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## Does OTC derivatives reform incentivize central clearing?☆

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### ABSTRACT

Regulatory changes in the over-the-counter (OTC) derivatives market seek to reduce systemic risk. The reforms require that standardized derivatives be cleared through central counterparties (CCPs), and they set higher capital and margin requirements for non-centrally cleared derivatives. We investigate whether these requirements create a cost incentive in favor of central clearing, as intended. We compare the total capital and collateral costs when banks transact fully bilaterally and when they clear all contracts through CCPs. We calibrate our model using data on the OTC market collected by the Federal Reserve. We find that the cost incentive may not favor central clearing. The main factors driving the cost comparison are netting benefits, the margin period of risk, and CCP guarantee fund requirements. Lower guarantee fund requirements lower the cost of clearing but make CCPs less resilient.

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### 1. Introduction

In response to the financial crisis of 2008, leaders of the Group of Twenty nations agreed to reforms in the over-the-counter (OTC)

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<sup>1</sup> This paper was produced while Paul Glasserman was under contract with the Office of Financial Research. He also serves as an independent member of the risk committee of a swaps clearinghouse.

derivatives markets with the goal of reducing the systemic risk posed by these markets. This program of reforms, launched in 2009, includes two elements.<sup>2</sup> First, all standardized OTC derivatives should be cleared through central counterparties (CCPs). Second, non-centrally cleared derivatives should be subject to higher capital and collateral requirements. An important motivation for the second of these elements is to create a cost incentive in favor of central clearing (BCBS and IOSCO, 2015). Our goal is to evaluate whether this objective has been met and to identify the main drivers of the cost comparison and their implications.

In a centrally cleared market, after two parties agree to an OTC derivative transaction, they replace their bilateral contract with two back-to-back contracts through a CCP. The original bilateral relationship is eliminated, and each of the two original parties continues to face the CCP throughout the life of the contract. In a market without central clearing, the two original parties would instead face each other.

A centrally cleared market offers potential netting and operational benefits; it may be better able to respond to the failure of a market participant; and it may yield greater transparency. It may

<sup>2</sup> See Bernanke (2011), Yellen (2013), Fischer (2015), BCBS and IOSCO (2015) for additional background.

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also create a network of exposures that is more vulnerable to a single point of failure (see the remarks by [Bernanke \(2011\)](#) and [Yellen \(2013\)](#) on various aspects of CCPs and their role in financial stability and financial reform). The effect of derivatives CCPs on financial stability, and the right design and regulation of the OTC derivative market continue to generate debate among industry participants, government officials, and the public; research and discussion of these questions includes [Culp \(2010\)](#), [Stulz \(2010\)](#), [Singh \(2010\)](#), [Duffie and Zhu \(2011\)](#), [Heller and Vause \(2012\)](#), [Pirrong \(2011, 2013\)](#), [Cont and Kokholm \(2014\)](#), [Duffie et al. \(2015\)](#), [Duffie \(2016\)](#), and [France and Kahn \(2015\)](#).

The goal of this paper is to gauge whether new rules imposed on bilateral trading<sup>3</sup> achieve the objective of incentivizing central clearing, and to identify the main factors driving the cost comparison and their implications. Creating a cost incentive for central clearing is a specific objective of the OTC derivatives reform program (see [BIS \(2014\)](#) and [BCBS and IOSCO \(2015\)](#)). It remains relevant, despite the clearing mandate, because the question of when a contract is sufficiently standard to require central clearing involves some discretion. Single-name credit default swaps, for example, continue to trade both bilaterally and through CCPs. In the absence of a cost advantage for central clearing, market participants may be motivated to customize contracts in order to trade them bilaterally. Without a cost advantage, banks may also be less inclined to move legacy trades to CCPs.

We limit our analysis to the capital and collateral costs of bilateral trading and central clearing. We take the perspective of a derivatives dealer within a bank holding company that is a clearing member of the CCPs through which it trades. Under both bilateral trading and central clearing, the dealer faces collateral costs resulting from margin requirements and capital charges resulting from counterparty credit risk. Central clearing also requires contributions to a CCP's guarantee fund,<sup>4</sup> which carries both a collateral and capital cost.

We compare these costs under two market configurations – a fully bilateral market and a fully centrally cleared market. The detailed rules covering all the relevant costs are complex; we develop a simplified framework that captures the key features driving these costs. Our model and its calibration are designed to take advantage of a confidential dataset collected by the Federal Reserve Bank of New York and the Division of Banking Supervision and Regulation at the Board of Governors of the Federal Reserve System. The dataset provides information on institution-to-institution derivatives exposures, including some information on both bilateral and centrally cleared transactions.

We find that three factors drive the comparison of costs between fully bilateral and fully centrally cleared market configurations: the degree of netting achieved in each case; the *margin period of risk* (MPOR) used to set initial margin and capital requirements; and CCP risk management practices – specifically, their relative reliance on initial margin and guarantee fund contributions.

Greater netting efficiency is often viewed as a benefit of central clearing through which total counterparty risk in the financial system is reduced.<sup>5</sup> In our cost comparison, greater netting lowers margin and capital requirements. A single, global CCP clearing all derivatives would theoretically achieve maximal netting efficiency.

However, as noted by [Duffie and Zhu \(2011\)](#); [Heller and Vause \(2012\)](#), and [Cont and Kokholm \(2014\)](#), central clearing may lose its netting advantage in a market with multiple CCPs. In our analysis, the cost comparison is driven by the relative benefits of netting by counterparty versus netting by product category. Although the importance of this tradeoff has been understood for some time, this study is the first to be able to estimate these effects across multiple product categories using necessary confidential data.<sup>6</sup>

Initial margin is intended to cover losses between the time of a counterparty's default and the time the position is closed out, known as the margin period of risk. This interval is currently set by regulators at five days for centrally cleared OTC derivatives and ten days for bilateral trading (see [BCBS \(2014a\)](#); [BCBS and IOSCO \(2015\)](#), and [BCBS \(2014b\)](#)). With all else equal, this difference favors central clearing.

CCPs generally require clearing members to contribute to a guarantee fund through which losses to the clearinghouse from the failure of one member are mutualized among surviving members. Guarantee fund contributions create capital and collateral costs for member banks and thus favor bilateral trading. At the same time, lowering these costs through smaller guarantee funds would undermine the financial stability objective of the clearing mandate. We find wide variation in the practices of CCPs in setting their margin and guarantee fund levels, which highlights the importance of this issue.

After taking into account these and other sometimes conflicting considerations and calibrating our model to the Federal Reserve data, we cannot conclude that OTC derivatives reform creates an unambiguous cost incentive in favor of central clearing; indeed, for a wide range of realistic parameter values, bilateral trading carries lower capital and collateral costs. This conclusion contrasts with a report from the Bank for International Settlements ([BIS, 2014](#)), which finds that capital and collateral costs favor central clearing. In addition to providing our overall comparison, our analysis allows a decomposition into the key factors driving the tradeoff and their sensitivity to modeling assumptions, insights that are difficult to glean from the results reported in [BIS \(2014\)](#).

The rest of this paper is organized as follows. [Section 2](#) reviews the pros and cons of central clearing and the objectives of OTC derivatives reform that provide the backdrop to our investigation. [Section 3](#) describes the capital and collateral rules we seek to capture in our analysis. [Section 4](#) develops our model. [Section 5](#) describes our dataset and connects the data with the elements of our model. [Section 6](#) discusses the calibration of the model, and [Section 7](#) presents our numerical results. In [Section 8](#), we discuss the main implications of our investigation.

## 2. OTC derivatives reform

We briefly review the objectives of the clearing mandate for OTC derivatives and the accompanying requirements of higher margin and capital requirements in the bilateral market. OTC derivatives reform faces some competing objectives, and these tensions influence the cost comparison we analyze.

As discussed in a joint report by the Basel Committee on Banking Supervision and the International Organization of Securities Commissions ([BCBS and IOSCO, 2015](#)), margin requirements for non-centrally cleared derivatives serve two objectives: to reduce counterparty credit risk in the bilateral market, and to promote central clearing.

Central clearing of derivatives can support financial stability in several ways. It may create greater opportunities for netting

<sup>3</sup> We use the term "bilateral trading" as a simple way to refer to the part of the market that is not centrally cleared. The term is imprecise because even centrally cleared OTC contracts are initially traded bilaterally, rather than through an exchange, and then novated to a CCP. The more precise but more cumbersome term is "non-centrally cleared derivatives."

<sup>4</sup> We use the terms "guarantee fund" and "default fund" interchangeably.

<sup>5</sup> [Pirrong \(2013\)](#) argues that netting does not reduce risk but merely redistributes it by giving seniority to derivatives claims over other claims. Whether netting is welfare-improving is an important question for the regulation of derivatives but it does not affect the cost comparison on which we focus.

<sup>6</sup> [Duffie et al. \(2015\)](#) compare bilateral and centrally cleared netting as well, but their analysis is limited to the CDS market.

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