


The Future of Central Clearing

Maximizing capital and cost efficiency
through an integrated cross-product
CCP clearing service



Analysis commissioned to and conducted by
 OLIVER WYMAN

 e u r e x c l e a r i n g

Table of contents

- 03 Introduction
- 04 Executive summary
- 05 Global regulations fundamentally transforming financial markets
- 06 Optimizing economics through integrated clearing
- 08 Sizing the opportunity
- 14 Conclusion
- 15 Sources
- 16 About us
- 17 Contacts

Introduction

In 2009 the G20 announced a plan to strengthen the international financial system, with an emphasis on building high quality capital and improving over-the-counter (OTC) derivatives markets. This initiated various new regulations in the U.S., EU and elsewhere, as well as major investments by banks, investment managers, clearing houses, custodians, execution platforms and data providers. As a result, both OTC and listed derivatives as well as securities financing (repo, securities lending) business will be subject to substantially higher capital and collateral requirements. Given these increasing costs for market participants, it is critical for CCPs to deliver safety and efficiency to enable market participants to better adapt to the changed regulatory environment.

Eurex Clearing has been actively addressing the regulatory challenges, continuously expanding the scope of cleared products covering cash, derivatives and securities financing transactions in various asset classes across listed and OTC. By clearing the broadest scope of products under a single legal and operational framework in Europe and accepting the world's widest spectrum of eligible collateral, Eurex Clearing delivers cost efficiencies to its clients while at

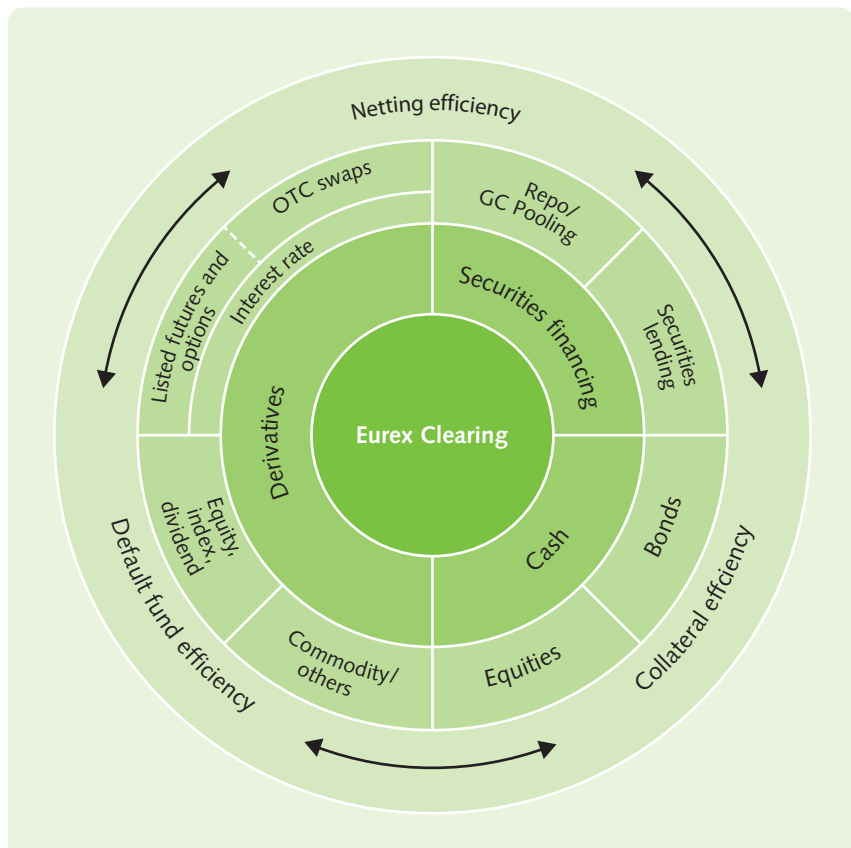
the same time increasing market safety. In a nutshell, it offers increased netting, default fund and collateral efficiencies with an integrated cross-product model, a large spectrum of eligible collateral, the possibility to reuse assets (e.g. GC Pooling) and access to central bank money, thereby lowering economic costs for clearing.

This study reviews the new regulations impacting derivative and securities financing markets; it highlights the

resulting shifts in clearing models and economics and gauges the cost-saving potential of integrated cross-product clearing in client case studies, based on analysis and calculations conducted by Oliver Wyman. The study focuses on capital and cost differentials in the mid-term, assuming the new regulations will be implemented with a view to incentivizing the use of central clearing in order to support the G20 agenda.

We hope you enjoy reading.

Exhibit 1: Integrated cross-product clearing model of Eurex Clearing



Executive summary

- The global regulatory agenda continues to deepen capital and collateral requirements for derivatives and securities financing transactions, particularly for bilateral trades.
- Central clearing will likely create sustained cost benefits which, however, will vary substantially across CCPs – driven by netting, default fund and the collateral efficiencies different CCPs can provide. Integrated cross-product CCPs with a broad eligible collateral spectrum – such as Eurex Clearing, clearing multiple listed and OTC products and asset classes through a single legal structure and platform – will generate increased efficiencies and superior economics for clients.
- Sell- and buy-side participants alike can substantially improve capital and cost efficiencies by actively pooling clearing business across products on integrated CCPs. Eurex Clearing is the natural hub for EUR-denominated equity as well as interest rate derivatives such as OTC IRS, Bund, Bobl, Schatz and Euribor futures, as well as repo and securities lending transactions.
- The quantitative case studies in this paper confirm cost benefits of centrally cleared over bilateral trades for most portfolios in a regulatory base case scenario, and also show that Eurex Clearing, an integrated cross-product CCP with a broad collateral spectrum, can increase cost savings substantially, by reducing risk exposures irrespective of the final regulatory outcome.
- For interest rate derivatives, repo and securities lending transactions, an integrated cross-product CCP structure with a broad collateral spectrum can deliver up to EUR 4–5 billion incremental cost benefits to the European sell- and buy-side community combined, on top of EUR 5–7 billion cost benefits of central clearing on a baseline CCP which are to a certain degree already realized.
- The choice of CCP and allocation of exposures becomes a strategic decision for sell- and buy-side participants as they optimize capital and cost efficiencies through integrated clearing.

Global regulations fundamentally transforming financial markets

Strengthening the resilience of financial markets is a major objective of the global regulatory reforms to the financial crisis, increasing transparency, reducing risks and shifting unregulated products onto regulated venues and infrastructures. More emphasis is being brought to bear upon the use of capital, collateral and central counterparties in these transactions. Five main sets of regulation are being introduced in EU jurisdictions for this purpose:¹

- 1. Basel III / CRD IV:** Deepens capital requirements for counterparty credit risks for derivatives and securities financing transactions.
- 2. CPSS / IOSCO principles:** Introduces standards for default fund requirement calculations for CCPs amongst a set of principles for financial market infrastructures.
- 3. BCBS / IOSCO margin requirements:** Proposes initial and variation margin requirements for non-centrally cleared derivatives, subject to certain conditions.

4. FSB Securities Lending and Repo framework: Includes consultative proposals on minimum standards for methodologies to calculate haircuts on non-centrally cleared securities financing transactions and a framework of numerical haircut floors.

5. EMIR: Primarily focuses on ensuring that risks around OTC derivatives are managed effectively. Specifically, EMIR requires all standardized OTC derivative contracts to be cleared via central counterparties (CCPs), formulates common rules for CCPs, and regulates trade reporting.

The final form of these regulations – particularly of Basel III – is still uncertain, with several proposals under consultation. The capital treatment of banks' contributions to default funds is proposed to be based on a new standardized approach to measure exposures as well as stress test calculations using CPSS / IOSCO standards ("cover stress tests") which may significantly increase capital requirements. The leverage ratio methodology as currently proposed could substantially penalize the use of initial margin,

additional collateral and client clearing activities from a capital perspective. It remains to be seen which changes will be implemented as proposed. The quantitative case studies below are assuming a mid-term base-case scenario, based on the new proposals implemented with necessary modifications to incentivize use of the central clearing model in order to support the G20 agenda.

¹ See sources of the main sets of regulation at the end of the document.

Optimizing economics through integrated clearing

OTC derivative transaction models have evolved over time. Historically most dealer-to-client OTC derivative transactions were completed on a bilateral basis without exchanging initial margin.² As counterparty credit risk exposures in these transactions tend to be high, a shift to the use of initial margin can be observed in bilateral transactions, especially since the financial crisis. In the interdealer market, these transactions are already widely complemented by the use of a central counterparty (CCP) which steps in between the two parties to further reduce and manage risks. Driven by the regulatory requirements described above, central clearing is now economically encouraged – and,

for selected products, enforced via a clearing obligation. Similarly, the use of a CCP is becoming more common for securities financing transactions.

There are a number of economic benefits pertaining to central clearing compared to the bilateral model, which tend to make CCP trades substantially more efficient for participants:

- **Reduced capital requirements**
- **Reduced funding requirements**
- **No credit value adjustments (CVA)**

The reduced capital and funding requirements are driven by multilateral exposure netting, shorter margin periods of risk (5 vs. 10+ days), with

the capital requirements further decreased by lower risk weights (2% vs. 20–100%+) and no CVA VaR charge. These reductions are partially offset by increasing requirements for default fund contributions.

Economics of participants across clearing models are driven by capital costs, funding costs, credit value adjustments, fees (such as CCP and client clearing fees) and variations in mark-ups on bid-ask spreads as a result of the underlying differences in costs. Exhibit 2 summarizes the key economic differentials across models.

Exhibit 2: Summary of client economics across clearing models under the changed regulatory framework

	Bilateral model without initial margin ^b	Bilateral model with initial margin (two-way) ^{b, c}	Central clearing model
Capital costs	High	Medium/low	Medium/low
Funding costs ^a	Low	High	Medium/low
Credit value adjustment (CVA)	High	Medium/low	No
Fees and bid-ask spread	High	High	Low

a) Funding costs for initial margin only, not for collateral against cash/securities borrowed/lent in securities financing transactions

b) Bilateral model with or without tri-party set-up involving a tri-party agent for collateral management purposes

c) Model only relevant for derivatives, not securities financing transactions

² In most cases variation margin is exchanged to reflect the current exposure of the transaction.

Cost efficiencies of central clearing, however, may vary substantially across different CCPs – along three key drivers:

- 1. Netting efficiency:** CCPs clearing different products under a single legal netting agreement and liquidation structure can lower capital and funding requirements through cross-product exposure netting and cross-margining for cleared trades.
- 2. Default fund efficiency:** CCPs with integrated cross-product and asset class structures can offer lower default fund capital and funding requirements for cleared trades.
- 3. Collateral efficiency:** CCPs with a large spectrum of eligible collateral, reuse of other assets (e.g. GC pooling) and access to central bank accounts can lower funding requirements.

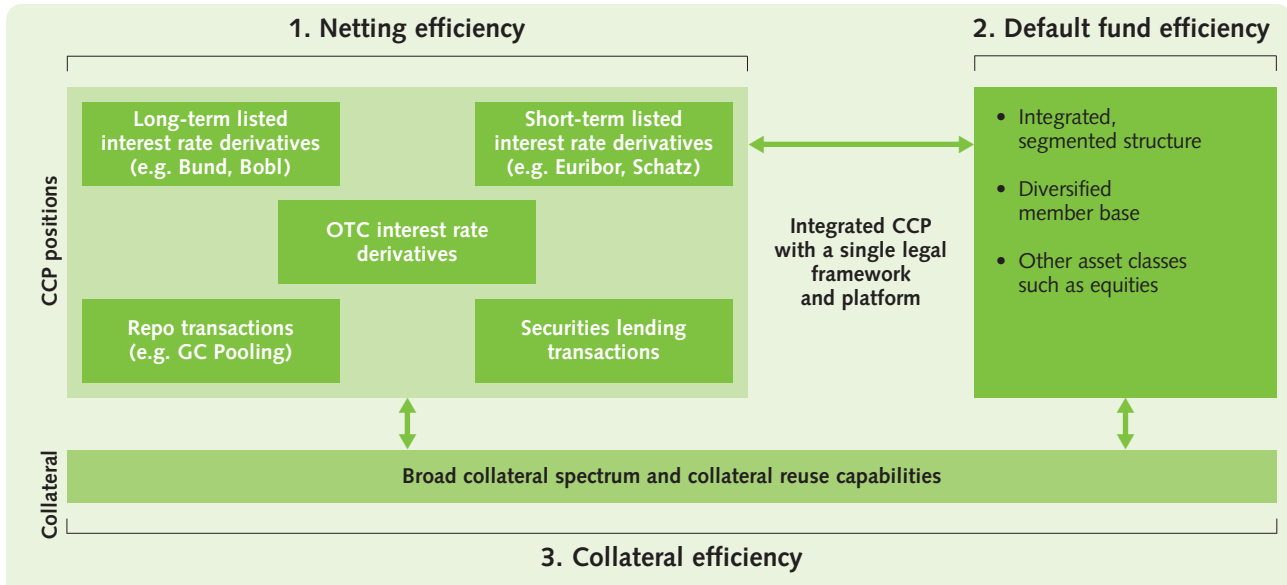
It is important to note that these cost efficiencies are driven by corresponding reductions in risk exposures (through portfolio netting), and are not a function of weakening risk management.

Eurex Clearing is an integrated cross-product CCP with a broad eligible collateral spectrum, clearing multiple products and asset classes through a single legal structure and platform. This entails the highest efficiency potential for market participants. Participants can substantially improve their economics by combining clearing business in particular in the same currency on an integrated CCP. Clearing the broadest scope of products under a single framework in Europe – listed and OTC derivatives, repo and securities lending transactions – and accepting a large spectrum of eligible collateral, Eurex Clearing is a natural hub for European portfolios, particularly for

EUR-denominated products in the fixed income and equity space (see Exhibit 3 for illustration).

Combining single offsetting OTC and listed interest rate derivatives in the same currencies on an integrated CCP leads to substantial initial margin reductions for these trades – of up to 60–80%. Also in a multi-currency swap portfolio context, cross-product margining benefits within an asset class outweigh cross-currency benefits. Cross-product margining benefits are expected to become even more important in the future, with the latest regulatory proposals ruling out cross-currency correlations to a large degree (e.g. the new Basel standardized approach for exposure and default fund calculations).

Exhibit 3: Increasing cost efficiencies on Eurex Clearing



Sizing the opportunity

In order to quantify the capital and cost efficiency opportunity on an integrated CCP such as Eurex Clearing in the new regulatory environment, the analysis considers a range of derivatives and securities financing case studies. The derivatives case studies analyze sell- and buy-side firms moving bilateral OTC portfolios onto a CCP and pooling these with other interest

rate products (such as exchange-traded derivatives, cleared repo and securities lending transactions), quantifying cost savings of central clearing as well as the additional efficiencies on an integrated CCP. The securities financing case studies analyze cost efficiencies of moving bilateral securities financing transactions onto the different CCP models.

Derivatives case studies

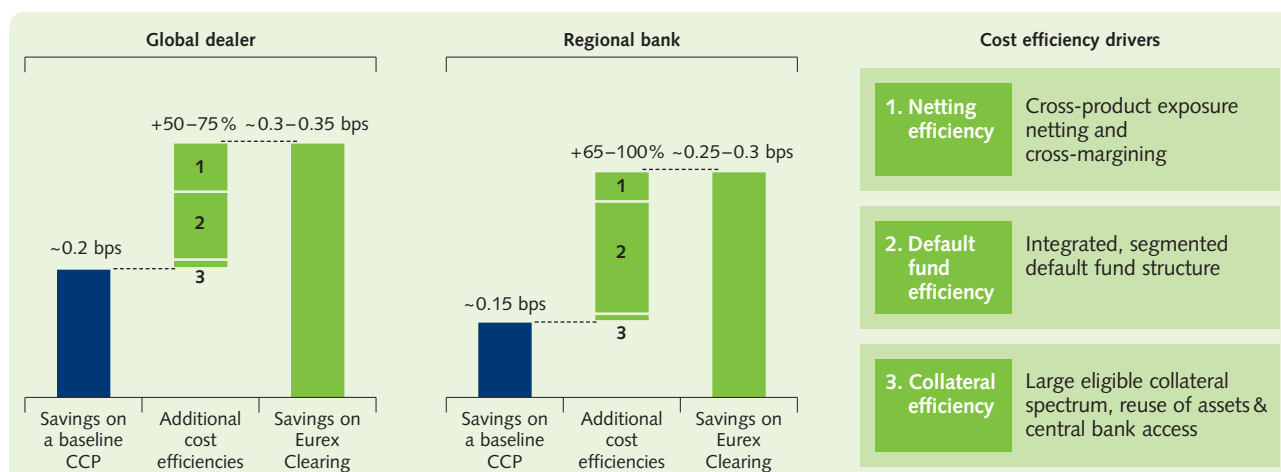
The first set of case studies is based on selected illustrative sell- and buy-side firm examples, representing different business models, to gauge the size and range of cost savings for derivatives clearing. Exhibit 4 provides an overview on approach and scope.

The sell-side case studies consider a global dealer (investment bank) and a regional bank, both with sizeable OTC interest rate derivatives portfolios, including client clearing activities. Exhibit 5 (on page 9) summarizes the cost savings of central clearing, taking into account capital and funding costs as well as CVA, assuming the complete OTC interest rate derivatives portfolios is moved from a bilateral with initial margin to a central clearing model. In order to account for differences in efficiencies between CCPs, the savings are shown for a baseline CCP with product siloes and narrow collateral spectrum compared to an integrated cross-product CCP with a broad collateral spectrum such as Eurex Clearing, quantifying the additional cost efficiencies outlined above.

Exhibit 4: Overview of derivative case study approach and scope

Approach		Scope	
Cost savings of clearing over bilateral with initial margin on a baseline CCP	<ul style="list-style-type: none"> • Capital costs • Funding costs • CVA • Fees and bid-ask spread 	Sell-side	Global dealer (self and client clearing)
			Regional bank (self and client clearing)
Additional benefits on an integrated CCP such as Eurex Clearing	<ul style="list-style-type: none"> • Netting efficiency • Default fund efficiency • Collateral efficiency 	Buy-side	Fixed income mutual fund
			Fixed income hedge fund

Exhibit 5: Sell-side cost savings of clearing over bilateral with initial margin (bps of notional)



By moving their portfolios from a bilateral set-up with initial margin onto a baseline CCP, banks can lower costs and save an estimated ~0.15–0.20 bps of gross notional (of the OTC interest rate derivatives book). Savings are mostly driven by a reduction in funding costs, due to multilateral risk netting on a CCP substantially lowering initial margin requirements. A recent quantitative impact study by BCBS/IOSCO shows initial margin reduction potentials of ~80% through multilateral risk netting (and shorter margin period of risks) on a CCP.³ If the portfolio is split between two or more CCPs the netting benefit would likely be lower, but the impact on initial margin and default fund contributions might be offset by reduced concentration charges by the CCP for bigger dealers. Credit value adjustments can be lowered as well, with some residual CVA for

the bilateral client legs due to the banks acting as clearing brokers. Funding and CVA benefits are somewhat offset by increased capital costs because of the default fund capitalization requirements.

Cost efficiencies of central clearing can be substantially improved on a diversified CCP, increasing cost savings by up to ~75% in the global dealer and up to ~100% in the regional bank example compared to a baseline CCP offering. An important driver for such additional savings is cross-margining and exposure netting between the banks' OTC and listed interest rate derivatives (such as Bund, Bobl, Schatz and Euribor futures) as well as cleared securities financing transactions. Further savings are driven by the default fund efficiencies of an integrated cross-product CCP model. Collateral efficiencies depend somewhat on the set-up and funding optimization of the banks and are only assured to a very limited extent, however there may be additional potential based on reuse of assets from repo and securities lending.

The buy-side case studies consider the economics of a range of buy-side firms including a fixed income mutual fund and a fixed income hedge fund. As mutual and hedge funds do not have to hold regulatory capital and make credit value adjustments, the economics are entirely driven by funding costs for initial margin, variations in bid-ask spreads and client clearing fees. It is assumed that both funds do not hold collateral eligible on a baseline CCP (with a narrow collateral spectrum), and incur funding costs as they need to upgrade collateral when moving onto the baseline CCP. The funds also need to pay fees to the clearing brokers. The additional funding costs and clearing fees, however, may be more than offset by reduced mark-ups on bid-ask spreads charged by the funds' trading counterparties, since cost structures of the counterparty banks are lower of centrally cleared versus bilateral transactions.

³"Quantitative impact study on margin requirements for non-centrally cleared OTC derivatives", BCBS/IOSCO document on margin requirements for non-centrally cleared derivatives (BCBS242.pdf)

Exhibit 6: Buy-side cost savings of clearing over bilateral with initial margin (bps of AuM)

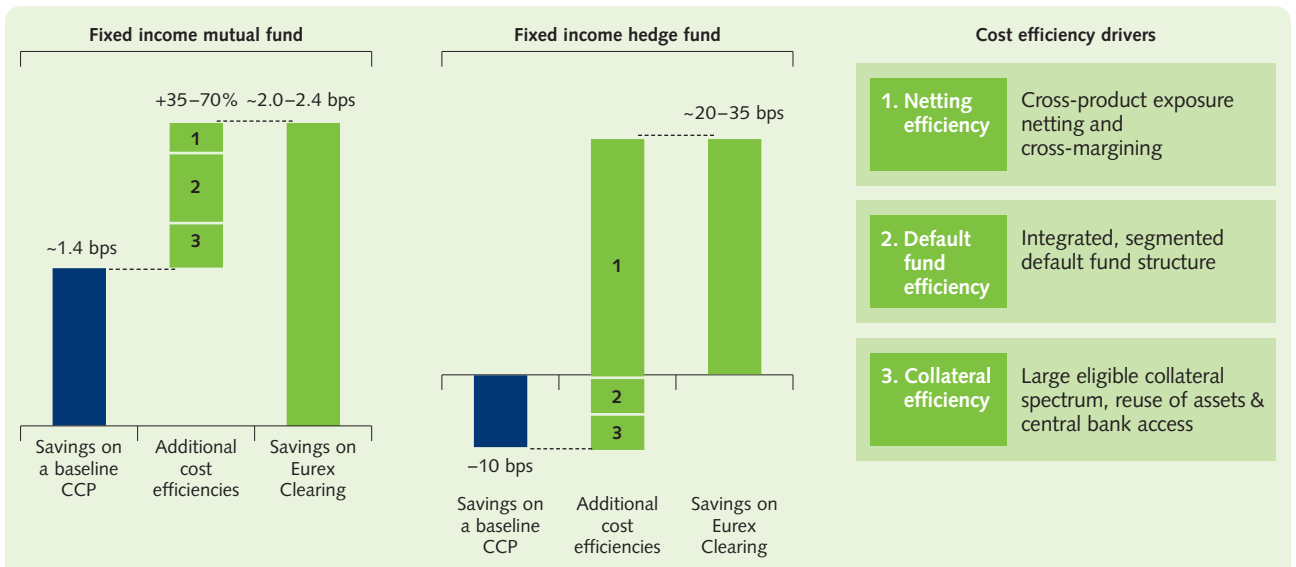


Exhibit 6 compares the cost savings of central clearing for the two funds on a baseline CCP with product siloes and narrow collateral spectrum to an integrated CCP such as Eurex Clearing, with the cost effects differing substantially between the mutual and hedge fund.

The **mutual fund** incurs funding costs and clearing fees when moving to central clearing on a baseline CCP. However, these costs are more than offset by improvements in bid-ask spreads – assuming the fund’s bank counterparties pass on cost savings as a result of being able to net their trades with the fund with other trades they have on the CCP. The net cost savings to the fund amount to ~1.4 bps of assets under management (AuM) on an annual basis. Savings via central

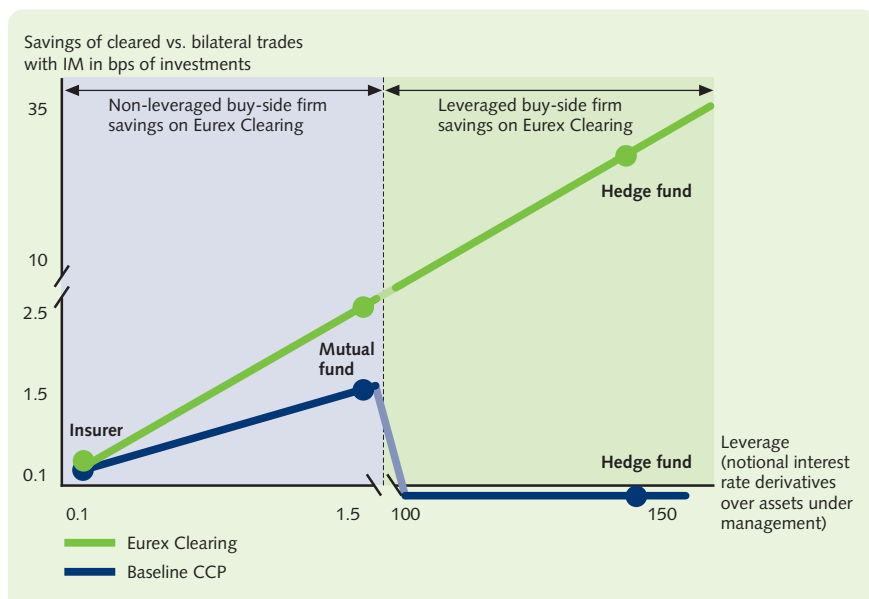
clearing can be significantly increased by the additional efficiencies of the integrated CCP model of Eurex Clearing. There are additional netting efficiencies depending on the fund’s use of listed alongside OTC interest rate derivatives. Default fund efficiencies for the clearing brokers and counterparties of the fund may result in lower fees and improved bid-ask spreads. Funding costs can be eliminated, since a sufficient amount of the fund’s investments are eligible with Eurex Clearing, given the large collateral spectrum accepted. Total additional cost savings of up to 70% over the baseline CCP can be achieved using Eurex Clearing.

In the case of the **hedge fund**, costs actually increase when moving from a prime brokerage bilateral model to central clearing on a baseline CCP, as funding costs and clearing fees

outweigh potential bid-ask spread improvements assuming that additional costs for banks will be passed on to the hedge fund. Multilateral netting benefits are already largely realized in the bilateral model through prime broker set-ups. In contrast, cost savings on an integrated CCP may run up to 35 bps of assets under management – mostly due to substantial cross-product netting benefits between OTC and listed interest rate derivatives, amplified by the hedge fund’s leverage (the notional of the fund’s interest rate derivatives being a multiple of assets under management).

Differences on the buy-side are primarily driven by the leverage in the portfolio and CCP netting efficiencies as illustrated by Exhibit 7. Differences in efficiencies between CCPs become more pronounced for higher leverage. For a buy-side firm with a relatively small interest rate derivatives portfolio compared to the overall assets under management (such as an insurer), cost differentials are less relevant. For a more leveraged buy-side firm such as a fixed income hedge fund with a large derivatives portfolio, CCP efficiencies can make a substantial contribution to the overall return on investment.

Exhibit 7: Relationship of buy-side savings to leverage



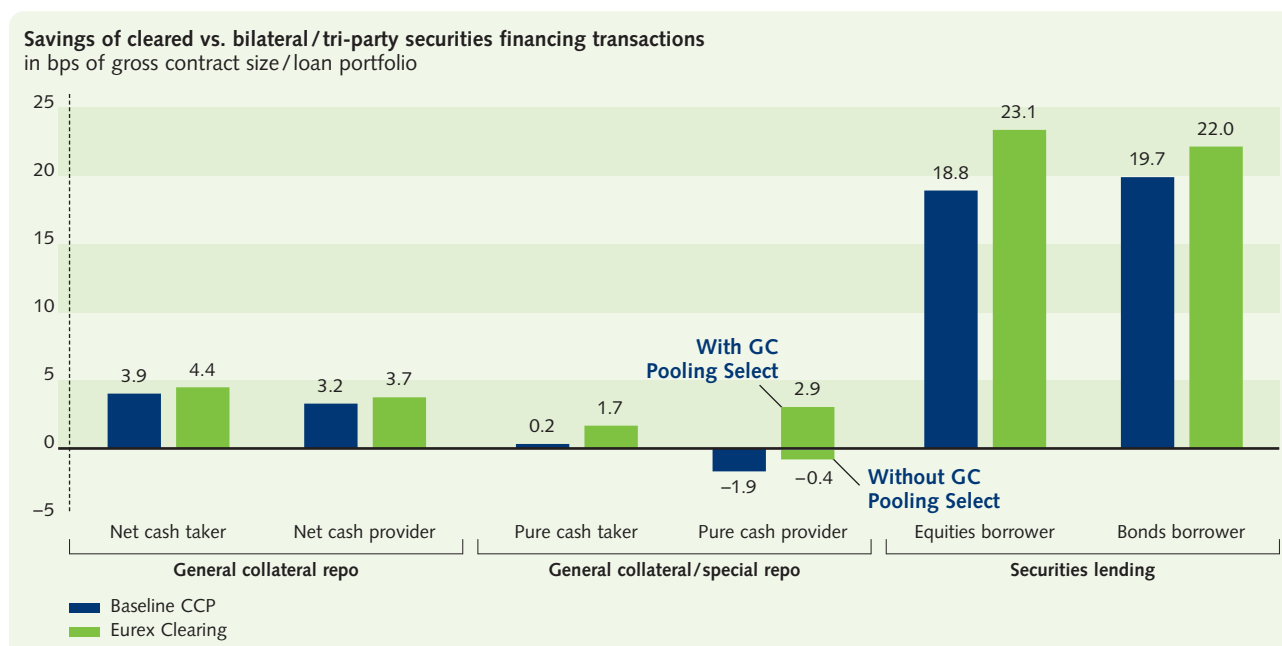
Securities financing case studies

The next set of case studies focuses on the efficiencies of moving bilateral (incl. tri-party) securities financing transactions onto a CCP. Economic cost differentials of bilateral and centrally cleared transactions are quantified for a range of representative bilateral repo and securities lending portfolios of global dealers and banks, taking into account capital and funding costs as well as CVA.

Exhibit 8 (page 12) compares the cost differentials across the portfolios on a baseline CCP compared to an integrated CCP such as Eurex Clearing (but abstracting from additional cross-product netting efficiencies which are analyzed above). Cost savings vary across portfolios depending on the CCP default fund efficiency, multilateral netting potential and the bilateral

exposure. Cost savings are substantial for repo portfolios where the bank is both cash provider and cash taker and can net on a CCP. Assuming a netting potential of 50% between repo and reverse repo on a CCP, the savings amount to around 3–4 bps for net cash takers and net cash providers, with improved savings on an integrated CCP with higher default fund efficiency. Cost savings of central clearing without netting can still be significant for cash takers, but only on an integrated CCP.

Exhibit 8: Securities financing cost savings of central clearing for banks



For pure cash providers, central clearing may be more expensive with no cash taker positions to net, mainly driven by the default fund contribution, particularly on the baseline CCP. If the cash provider uses a service without default fund requirement like GC Pooling Select with a special membership for cash providers only on Eurex Clearing, central clearing becomes more attractive than bilateral. Finally, for securities lending transactions where the credit exposures can be quite substantial for the securities borrower due to high risk haircuts, cost savings run up to ~20 bps on a baseline CCP, and up to ~23 bps on an integrated CCP.

Centrally cleared securities financing portfolios tend to be more cost-efficient than bilateral trades, with cost savings

being substantial for portfolios which can be netted down on a CCP or which create large exposures due to the risk markups and haircuts. Calculations based on capital requirements driven by the leverage ratio (as opposed to risk-weighted assets as above) generate similar results. Cost efficiencies can be increased on an integrated CCP, with lower default fund contribution and the potential to further improve savings by netting securities financing with derivatives portfolios.

It can be expected that such cost efficiencies will likely result in more attractive terms for securities lending firms and cash providers such as mutual funds, insurers and corporate treasuries, thereby providing an incentive to use central clearing services.

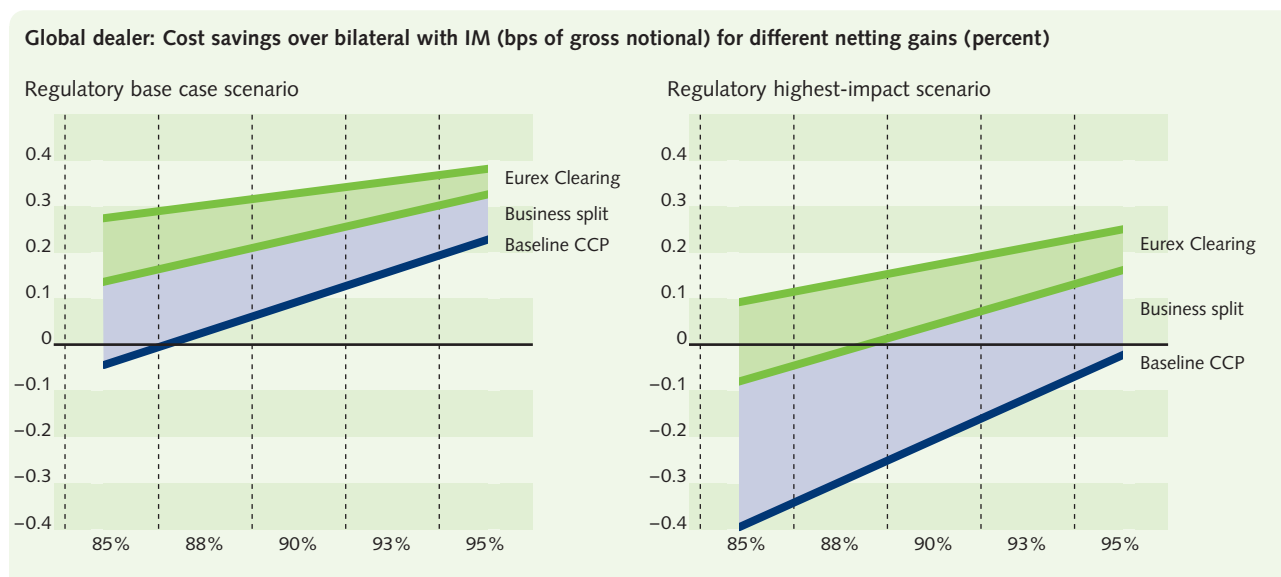
Regulatory scenarios

The level of the benefits of clearing ultimately depends on the final set of regulation. The quantitative case studies above assume a mid-term base case scenario based on the new proposals, implemented with necessary modifications to incentivize the use of the clearing model in order to support the G20 agenda.

In a regulatory highest-impact scenario of the new default fund capitalization and leverage ratio proposals being fully implemented, the benefits of clearing would be substantially reduced. Exhibit 9 shows the cost savings of OTC derivatives clearing over bilateral with initial margin for the global dealer

for the regulatory base case and highest-impact scenario for different netting gains. In the regulatory highest-impact scenario, clearing on a baseline CCP is substantially more expensive. On an integrated CCP such as Eurex Clearing, cost savings are reduced but still substantial for higher netting gains. In case the dealer splits business across two or more European CCPs, savings depend on how netting is optimized between different CCPs used. It is important to emphasize that if final regulatory requirements are too strict in terms of default fund capitalization and leverage ratio, offering clearing services might become uneconomical altogether, undermining G20's ultimate goal to centrally clear OTC business.

Exhibit 9: Global dealer cost savings across regulatory scenarios



Conclusion

Central clearing can create sustained cost benefits for market participants by lowering the sum of capital and funding costs, CVA and other charges. The benefits depend to some extent on final implementation of the new regulations. Ongoing consultations (especially on default fund capitalization and leverage ratio rules) need to be closely monitored as they have the potential to make clearing less attractive. The study expects the new regulations to be implemented with a view to incentivizing the use of central clearing in order to support the G20 agenda.

Cost benefits are also dependent on the efficiency of CCPs to reduce risk exposures of market participants along three drivers:

- 1. Netting efficiency:** CCPs clearing different products under a single legal netting agreement and liquidation structure can lower capital and funding requirements.
- 2. Default fund efficiency:** CCPs with integrated cross-product structures and significant existing exposures can lower default fund capital requirements.
- 3. Collateral efficiency:** CCPs with a large spectrum of eligible collateral, the ability to reuse other assets (e.g. GC pooling) and access to central bank accounts, can mitigate funding requirements.

Central clearing on a baseline CCP in a regulatory base case scenario is more cost-efficient than bilateral trading with initial margin, in most case studies. Cost efficiencies can be significantly improved on an integrated CCP along the three efficiency drivers in all case studies.

There is a sizeable capital and cost efficiency opportunity for both clearing members and their clients by moving and pooling business across products on an integrated CCP. In the fixed income space, Eurex Clearing is the natural hub for EUR-denominated OTC and listed interest rate derivatives as well as repo and securities lending transactions.

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“Capital treatment of bank exposures to central counterparties” (bcbs253.pdf), Basel Committee on Banking Supervision, June (rev. July) 2013

Consultative Document,
“The non-internal model method for capitalizing counterparty credit risk exposures” (bcbs254.pdf), Basel Committee on Banking Supervision, June (rev. July) 2013

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“Revised Basel III leverage ratio framework and disclosure requirements” (bcbs270.pdf), Basel Committee on Banking Supervision, January 2014

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BCBS/IOSCO

“Margin requirements for non-centrally cleared derivatives” (bcbs261.pdf), Basel Committee on Banking Supervision / Board of the International Organization of Securities Commissions, September 2013

EMIR

Regulation (EU) No 648/2012 of the European Parliament and of the Council of 4 July 2012 on OTC derivatives, central counterparties (CCPs) and trade repositories (TRs)

FSB

“Strengthening Oversight and Regulation of Shadow Banking – Policy Framework for Addressing Shadow Banking Risks in Securities Lending and Repos”, Financial Stability Board, August 2013

About us

About Eurex Clearing

Eurex Clearing is one of the leading central counterparties globally – assuring the safety and integrity of markets while providing innovation in risk management and clearing technology delivering superior capital and operational efficiencies. We clear the broadest scope of products under a single framework in Europe – both listed and OTC – including derivatives, equities, bonds, securities financing and energy transactions.

We at Eurex Clearing stand between the buyer and the seller, which makes us the central counterparty for all your transactions. We mitigate your counterparty risk and maximize your operational and capital efficiency.

Our one-stop shop offering combines seamless post-trade services, efficient collateral and delivery management with an industry leading risk management – to keep you clear to trade.

Eurex Clearing serves more than 175 Clearing Members in 16 countries, managing a collateral pool of EUR 48

billion and processing a gross risk valued at almost EUR 15.9 trillion every month. In 2013, we cleared around 1.6 billion derivatives contracts.

We also provide you with highest safety and efficiency as perfect basis for your OTC business: EurexOTC Clear offers a strong holistic solution in terms of product coverage, Client Asset Protection, capital efficiency and ancillary services by leveraging the existing Eurex Clearing infrastructure.

Together with Eurex Exchange, the International Securities Exchange (ISE), the European Energy Exchange, Eurex Bonds and Eurex Repo, Eurex Clearing forms the Eurex Group. Eurex Group is part of Deutsche Börse Group.

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