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# CLEARING AND OTC TRADED DERIVATIVES: A SURVEY

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The financial economics literature on market microstructure — or the way a market is organized — has grown substantially since Garman's (1976) seminal article. Much of the focus of the existing literature is on the impact of market microstructure on price formation and price discovery. Market microstructure characteristics such as settlement and clearing arrangements have received less attention. The 2007–2009 Global Financial Crisis has highlighted the importance of clearing to practitioners, policymakers, and academics alike. A sharp rise in perceived counterparty risk during the financial crisis for some over-the-counter (OTC) traded derivative securities, coupled with uncertainty by regulators over the true size of outstanding positions in such securities by market participants, has led to calls for mandatory clearing through *central counterparties* (CCPs) of some (G-20 Leaders 2009) or virtually all (Hull 2010) OTC traded derivatives and centralized reporting of OTC derivative transactions to *trade repositories* (TRs).<sup>1</sup>

The principal objectives behind such proposals are to increase transparency, reduce counterparty risk, reduce excessive risk-taking by financial institutions and the potential for systemic risk, prevent market abuse, and avert similar financial crises from arising in the future. This study surveys the recent financial economics literature to ascertain whether the desired objectives are likely to be met from mandatory centralized clearing and centralized trade reporting of OTC derivative transactions; which, if any, OTC traded derivatives should be subject to centralized clearing; and, if so, who should clear OTC traded derivatives. In addition, this study

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1. In September 2009, leaders of the G-20 nations agreed to the following objective regarding OTC derivatives: "All standardized OTC derivative contracts should be traded on exchanges or electronic trading platforms, where appropriate, and cleared through central counterparties by end-2012 at the latest. OTC derivative contracts should be reported to trade repositories. Non-centrally cleared contracts should be subject to higher capital requirements. We ask the FSB and its relevant members to assess regularly implementation and whether it is sufficient to improve transparency in the derivatives markets, mitigate systemic risk, and protect against market abuse." (See page 9 from the Leaders' Statement, the Pittsburgh Summit, 2009.)

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assesses the likely implications of mandatory clearing of OTC derivatives for the financial innovation process and the prevention of similar financial market crises in the future.

The G-20 Leaders' Statement from the 2009 Pittsburgh Summit leaves the process for the adoption of mandatory clearing of standardized OTC derivatives up to the individual member nations but imposes a requirement for periodic progress reports to G-20 Leaders from the Financial Stability Board.<sup>2</sup> However, even the adoption of mandatory clearing for standardized OTC derivatives in a given country may leave many questions unanswered for market participants. For instance, the passage of the *Wall Street Reform and Consumer Protection Act* (better known as the Dodd-Frank Act) in the United States in 2010 requires standardized OTC derivatives to be centrally cleared or traded on an exchange but leaves many of the important details to be determined by the relevant regulatory agencies charged with enforcing the law. This means that although a decision has been taken mandating centralized clearing of standardized OTC derivatives in the United States, industry representatives still have ample opportunity to influence regulatory policymakers on how that mandate works in practice.

Moreover, as Grant (2011) points out, one unintended consequence of leaving implementation of the mandate to individual G-20 nations is the potential to increase market fragmentation and create *regulatory arbitrage* opportunities by imposing local clearing restrictions on affected OTC derivatives.<sup>3</sup> This has the potential to create additional problems that may impede achievement of the original objectives. For instance, Pirrong (2011) argues: "Fragmentation of clearing on jurisdictional lines will increase the costs and risks of clearing, including systemic risks." Fragmentation in clearing means that potential economies of scale are not exploited

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2. A 2010 progress report by the Financial Stability Board reported: "Progress is being made toward achieving implementation of these objectives, including industry efforts to meet commitments made to supervisors; ... At the level of the industry, the so-called G14 major derivatives dealers and a number of buy-side institutions issued a joint letter on 1 March 2010 detailing further commitments to supervisors relating to OTC derivatives market transparency, expanded central clearing, standardization and collateral management. This advance on the commitments made by firms in September 2009 to specific target levels for central clearing of CCP-eligible OTC credit derivatives and CCP-eligible OTC interest rate derivatives. "However, the enhanced clearing targets only partially cover the OTC market, as most derivative contracts are currently not CCP-eligible" (see page 39). It also reported on page 41: "At the [June 2010] Toronto Summit, G20 Leaders pledged to work in a coordinated manner to accelerate the implementation of over-the-counter (OTC) derivatives regulation and supervision and to increase transparency and standardization. OTC derivative contracts should be reported to trade repositories. The G20 will work towards the establishment of CCPs and TRs in line with global standards and ensure that national regulators and supervisors have access to all relevant information."

3. Grant [2011] argues "... In Japan, legislation is already in place that require yen-based over-the-counter (OTC) derivatives to be cleared in Japan; ... and India has developed the Clearing Corporation of India to act as a central counterparty (CCP) and trade repository for the domestic market. ... it looks like efforts to implement the G20 reforms...- are fragmenting all over the place. ... Basically Asian regulators want to ensure that trades in which institutions in their jurisdictions are involved are cleared through entities over which they have some control."

and relevant information about the aggregate positions of market participants may not be understood.<sup>4</sup>

The push for mandatory clearing of OTC traded derivatives is as much a result of the long history of success of exchange traded derivative markets in minimizing counterparty risk and promoting transparency as the presumed failure of certain OTC traded derivative markets to handle counterparty risk during the recent financial crisis. Simply stated, exchange traded derivative markets worked well during the crisis while some OTC derivatives markets either did not or appeared not to work well.

Exchange traded derivatives are contracts where all terms have been standardized, leaving only price to be determined. In addition, exchange traded derivative securities require trades to be processed via a clearinghouse or central counterparty. Mandatory clearing in futures markets, for instance, has made defaults relatively rare and market prices more transparent. Not surprisingly, a common view of how centralized clearing would operate in the OTC derivatives markets mirrors how existing futures clearinghouses operate and manage risk (that is, through imposing margin requirements and daily marking to market of outstanding positions). This is more complex than it first appears, as market prices may not be readily available to determine appropriate margins for counterparties.

## **I. CLEARING AND THE SIZE OF OTC DERIVATIVES MARKETS**

According to the Bank for International Settlements (BIS 2011), the total notional principal of OTC derivatives outstanding at the end of calendar year 2010 stood at \$601 trillion. Interest rate swaps, forward rate agreements (FRAs) and options accounted for 77% of all OTC derivatives. This was followed by foreign exchange forwards, forex swaps, currency swaps and options that collectively accounted for \$57.8 trillion or over 9.6% of the total. Credit default swaps accounted for \$29.9 trillion or about 5% of total OTC derivatives. Equity linked derivatives and commodity derivatives accounted for \$5.6 trillion and \$2.9 trillion, respectively, or about 1.5% between the two categories. The remaining \$38.5 trillion is classified as “unallocated” and represents OTC derivatives of all types from non-reporting institutions from the triennial BIS survey. Notional principal is a poor measure of overall risk exposure. The BIS reports that netting arrangements reduced the gross credit exposure to \$3.34 trillion as of the end of 2010.

Although the leaders of the G-20 nations agreed in 2009 to mandate the use of a central counterparty for standardized OTC derivatives, by 2012 the market was already moving in that direction earlier. Culp (2009) points out that “clearing and settling OTC derivatives through CCPs was already becoming popular well before

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4. Bliss and Steigerwald (2006) note that the desired benefits from clearing can be achieved with different structures. For instance, they point out, “Economies of scale can be achieved both by cross-border consolidation of CCPs and by cross-border consolidation of dealers. Credit risk management can be done by CCPs or by insurance companies. Operational efficiency can be obtained by centralizing processing in CCPs or in securities depositories.”

the advent of the financial crisis in mid-2007.” The fraction of transactions in OTC derivatives that are centrally cleared continues to rise. The International Swaps and Derivatives Association (2011) estimates that “the level of cleared interest rate swaps exceeded 50 percent of interest rate swap notional outstanding at the end of 2010, up from 21 percent at year-end 2007. Over the same time frame, the volume of uncleared interest rate swaps outstanding declined from \$201 trillion to \$116 trillion, a decrease of \$85 trillion or 42 percent.”

It is worth noting that the demand for mandatory clearing of OTC derivatives primarily arose from perceived problems in the credit default swap sector. Other OTC derivatives did not raise the concerns the credit default swap (CDS) market raised. At the height of the financial crisis, the notional value of outstanding credit default swaps was over \$60 trillion. However, portfolio compression has reduced the outstanding amount of credit default swaps substantially.

## **II. THE NATURE OF CLEARING**

### **A. Clearing and the Frequency of Clearing**

The term clearing can be used to describe the frequency with which trading is allowed on a market or the process by which ownership is exchanged between counterparties to trades. Both are important market microstructure characteristics. For instance, in a continuous auction market trading is allowed at any time during the trading day. Alternatively stated, the market clears continuously throughout the trading day. In contrast, a periodic call auction market is one in which trades are only allowed at specified times during the trading day and prohibited at all other times. The market “clears” periodically during the trading day. This “batch processing” of trades allows information to accumulate as orders to buy and sell accumulate and arguably leads to more informative prices than from a continuous auction market. Nevertheless, most markets today permit continuous trading while open.

The term clearing is also used to describe the transfer of ownership of security positions between parties. It is this use of the term that is behind the proposals to impose mandatory clearing of certain OTC traded derivatives. In exchange traded derivative markets, the clearinghouse takes the other side or interposes itself between every transaction. This reduces potential counterparty risk in most cases because the presumably stronger clearinghouse takes the other side of every trade. It also makes it easier for markets participants to enter or exit futures positions.

### **B. Clearing of Equities versus Derivatives**

Clearing is needed whenever security positions change hands. However, there is a fundamental difference between clearing on equity markets and clearing on derivatives markets. For example, suppose Party A agrees to buy 1,000 shares of Apple stock from party B. Both parties need a mechanism to transfer ownership from Party B to Party A. That mechanism is clearing. The clearing process of a stock transaction is essentially immediate. The risk associated to the clearinghouse

is similarly short-lived. A bookkeeping transaction records the change in ownership and the clearing process is essentially over. The clearing process for an option or futures transaction entails clearinghouse or central counterparty involvement until the position is closed.<sup>5</sup>

This fundamental difference between clearing stock and derivative market trades gives rise to potential economic rents to futures exchanges that not only clear their own futures transactions but disallow clearing of their exchange's products on other markets. Put differently, one consequence of restricted clearing is that it also impedes the fungibility of futures contracts. *Fungibility* means that a futures contract on some commodity, index, or security can be initiated on one exchange and offset on another. It should be noted that the non-fungibility advantage enjoyed by futures markets may not accrue to equity options exchanges as equity options exchanges in the United States are required by their regulator — the Securities and Exchange Commission — to use a common clearing firm, the Options Clearing Corporation, to clear all option trades. This allows exchange traded equity options to trade on multiple exchanges.

### C. The Gains from Clearing

The important contribution of the provision of clearing services to the value of an exchange is not commonly recognized. For instance, a significant component of the value of futures exchanges is due to the value of the clearinghouses that they control. Anecdotal evidence of this fact includes the dramatic decline in the value of the CME Group on February 5 and 6, 2008, in response to a U.S. Justice Department, Anti-Trust Division letter suggesting that clearinghouses be separated from exchanges. The *Financial Times* (Weitzman 2008) reported on February 8, 2008:

Shares of the CME Group and Nymex fell sharply in New York yesterday, as investors digested the implications of the US Department of Justice's call for the separation of clearing houses from the futures exchanges that own them. CME shares fell 12 per cent by mid-day trading to \$519.30 on fears that any change would result in severe disruption to the business model that has enabled the CME to become the world's largest futures exchange. Nymex, which CME targeted with a cash-and-share bid last week, saw its shares fall 11 per cent to \$94.92.

Another example is the widespread belief that the primary reason the Intercontinental Exchange (ICE) purchased the New York Board of Trade (NYBOT) in 2006 was to obtain the NYBOT's clearinghouse. The *Financial Times* (Morrison

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5. Bliss and Steigerwald (2006) provide a detailed analysis of the clearing function for derivatives. They note: "In securities clearing and settlement, the length of time between the execution of a transaction (in which the counterparties undertake reciprocal obligations to deliver a security against payment) is dictated primarily by operational constraints. With derivatives, however, the length of time between the execution of a transaction and settlement is essential to the contract. Put another way, the fundamental economic purpose of a derivatives transaction involves the reciprocal obligations of the parties over the life of the contract."

and Cameron 2006) reported on September 17, 2006:

Traders said the key attraction of ICE's purchase of Nybot, through \$400m in cash and the issue of equity that equates to 15 per cent of its stock, was Nybot's own clearinghouse, the New York Clearing Corporation rather than Nybot's soft commodities such as coffee, cocoa, sugar, cotton and orange juice and its financial futures business. This will give the Atlanta-based electronic commodities exchange the flexibility it wants to compete with its bigger rival the New York Mercantile Exchange.

Both of the foregoing examples illustrate the value that exchange owned clearinghouses contribute to the value of a futures exchange. The mandate that exchange traded derivatives be cleared through a central counterparty has potentially important implications for how profits are made in various financial businesses. To be sure, it creates new potential revenue opportunities in clearing certain OTC derivatives. However, the potential size of the business opportunity is not clear.

#### **D. Risk Management at Clearing Counterparties**

Risk management is central to the successful operation of a clearinghouse or clearing counterparty. Clearinghouses manage their risk exposures by imposing margin requirements and marking security positions to market on a daily or more frequent basis, as conditions require.<sup>6</sup> Proper risk management by clearinghouses necessitates the ability to correctly identify the market value of security positions. This may be difficult to do for certain OTC derivatives whose market value is uncertain. It is also important to point out that the choice facing market participants is not clearing everything or clearing nothing, but rather runs the continuum from no clearing to requiring trades be entered into a trading repository (without a mandate for centralized clearing) to clearing OTC derivatives centrally to restricting trading to derivatives exchanges.

### **III. THE NATURE OF FINANCIAL INNOVATIONS**

Smithson (1998) argues that financial innovations arise from attempts to lower transaction costs or reduce risks. He argues that most complex securities can be decomposed into simpler ones. For instance, futures contracts are simply exchange traded forward contracts. That is, futures contracts represent an advance over forward contracts where significant counterparty risk may exist. Other mechanisms also exist as potential solutions for the presence of counterparty risk such as one or both parties posting collateral. It should be noted that, in some cases, a futures position might have more risk than otherwise similar forward contracts. For instance, it may be that the counterparty risk of a large bank trading with another "too large to fail" large bank may be lower than that with the exchange clearinghouse.

Financial markets evolve over time to meet the needs of market participants. The question naturally arises as to why OTC traded derivatives continue to exist if

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6. For instance, during the stock market crash of October 19, 1987, many futures positions were marked to market on an intraday basis.



exchange traded derivative markets represent an improvement over OTC traded derivatives. Trade is voluntary. Trade occurs only because both parties believe that they are better off from engaging in it. The continued co-existence of futures markets with corresponding OTC forward markets suggests that there is a need for many types of derivative products. Simply stated, some of the older techniques still serve the needs of some market participants better than the newer alternatives.

Alternatively stated, there are costs and benefits to both exchange and OTC traded derivatives. Culp (2009) argues the benefits of clearing OTC derivatives through a CCP include “counterparty anonymity,” greater “transparency and consistency of pricing for margins and funds settlements,” easier “monitoring of market participants’ aggregate activity within the CCP across products,” and simpler resolutions in the event of defaults, among others. Culp (2009) also argues that the costs of clearing OTC derivatives through a CCP include the potentially high cost of margin and collateral “during periods in which derivatives participants are liquidity constrained;” disagreements with models used to determine margin; disagreement with pricing or valuation of positions; and “limited gains” from the anonymity benefit for large well-capitalized traders.

#### **IV. THE CASE FOR MANDATORY CLEARING OF OTC DERIVATIVES**

Acharya et al. (2009) detail “three levels of centralized clearing” for credit derivatives (i.e., trade registry, centralized clearing for OTC derivatives, restricting trading to a derivatives exchange) in order to increase market transparency and reduce counterparty risk. Basically, they argue that such a change is necessary to provide “aggregate information on outstanding deals and risk exposures” to both regulators and market participants. They argue: “We therefore feel that the strongest public policy need in the area of OTC derivatives is to require centralized clearing for all systemically important derivatives.”

Acharya and Bisin (2010) advance a competitive two-period general equilibrium model where default by market participants on contracts is possible. They show that opacity in the OTC markets makes counterparty risk more difficult to assess and gives rise to a “counterparty risk externality [that] can lead to excessive default and production of aggregate risk, and more generally, inefficient risk-sharing.” However, the introduction of centralized clearing makes markets more transparent. The greater transparency allows market participants to adjust contract terms to reflect the overall positions held by the counterparty — that is, to force the other side “to internalize the counterparty risk externality of its trades” — and results in efficient risk sharing.

Acharya and Bisin (2010) focus on the credit default swap market — a market that some observers argue exacerbated the severity of the 2007–2009 financial crisis. They argue that “the moral hazard that a party wants to take on excessive leverage through short positions — collect premiums today and default tomorrow — is counteracted by the fact that they face a steeper price schedule by so doing.” They contend that their “model provides one explanation for the substantial buildup



of OTC positions in credit default swaps in the period leading up to the crisis of 2007-09, their likely contribution to over-extension of credit in the economy, and possible remedies for avoiding this excess in future.”

As the title of his paper suggests, Hull (2010) examines issues arising from the proposed mandates that OTC derivatives be cleared centrally. Particular attention is directed toward the issue of whether all types of OTC derivatives should be subject to centralized clearing. Hull decomposes OTC derivatives into four major types: (1) plain vanilla derivatives with standard maturity dates; (2) plain vanilla derivatives with non-standard maturity dates; (3) nonstandard derivatives for which there are well-established pricing models; and (4) highly structured deals.

Hull argues that the first two types of OTC derivatives are readily amenable to clearing because market prices are either readily available (Type 1) or can be easily interpolated from readily available market prices (Type 2). Hull recognizes that the third type of OTC derivative is often illiquid due to infrequent trading. Examples include “Asian options, barrier options, compound options, basket options, accrual swaps, and so on.” Hull recognizes that valuation of all Type 3 OTC derivatives may be difficult and proposes that “market participants provide the CCP with valuation software when the OTC derivative is traded.” Not surprisingly, the fourth type of OTC derivatives, “highly structured deals,” is the least amenable to being cleared centrally “because they are usually quite complex and models for valuing them are less readily available.” Nonetheless, Hull argues “it is important to find a way of handling them” because “it is often these types of derivatives that lead to huge speculative positions and have the potential to increase systemic risk.” Hull argues that one way of doing so is to require counterparties in Type 4 OTC derivative transactions to provide mutually agreed valuation software to the clearinghouse or agree on a third party to appraise the value of the OTC derivative security position.

Hull also envisions some exemptions from central clearing requirements, which he suggests, be called “zero margin trades.” Basically, it would include firms that do not currently have to post collateral for their private derivatives market transactions. Hull argues that such transactions would have to be registered with the central clearing party although no margin would need to be posted. Lang and Madlener (2010) examine the potential impact of mandating centralized clearing of OTC derivatives in the electric power sector. Collateral would be required for derivative positions that currently do not require collateral. This poses a problem for market participants because as Lang and Madlener (2010) note, “collateralization does not come for free.”

## **V. THE CASE AGAINST MANDATED CLEARING OF OTC DERIVATIVES**

One concern with mandated clearing of standardized OTC derivatives center on the extension of mandated clearing to illiquid or difficult to price OTC derivatives. Culp (2009) notes that the principal function of a clearinghouse or central counterparty is to substitute its credit risk for the credit risk of the counterparties. This is a meaningful advantage only if the risk of the clearinghouse is lower than

the risk counterparties would otherwise face. It is critical that CCPs effectively manage their risk exposure. However, doing so requires CCPs to be able to determine the market price of the derivatives. This is hard to do in an illiquid market. Pirrong (2011) provides a detailed analysis of the role that central counterparties play and considers “what effects increased use of them will have on the financial system.” In particular, he argues that central counterparties should limit any OTC derivatives clearing to “liquid standardized products” in order to effectively manage the risks to which the CCP is exposed.

Another concern with mandated clearing of OTC derivatives is that the assumption of counterparty risk by the CCP could aggregate too much risk in one entity — the CCP. This could lead to an “excessive concentration of risk” in the CCP and a belief among market participants that the CCP is “too big to fail” as Culp (2009) and Singh (2011) point out. Culp argues that this, in turn, may induce “a *moral hazard* problem in which derivatives participants manage their risks less prudently because of an expectation that derivatives CCPs would be bailed out.”

Pirrong (2011) argues that the actions of CCPs may impact systemic risk. Specifically, Pirrong asserts such actions “can both decrease it” (for instance by reducing the impact of clearing member failure) “and increase it” (for instance by increasing margin requirements during a period of financial stress). He also warns “that CCPs have failed in the past.” Culp (2009) draws similar conclusions when he argues that the proposed mandatory centralized clearing of standardized OTC derivatives “might well actually increase the fragility of the financial system by creating new institutions that regulators, and politicians believe are too big or too interconnected to fail. At the same time, mandated clearing and settlement could impose significant costs on various market participants and interfere with financial innovation.”

As noted above, the fragmentation of CCPs across international boundaries or asset classes reduces the potential effectiveness of the CCP. Duffie and Zhu (2011) examine whether the addition of a new separate CCP to a “particular class of derivatives increases or reduces counterparty exposures.” They report evidence that the introduction of a CCP “reduces netting efficiency, increases collateral demands, and leads to higher average exposure to counterparty default.” In addition, they report that the existence of multiple CCPs increases counterparty risk. They recommend a single CCP for “standard interest rate swaps and credit default swaps” to avoid this latter issue.

Culp (2009) dichotomizes financial market regulation into regulation of products and institutions. He contends that mandated clearing of OTC derivatives is a form of product regulation and argues that regulating institutions is a better way of monitoring and controlling systemic risk than regulating financial products. Culp argues that rather than reducing systemic risk mandated clearing “will likely engender significant legal and regulatory uncertainty, impede financial innovation, raise market participants’ costs, and adversely impact the competitiveness of U.S. derivatives participants.”

Gubler (2009) argues that the requirement for clearing of OTC derivatives is essentially “an attempt to regulate the process of financial innovation itself and that,

when viewed in this light, the proposal is neither as modest nor as obviously superior to the status quo as its proponents claim.” That said, it is also important to point out that many OTC derivatives were being centrally cleared prior to the proposal that standardized OTC derivatives be centrally cleared or traded on an organized exchange.

## **VI. MANDATORY CLEARING OF OTC DERIVATIVES AND FINANCIAL CRISES**

Although the Acharya and Bisin (2009) “model suggests that excessive leverage and excessive production arising due to the OTC nature of trading can lead to a ‘bubble’ in the market for goods (e.g., the housing stock), a subsequent crash upon realization of adverse shocks, and a breakdown of risk transfer (credit or insurance markets) in those states,” most observers contend that the failure to centrally clear OTC derivatives was not the principal cause of the 2007–2009 financial crisis.<sup>7</sup> Nor would the adoption of centralized clearing for OTC derivatives avert a similar financial crisis in the future. Hull (2010) states emphatically: “The first point to make is that OTC derivatives did not cause the 2007–2009 financial crisis (or previous financial crises). The causes of the crisis are complex and it would be a mistake to imagine that regulating OTC markets will somehow automatically prevent similar crises in the future.” Similarly, Culp (2009) argues: “I contend that the proposal to mandate central counterparty OTC clearing for standardized products will not likely avert another potential crisis or failure of a large financial institution, but will likely engender significant legal and regulatory uncertainty, impede financial innovation, raise market participants’ costs, and adversely impact the competitiveness of U.S. derivatives participants.” Baker (2011) argues that much financial regulation emanating from a financial crisis is driven by stories about particular firms during the crisis.<sup>8</sup> She argues that the mandate that standardized OTC derivatives be centrally cleared has broader and unintended implications for the repo and other markets.

## **VII. WHO SHOULD CLEAR OTC DERIVATIVES?**

Not surprisingly, the literature is largely silent on who should clear OTC derivatives. Nystedt (2004) argues that organized derivatives exchanges (ODE) should clear such contracts. He states: “A potentially important service ODE markets can provide OTC market participants is to extend clearing services to them. Such services would allow the OTC markets to focus more on providing less competitive contracts/innovations and instead customize its contracts to specific investors’ risk

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7. For instance, see the statement of the Financial Economists Roundtable (2009).

8. Baker (2011) argues: “Memorable tales of financial collapse, such as that of Lehman Brothers (Lehman), Bear Stearns, and American Financial Group (AIG), frequently drive narratives of financial market crises and future preventative regulatory solutions. Much U.S. financial regulation, such as the monumental and historic ‘Dodd-Frank Wall Street Reform and Consumer Protection Act,’ (Dodd-Frank) can be understood from this perspective.”

preferences and needs.” According to Culp (2009), many derivatives exchanges are already providing such services, including CME Group, ICE, Eurex, SGX, and NYSE LIFFE, as well as LCH.Clearnet, which formerly cleared a number of future contracts.

## VIII. CONCLUSIONS

There is general agreement in the financial economics literature that the absence of centralized clearing for OTC traded derivatives did not cause the Global Financial Crisis of 2007-2009 nor will the imposition of centralized clearing on standardized or virtually all OTC traded derivatives be likely to avert similar financial crises in the future. The demand for centralized clearing for those OTC traded derivatives that are not currently centrally cleared is not coming from the parties to the trades. The push for centralized clearing of standardized is principally coming from regulators and policymakers, not OTC market participants.

Trading in OTC derivatives is voluntary. Existing counterparties have shown by their actions that they are willing to enter into OTC derivative transactions without requiring the transactions be cleared centrally. While the imposition of mandatory centralized clearing of standardized OTC traded derivatives and the requirement that most OTC derivative transactions be reported to trade repositories may not help individual market participants, it is likely to provide regulatory authorities with the information to make better decisions about which actions to take during periods of financial market stress.

Many OTC derivatives are already being cleared centrally. This movement toward greater central clearing of OTC derivatives has been in response to market forces rather than government edict. Futures clearinghouses handle much of that business. One large segment of the OTC derivatives sector — interest rate swaps — is starting to be cleared. Mandatory centralized clearing of standardized OTC derivatives represents a potentially lucrative business opportunity to clearinghouses.

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