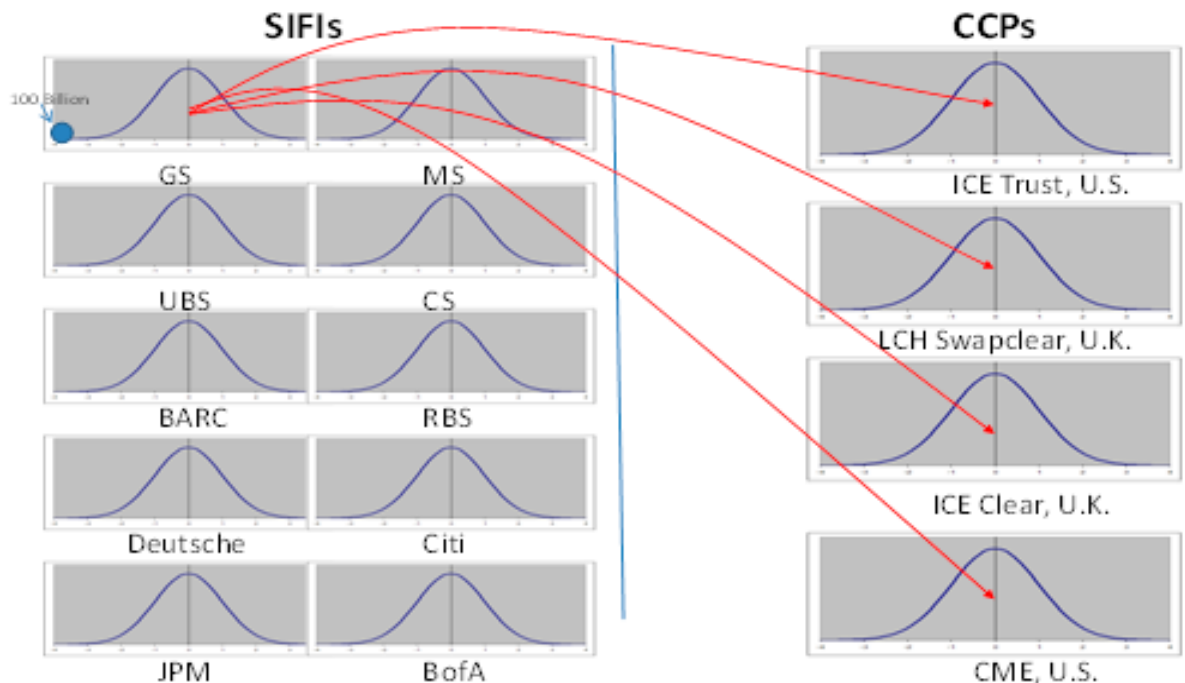
In fact, recent developments have diverged substantially from this “first-best” solution. A CFTC draft proposal has lowered the capital threshold for a CCP to \$50 million, which will encourage new entrants in this business. Furthermore, end-user exemptions along with not moving certain products like the foreign exchange OTC derivatives to CCPs may not only dilute the intended objectives, but actual outcomes may be sub-optimal relative to the status-quo.

CCPs will require collateral to be posted from all members. In essence, both parties should post collateral to CCPs; no exceptions or exemptions. This is also called two-way CSAs (Credit Support Annexes) under ISDA.⁷ Thus moving transactions to CCPs would make the under-collateralization obvious and require large increases in collateral. The amount of capital needed to be raised will depend on how the collateral requirements are assessed by CCPs and the regulators (e.g., entity type, rating, or riskiness of the portfolio that is offloaded to CCPs) and how firms choose to raise the required collateral.

⁷ However, this is not happening since it is envisaged that there will be exemptions to some end-users. Also, many central banks, sovereigns, and municipalities do not yet post full collateral.

By way of background, prior to the momentum to move OTC derivatives from SIFIs books, CCPs were viewed under the rubric of payment systems. After Lehman, regulators are “forcing” en-masse sizable OTC derivatives to CCPs. This is a huge transition, primarily to move this risk outside the banking system. These new entities may also be viewed as “derivative warehouses,” or concentrated “risk nodes” of global financial markets. Figure 1 illustrates that on average, each of the top ten SIFIs carries about \$100 billion of derivatives-related tail risk—this is the cost to the financial system from the failure of a SIFI (see Section IV and Annex 1 for a snapshot of a SIFI’s derivative risk from its financial statement). Yet, instead of addressing the derivatives tail risk, the present regulatory agenda is focused on offloading all (or most) of the OTC derivatives book to CCPs.

Figure 1. The SIFIs Will Offload Most of Their OTC Derivative Book to CCPs (Rather Than The Tail Risk)



This section highlights key issues that need to be understood when moving a sizable part of the OTC derivatives positions at SIFIs to CCPs. These issues include (i) interoperability of CCPs which would allow multilateral netting of positions across SIFIs residual positions; (ii) sizable collateral needs; (iii) unbundling netted positions; (iv) duplicating risk management; (v) likely regulatory arbitrage; (vi) concentration of systemic risk; (vii) decrease in rehypothecation of collateral (viii) backstopping by central banks; and (ix) more SIFIs to supervise.

Interoperability of CCPs

Interoperability, or linking of CCPs, allows a SIFI to concentrate its portfolio at a CCP of its choice, regardless of what CCP its trading counterparty chooses to use. Thus, at the level of each CCP, CCP_i may hold or have access to collateral from another CCP_j that may go bankrupt in the future, so that losses involved in closing out CCP_j 's obligations to CCP_i can be covered. However, legal and regulatory sources indicate that cross-border margin access is subordinate to national bankruptcy laws (such as Chapter 11 in the U.S.). Thus it is unlikely that CCP_i in a country would be allowed access to collateral posted by CCP_j registered in another country.

This is precisely why U.K.'s LCH.Clearnet/Swapclear has been unable to compete for clients in the U.S.—the reluctance of U.S.-based end users (e.g., PIMCO, Blackrock, Fannie Mae, and Freddie Mac) to clear through a foreign entity. LCH.Clearnet/Swapclear is not governed by U.S. Chapter 11; thus U.S. clients' collateral with LCH.Clearnet/Swapclear will be subordinate to the U.K.'s national bankruptcy laws. Regulators are increasingly cognizant of the demand for “bankruptcy remote” collateral structures, including how capital charges will be allocated to such collateral.⁸

A recent discussion paper by EuroCCP is reviving some interest in the linking of CCPs.⁹ The basic premise of this paper is that when CCPs agree to interoperate, they should each increase their default fund as a function of the open positions between them. In other words, default funds in a linked-CCP world will be higher than the status quo, but the linked-CCP world may provide higher netting benefits to justify the larger default funds at CCPs. The augmented default fund proposal avoids the cross-border complexities potentially associated with collateral being trapped in a defaulted CCP. All else being equal, interoperability reduces both (i) the probability of default of CCPs since the overall netting will be higher, which results in smaller tail risks at CCPs, and (ii) the sizable collateral needs associated with offloading derivative risks to multiple CCPs. Also, note that interoperability of CCPs does *not* equate to one global CCP, since the former would straddle multiple legal jurisdictions. Nevertheless, interoperability allows a way to proxy the “first-best” solution outlined above to maximize netting and lower the associated collateral needs when moving OTC derivatives to CCPs.

⁸ If members pledge securities via a scheme such as the Euroclear Bank pledge accounts structure, then these securities are bankruptcy remote in the sense that if the CCP is insolvent they do not form part of the estate and can be repatriated by the member in full independent from the insolvency process.

⁹ A group of Europe's largest clearing houses are confident of breaking a regulatory deadlock that could enable them to compete directly for the first time as soon as the first quarter of next year. London-based LCH.Clearnet Ltd and EuroCCP, Dutch clearer EMCF and Swiss provider SIX x-clear have spent this year working with Dutch, Swiss, and UK regulators to comply with inter-CCP risk management requirements that will allow them to be linked.

Sizable collateral requirements

Without interoperability, the 10 largest SIFIs will continue to keep systemic risk from OTC derivatives on their book and regulatory efforts will introduce more new entities (i.e., CCPs) that will hold systemic risk from OTC derivatives. This goes against the Duffie/Zhu argument that suggests the need to minimize the number of CCPs (and benefit from additional netting), rather than increasing their number. Thus, collateral needs will be higher in the proposed world. Most of the major SIFIs' derivatives books are largely concentrated in one "business" (i.e., a legal entity) to run the derivatives clearing business so as to maximize global netting. Some clients like sovereigns and U.S. municipalities are presently not in a position to post collateral. A recent Tabb Group study (November, 2010) also estimates under-collateralization in the OTC derivatives market at around \$2 trillion and suggests that due to end-user exemptions a significant part of this market will not reach CCPs. ISDA has also acknowledged the sizable collateral needs resulting from moving derivative positions to CCPs, despite their (earlier) margin surveys indicating that most of this market is collateralized.¹⁰ The sizable collateral needs imply that CCPs may not inherit all the derivative positions from SIFIs.

Unbundling of netted positions

The SIFIs are reticent to unbundle "netted" positions, as this results in deadweight loss and increases collateral needs. Since there is no universally accepted formal definition of a "standard" contract (or contracts that are "clearable" at CCPs), there is room for SIFIs to skirt this definition despite the higher capital charge associated with keeping non-standard contracts on their books, since the netting benefits may be sizable relative to the regulatory capital charge wedge. This can be expected of SIFIs where risk management teams build high correlations across OTC derivative products for hedging purposes.¹¹ Following the Dodd-Frank Act, there may be end-user exemptions including the possibility that U.S. Treasury exempts the entire foreign exchange market. This would entice SIFIs not to unbundle positions bundles with foreign exchange contracts (e.g., correlated foreign-exchange/interest-rate swap, or a correlated foreign-exchange/CDS swap etc.).

¹⁰ The ECB references the EU Commission's comment on ISDA: "The dominant source of the nature and extent of bilateral collateral is ISDA's margin surveys. This section is based on the numbers provided by ISDA. However, the Commission services cannot judge the solidity of these numbers, as no information is available about the methodology for calculating the numbers. They should accordingly be considered as indicative only."

¹¹ For example, a recent Goldman Sachs financial statement suggests significant cross-product netting (contributing 15 percent towards overall netting, or \$30 billion of receivables and payables). Recent OCC reports suggest that overall netting on average reduces the total "in/out of the money" positions by 90 percent.

Adverse impact on risk management

In an environment where CCPs compete, unlimited loss sharing may not be a viable business model because market participants are likely to choose CCPs with the lowest loss sharing obligations in their rules, everything else being equal.¹² Yet, pushing CCPs to clear riskier and less-liquid financial instruments, as the regulators are now demanding, may increase systemic risk and the probability of a bailout. Banks may also provide loans as collateral and not lose clients/business, so the tail risk may not leave their books.

Regulatory arbitrage likely

Gaps in coordinating an international agenda will result in regulatory arbitrage by SIFIs. Following Senator Lincoln's "push out" clause under Dodd-Frank Act, SIFIs' banking groups can keep interest rate, foreign exchange, and investment grade CDS on the banking book. Other OTC derivatives like equities, commodities, and below investment grade CDS have to be outside the SIFI's banking book. This will also lead to "unbundling" of positions (or a move to another jurisdiction like the U.K. that skirts the Lincoln "push out").

Concentration of systemic risk via "risk nodes"

Regulators are "forcing" en-masse sizable OTC derivatives to CCPs. This is a huge transition, primarily to move this risk outside the banking system. If the intended objective(s) are achieved, these new entities should be viewed as "derivative warehouses," or "risk nodes" in financial markets, and not under the payment/settlement rubric.

CB backstop (or taxpayer bailout)

A CCP may face a pure liquidity crisis if it is suffering from a massive outflow of otherwise solvent clearing members, in which case the risk is that it will have to realize its investment portfolio at low prices. Assume an external shock where everyone is trying to liquidate collateral simultaneously. This will lead to a problem if the CCP has repo'd out the collateral it has, cannot get it back, and for whatever reason does not want to pay cash to the members (i.e., effectively purchasing the securities at that price).¹³ In these circumstances, a central

¹² Loss sharing agreements are defined in each CCP's default structures. Typically a default funds is broken into, initial margin (IM) and guarantee fund (GF). This split is presently not identical among CCPs since their default simulation methodology is not identical. Thus there may be moral hazard in choosing CCPs. For example, CCP_i may have higher IM and lower GF relative to another CCP_j that takes lower IM and higher GF. GFs are typically shared pro-rata based on the exposure of the clearing member. Smaller clearing members will elect to choose CCPs that have larger GFs, and benefit from the mutualization (or shared) risk.

¹³ CCPs have in house Treasury operations to manage their investment portfolio. If a CCP repo'd out \$100 of IBM bonds at T₀, they may at time T₀ get cash of 90 cents (assumes 10 cents is the margin for moves in IBM bonds). At the end of the repo period T₁, CCP will get the IBM bonds + repo fee. Liquidity need arises since the
(continued...)

bank (CB) would be repo-ing whatever collateral the CCP would ultimately get back. In such instances, it would be more sensible to require the bank members (e.g., JPMorgan, Credit Suisse) of the CCP to access the CB and then provide the CCP with *liquidity*.¹⁴

The CCP may also need CB support if it has suffered a series of member defaults and is subject to a run because of credit concerns. In this case, the CCP's book is not balanced (since the trades of the defaulting members have fallen away) and if the CB provides *liquidity* support it will be taking *credit/solvency* risk on whatever the net CCP position is. A CCP failure should not be ruled out.¹⁵ As CCPs begin to clear more complex, less liquid, and longer-term instruments, their potential need for funding support in *extremis* will rise. In the most extreme scenario, where a temporary liquidity shortfall at a CCP has the potential to cause systemic disruption, or even threaten the solvency of a CCP, it is likely that a CB will stand ready to give whatever support is necessary. However, such an arrangement would create moral hazard (see Box 1).¹⁶

The recent (draft) EU framework for Crisis Management in the Financial Sector acknowledges that CCPs are potentially too-big-to-fail and will be an integral part of any resolution arrangements:

“The framework outlined in this Communication will apply to all credit institutions and some investment firms, irrespective of whether they operate cross-border or domestically. However, the Commission will carry out further work on resolution of other financial institutions, reporting by the end-2011. That work will consider, in particular, what crisis management and resolution arrangements, if any, are necessary and appropriate for other financial institutions, including insurance companies, investment funds and Central Counterparties.”

CCP does not want to pay 90 cents cash in lieu of the collateral between T_0 and T_1 (and come up with another 10 cents from its own pocket to make its member “whole”).

¹⁴ It would be important to make CCPs unlimited companies, since this would at least make clear what is currently true but unclear—that in the event of a crisis, members would be compelled by regulators to support the CCP. For example, CME's futures business has unlimited liability but the OTC derivative business does not.

¹⁵ See a recent BIS Consultative Document that alludes to the demand for “bankruptcy remote collateral” structures in case a CCP is insolvent <http://www.bis.org/publ/bcbs190.htm>.

¹⁶ There may be drawbacks to CCP failure. Surviving firms no longer have any trades since these have been novated to the insolvent CCP. Replacing those trades at prevailing market prices could be costly to these firms and destabilizing to the financial system. If the CCP is the only one clearing for an organized market, then that market will have to cease trading until an alternative clearing arrangement can be implemented. In some organized markets, the possibility of continuing to trade without a CCP is not a viable option. Depending on the systemic criticality of the market, bailing out the CCP may become a preferable public policy. As examples, in 1998, when the ruble crashed, the Russian central bank had to monetize the losses because the whole MICEX system was at risk.

Under the Dodd-Frank Act in the U.S., the Federal Reserve cannot bail out any derivatives dealer. More generally, there is not complete clarity on whether non-banks would have access to CB liquidity. Sections 802 through 806 of Dodd-Frank Act generally authorize the Fed to provide liquidity support under unusual or exigent circumstances to CCPs that have been designated as systemically significant.

Decrease in rehypothecation

The decrease in the “churning” of collateral may be significant since there is demand from some SIFIs and/or their clients (asset managers, hedge funds etc.), for “legally segregated/operationally commingled accounts” for the margin that they will post to CCPs. Also, the recent demand for bankruptcy remote structures—another form of silo-ing collateral—that stems from the desire not to legally post collateral with CCPs in jurisdictions that may not have the central bank’s lender-of-last-resort backstop (i.e., liquidity and solvency support) will reduce rehypothecation (see Box 2).

Supervision of more SIFIs

Regulators will have to supervise more SIFIs, as CCPs will effectively be SIFIs. Furthermore, existing SIFIs (i.e., large banks/dealers) will retain OTC derivative positions since nonstandard contracts will stay with them. End-user exemptions and (likely exempt) foreign exchange contracts will not migrate to CCPs. SIFIs may keep some non-standard/standard combination on their books due to netting benefits across products and not move them to CCPs despite higher regulatory capital charge. Post-Lehman there has not been much progress on crisis resolution frameworks for unwinding SIFIs; thus creating more SIFIs need to be justified. However, policies and regulations in these areas are evolving.

Box 1. Bankruptcy Remote Collateral Structures

Just like any SIFI, CCPs by definition will have some probability of failing; bankruptcy remote collateral (BRC) structures are thus highlighting the obvious underlying economics. With a central bank (CB) providing a lender-of-last-resort, we are shifting the potential tax-payer bailout from Wall Street to entities such as ICE Trust (U.S.), or ICE Clear (U.K.), or LCH.Clearnet/Swapclear (U.K.) or CME (U.S.).

The demand for BRC structures suggests that there is concern about the failure of CCPs to warrant such schemes. Many end-users of OTC derivatives (Pimco, Blackrock, etc.) are reluctant to post collateral with certain CCPs that do not have CB backstopping. The alternative is to pledge collateral via a scheme such as the Euroclear Bank pledge accounts structure. These securities are bankruptcy remote in the sense that if the CCP is insolvent, the collateral does not form part of the CCP estate and can be repatriated by the end-user in full, independent from the insolvency process.

The BRC fee when dealing with a CCP is analogous—and mathematically equal in a no arbitrage world—to the CDS spread on the underlying CCP (or the ‘reference entity’). The recent demand for BRC structures may stem from certain jurisdictions such as U.K., where Bank of England’s position is not to backstop a U.K. CCP; in fact it is not even clear if CCPs can borrow from the Bank of England.¹ Also, in the U.S., under the Dodd-Frank Act the Fed will only provide liquidity support in unusual circumstances. Thus the demand for BRC structures highlights the ‘market clearing price for pricing OTC derivatives in their transition from SIFIs to CCPs and reduces moral hazard (and potential losses to taxpayers in case CCPs are bailed out). However, E.U. is in favor of liquidity support to CCP and it remains unclear that despite attempts to minimize regulatory arbitrage, there is a clear divide between the E.U., the U.K. and the U.S. on this issue (see discussion in the paper on the impractical distinction between liquidity and solvency support by CBs).

In this context, it is interesting to note that a recent Basel Committee’s draft proposal suggests zero percent capital charge when a clearing member/client deals with CCPs via BRC structures—since there will be no loss of collateral if the CCP goes under. Thus, not only are regulators cognizant of BRC structures but from a legal perspective such BRC structures will benefit from lower capital charges. For comparison, there is a 2 percent capital charge when moving derivatives to CCPs (without any BRC structures).

No country has a formal regime for resolving non-bank SIFIs, mostly because until recently it was an article of faith that nonbanks weren’t systemic.² Another related point which is effectively addressed in the U.S. but nowhere else is that there is no remedy for a non-bank SIFI to free up client assets rapidly like in the U.S. under the SIPA (Securities Investors Protection Act). As we learned from the Lehman U.K. insolvency, this can only be done if the regime has a client preferential regime that is not available in the U.K. (and the status quo is likely to remain the same in the near future due to the ‘title transfer’ aspects associated with English law that encourages rehypothecation).³ In other words, U.K. offers a ‘market clearing’ price for both collateral re-use and for pricing OTC derivatives.

¹/ However, if Bank of England decides to bail out a nonbank, it will be legal.

²/ Non-banks within the group of an insolvent bank can be resolved using the bank resolution regimes; however, it is unlikely that any E.U. or U.K. regulator contemplate its application to free-standing non-banks. An administration/chapter 11 style remedies will work for non-banks. The European Commission and the U.K. regulators are addressing these issues and consultations on resolution of SIFIs and non-banks are to be finalized later this year.

³/ See IMF Working Paper 10/172, “The Sizable Role of Rehypothecation in the Shadow Banking System,” (Singh and Aitken).

Box 2. Central Bank Backstop With and Without Interoperability

CCPs might need a central bank (CB) backstop even if they take adequate collateral. CB support for *interoperable* CCPs that are in distress could well span multiple jurisdictions, due to the associated contagion. Some analytical work suggests that if a critical mass (i.e., about two-third) of OTC derivatives does move to CCPs, then about \$200 billion will need to be contributed to initial margin and default funds at CCPs (Singh 2010).¹ In the context of this paper, the focus is on CCPs relevant to OTC derivatives such as ICE Clear U.K., ICE Trust U.S., LCH.Clearnet/Swapclear, CME; some of the newer names are not included.² Increased netting results in lower residual risk across all SIFIs' books. In an interoperable world, if international legal challenges are overcome, the increased netting benefits may exceed the extra funds needed to augment default funds at linked-CCPs.

In the more likely scenario (i.e., under *no interoperability*), CB support will presumably be limited to the failed CCP in one jurisdiction, assuming there is no contagion. However, the present non-linked CCP world results in lower multilateral netting that will require much higher collateral costs for all users of derivatives. The financial statements of the 10 largest SIFIs suggest that under-collateralization has been on average about \$1.5–\$2 trillion in recent years (Singh 2010a, and TABB Group, 2010). At present, there are many derivative users such as sovereigns, quasi-sovereigns, debt management offices, U.S. municipalities, privileged clients of SIFIs such as high rated corporates, AAA insurers, pension funds, etc., who do not post full (or any) collateral to SIFIs. Market sources confirm that at present, derivative users such as some European sovereigns or U.S. municipalities are unlikely to post their full share of collateral.³ This, along with exemptions for end-users, nonstandard contracts that cannot be cleared, and perhaps a waiver for the foreign exchange market, will result in a non-trivial share of the OTC derivative books staying with the SIFIs.

¹/ As per Figure 1, augmenting default funds would imply the four linked CCPs hold more than \$200 billion. Also see <http://www.euroccp.co.uk/leadership/index.php>.

²/ If these four CCPs are linked, they will augment their default funds, and some netting will result from some consolidation of exposures by participants at their chosen CCP. A back-of-the-envelope calculation, assuming the four key CCPs are about equal in size (i.e., each with about \$50 billion in default funds), suggests that each default fund may need to be augmented by another \$75 billion, mid-way between the envisaged \$50 billion and \$200 billion maximum.

³/ Their present financial situation does not allow them to post unencumbered collateral. Such end-users will either not hedge nor will find ways to skirt regulations/seek exemptions, or banks will offer loans to be used as margins. Contracts in the past that were not associated with any collateral agreements may become more “in the money” for SIFIs and will require hedging. These constraints/issues will manifest themselves in other ways such as higher sovereign CDS spreads etc. See <http://www.ft.com/cms/s/0/798e34e4-24c9-11e0-a919-00144feab49a.html>

IV. HOW TO GET BACK ON TRACK: TWO ALTERNATIVES

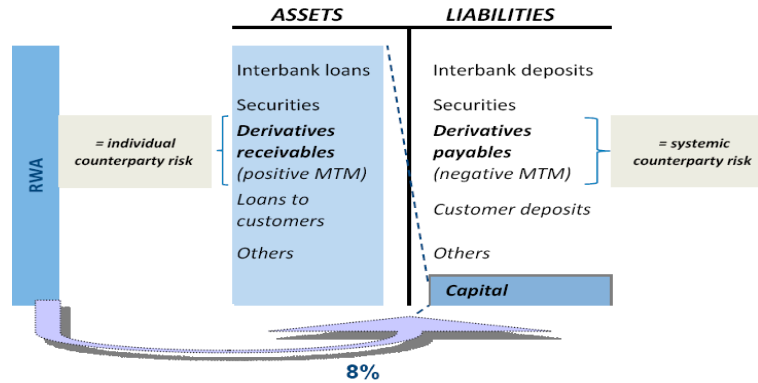
In view of the remaining risks described above, there is a need for alternative policies. We offer two such options below. These options are only two of many, and should not be seen as precluding other suggestions to address the systemic risk at SIFIs.

A. Taxing Derivative Liability Positions of SIFIs

In order to summarize the derivatives risk to the financial system, we measure the exposure of the financial system to the failure of a SIFI that is dominant in the OTC derivatives market, according to the SIFI's total "derivative payables" (and not "derivative receivables").

Derivative payables represent

the sum of the counterparty's contracts that are liabilities of the SIFI.¹⁷ Similarly, derivative receivables represent the sum of the counterparty's contracts that are the assets of the SIFI. At present, a SIFI's derivative payables do not carry a regulatory capital charge and are not reflected in risk assessments. On the other hand, derivative receivables are imbedded in credit risk and there is already a capital charge/provision for potential non-receivables. By using derivative payables as a yardstick, we thus provide a readily available metric to measure systemic risk from derivatives, compared to other sources that focus on derivative receivables.



The five largest European banks had about \$700 billion in under-collateralized risk in the form of derivative payables as of December 2008. The U.S. banks had around \$650 billion in derivative payables as of end-2008, as dislocations were higher then. The key SIFIs active in OTC derivatives in the United States are Goldman Sachs, Citi, JP Morgan, Bank of America, and Morgan Stanley. In Europe, Deutsche Bank, Barclays, UBS, RBS and Credit Suisse are sizable players. It is useful to note that the International Swap and Derivatives Association's (ISDA) master agreements allow SIFIs to net (or offset) their derivative receivables and payables exposure on an entity. Thus, if Goldman has a positive position with Citi on an interest rate swap and a negative position with Citi on a credit derivative, ISDA allows for netting of the two positions.

¹⁷ Derivative payables are also called Negative Replacement Values (NRV) in European financial statements. Derivative receivables are known as Positive Replacement Values (PRV) in Europe.

A tax or a levy on derivative payables (after netting) has been suggested in earlier research by the IMF (Singh 2010). This route may be more transparent than moving OTC derivatives to CCPs, especially if the costs to bail out CCPs are to be funded by taxpayers. Even if the CCP route is preferred for other reasons, it is argued that a tax/levy on derivative payables (after netting) may incentivize SIFIs to move to CCPs. Unless the regulatory capital charge “wedge” between non-cleared derivatives and cleared derivatives is large, a SIFI is unlikely to offload its derivative books to CCPs and forgo the netting benefits across derivatives that exist on its books in the status quo (see Box 3 for analytics on the “tax on derivative payables”).¹⁸ As an illustrative example, a tax rate of 10 percent—20 percent for contracts that stay on SIFIs’ books, and that at least one-third of OTC derivatives will remain non-standardized/not eligible for CCP clearing suggests additional capital needs for the large SIFIs, or about \$70 billion—\$140 billion (i.e., 10 percent—20 percent x 1/3 x \$2 trillion).¹⁹ The tax can be calibrated so that a critical mass of OTC derivatives moves to CCPs. Our understanding is that the present capital charge (after netting) on derivative receivables does not involve cash flows and cannot be compared with sizable *new funding* that will be needed for margin requirements at CCPs.

Under no interoperability, tail risks are less likely to decline. Let p denote the probability of a bail-out in a CCP world, and let P measure the probability of the bailout of a SIFI in the (status quo) non-CCP world.

For $p < P$, overall tail risks in the CCP world would be lower than the tail risks in the non-CCP world. Increased multilateral netting via interoperability is one way this could happen, but this is unlikely, e.g., because the needed legal conditions are not in place. Furthermore, no CCP offers cross-product netting, so contracts that net at a SIFI book may need to be “unbundled” when moved to two non-linked CCPs. Similarly, between-product netting may also lead to collateral inefficiencies, since a standard/nonstandard combination would have to be unbundled: the standard contract would move to a CCP along with the associated collateral, while the nonstandard contract would stay with the SIFI and attract a regulatory charge. Such unbundling decreases overall netting.

Thus, ex-ante, it remains unclear if the overall netting due to CCPs (primarily between-products and not across products) will be higher than that from the unbundling of netted positions or other issues associated with moving derivatives to CCPs (e.g., reduced rehypothecation of collateral due to the ‘silo-ing’ of collateral at CCPs, or demands for

¹⁸ The regulatory capital charge will be on residual or after netting, derivative receivables; the systemic risk from this market stems from the residual derivative payables at SIFIs.

¹⁹ It is not clear if the present \$2.0 trillion under collateralized derivative payables will decrease uniformly when 2/3 of OTC derivatives are offloaded to CCPs. So the residual derivative payables may be higher than 1/3 x \$2 trillion, due to some loss in netting.

segregated collateral accounts by certain clients).²⁰ The decrease in the “churning” of collateral under restricted rehypothecation may be significant (as discussed above in Section III).

Another way to reduce tail risks is to take collateral from those who are not posting collateral. This can be done in the CCP world by regulatory incentives. But it could also be done in the status quo world by placing a levy/tax on derivative liabilities (that would result in revenue that could be used if a SIFI needs to be bailed out in the future).

Now, let p_I and P_I denote the probability of a bail-out when the present under-collateralization is reduced. Note that $p_I < p$ and $P_I < P$. Moreover, p_I is largely exogenous due to regulatory uncertainty, while P_I is endogenous since the tax, T , can be calibrated to reduce the risk metric (i.e., residual derivative payables in the non-CCP world). Thus, P_I can be less than p_I and further strengthens the tax argument analytically. However, we will make the “worst-case” assumption here that they are equal, i.e., $p_I = P_I$.

To summarize, the tail (or bailout) risk in the envisaged CCP world and the present SIFI-only world might well remain the same.²¹ However, the CCP world would have a bail-out cost of C (i.e., when a CCP and/or a SIFI goes under). The status quo world without CCPs may well have a similar bail-out cost C when a SIFI goes under, but this can be paid by the revenue T via the tax/levy that will be imposed on the large residual derivative liabilities of SIFIs who want to ‘carry’ this systemic risk. Such tax could be set-aside and akin to FDIC’s insurance premium, or SIPC’s (Securities Investors Protection Company) annual assessments of SIFIs.

Analytically,

	CCP world	Status quo with tax
At present, probability of bailout	p	P
Ex-post, probability of bailout	p_I	P_I
Ex-post, cost, C , of bailout in n years	$p_I C$	$P_I C - \sum_{T=1}^n T$

As argued above, since p_I is not less than P_I , the status quo with tax is economically more efficient.

²⁰ Thus the \$100 billion in Figure 1 may be higher unless CCPs offer cross-product netting (which at present none do, but may do in due course).

²¹ In fact, the CCP route will distribute the tail risk over several additional entities that entail higher collateral cost relative to the SIFI-only route.

B. CCPs as a Public Utility Infrastructure

As noted above, regulatory efforts to move the OTC derivatives market to CCPs with appropriate collateralization are meeting with limited success due to the complexity of the market, excessive opacity, and other vested interests of the financial industry.

Given the systemic importance of CCPs, it would appear appropriate for regulators to at least consider approaching them as a public utility infrastructure. For example, moving most OTC derivatives to closely regulated exchanges would reduce systemic risk and enhance transparency, while also reducing spreads on many products.

However, the large banks have fought hard to keep their most profitable business line opaque, and have been supported in this by some large end users. SIFIs who originate the OTC derivative transactions are passing on the risks, but not the profits, to CCPs. Regulators have allowed this to happen—recently they agreed that “third” party marks/quotes will not be required to price derivatives moving to CCPs. Thus the bid/ask spread of SIFI transactions will remain opaque and will not be available real time. Altogether, the bespoke nature of much of the OTC derivatives market and the “compromise” between regulators and SIFIs provides the argument for the current policy of transferring only certain parts of this market to a fragmented set of CCPs. Quantity restrictions are also not being implemented, as these would limit the growth of OTC derivatives, which are often seen as beneficial in that they “complete” markets.

However, the welfare benefits of derivatives markets are somewhat speculative. In particular, the costs of financial, sector “pollution” (Haldane, 2010) may be large since systemic tail risk is created by the markets and does not arise from fundamentals.²² The social costs of future financial crises will continue to be correlated with the high rents in the market.²³ The importance of CCPs is apparent since key regulators are willing to provide liquidity support in certain situations (e.g., ECB and the Fed). Such a backstop may lead to moral hazard that may manifest itself, for example, in CCPs not requiring full collateral from their clearing members/clients, quite possibly with the acquiescence of regulators.

By contrast, organizing CCPs as utilities encompasses both (i) a government backstop and (ii) a carefully engineered and regulated infrastructure that emphasizes safety and transparency. By ensuring that users of OTC derivatives (both the large dealers and end users) bear the full social costs of those products, the utility model could reduce the extent of

²² See Haldane (2010) speech, “The \$100 Billion Question,” where he examines the costs of banking pollution and the role of regulations and restrictions in tackling this externality but the discussion does not include CCPs. <http://www.bankofengland.co.uk/publications/speeches/2010/speech433.pdf>.

²³ Economic rents or profits in the banking sector are market determined and usually greater than those in the utilities sector (which are primarily determined by regulators, ex-ante).

financial “pollution” and also limit the excess rents currently earned by major participants in the market at the expense of the broader economy. However, given that CCPs are not being treated as utilities, the size of the public backstop provided is very high, compared with a suboptimal amount of systemic risk reduction. This raises the question whether the public at large is being well served by the present non-utility regulatory models.

At a minimum, CCPs should be viewed as very important SIFIs (or V-SIFIs) and abide by their principles. Some CCPs such as LCH.Clearnet/Swapclear in U.K. clear the bulk of the global interest-rate swaps market—over \$200 trillion and almost half of this market—and are thus interconnected to most other SIFIs active in the OTC derivatives. Furthermore, since LCH is owned by the large SIFIs, their shareholder structure unfolds systemically relevant network linkages and raises contagion and pro-cyclicality risks. Another notable CCP is the ICE Group, which includes ICE Trust in the U.S. and ICE Clear in the U.K. has a niche in the credit derivatives (CDS) market. Most of their business has so far focused on clearing CDS indices. ICE Group’s systemic importance will only grow for two reasons: (a) there will always be “jump” risk associated with CDS contracts and (b) they will inherit more risky business as SIFIs offload single name CDS to CCPs. Regulation of CCPs should encompass and adhere to basic SIFI rules that include resolution schemes, increased loss absorbency, and supervision by a global regulator that straddles cross border SIFIs.

Box 3. Objective of a SIFI to Minimize Costs of Moving OTC Derivatives to CCPs

This box summarizes the costs that a SIFI will face when moving derivative risk to CCPs and paying margin and contributions to a guarantee fund and a tax/levy (not a capital charge) for derivative contracts that are not moved to CCPs. It assumes that the regulators will insist that a SIFI either moves its eligible/standard contracts to CCPs, or pays a tax/levy on the positions that remain on the books. The tax, T, would be levied on OTC positions that are not moved to CCPs; this tax differs from the present capital charge incentives, which do not involve cash flows from the SIFIs to the tax authorities. The basic parameters are the following:

T:	Tax or a levy on derivative payables (after netting) to reduce systemic risk (in percent)
DP _{after netting} :	Derivative Payables after netting on the books of a SIFI
M:	Margin (initial and variation) and contribution to the Guarantee Fund (in percent of Notional)
N:	Notional amount of derivatives offloaded to CCPs

A SIFI will *minimize* the overall costs comprising the tax and margin as shown below:

$$T \times DP_{\text{after netting}} + M \times N$$

Although regulatory proposals are being fine-tuned, we assume that CCPs will not be allowed to lower margins (M) to gain business. We also assume that a high T will impact DP_{after netting}, as banks will be encouraged to “standardize” and offload a higher fraction of their portfolios to CCPs.

We also note that empirically, DP_{after netting} is related to N (about 0.3 percent to 0.4 percent of N, as per recent BIS semi-annual OTC derivative surveys). Also, there may be additional regulatory relief/rebate in offloading more derivatives that are part of N.

V. SOME POLITICAL ECONOMY CONSIDERATIONS

CB backstopping of CCPs is shifting the potential taxpayer bailout from Wall Street to entities such as ICE, CME or LCH.Clearnet/Swapclear. This transition is increasingly opaque to the ordinary taxpayer, especially since moving derivatives from SIFIs' books to those of CCPs is mired in convoluted arguments and impenetrable technical jargon. However non-economic considerations have been instrumental in pushing the regulatory efforts forward, some of which are highlighted below.

- The ECB favors a CB liquidity backstop but not the United Kingdom.²⁴ The ECB's view is that in order to have an account with a Eurozone CB, a CCP should be incorporated and regulated in the Eurozone (and not, for instance, in the U.K.).²⁵
- Some have suggested offering CCPs access to a "standing credit facility" at CBs. But even if a CCP does not have a CB account, the relevant authorities could still decide to bail out the CCP if it is deemed too systemically important to fail. Put differently, using public money to bail out a CCP is a policy decision, independent of whether the CCP has routine access to central bank liquidity.
- In distressed market conditions, access of CCPs' members to CB overnight credit may not be sufficient to ensure that the CCP remains liquid, as the liquidity transfer from the CB to the CCP (via CCP members) may not materialize as CCP members may hoard liquidity for precautionary reasons, perhaps reflecting uncertainty over CB actions. Thus CB backstopping and associated funding, if provided, might be based on the condition that funds are passed through the CCP member banks (i.e., increasing their liability to CB) to CCPs.²⁶

²⁴ The ECB is willing to backstop a CCP only if they are registered in the Eurozone and would prefer if Eurozone SIFIs clear their euro-denominated OTC derivatives via Eurozone CCPs. In the recent context of Ireland, the Bank of England had access to euro swap lines from the ECB.

²⁵ The Dodd-Frank Act allows the Fed to provide *secured lending only*, and not unsecured lending. Thus, CCPs can benefit from the Fed discount window via an account only to the extent of a CCP's non-cash collateral at the Fed.

²⁶ If a CCP fails and there is insufficient collateral among all CCPs to cover the losses, then one could consider an *unlimited call* on the SIFIs dealing with the CCP to bridge the losses (and thus have "skin in the game" and avoid moral hazard). In the aftermath of the October 17, 1987 crash, the Federal Reserve (Chicago and New York) persuaded banks to lend freely to CCPs, promising whatever support was necessary. In the case of CME, failure was averted when its bank, Continental Illinois advanced CME \$400 million just minutes prior to the opening bell. See MacKenzie and Millo, (2001) and the Brady Report (1988).

VI. CONCLUSIONS

Present efforts to move OTC derivatives to CCPs involve the following:

- i. A significant increase in overall collateral needs.
- ii. Some netted positions will need to be unbundled.
- iii. Duplicating risk management teams (at CCPs) which already exist at large banks.
- iv. Public authorities will have to supervise more SIFIs, as CCPs will effectively be SIFIs. Furthermore, existing SIFIs (i.e., the large banks/dealer) will retain OTC derivative positions (nonstandard contracts, end-user exempted positions, foreign exchange contracts, “netted” positions, etc).
- v. Regulatory arbitrage will increase—stemming from commodity caps in the U.S., and from the “push out” clause in the Dodd-Frank act.
- vi. Rehypothecation, or churning of collateral will decrease, as much of the collateral at CCPs will be segregated at the client’s request or, in bankruptcy remote structures.
- vii. Derivative warehouses will be created that are more akin to “concentrated risk nodes” in global finance.
- viii. CCPs will be viewed under the payment/settlement rubric. They will thus likely garner CB support and taxpayers could well be on the hook again to bail-out CCPs.

These regulatory steps seem unlikely to adequately reduce systemic risks or excess rents from OTC derivatives, and the likelihood of future taxpayer bailouts appears to remain significant. Taxing derivative payables would be a good alternative (or a complementary solution while regulations are finalized). Explicitly recasting the OTC market infrastructure as a public utility might be another option, although this would need to be accompanied by stronger steps to eliminate cross-border regulatory arbitrage.

Annex 1. Typical OTC Derivative Position from a SIFI's Financial Statement

	March 2009	
	Derivative Assets	Derivative Liabilities (in \$)
Derivative contracts for trading activities		
Interest rates	\$ 1,171,827	\$ 1,120,430
Credit	469,118	427,020
Currencies	92,846	85,612
Commodities	80,275	77,327
Equities	100,291	92,612
Subtotal	<u>\$ 1,914,357</u>	<u>\$ 1,803,001</u>
Derivative contracts accounted for as hedges under SFAS No. 133 ⁽¹⁾		
Interest rates	\$ 24,347 ⁽⁴⁾	\$ 1
Currencies	50 ⁽⁵⁾	31
Subtotal	<u>\$ 24,397</u>	<u>\$ 32</u>
Gross fair value of derivative contracts	\$ 1,938,754	\$ 1,803,033
Counterparty netting ⁽²⁾	(1,685,348)	(1,685,348)
Cash collateral netting ⁽³⁾	(149,081)	(27,065)
Fair value included in "Trading assets, at fair value"	<u>\$ 104,325</u>	
Fair value included in "Trading liabilities, at fair value"		<u>\$ 90,620</u>

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