

# The Foreign Exchange Market and Central Counterparties

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The financial crisis has led to considerable efforts to improve risk management practices in financial markets. One of the main proposals being suggested in international fora is to increase the use of central counterparties. This article discusses the potential for central counterparty arrangements to complement existing risk management practices in the foreign exchange market.

## Introduction

In response to the global financial crisis, there has been much discussion globally about how the infrastructure and risk management practices in financial markets can be improved to ensure they are more resilient.<sup>1</sup> In particular, the collapse of Lehman Brothers and the problems experienced in resolving issues at the troubled insurer AIG have highlighted the need for improvement in risk management practices in many over-the-counter (OTC) derivative markets. One of the main proposals under consideration is to increase the use of central counterparties.<sup>2</sup> This has the potential to improve counterparty risk management through multilateral netting, provide operational efficiencies and more effective default resolution, and increase market transparency.

Central counterparties have long been used in exchange-traded equity and derivative markets and,

over the past decade or so, have been developed for a range of OTC derivatives including interest rate and equity products. Following the recent market disruptions, considerable effort has also been devoted to setting up central counterparties for credit derivatives. In contrast, central counterparties have not been widely used in the foreign exchange market, and there has been only limited support from industry participants for a move in this direction (FXC 2009; FXJSC 2009; ISDA 2009a). This article first discusses the general case for the use of central counterparties and then considers the application of these arrangements to the foreign exchange market.

## The Role of Central Counterparties in OTC Markets

In the absence of a central counterparty, the original counterparties to an OTC derivative trade retain direct obligations to one another for the life of the contract. Should one party fail and the contract be terminated, the other party faces the risk that replacing the trade might only be possible on unfavourable terms. At least in the inter-dealer market, bilateral arrangements of this nature are often underpinned by standard legal documentation developed by the International Swaps and Derivatives

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1 Ahead of the G-20 meeting in Pittsburgh in late September 2009, the Financial Stability Board made a range of commitments, subsequently endorsed by the G-20 Leaders, to improve practices in financial markets. See FSB (2009).

2 Cecchetti, Gyntelberg and Hollanders (2009) outline the economic benefits of central counterparties and provide an update on regulatory and market developments.

Association (ISDA), which sets the parameters for the management of this replacement-cost risk through bilateral (close-out) netting and margin requirements.

In contrast to these arrangements, a central counterparty assumes responsibility for the obligations associated with the contract by becoming the buyer to every seller, and the seller to every buyer. This occurs through a legal process known as novation. As such, numerous bilateral exposures are substituted for a single exposure to a highly rated central counterparty. The resulting multilateral netting has the potential to substantially reduce the size of outstanding obligations relative to bilateral arrangements. These smaller exposures are then typically subject to standardised risk management tools, including initial and mark-to-market margins.<sup>3</sup> A central counterparty also typically maintains additional financial resources to deal with a default. These resources may include, for example, participant contributions to a pooled guarantee fund and/or the central counterparty's own capital. A central counterparty can also encourage more streamlined trade and post-trade processing.

Since a central counterparty has full information on outstanding exposures related to trades that have been novated to it, it is also well positioned to manage a participant's default. As central counter-

parties can see the size and location of market exposures across all participants, they can mitigate systemic risks by managing the close-out and replacement of trades in the event of a participant default. They can also provide regulators with a clear focal point for regulation, as well as a centralised source for the collection and publication of trading data.

Notwithstanding these benefits, a central counterparty model raises a number of issues. First, a central counterparty concentrates counterparty risk on a single institution. The potential systemic importance of this institution places greater emphasis on the need for appropriate risk management practices by the central counterparty.

Second, novating some contracts to a central counterparty can have the unintended consequence of increasing the counterparty risk among products that are not novated because less bilateral netting is possible (Duffie and Zhu 2009). Without more information, it is difficult to assess how much this 'un-netting' might offset the reduction in counterparty risk that occurs through the multilateral netting of contracts. It depends on a number of factors that affect the scope of both bilateral cross-product netting agreements and central counterparty coverage, and the nature of participants' portfolios. The degree of un-netting could be mitigated by central counterparties accepting a broad range of products, although this would increase the concentration of risk on the central counterparty and not all products are suitable for novation to a central counterparty.

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<sup>3</sup> *Initial margin* is collected at the time a position is established to cover potential adverse price moves between the time the last mark-to-market margin call was settled and the time at which a defaulter's open positions can be closed out. A central counterparty typically makes *mark-to-market margin* calls at least daily, collecting funds from participants that have incurred mark-to-market losses on their open positions, and paying funds to those with mark-to-market gains.

The above discussion makes it clear that the net benefits of a central counterparty will differ across the various OTC derivative instruments and will depend on at least three broad factors.

- **Product characteristics:** Central counterparties can most easily manage the replacement cost risks of products that have reliable and frequently quoted prices and relatively standardised terms. The scale of replacement-cost risks is larger, and therefore potentially harder to manage, for products with more volatile prices, settlement dates further into the future and larger amounts outstanding.
- **Structure of participation:** The greater the number of counterparties and the number of trading relationships between them, the larger the benefits of multilateral netting and default-management arrangements provided by a central counterparty. The reduction in the administrative burden of maintaining bilateral relationships, which includes individual credit checks, position monitoring and back-office procedures, will also be larger. The structure of participation and the nature of the portfolios being managed will also affect the scale of un-netting that may occur with the introduction of a central counterparty.
- **Existing risk management and post-trade processes:** The benefits from introducing a central counterparty depend on the breadth and quality of existing collateralisation and other risk management practices, including the degree of automation in post-trade processes.

Even in situations where an evaluation of these factors might argue in favour of a central counterparty, the market might not voluntarily adopt such a solution. First, individual participants may not fully internalise

the costs of systemic risk and therefore place less weight on the risk-reducing benefits of a central counterparty; this is more likely to be the case if some institutions are perceived to be too big to fail. Second, in bilaterally cleared OTC derivative markets, dealers with high credit ratings should, other things being equal, be better placed to compete for business; a central counterparty could remove this competitive advantage and therefore reduce their incentive to support its development. Finally, coordination issues may also arise. Even where private incentives may be sufficiently strong, a workable market solution may require industry participants to coordinate to introduce a new market structure. Cooperation to design and fund a new piece of infrastructure can be difficult, particularly where participants otherwise compete with one another. In some cases, the public sector may be required to facilitate and encourage cooperation, as was the case with the establishment of CLS Bank in 2002 (see below).

## The Foreign Exchange Market

As discussed above, the benefits of using a central counterparty are likely to vary across OTC derivative instruments depending on the characteristics of the products, the structure of the market, and the existing risk management practices and infrastructure. This section discusses these aspects of the foreign exchange market and, in particular, how they might bear on the potential role for a central counterparty.

### Product characteristics

The foreign exchange market is very large, with more than US\$3 trillion of value traded daily across products in 2007, the most recent year for which global data are available (Table 1). The largest segment is foreign exchange swaps, which accounted for around US\$1.7 trillion of daily turnover in 2007. Foreign

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exchange swaps, as well as spot and outright forward contracts, are highly standardised, generally liquid, and subject to transparent pricing. As a result, more than half of spot transactions and up to 30 per cent of transactions in forwards and foreign exchange swaps are executed across electronic platforms (Gallardo and Heath 2009). Since many of the characteristics that facilitate electronic trading also allow for more efficient netting and reliable risk management, these markets are, in principle, good candidates for novation to a central counterparty. Similarly, currency swaps typically have relatively simple structures and can be reliably priced. Foreign exchange options, on the other hand, are less standardised and less liquid and their pricing is typically less transparent.

The total value of outstanding positions in the foreign exchange market was US\$58 trillion in June 2007. While average daily turnover is concentrated in spot and short-dated foreign exchange swap transactions, turnover in longer-dated foreign exchange contracts accumulates to a sizeable share of outstanding positions: in 2007, the value of outstanding forward, foreign exchange and currency swap contracts with a term longer than seven days is estimated to have been around US\$42 trillion. The scale and term of these outstanding positions indicate that replacement-cost risk could be a significant issue for participants in the foreign exchange market. In combination, therefore, the characteristics of foreign exchange instruments suggest that there could be a role for central counterparties in the foreign exchange market.

**Table 1: Key Characteristics of Product Types in the Foreign Exchange Market**  
US\$ billion

	Spot	Outright forward	Foreign exchange swap	Currency swap	Foreign exchange option
Average daily turnover April 2007	1 005	362	1 714	31	212
of which < 7days	na	154	1 329	6	na
> 7days	na	208	382	25	na
Average term <sup>(a)</sup>					
< 7days	na	2	2	2	na
> 7days	na	99	107	293	na
Outstanding positions <sup>(b)</sup> end June 2007	na	9 836	19 935	14 127	13 662
of which < 7days	na	165	1 425	24	na
> 7days	na	9 671	18 510	14 103	na

(a) RBA calculations based on BIS (2007).

(b) Outstanding positions are from BIS Table E.38. Breakdowns between forwards and foreign exchange swaps and of outstanding positions by term are estimates based on turnover data in BIS Table E.1.

Sources: BIS (2007); RBA

## Structure of participation

As noted above, the structure of participation in a market, in particular the number of counterparties, can affect the extent to which multilateral netting reduces counterparty risk. Although there is a wide range of end-users in the foreign exchange market, including businesses, individuals and governments, the vast majority of transactions – by value – is carried out by a relatively small number of large dealers. According to the most recent *Euromoney* survey, the top five dealers account for more than 60 per cent of the value of transactions globally (*Euromoney* 2009). This is consistent with statistics from the BIS, which show that in 2007, even in the largest foreign exchange markets of the United Kingdom and the United States, 75 per cent of turnover was accounted for by no more than 12 banks (Table 2). A market with 12 larger participants is likely to deliver some benefits in the form of operational efficiencies and multilateral netting (see below), but whether these are large enough to offset costs such as un-netting is an empirical issue that is difficult to address without additional information.

The structure of the foreign exchange market suggests that participation in a central counterparty would be likely to be tiered; i.e. large dealers would

become direct clearing members and, in turn, provide client-clearing services to other market participants. This might raise questions for regulators around the potential for a high concentration of risk in – and high level of dependence on – a small group of direct clearing members. There are also issues regarding the segregation of client positions and collateral, and their portability in the event of a participant's default.

The global nature of the foreign exchange market also raises some important considerations for the implementation of a central counterparty, with around 75 per cent of total turnover distributed over seven trading centres (Table 2). This suggests that any central counterparty for foreign exchange might be global in nature. This would both be operationally complex and require a high level of cooperation among regulators. However, global provision of central counterparty services is not without precedent. For instance, LCH.Clearnet's SwapClear covers interest rate swaps in 14 currencies and is expanding its membership to accommodate participants in multiple markets. In addition, CLS, the existing centralised settlement service for the foreign exchange market, also operates effectively across multiple markets.

**Table 2: Global Foreign Exchange Markets**  
April 2007

	Number of banks accounting for 75% of turnover in each market	Share of global turnover (%)
United Kingdom	12	34.1
United States	10	16.6
Switzerland	3	6.1
Japan	9	6.0
Singapore	11	5.8
Hong Kong	12	4.4
Australia	8	4.3
France	4	3.0
Germany	5	2.5
Canada	6	1.5

Source: BIS (2007)

### Existing risk management and post-trade processes

In the foreign exchange market, bilateral counterparty risk mitigation practices are common and market participants have access to some of the post-trade services typically offered by a central counterparty through the centralised international settlement infrastructure provided by CLS Bank.

Bilateral payment and close-out netting under ISDA Master Agreements is common market practice in the foreign exchange market (FXJSC 2009). Data from the BIS indicate that enforceable (often cross-product) bilateral netting agreements reduce the total gross value across all global OTC derivative positions by around 85 per cent – a netting ratio of 6.8.<sup>4</sup> Assuming that the same netting ratio applies to foreign exchange contracts with a term longer than seven days, the outstanding position of US\$42 trillion noted earlier amounts to an effective exposure closer to US\$6 trillion. Based on the stylised and simplifying assumption that this exposure is distributed equally across 12 equal-sized participants in the foreign exchange market, this implies that each participant will have an exposure of US\$520 billion after bilateral netting.

Using these estimates, it is possible to make some illustrative calculations of the potential size of replacement-cost risk facing each participant under

different assumptions about risk management arrangements. Assuming one of the 12 participants defaults; that this participant has a mark-to-market loss on its exposure; and the other 11 participants have equal mark-to-market gains; then the non-defaulting participants will incur costs to replace the contracts on which the other participant has defaulted. Assuming an extreme exchange rate movement of 15 per cent on all contracts, the cumulative exposure where there is no bilateral netting would be almost US\$50 billion for each participant (Table 3).<sup>5</sup> If it is assumed that bilateral netting is used by all participants, then the cumulative exposure for each participant would be around US\$7 billion.

In OTC markets, it is becoming increasingly common to supplement the use of bilateral netting agreements with collateral agreements (typically ISDA Credit Support Annexes) to effectively post margin against mark-to-market losses on bilaterally netted exposures. According to the most recent survey by ISDA of collateralisation practices, almost 50 per cent of exposures by value across foreign exchange derivative products were collateralised at the end of 2008 (ISDA 2009b). In addition, the use of standard bilateral collateralisation agreements for foreign exchange contracts has almost certainly increased since the onset of the recent financial crisis when concerns about counterparty risk intensified.

**Table 3: Risk Implications of Alternative Risk Management Arrangements**  
US\$ billion

	Total loss shared	Individual bank's loss
No counterparty risk management	528.6	48.1
Bilateral netting only	78.0	7.1
Bilateral netting and mark-to-market margin	7.8	0.7
Central counterparty	0	0

Source: authors' calculations

<sup>4</sup> This netting ratio is derived with reference to Table 1, p 5 of BIS (2009). It is the comparison of the gross credit exposure of US\$3.7 trillion, which takes into account legally enforceable bilateral netting agreements, with the total gross market value of US\$25.4 trillion.

<sup>5</sup> Specifically, the US\$3.5 trillion position of each participant (US\$42 trillion divided by 12) is multiplied by 15 per cent to obtain the mark-to-market loss from default and then divided among the remaining 11 participants. A 15 per cent change in the exchange rate is consistent with the 99<sup>th</sup> percentile of the distribution of EUR/USD currency returns over the 15 years to 2009, calculated for horizons longer than 100 days.

Furthermore, risk management tools other than collateralisation, such as position limits, early termination options, and charges over balance sheet assets, are often applied in relation to non-financial end-users of OTC derivatives.

To the extent that participants in the foreign exchange market do use standard bilateral collateralisation agreements, their exposure to counterparty risk will be lower than if they only use bilateral netting. Extending the above example, if all market participants are paying mark-to-market margins to each other to settle gains and losses on outstanding positions each day, they ensure that their maximum exposure in the event of a default is only the price movement over one day. Assuming an adverse exchange rate movement over one day of 1.5 per cent, the potential loss falls from US\$7 billion to US\$0.7 billion, a tenfold decrease.<sup>6</sup> This highlights the importance of netting and posting mark-to-market margins in the management of replacement cost risk.

In general, a central counterparty enforces mark-to-market margining and also requires an initial margin to be posted at the time a position is established. Given that a central counterparty allows for multilateral netting, the total amount of initial margin that needs to be posted could be significantly lower than what would be needed if only bilateral netting were possible. Based on some simplifying assumptions, in a market with 12 equal-sized participants multilateral netting could reduce exposures relative to the case where there is only bilateral netting by a factor of more than three.<sup>7</sup> Using the estimates in this example would reduce the initial margin to be posted from US\$0.7 billion to US\$0.2 billion. Thus, when considering different risk management arrangements, each participant is comparing the low-probability loss of US\$0.7 billion with bilateral netting and mark-to-market margin

with the interest costs associated with an initial margin of US\$0.2 billion with a central counterparty.

Another important feature of the risk management infrastructure in the foreign exchange market is CLS, which was introduced in response to regulatory concern about the scale of foreign exchange settlement risk (also known as Herstatt risk). Settlement risk arises if the two legs of a foreign exchange transaction are not settled simultaneously, leaving one party exposed to a gross exposure should its counterparty default. CLS eliminates this settlement risk by coordinating the exchange of currencies by way of a 'payment-versus-payment' settlement process. Since its introduction, the number of participants in CLS and the volume of foreign exchange transactions settling through it have increased such that more than half of all trades are now settled via CLS (CPSS 2008).<sup>8</sup> Even before the default of Lehman Brothers, foreign exchange market participants were exploring ways to expand the coverage and penetration of CLS (both in terms of participants and currencies) and were looking to introduce a facility for same-day settlement in CLS. The financial crisis has heightened interest in these enhancements, although there are limits to what can be achieved, particularly in the near term. CLS also recently announced its intention to use its extensive transaction-level data to provide a trade repository service for the foreign exchange market to meet regulators' demands for market transparency.

Although CLS does not manage the replacement-cost risks arising prior to settlement, which is a core function of a central counterparty, it does carry out other key post-trade functions that might be provided by a central counterparty in other contexts (Table 4). Thus, while the basic role played by each is quite distinct, there is some overlap.

6 A 1.5 per cent change in the exchange rate is consistent with the 99<sup>th</sup> percentile of the distribution of EUR/USD daily currency returns.

7 Assuming that trading positions are drawn from a normal distribution, the netting ratio will be equal to the square root of the number of trading partners (Jackson and Manning 2007).

8 It is believed that market penetration has recently increased further, reflecting a heightened focus on counterparty credit risk in the wake of the Lehman Brothers' default. See CLS (2009) for a further discussion of the global foreign exchange market and the role of CLS.

## Conclusion

This article has discussed the potential role for central counterparties in the foreign exchange market. With high outstanding notional values and volatile price movements, it is important for robust arrangements for managing replacement-cost risk to be in place. One way of achieving this would be

through the introduction of a central counterparty. However, before steps in this direction are taken, further work is needed to assess the benefits of a central counterparty in the foreign exchange market, particularly given the arrangements that are currently in place to manage counterparty risk. ✕

**Table 4: Post-trade Services Offered by Typical Central Counterparties and CLS**

Post-trade process	Explanation	Central counterparty <sup>(a)</sup>	CLS
Matching	Counterparties confirm the economic terms of the trade with each other in order to mitigate operational risk and contractual disputes, and ensure accurate data flows to risk management systems	✕	✓
Confirmation processing	Contract becomes legally binding, generally according to standard documentation such as that provided by ISDA	✕	✓
Calculation of obligations	Obligations arising in relation to the trades are calculated among participants	✓	✓
Novation	A third party becomes the legally binding counterparty to both sides of every trade, taking offsetting long and short positions	✓	✕
Multilateral exposure netting	Participants' obligations to and from other participants are netted as though participants were dealing with a single counterparty	✓	✕
Collateral and replacement cost risk management	The calculation and collection of initial and variation margin from adverse prices moves and participant default (replacement-cost risk) prior to settlement	✓	✕
Multilateral payment netting	Payment obligations at trade termination date are calculated on a net basis across participants	✓	✓ <sup>(b)</sup>
Settlement	Final settlement of payment obligations between counterparties	✕	✓

(a) The precise functions carried out by central counterparties vary. Here, we assume a typical model whereby the central counterparty accepts a feed from an electronic trading venue or confirmations processing platform, calculates and risk manages participants' obligations and then submits net settlement instructions to a payment system.

(b) Payment obligations in CLS are netted, although settlement is gross.

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