The Impact of Central Clearing on Prices, Price Volatility and Market Size for Over-The-Counter Swaps Markets

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Page numbers

Overall: nice description, but at times it is not clear.

The basic hypotheses or questions need more

Note: Green means not clear or need some work

# Motivation

The 2008 financial crisis was one of the most severe economic downturns in modern history. The crisis originated with the bursting of the residential real estate bubble in the US. Prior to the crisis, many residential mortgages had been packaged, repackaged and resold to financial institutions. As mortgage delinquency rates began to rise, the value of these assets began to fall, putting a severe strain on the financial institutions that held them. Another contributor to the crisis was a financial instrument known as a credit default swap. A credit default swap (CDS) is an agreement between two counterparties to exchange a series of payments (called spreads) by one party in return for a lumpsum payment by the other counterparty in the case of default (credit event) of an underlying bond or credit instrument (called a reference entity). It is essentially an insurance contract against the default of the underlying credit instrument (reference entity), where the CDS buyer pays the spread as a premium in exchange for a lumpsum payment by the CDS seller if the underlying bond becomes non-performing. Before the financial crisis, many firms bought CDS as insurance (or bets) against a decline in the real estate market.

CDS were very lightly regulated before the financial crisis. They were classified as an over-the-counter financial derivative product, rather than an insurance product, and were exempt from most regulation (aside from some “light-touch” regulation from the Federal Reserve and the Options Clearing Corp). As a result, the CDS market was relatively opaque, with participants being unaware of prevalent prices and size, identity of participants (other than their immediate counterparty) and other risk characteristics. The market came to be dominated by a few firms, which were not regulated as banks (e.g., shadow banks) and had poor risk management practices. In late 2008, AIG—a very large participant in the CDS market—was on the verge of collapse due to ongoing losses from CDS protection it had sold, as well as the decline in value of its mortgage-backed securities portfolio. As a large (systemically important) financial institution, it was thought that the failure of AIG would ripple through the financial system and have other undesirable effects. The government rescued AIG for $180 billion and assumed control of the company.

Above PP: Its good but I am not sure it describes the problem. It sounded like AIG is the only culprit here and the cause for the crisis..

The Dodd Frank Act (DFA) attempted to regulate the entirety of the over the counter (OTC) swaps market in order to reduce the risk of a repeat of the 2008 financial crisis. Areas of swaps regulation included (1) standardization of swaps contracts (2) trading of contracts in exchanges or electronic platforms (swaps execution facilities) (3) record-keeping and reporting of trades to financial regulators (4) registration, capital requirements and business conduct requirements for dealers and major market participants and (5) central clearing of swaps contracts.

These regulations are likely to have large impacts on swaps trading. By standardizing contracts and trading them on electronic platforms, information on size and prices in the market become more transparent. However, standardized contracts might not be able to fully meet the risk-management or other needs that customized (bespoke) swaps contracts can provide. Registration, capital and business conduct requirements should encourage market participants to follow sound risk-control measures. Record-keeping and reporting requirements will help regulators understand exposures in the market and unwind trades in an orderly fashion the case of a failure.

Above PP: It a while since the new regulations… so is it likely only or are there some initial – or more – evidence?

Although the other regulations discussed above are likely to change swaps trading, this paper will focus on the impact of central clearing mandates. Central clearing mandates are likely to have a profound impact on derivatives trading. They will create a new type of systemically important financial institution (the clearinghouse) and will impact costs, volatility and riskiness of swaps contracts. Thus, it is important to understand and quantify the impact of the clearing mandate on the markets. Briefly, when a swap is cleared, the contract between the two parties is *novated* by a contract between each party and a central clearinghouse. The clearinghouse becomes the buyer to the original seller and seller to the original buyer. A clearing mandate requires all (or almost all) swaps to be cleared through a clearinghouse.

Explain why. Is this the most potent part of the law/regulation???

The clearing process transforms counterparty risk (the risk that one of the parties will default on its obligation) with a risk between each party and the clearinghouse. Clearinghouses are large financial institutions which should practice risk control measures such as collecting margin from its members for each trade, having a guarantee fund if the defaulting member’s collateral is not enough to cover losses, having other sources of funding such as equity if the guarantee fund is not enough to cover losses, and practicing other risk control measures (for example requiring larger margins for riskier trades or requiring parties to liquidate risky positions) to lower the risk and impact of default. Thus, central clearing should reallocate default losses through netting, collateralization (margin), insurance, equity and mutualization.

Clearinghouses were originally created by the members of futures exchanges to serve the members’ interests (i.e., protect members in case one party’s default and reduce collateral demand through netting). Regulations such as DFA and European Market Infrastructure Regulation (EMIR) mandate central clearing of derivatives, expanding the importance of these financial entities. Mandated clearing is likely to have both macro (market-wide) and micro (individual trade) level effects. On the macro level, clearing could reduce volatility by mitigating the effects of the failure of a single large trading firm. However, collateral demand (margin calls) by the clearinghouse can put additional strain on the market. Margin calls are likely to occur precisely when the markets are volatile or illiquid. If firms then need to sell into this illiquid market in order to pay up, it is likely to further destabilize the market. In addition, large enough losses could threaten the solvency of the clearinghouse, which could then transmit the effect to all members who have business with the clearinghouse.

At the micro level, central clearing could change the type of trades that firms enter. As stated earlier, central clearing mutualizes the risk of default. Thus, when clearing is mandated, firms might be more inclined to enter riskier trades, since they do not bear all the costs of default (i.e., adverse selection). In addition, firms could engage in riskier activities after entering a trade (i.e., moral hazard), since, again, they do not bear the full cost of default. Central clearing is also subject to economies of scale and scope, which would lead to natural monopolies in the market. However, regulators are likely to require that trades be cleared through their “local” clearinghouse, and to scrutinize mergers in the industry for antitrust reasons, preventing the realization of such economies. These are real costs to traders who cannot benefit from the netting effects of one (or a few) large entity (entities) handling all clearing. Clearinghouses also require resources to engage in their risk management activities (such as setting and collecting margin, monitoring members’ financial conditions and trading positions, and mitigating funding and liquidity risk). Thus, it is likely to raise the costs of trading in this respect (although might lower overall cost by reducing default risk).

Central clearing could have other impacts on derivatives trading as well. If netting lowers collateral demand (improves capital utilization), the size of the derivatives market could expand due to the lower costs. Clearing could also change how market participants fund themselves and which participants enter the market. Getting a full understanding of the impact of clearing mandate on the swaps market as a whole is important.

Above section is overall fine, but maybe something is missing… what is s till the main problem/issue and why?? – Just a thought – I am not sure

# Objective

As discussed in the motivation section, the swaps clearing mandate is likely to have important impact on trading (add references). The objective of this paper is to identify and quantify some of these impacts. The main impacts investigated here are

Is it likely, or is it designed to…

Should it be …to identify, quantify and test…

1. Central clearing could reduce price volatility in the market by mitigating the effects of the failure of single trading firms. We would expect these effects to be the largest around the time that losses or failures of large derivatives trading firms become knowledge. Examining price volatility, especially around the announcement of large losses or failures could shed light on the impact of the clearing mandate on price volatility.
2. Central clearing allows netting across products and positions. There are two types of netting in the market: position netting and product (exposure) netting. For position netting, consider the case where counterparty A and counterparty B have a contract that requires counterparty A to put up some collateral to counterparty B. At the same time, counterparty B has an offsetting contract that requires it to put up collateral to counterparty C. If these contracts are centrally cleared and netted, counterparty B’s collateral obligation will be cancelled (as it receives collateral from A and sends collateral to C). For product netting, consider a counterparty that has mark-to-market losses for some contracts and mark-to-market gains for other contracts. When the clearinghouse is calculating margins, the gains can be netted against losses. Overall, both techniques lower collateral demand on traders. In addition, clearing reduces the impact of counterparty default, as the clearinghouse can unwind trades in a more orderly fashion (rather than scrambling for alternate counterparties in the case of default in an uncleared market) and have other resources (guarantee fund, equity) to cover default losses. However, clearinghouses charge fees to fund the risk control activities they engage in. Traders must account for both the increased costs of clearing and the lowered costs from netting and lower counterparty risk. The impact of the clearing mandate on trading costs (such as bid-ask spreads) are an important area of study.

Is counterparty the used terminology? Maybe just ‘firm’ or…

Also: is it really ‘cancelled?” Isn’t the condition for cancelled is that both put exactly same amount??

Last sentence: Missing the ‘why’.’ Can you state it as a real hypothesis?

1. Central clearing mutualizes the risk of default. In the case of a large enough default, the guarantee fund (which is paid into by all clearing members of the clearinghouse) and equity will be used to cover losses. This suffers from adverse selection (firms selecting more risky contracts to be cleared) and moral hazard (firms not taking appropriate risk-control measures after entering into a contract) problems as the counterparties entering into the contract do not bear the full costs of default. Clearinghouses try to mitigate this risk through margining and monitoring of members’ financial conditions and trading positions. However, if clearinghouses are not able to perfectly perform this function, clearing could increase the riskiness of the market. Measuring the impact of the clearing mandate on the risk-taking behavior of firms (including the riskiness of the trading positions they enter) are also important area of study.

Last sentence – above - is good!

1. If central clearing lowers costs, reduces volatility, and mitigates counterparty risk, it is likely to lead to more trading in the market. Examining the impact of the clearing mandate on the size (volume or dollar volume) and scope (number and type of participants) of the swaps market would are also an important area of study.

Another possible question: Does the clearing house creates barriers to entry?

It is important to discuss the possible metrics that could be used for each of the above. For price volatility, period (e.g., daily, weekly, monthly) standard deviation or coefficient of variation is a common measure (add more; why not include entropy as well – then compare results). For trade costs, bid-ask spreads are a common measure. For riskiness, value-at-risk (VaR) and expected shortfall (ES) are common measures. For market size and scope, dollar volume, ticket volume and notional outstanding are common measures of market size. Number of traders is a common measure of market scope.

I understand what it is after looking but needs to be defined

Also, do you need to add in addition to number of traders, volumes of each??

# Review of literature

Many of the issues that central clearing may cause was first articulated in (Pirrong, 2011). The theoretical advantages of central clearing in reducing collateral demand is studied by (Duffie & Zhu, 2011) and (Cont & Kokholm, 2014). They show that “[c]entral clearing introduces a trade-off in collateral demand between the benefits of multilateral netting within a class of contracts against lost bilateral netting benefits across contract types”. (Duffie et al., 2015) estimate the impact of various market structures on initial margin, variation margin and other types of collateral demand using proprietary data for certain credit default swaps (CDS). (Loon & Zhong, 2016) examine the impact of counterparty risk in CDS spreads (the premia demanded by insurance providers on CDS) using an event-study based approach, with the start of the clearing Dodd-Frank mandate as the event. They also study the impact of central clearing (and resultant reduction in counterparty risk) on prices, arguing that settlement prices for cleared contracts will differ from the broad market since cleared contracts do not suffer from counterparty risk. (Benos et al., 2019) estimates the cost of fragmentation (i.e., the fact that contracts need to be cleared through many smaller clearinghouses rather than one large clearinghouse). (Akari et al., 2021) estimates the impact of clearing on a sample of single name CDS contracts.

# Proposed contribution

The existing literature on the impact of central clearing focuses on its impact on the CDS markets. The CDS market was intimately involved in the 2008 financial crisis (and the failure of AIG), so it is an important area of study. However, the clearing mandate not only affects the CDS trade, but also the broader swaps market. This paper will take a broader view of this whole market rather than just the CDS trade alone. By exploiting variations in the types of contracts that need to be cleared, it is possible to identify the causal impact of the clearing mandate on swaps trading.

Just trading, or more?

Previous studies were also limited in the types of impacts they studied: either collateral demand or prices. This paper will take a more wholistic view. I will look at a broad array of market performance measures such as liquidity, volatility, riskiness and market size. In addition, existing literature often uses the effective date of the clearing mandate to perform event-studies. However, the Dodd-Frank Act required regulators to issue clearing mandates when it became law in 2010, and regulators issued many notices of proposed rule-making prior to the enactment of the final rules. Legislators and regulators in the UK, EU, Australia, Japan, South Korea, Hong Kong and Singapore were also enacting similar regulations at the time. Since market participants could anticipate these regulations and voluntarily clear their contracts, the final rule enactment/effective date by the US regulator might not be a good choice as the date of the event. Exploiting the variations in timing and content of the various regulations could help identify the causal impact of central clearing on swaps trading.

Be specific; Elaborate…

# Model for prices

The price of a swap at time is determined by

where is the “fundamental value” of the swap, at time , is an indicator variable that takes on a value of if the swap is cleared, is a vector of other swap characteristics, and is a vector of coefficients.

Does the above model need also macro level (environmental) info/var? Say + gamma\*Z???

For interest rate swaps (fixed-floating swaps and basis swaps), the fundamental value is determined by the relevant market interest rates so that the net present value of the two streams of payments is equal. For cross-currency swaps, the fundamental value is determined by the relevant market interest rates, the exchange rate and the cross-currency basis so that the net present value of the two streams of payments is equal. For credit default swaps, the fundamental value is determined by the relevant market interest rates and the riskiness of the underlying asset (or assets) being insured, so that the expected net present value of the two streams of payment (CDS spreads/premia from one counterparty, and the payment in case of a default/credit event from the other counterparty) is equal.

Fundamental: should it be theoretical/neutral???

Also, should it be perceived riskiness??

is a vector of other characteristics that may impact swaps pricing. These can include trade size, currencies or reference entities involved in the transaction, collateralization, tenor, maturity, payment frequency, execution in a swaps execution facility/derivatives exchange, and risk characteristics of the counterparties. We expect liquid contracts with lower-risk counterparties to have lower prices than illiquid contracts (liquidity and counterparty risk premium).

is an indicator that is if the swap is uncleared and otherwise. Thus, is the premium for uncleared swaps. We expect to be positive if uncleared swaps are more expensive (due to counterparty default).

Are there uncleared swaps? Is it allowed by the regulation? If so explain under what conditions…

# Models for price volatility

Consider some volatility measure . We assume that if there was a large change in price (returns) in the previous period , then the market volatility is high. Large change in prices can trigger margin calls. Traders might need to liquidate positions in order to meet margin calls, which causes them to sell into a distressed market. This creates additional price pressure, further destabilizing the market. In addition, the initial change in price might set off panic selling also destabilizing the market. Our model for volatility is

Where is fundamental volatility, is previous period’s return and is an indicator variable that takes a value of 1 if the swap is uncleared and 0 if the swap is cleared. We expect the sign of to be positive if uncleared markets have more volatility than cleared markets.

Where is v coming from? Is it observable?

# Models for market size

I define the size of a particular swaps market as the total notional value of that class of swaps (e.g. interest rate swaps, cross-currency swaps and interest rate swaps). This notional value can be thought of as the quantity traded. Change in quantity can be driven by the change in prices. Since central clearing should reduce swaps prices by reducing counterparty risk, the quantity (size of the market) should increase following mandatory clearing.

Where is the quantity traded at time , is the price at time and is a vector of other characteristics that affect trade quantity, is a vector of coefficients and and are coefficients.

Replacing the model for price with the price model from part I, we obtain

Where is the quantity traded at time , is the fundamental price of the swap at time , c is an indicator variable that takes a value of 1 if the swap is uncleared and a value of 0 if the swap is cleared and and .

Overall, a fine start but needs more (just my view here of course): I would discuss the theoretical models of interest describing the mechanism…. And then go into discussion of unobserved quantities vs observable and form a way to test the models and answer the questions. Also, try to relate it directly to the questions/hypotheses you raised earlier.

# Bibliography

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Are there more published references?