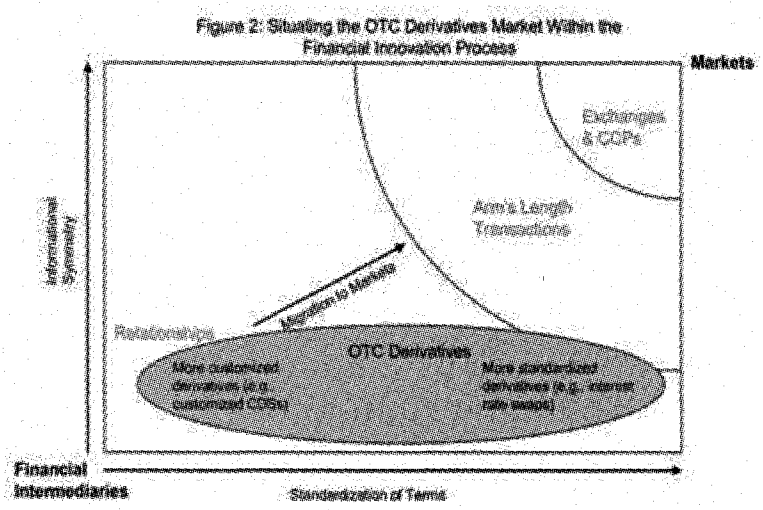
approach to addressing the problem of counterparty risk mismanagement in the OTC derivatives market is through a rule (the "mandatory CCP-clearing rule") that would require the counterparty risk of OTC derivatives to be managed by a heavily regulated third-party called a CCP. As previously mentioned, this rule has been adopted in the United States by the Dodd-Frank Act[149] and is still the subject of considerable debate in Europe.[150] The effect of this type of rule on the OTC derivatives market can be understood by reference to the following Figure 2:



As indicated in Figure 2, some OTC derivatives are highly customized and therefore embedded in banking relationships (and therefore spatially located closer to financial intermediaries in the figure) while others are more standardized. Within the context of Figure 2, the "mandatory CCP-clearing rule" would effectively force a right-upward shift of the OTC derivatives market, moving a large portion of these contracts to a CCP. Viewed in this light, mandatory CCP clearing is not simply an instance of modest tinkering with the financial plumbing, but a dramatic intervention in

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costs associated with market participants' previous failure to engage in private ordering with respect to these contracts").

[149]Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. No. 111-203, § 723(a), 124 Stat. 1376, 1675-81 (2010).

[150]In the United Kingdom, the mandatory rule is a part of the British Treasury's financial reform proposals. *See* Financial Services Authority & HM Treasury, Reforming OTC Derivative Markets: A UK Perspective 11 (Dec. 2009), *available at* http://www.fsa.gov.uk /pubs/other/reform_otc_derivatives.pdf. The mandatory CCP-clearing rule has also been proposed in an official European Commission Communication. *See* Ensuring Efficient, Safe and Sound Derivatives Markets *supra* note 17.

the financial innovation process itself. Drawing on the framework developed in Part II, this part contends that the debate over a mandatory CCP-clearing rule has largely overlooked[151]—the importance of the elimination of information asymmetries in the market migration process. This part begins with a brief account of the role played by OTC derivatives in the financial crisis of 2008. It then proceeds with a critical assessment of a rule requiring mandatory CCP clearing of OTC derivatives.

A. *The Role of OTC Derivatives in the Financial Crisis*

While OTC derivatives were not the "proximate cause" of the financial crisis,[152] they are thought to have exacerbated the crisis in two principal ways: by laying the foundation for faulty risk modeling, and by contributing to bank-like runs.[153] First, credit default swaps ("CDSs"), one type of OTC derivative, allowed dealers in such instruments to assume considerable exposure to ABS CDOs by selling insurance on the risk of default of super senior (high investment grade) tranches of these securities.[154] One of the most significant dealers in CDSs was AIGFP, which in 2003, underwrote close to eighty billion dollars in notional amount of these securities.[155] This extraordinary success, however, was in some sense a house of cards, as it was built at least in part on faulty risk modeling that led AIGFP to sell more insurance than it would have had the risks of CDSs been properly accounted for.[156] When these overlooked risks finally materialized and it became increasingly likely that AIGFP would have to make substantial payments on its CDS positions, AIGFP's parent company and guarantor,

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[151] *But see* Craig Pirrong, *Rocket Science, Default Risk and the Organization of Derivatives Markets* 26 (Aug. 14, 2006) (unpublished note, *available at* http://www.isnie.org/ISNIE06/Papers06/07.1%20(no%20discussant)/pirrong02.pdf).

[152] *See* René M. Stulz, *Credit Default Swaps and the Credit Crisis*, 24 J. ECON. PERSP. 73, 83 (2010) (arguing that a combination of panic combined with institutional opaqueness and bad bets, not credit default swaps or other OTC derivatives, were the ultimate cause of the failure of AIG, Bear Stearns, and Lehman Brothers).

[153] *See* Duffie, *supra* note 142, at 5-6.

[154] SCOTT, *supra* note 47, at 110-12.

[155] *See* Carol J. Loomis, *AIG: The Company That Came to Dinner*, FORTUNE, Jan. 19, 2009, at 70, 73.

[156] AIGFP estimated that it basically would never be obligated to make a CDS payment. *See* Brady Dennis & Robert O'Harrow, Jr., *A Crack in the System (pt. 2)*, WASH. POST, Dec. 30, 2008, at A1 (noting that AIGFP's estimate of having to make such a payment was less than 1%). More problematic, however, was the fact that AIGFP failed to assess the impact of a downgrade in the credit rating of AIGFP's parent AIG, which was a guarantor of AIGFP's obligations. *See* Robert O'Harrow, Jr. & Brady Dennis, *Downgrades and Downfall (pt. 3)*, WASH. POST, Dec. 31, 2008, at A1.

AIG, became obligated to post billions of dollars in collateral that it didn't have, and AIG teetered on the brink of bankruptcy.[157] An AIG bankruptcy would have had potentially devastating implications on the hundreds of domestic and foreign financial firms that were counterparties to AIGFP's CDS contracts.[158]

Whereas in the case of AIG, OTC derivatives exacerbated the effects of the financial crisis by proving to be devilishly tricky instruments for risk modeling, OTC derivatives also contributed to the financial crisis by giving rise to bank-like runs.[159] The paradigmatic example here is Bear Stearns. As discussed in Part II, firms like Bear Stearns were exposed to ABS CDOs in a variety of ways, yet Bear's institutional complexity prevented outside investors from accurately assessing the magnitude of the risks to which the firm was exposed. Consequently, Bear Stearns's OTC derivatives counterparties reduced their exposures to the firm as news of its weakness spread.[160] As these counterparties unwound their derivatives positions with Bear Stearns, they withdrew the cash collateral they had posted with the firm as part of their derivatives agreement, reducing Bear Stearns's liquidity and accelerating its failure. Fearing that a Bear Stearns bankruptcy would pose a "systemic risk"[161] to the system, the federal government orchestrated a buyout of the investment bank by J.P. Morgan.

In the case of both AIG and Bear Stearns, the risk that these firms would fail to fulfill their obligations under their relevant OTC derivatives contracts was substantial enough to require dramatic federal intervention—a government bailout in the case of AIG and, in the case of Bear Stearns, a government-orchestrated buyout by J.P. Morgan.[162] Indeed, although estimates vary, some have claimed that when such systemic risks are taken

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[157]O'Harrow & Dennis, *Downgrades*, *supra* note 156, at A1.

[158]Morgenson, *supra* note 41, at A1; Joe Nocera, *Propping Up a House of Cards*, N.Y. TIMES, Feb. 28, 2009, at B1; O'Harrow & Dennis, *Downgrades*, *supra* note 89; Press Release, U.S. Dep't of Treasury, U.S. Treasury and Federal Reserve Board Announce Participation in AIG Restructuring Plan (March 2, 2009), *available at*, http://www.treas.gov/press/releases/tg44.htm.

[159]*See* Duffie, *supra* note 142, at 5-6.

[160]SCOTT, *supra* note 47, at 37.

[161]There is no consensus definition of "systemic risk." It is often defined in terms of risk that causes a "chain reaction of failures of major financial institutions." Darrell Duffie et al., *supra* note 18, at 1 n.1. For a more detailed version of this definition, see Steven L. Schwarcz, *Systemic Risk*, 97 GEO. L.J. 193, 204 (2008) (defining "systemic risk" as "the risk that (i) an economic shock such as market or institutional failure triggers (through a panic or otherwise) either (X) the failure of a chain of markets or institutions or (Y) a chain of significant losses to financial institutions, (ii) resulting in increases in the cost of capital or decreases in its availability, often evidenced by substantial financial-market price volatility").

[162]*See* Vikas Bajaj & Julie Creswell, *Bear Stearns Staves Off Collapse of 2 Hedge Funds*, N.Y. TIMES, June 21, 2007, at C1.

into account, the total loss of the failure of a financial institution to perform under an OTC derivatives contract could exceed $1 trillion.[163] In light of these sorts of calculations, and given the sobering quality of recent financial history, reducing "counterparty risk" has become a significant concern for policymakers and is indeed the motivation behind the mandatory CCP-clearing rule, a topic to which we now turn.

B. *The Argument for Mandatory CCP Clearing*

The current structure of the OTC derivatives market consists of "bilateral" contracts between dealers, and contracting parties accordingly bear all of the risks inherent in their transaction, including both market risk and counterparty risk. The mandatory CCP-clearing rule would alter this market structure by effectively transferring the management of counterparty risk to a CCP, subject to substantial regulatory oversight. An example might help illustrate how a CCP functions. Let us say that Seller sells a credit default swap to Buyer, providing Buyer with protection from the risk that a reference entity (let us call it XYZ Inc.) will default on a particular security (let us call it XYZ Bond). Where trades must be "cleared" through a CCP, Seller and Buyer novate their side of the transaction to the CCP, thereby creating two new contracts, one between the CCP and Seller and another between the CCP and Buyer. Once the trade is cleared through the CCP, Seller and Buyer no longer have a contractual relationship with one another. In effect, the CCP becomes the buyer to every seller and the seller to every buyer. Under this arrangement, if the transaction were to become more profitable to Buyer due to price fluctuations on the CDS instrument, Seller would still owe the relevant amount upon settlement, but it would now owe it to the CCP, not to Buyer. Thus, the original counterparties still bear the market risk of the transaction. However, they no longer bear the counterparty risk. If, for example, Seller defaults on its payment obligation, the CCP is obligated to make Buyer whole. Thus the CCP, not the original counterparties, bears the default risk. Why should a CCP be expected to manage default risk better than market participants? The academic and policy literature provides two answers, and they track the two principal methods for managing default risk: netting and collateral.[164]

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[163] *See* Segoviano & Singh, *supra* note 144, at 12.

[164] *See* Stephen G. Cecchetti et al., *Central Counterparties for Over-the-Counter Derivatives*, BIS Q. REV., Sept. 2009, at 49-50 (identifying netting and collateral as the core benefits of a CCP for OTC derivatives markets).

1. Multilateral Netting

The argument for mandatory CCP clearing of OTC derivatives relies in part on the availability of "multilateral netting" when trades are cleared through a CCP.[165] The intuition behind netting should be familiar to anyone who has ever gone through the simple arithmetic of figuring out how much to reimburse a friend for an expense incurred on your behalf (say $10 for a movie ticket), where the friend herself owes you a certain amount for a different expense that you incurred on the friend's behalf (say $8 for a soda at the concession stand). Paying $2 to the friend in a single transaction is much simpler than engaging in two transactions, a transfer of $10 from you to the friend, and a transfer of $8 from the friend to you. Besides mere simplicity, a netting rule also avoids the breakdown in the payment process that arises if you only have $5 in your wallet and your friend is broke. Netting in the OTC derivatives market works roughly the same way as in the movie theater example. Derivatives are a zero-sum game: one side wins while the other side loses.[166] Thus, where two parties have multiple derivatives contracts outstanding between them, each party will have some losing contracts (where they owe the other side money) and some winning contracts (where the other side owes them money). Under a netting rule, each party subtracts all of her losing contracts from all of her winning contracts to determine how much she owes (or is owed by) the other party, thereby reducing the number of times money changes hands at settlement.[167] The principal benefits of netting in the OTC derivatives market are also similar to those illustrated in the movie theater example: by reducing the number of cash transfers that must be made, netting also reduces the amount of cash that must trade hands.[168] In the presence of liquidity constraints (where, like the two friends at the movies, OTC derivatives dealers have empty or near-empty wallets), reducing the amount of cash that must trade hands can mean the difference between performance and default.

While netting occurs in bilateral markets, CCPs provide for *multilateral* netting, which can result in even greater cash reductions between parties, since a CCP becomes counterparty to all contracts being

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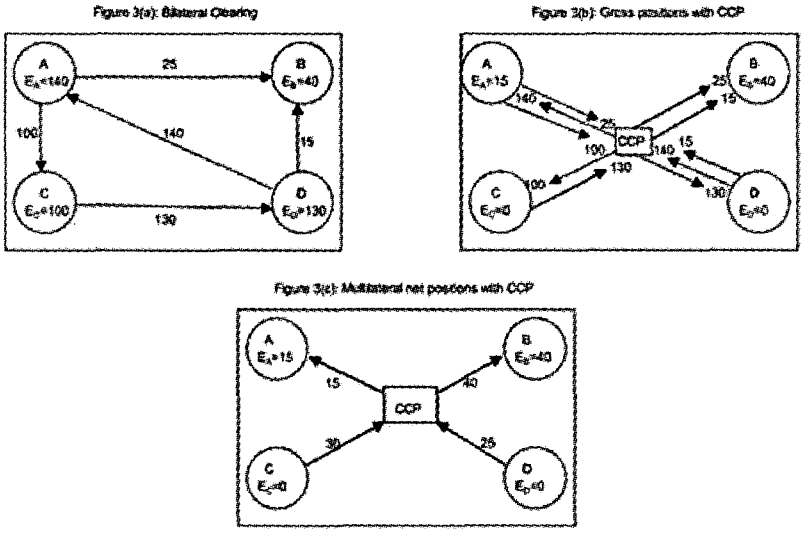
[165] *Id.* at 49-50.

[166] Bryan H. Booth, *Prudence or Paranoia: Considering Stricter Regulation of the International Over-the-Counter Derivatives Market*, 5 DUKE J. COMP. & INT'L L. 499, 523 (1995) ("If a company records a loss on a derivative product, there is a counterparty who comes out ahead.").

[167] Cecchetti et al., *supra* note 164, at 49.

[168] *See* Anupam Chander & Randall Costa, *Clearing Credit Default Swaps: A Case Study in Global Legal Coverage*, 10 CHI. J. INT'L L. 639, 647-48 (2010).

cleared by clearing members, and therefore there are potentially a greater number of contracts that can be netted against. The following figure[169] illustrates the benefits of multilateral netting:



In the above figures, there are four OTC derivatives dealers, "A," "B," "C," and "D." The "E" indicates the maximum counterparty exposure for a given dealer. The three figures illustrate the difference between bilateral clearing, in Figure 3(a), and multilateral clearing in Figure 3(c). Figure 3(b) is included simply to show the gross positions in a multilaterally cleared market to illustrate the step between Figure 3(a) and Figure 3(c). As illustrated, counterparty risk exposure ("E") decreases significantly for all parties.

2. Resolving the "Counterparty Risk Externality"

In addition to multilateral netting, the other principal argument that is made in favor of mandatory CCP clearing for OTC derivatives is that CCPs will be able to overcome what some refer to as the "counterparty risk externality"[170] of bilateral markets, which in turn will lead to more accurate

[169]This figure is based on one set forth in Raymond Knott & Alastair Mills, *Modelling Risk in Central Counterparty Clearinghouses: A Review*, FIN. STABILITY REV. Dec. 2002, at 162, 163.

[170]Acharya & Bisin, *supra* note 145, at 3.

pricing of collateral. Typically, parties will be required to post collateral, called "initial margin," at the inception of a derivatives transaction and will be subject to adjustments to this initial margin, called "variation margin," throughout the course of the trade.[171] The parties' objective in using collateral is to force the counterparty to internalize the risk of default and therefore to price the collateral so as to reflect the risk that the counterparty will default on its obligation.[172] The so-called counterparty risk externality arises by virtue of the fact that counterparty risk is a function, at least in part, of the number of outstanding derivatives positions of a given party.[173] When Seller sells a credit default swap to Buyer A that requires Seller to pay Buyer A up to a certain notional amount (call it $100 million) upon the occurrence of a credit event at the reference entity (XYZ Inc. in the above example), the counterparty risk is the risk that Seller will not be able to perform on the contract if the credit event occurs. The risk that Seller will default on either contract, or both, increases if Seller sells another credit default swap to Buyer B. Yet in bilateral markets, Buyer A is not necessarily aware of the contract that Seller has with Buyer B. As the argument goes, in the absence of information regarding counterparties' outstanding derivatives positions, risk will be underpriced, which will lead to inefficient levels of default risk-taking in bilateral markets.[174] A CCP, by contrast, will have information regarding the outstanding positions of all dealers who are clearing members because the dealers' positions are the CCP's positions, as the CCP is a party to all cleared contracts.

While the counterparty risk externality may identify a serious informational advantage that a CCP has over bilateral markets, two observations are in order. First, participants in the OTC derivatives market are certainly not ignorant of the fact that counterparty risk increases with the number of outstanding positions held by the counterparty. Because it is in the interest of a trading party to reduce counterparty risk, it is also in the trading party's interest to incur costs to discover the information necessary to minimize the counterparty risk externality. To be sure, the signals that a party obtains will not be as free of "noise" as the information that a CCP will acquire by simply observing all of its outstanding positions. But the important point is that a CCP is an improvement not over the absence of

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[171] In the U.S., collateral used in OTC derivatives transactions tends to be either cash or cash substitutes, such as treasury bills. INT'L SWAPS AND DERIVATIVES ASS'N, INC., ISDA MARGIN SURVEY 2009 at 4 (2009), *available at* http://www.isda.org/c_and_a/pdf/ISDA-Margin-Survey-2009.pdf.

[172] *See* Chandler & Costa, *supra* note 168 at 647.

[173] *See* Acharya & Bisin, *supra* note 145, at 3-4.

[174] *See* Cecchetti et al., *supra* note 164, at 50.

information, but over "noisy" information. Thus, the counterparty risk externality might overstate somewhat the benefits gained from a CCP.

Second, and perhaps more importantly, the counterparty risk externality isn't really an externality at all, or at least, it is not an externality that is resolved by a CCP. An externality occurs "whenever the activities of one economic agent affect the activities of another agent in ways that are not reflected in market transactions."[175] Yet, as already discussed, transactions in the OTC derivatives market can be expected to reflect a trading party's best estimates regarding its counterparty's outstanding positions. These estimates will be noisy and subject to error, but the market will capture them nonetheless. To be sure, market transactions will not reflect the social costs of a failure to account accurately for outstanding positions. For example, some have calculated that the social costs of the failure of a financial institution to perform under an OTC derivatives contract could exceed $1 trillion when taking into account the costs on other industries, lost jobs, etc.,[176] and trading parties in the OTC derivatives markets certainly do not take into account these costs in calculating and pricing counterparty risk. If this is what is meant by "counterparty risk externality," then there is no doubt that that is a true externality. However, a CCP does not resolve that externality. Like dealers in a bilateral market, a CCP does not take into account the societal effect of a dealer's non-performance in calculating the magnitude of loss from default.[177]

There is little doubt that multilateral netting and the informational advantages of a CCP with respect to calculating the risk of default attributable to a counterparty's outstanding positions, even if somewhat overstated, are improvements over the current bilateral structure. In light of these considerations, a rule requiring clearing of OTC derivatives by a CCP might be a Pareto improving move, everything else equal. The problem, of course, is that everything else is not at all equal, as the next subsection demonstrates.

C. *Complicating the Argument for Mandatory CCP Clearing*

The standard argument for mandatory CCP clearing in the OTC derivatives market overlooks the importance of the elimination of information asymmetries in the financial innovation process, as explained in

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[175] WALTER NICHOLSON, MICROECONOMIC THEORY: BASIC PRINCIPLES AND EXTENSIONS 729 (7th ed. 1998).

[176] *See* Segoviano & Singh, *supra* note 144, at 15.

[177] *See* Acharya & Bisin, *supra* note 145, at 4.

Part II and reflected in Figure 2. In the case of the OTC derivatives market, information asymmetries arise from the complicating effect that the modern financial innovation process has on products and institutions. In particular, the financial innovation process leads to increased complexity in financial instruments and the institutions that deal in those instruments.[178] This increased complexity in turn increases the costs of developing counterparty risk models, which must take into account factors that are specific to both products and institutions. These costs are likely to be greater for a CCP than for participants in the bilateral market because of the comparative advantage of dealers in obtaining non-public (or at least publicly available, yet costly) information pertaining to product and institutional complexities. These informational advantages are reinforced by economies of scale in the development of counterparty risk models and incentives to invest in such models that simply do not exist (or at least do not exist to the same degree) in the case of a CCP.[179] If these increased costs outweigh the benefits of centralized clearing, then a mandatory CCP-clearing rule could actually result in an institutional structure that does a worse job pricing counterparty risk than the current bilateral market. This could lead to two potential outcomes. CCPs could increase the probability of default among systemically important entities and therefore multiply the number of bailouts that would occur in the absence of a CCP. Additionally, CCPs could act as a conduit for transmitting shocks from OTC derivatives markets to other markets, such as the new markets, which react particularly severely to such shocks, as discussed in Part II. To set the stage for this discussion, let us consider briefly the building blocks of counterparty risk models.

In financial economics literature, it is assumed that a counterparty will default on a derivatives trade only if it is both insolvent and at the same time owes a payment under the derivatives contract.[180] Counterparty risk is therefore principally a function of two variables: the expected exposure

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[178] *See supra* Part II.B.1 & 2.

[179] *See* Gordon C. Rausser et al., Centralized Clearing for Over-the-Counter Derivatives 9 n.11 (Sept. 18, 2009) (unpublished comment, *available at* http://escholarship.org/uc/item /494976mk).

[180] *See, e.g.*, Ludger Hentschel & Clifford W. Smith, Jr., *Risks in Derivatives Markets: Implications for the Insurance Industry*, 64 J. RISK & INS. 323, 331 (1997); *see also*, Edward I. Altman, Analyzing and Explaining Default Recovery Rates: A Report Submitted to the International Swaps & Derivatives Association 26 (Dec. 2001) (unpublished manuscript) (on file with author) (providing a survey of the four general types of extant credit risk models). While all of the available models focus on EE and PD, they may differ with respect to the assumptions they make regarding the relationship between EE and PD.

("EE")[181] at the time of default and the probability of default ("PD").[182] The value of a derivative, and therefore the exposure that a party bears with respect to the instrument, fluctuates over time and depends principally on the behavior of the price of the reference security.[183] Thus, the price of an interest rate swap is a function of the price of interest rates. The price of an exchange rate swap is a function of exchange rates and the price of a CDS is a function of the risk that the CDS is insuring against: the risk of default on the underlying debt security. For example, the price the Buyer pays for a CDS is typically a percentage (let us say 1%) of the instrument's notional amount (let us say $100 million), and the Buyer must pay this amount, like an insurance premium, on a periodic basis (perhaps quarterly). But recall that the Seller of a CDS promises to make the Buyer whole in the event that the reference entity defaults on the reference security. If the reference entity experiences an adverse shock that affects its credit, then the CDS will become more profitable to Buyer because it becomes more likely that Seller will have to make a payment. The risk of such price fluctuations is called "market risk," and models of such market risk have been a staple of risk management for years.[184] Indeed, the famed Black-Scholes model, which ushered in the modern era of financial engineering by setting forth a method for pricing options, is precisely such a model. And one of the challenges of financial innovation is developing models that will predict the market risk of new instruments.

Understanding the market risk, and therefore the expected exposure, of a derivative instrument is only one of the building blocks for modeling counterparty risk. After all, counterparties are not all created equal. Whereas a $30 million obligation might bankrupt a local community bank, the same obligation would be a drop in the bucket for a Wall Street firm. Thus, the risk that a counterparty will default on a payment obligation under a derivatives contract depends not only on the size of that payment obligation at a given time (i.e., EE), but also on PD at that time. Measurement of the PD must take into account past and current information regarding the counterparty's fiscal health, as measured both by balance sheet and off-balance sheet activities.

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[181]The expected exposure is the cost to Buyer of replacing the defaulted-on trade minus the expected recovery from the counterparty. So, let us say that Seller defaults in the fourth year of the trade when the price of the CDS on XYZ bond has increased from 1% of notional to 5% of notional and that the expected recovery from the Buyer is zero. The expected exposure of the trade would be 5% of notional, or $5 million.

[182]*See, e.g.*, Hentschel & Smith, *supra* note 180, at 330.

[183]HULL, *supra* note 46, at 1.

[184]*See* Kavanagh, *supra* note 146, at 252-53.

1. The Superiority of Bilateral Markets in Navigating Increasing Product and Institutional Complexity

Part II explained how the financial innovation process leads to products and institutions that exhibit increasing complexity. These increased complexities raise the costs of modeling the EE and PD components of counterparty risk. Parties in bilateral markets, however, are likely to model EE and PD at less cost than a CCP because of (i) dealers' closer proximity to financial innovation; (ii) dealers' greater access to (noisy) signals regarding a counterparty's institutional risk; (iii) economies of scale in the development of counterparty risk models that simply do not exist for a CCP; and (iv) dealers' greater resources to hire highly paid specialists with quantitative mathematical backgrounds. These informational cost savings are reinforced by incentives, in particular, the arguably weaker moral hazard effect and greater reputational constraints in bilateral markets as compared to CCPs.[185]

a. *Informational Advantages*

1. Informational Advantages in Calculating "Expected Exposure" (or the Superiority of Bilateral Markets in Navigating Product Complexity)

While the risks inherent in newer financial products are likely to be misunderstood as compared to more time-tested products, dealers will understand these risks better than a CCP because of their closer proximity to the source of the innovation. This is certainly true for the dealer who created the product in the first place. For example, J.P. Morgan, the creator of one of the first CDOs,[186] arguably understood the risks inherent in that security better than its competitors, as evidenced by its refusal to enter the market for the mortgage-backed variation of J.P. Morgan's original CDO, which it determined was simply not profitable in light of the substantial risks the security posed.[187] Moreover, new financial products are rarely created *ex*

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[185] *Id.* at 39-42.

[186] To be clear, a CDO is not a derivative. This example is used here simply to illustrate the general claim that the closer one is to innovation, the better one understands the nature, including the risks, of the innovative product.

[187] In the mid-1990's, J.P. Morgan pioneered a particular type of CDO, which was a precursor to the subprime mortgage-backed securities at the epicenter of the financial crisis. Instead of bundling together subprime assets, however, the original J.P. Morgan CDO, which eventually was referred to as a "synthetic" CDO, actually bundled together CDSs. As CDSs act like insurance on the risk of default of some credit instrument, the investors in these synthetic CDOs were essentially purchasing a claim on a pool of insurance premiums. At the time, the same J.P. Morgan team that created these synthetic CDOs also considered constructing them out of a pool of mortgages but

nihilo, "out of nothing," but instead build off of previous products. The "synthetic CDO" that J.P. Morgan introduced in the late 1990's was composed of bits and pieces of prior innovations.[188] This sort of innovation by precedent results in knowledge spillovers such that a dealer that invents a new product will obtain knowledge regarding the risks of products that were precedential in the development of that product but that the dealer itself did not invent. Finally, knowledge of product complexities may be diffused among dealer firms through the labor market.[189] There is a high turnover rate at dealer firms among "quants," specialists who are typically trained in some branch of the "hard" sciences and who are largely responsible for doing the heavy lifting required to bring a new financial innovation to light.[190] In moving from one dealer firm to another, these human repositories of product-specific knowledge help diffuse this knowledge among dealers.[191] Because CCPs do not themselves invent financial products, they are never in a position to benefit from this pattern of knowledge accrual concerning product complexities.

2. Informational Advantages in Calculating the "Probability of Default" (or the Superiority of Bilateral Markets in Navigating Institutional Complexity)

As discussed above, the "counterparty risk externality" identifies an informational advantage that a CCP has over bilateral markets because the CCP is able to view the outstanding positions of all dealer trades that are being cleared with the CCP whereas such information is concealed in

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ultimately decided against it, concluding that the risks didn't make the security profitable. *See* TETT, *supra* note 20, at 125-26. When other banks began offering such products, copying J.P. Morgan's original invention but replacing the pool of CDSs with a pool of subprime mortgages, J.P. Morgan twice re-considered entering the market, motivated by the apparently booming business being conducted by its competitors. *Id.* at 125-26, 140. But each time, the team reached the same conclusion that it had originally—the business was not profitable in light of the risks. *Id.* at 125-26. In retrospect, one explanation for why the other banks were willing to shoulder these risks whereas J.P. Morgan was not is that only J.P. Morgan truly understood the nature of the risks inherent in such securities because it successfully developed and marketed the original version. A competing explanation might be that the other banks were aware of and understood the risks involved in mortgage-backed CDOs but that they were seduced by the allure of short-term profits and figured that they would ride out the bubble until it burst. But this explanation almost raises more questions than it answers, not the least of which is how to account for such dramatic differences in culture and intra-firm incentives among Wall Street banks.

[188] TETT, *supra* note 20, at 125-26.

[189] *See, e.g.*, Börje Johansson and John M. Quigley, *Agglomeration and Networks in Spatial Economics* 10 (Berkeley Program on Housing and Urban Policy, Working Paper No. W04-004), *available at* http://www.escholarship.org/us/item/6g49t7n4.

[190] *See Hu, Misunderstood Derivatives*, *supra* note 7, at 1484.

[191] *See id.*

bilateral markets. This informational advantage is somewhat overstated, however, as dealers in bilateral markets also obtain information about the outstanding positions of trading parties, although this information is likely going to be obscured by "noise." Regardless, information pertaining to a dealer's outstanding derivatives positions is only one of the many factors that affect a dealer's probability of default, and dealers, not CCPs, have the informational advantage with respect to these other factors—what some refer to as "balance sheet risk."[192]

As explained in Part II, the financial innovation process increases the complexity of financial institutions, as such institutions replace less profitable, plain vanilla risk with more complicated risk. These risks do not derive solely from OTC derivatives but from the myriad services performed by a typical dealer, including trading and commercial lending. In the bilateral market, dealers in OTC derivatives adjust collateral levels to reflect estimates of counterparty balance sheet risks.[193] Clearinghouses, by contrast, typically do not.[194] The information that dealers rely on to estimate such balance sheet risk can come through a variety of different channels. First and foremost, dealers in bilateral markets look to their own balance sheet risk to make informed guesses regarding the balance sheet risk of trading parties.[195] Dealer firms operate in an industry that is characterized by herd behavior,[196] where the principle of minimum differentiation surely applies. Thus, the balance sheet risk of one dealer firm is to a certain extent predictive of the balance sheet risk of other dealer firms. Second, dealer firms obtain information regarding a trading party's balance sheet through industry consultants. Moreover, the work product created by these consultants does not fall on deaf ears but is instead taken seriously by market participants. For example, it was apparently an industry report by the consulting firm Oliver Wyman that spurred J.P. Morgan, which had pioneered one of the early versions of CDOs, to reconsider its earlier

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[192] *See, e.g.*, Craig Pirrong, The Economics of Clearing in Derivative Markets: Netting, Asymmetric Information, and the Sharing of Default Risks Through a Central Counterparty 4 (Jan. 8, 2009) (unpublished manuscript), *available at* http://ssrn.com/sol3/papers.cfm?abstract_id=1340660.

[193] *See id.* ("In bilateral markets (a) dealers expend resources to evaluate the balance sheet risks of their counterparties, and (b) charge different prices for risks to different counterparties by establishing different collateral requirements for different counterparties, and sometimes charging different counterparties different transaction prices to reflect different default risks.").

[194] *See id.* at 44 (noting the difference between CCPs and dealers in evaluating counterparty balance sheets).

[195] *See, e.g.*, *id.* at 14-15.

[196] *See supra* Part II.B.3.

resistance to CDOs backed by residential mortgages.[197] Finally, the sociology literature emphasizes the informal information flows in the financial services industry in general and the OTC derivatives market in particular.[198] Networks that give rise to interactions ranging from telephone conversations to after-work drinks at local bars facilitate information sharing that allows dealer firms to understand, interpret, and assess what other market participants are thinking and to form a "consensus view" regarding particular market trends.[199] These various channels provide dealer firms with important information regarding the balance sheet risk of rival dealer firms, information that CCPs do not typically seek out for purposes of calculating a dealer's probability of default.

3. Economies of Scale in Building Risk Models

Another source of dealers' comparative advantage over CCPs is that dealers in bilateral markets must manage not only market risk but default risk as well.[200] As discussed above, CCPs, by contrast, only manage default risk. Yet, default risk models themselves must piggyback on models of market risk because default risk is a function in part of the expected exposure of the derivatives over the life of the contract.[201] For dealers, who can use their development of market risk models to inform their default risk models, there are economies of scale. Thus, if there are two different default risk models, one of which is both of higher quality and costlier than the other, it is more likely that the dealer, not the CCP, will choose to produce the higher quality model despite the higher cost because of its ability to spread these costs across market risk models as well.

4. Talent

Not only are dealers more likely than CCPs to benefit from the knowledge accrual resulting from the proximity to new products, but dealers also have greater resources than CCPs to hire specialized talent for

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[197]Upon re-consideration, J.P. Morgan confirmed its previous conclusion that the risks outweighed the benefits. *See* TETT, *supra* note 20, at 140.

[198]*See, e.g.*, Pierre Agnes, *The "End of Geography" in Financial Services? Local Embeddedness and Territorialization in the Interest Rate Swaps Industry*, 76 ECON. GEOGRAPHY 347, 354 (2000).

[199]*Id.* at 356-58.

[200]*See* Pirrong, *supra* note 192, at 34-36.

[201]*See, e.g.*, Hentschel & Smith, *supra* note 180, at 329-31.

developing risk models for such products.[202] It is well understood that financial institutions are increasingly populated with so-called quants and rocket scientists, specialists who often have Ph.D.'s in a field requiring a quantitative mathematical background and who are charged with drawing on that background to develop new trading strategies, models and instruments.[203] These individuals often forego promising careers in academia for highly lucrative jobs on Wall Street, and their influence on modern financial markets cannot be underestimated. Indeed, it was quants from J.P Morgan, not from the Ivory Tower, who developed the "value-at-risk" model,[204] one of the most widely used market risk measures and, incidentally, one of the models that has drawn the ire of commentators for having failed to predict the losses resulting from the financial crisis.[205] CCPs simply do not have the resources to compete with dealers for this talent pool. While this competitive disadvantage may not be particularly significant where, as in futures markets, product risks are relatively well tested and well understood, this disadvantage is of grave concern when such risks are poorly understood, as they are with many (if not most) of the products in the OTC derivatives market.[206]

b. *Incentives – Moral Hazard and Reputational Constraints*

Finally, CCPs face a moral hazard problem that is arguably more severe than that faced by dealers. Moral hazard arises when insurance coverage causes a party to engage in behavior that actually increases the likelihood of incurring losses.[207] A considerable amount of ink has been spilled about the moral hazard effect that the bailout of Bear Stearns and AIG has had on large financial institutions.[208] Now that these firms know

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[202]*See* Pirrong, *supra* note 192, at 35-36.

[203]*See, e.g.*, Hu, *Swaps, supra* note 7, at338-39 (discussing how "quants" or "rocket scientists" rely on "the nuances of such matters as 'option pricing theory' . . . to take advantage of subtle differences among and inefficiencies in today's volatile capital markets" (citation omitted)).

[204]*See, e.g.*, Olivier Scaillet, *The Origin and Development of Value-at-Risk, in* MODERN RISK MANAGEMENT: A HISTORY 154-55 (2003) (explaining the role of JP Morgan in developing the VaR measure); TETT, *supra* note 20, at 33-34 (detailing J.P. Morgan's history of analyzing firm-wide risk on a daily basis).

[205]*See, e.g.*, Joe Nocera, *Risk Mismanagement: Were the Measures Used to Evaluate Wall Street Trades Flawed?*, N.Y. TIMES MAG., Jan. 4, 2009, at 24.

[206]Duffie et al., *supra* note 18, at 4-5.

[207]*See* Sean W. Gallagher, *The Public Policy Exclusion and Insurance for Intentional Employment Discrimination*, 92 MICH. L. REV. 1256, 1266 (1994).

[208]*See e.g.*, Viral V. Acharya et al., What if a Large, Complex Financial Institution Fails? (unpublished comment), *available at http://w4.stern.nyu.edu/news/docs/what_if_a_big_bank_fails.pdf.*

that the federal government will come to their aid in the event that any one of them faces the threat of insolvency, the argument goes, these institutions will actually engage in riskier behavior than before. While this moral hazard problem is significant, it could be worse. Importantly, the federal government did not bail out Lehman Brothers, and there is an ongoing debate regarding the wisdom of that decision.[209] Thus, there exists some residual uncertainty regarding the likelihood of a bailout of even large Wall Street banks, which of course are dealers in OTC derivatives, within the zone of insolvency. There is a general consensus, by contrast, that if OTC derivatives are subject to a mandatory clearing by CCPs, the CCPs themselves will become systemic institutions, and therefore they will benefit from an implicit government guarantee.[210] Thus, CCPs know with virtual certainty that if they cause a systemic event among their members by virtue of under-investing in models, they will be bailed out.

To be sure, there might be reputational costs that constrain CCPs from producing lower quality models. There is a rich theoretical literature that maintains that reputations can help buttress the production of quality in markets where information problems prevent regulators or consumers from verifying the quality of the product.[211] These reputational constraints, however, are not particularly significant, where, as is likely to be the case with CCPs, producing a higher quality product (here, a higher quality model) adds little to a firm's revenues and the time horizon for verifying a firm's reputation is particularly long. In this respect, the reputational constraints of a CCP for OTC derivatives markets might bear some resemblance to those placed on credit rating agencies.[212]

Credit rating agencies rate the creditworthiness of institutions and securities. These firms—which include familiar names such as Moody's, Standard & Poor's, and Fitch—have attracted a rash of criticism for what,

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[209] *See, e.g.*, SCOTT, *supra* note 47, at 41-42 (noting that "[i]t is unclear why the authorities decided upon the bankruptcy alternative" as opposed to a bailout of Lehman Brothers).

[210] *See, e.g.*, SCOTT, *supra* note 47, at 120 ("To be sure, these mega-concentrations of counterparty risk would demand vigilant regulatory oversight, and even perhaps an explicit guarantee by the Fed, the ECB, and other central banks.").

[211] One of the pioneering works in this literature is Benjamin Klein & Keith B. Leffler, *The Role of Market Forces in Assuring Contractual Performance*, 89 J. POL. ECON. 615 (1981). *See also* Russell Cooper & Thomas W. Ross, *Prices, Product Qualities and Asymmetric Information: The Competitive Case*, 51 REV. ECON. STUD. 197 (1984); Douglas W. Diamond, *Reputation Acquisition in Debt Markets*, 97 J. POL. ECON. 828 (1989); George J. Mailath & Larry Samuelson, *Who Wants a Good Reputation?*, 68 REV. ECON. STUD. 415 (2001); Carl Shapiro, *Premiums for High Quality Products as Returns to Reputations*, 98 Q. J. ECON. 659, 659-60 (1983).

[212] *See* Jill E. Fisch, *Top Cop or Regulatory Flop? The SEC at 75*, 95 VA. L. REV. 785, 813-15 (2009) (explaining the development of SEC oversight of credit rating agencies via the Credit Agency Reform Act of 2006).

with the benefit of hindsight, appears to have been exceedingly positive credit ratings that they ascribed to the mortgage-backed securities that fueled the financial crisis.[213]

Among the evidence that has emerged regarding the role of credit rating agencies in the financial crisis, there is some indication that reputational constraints failed to induce credit rating agencies to invest in more accurate models, at least in part, because such investments would not substantially increase the credit rating agency's revenues.[214] In addition, investors who relied on credit ratings for their investment decisions were not able to assess the reputation of a credit rating agency until after a meltdown, if even then.[215] These same factors are likely to be present in a CCP structure for OTC derivatives.

2. Bilaterally Cleared Markets v. CCP-Cleared Markets: The Cost-Benefit Problem

Table 1 below sets forth a tabular representation of the analysis of mandatory CCP clearing developed in this Part.

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[213] *See id.* at 814-15 (detailing a report issued by the SEC "criticizing the agencies for conflicts of interest, poor internal auditing, and noncompliance with disclosure requirements" in the context of mortgage-backed securities).

[214] Frank Raiter, former Managing Director and Head of Residential Mortgage Backed Securities Ratings at Standard & Poor's ("S&P"), testified before Congress that S&P did not adopt a model that would more accurately reflect the risk in structured products because "improving the model would not add to S&P's revenues." *Credit Rating Agencies and the Financial Crisis: Hearing Before the H. Comm. on Oversight and Gov. Ref.*, 111th Cong. 6 (2008) (statement of Frank Raiter).

[215] *See* Fisch, *supra* note 212, at 815 (noting the failure of the SEC to adopt the "two most significant reforms under consideration" to address conflicts of interest with credit rating agencies).

Table 1: Charting the Argument for Mandatory CCP clearing

	Pricing Collateral			Netting
	Market Risk ("Expected Exposure")	Balance Sheet Risk ("Probability of Default")	Minimizing the "Counterparty Risk Externality" ("Probability of Default")	
CCP	-	N/A	+	M
Bilateral Market	+	+	-	B

With respect to the cost of information necessary to accurately price collateral, the "plus" sign in Table 1 indicates a cost advantage, whereas the "minus" sign indicates a cost disadvantage. Thus, a bilateral market has a cost advantage over a CCP with respect to information pertaining to market risk and balance sheet risk whereas a CCP has a cost advantage with respect to information regarding outstanding derivatives positions, which reduces the "counterparty risk externality." In the netting column, the "M" refers to multilateral netting and the "B" refers to bilateral netting. The non-shaded area represents the standard argument for mandatory CCP clearing while the shaded area indicates how this Part has complicated that argument. The "not applicable" in the cell representing the CCP's cost of balance sheet risk information indicates that CCPs typically do not attempt to incorporate balance sheet risk information into estimates of the probability of default because of the prohibitive cost of obtaining that information.[216] As a summation of the analysis in this Part, Table 1 implies the following cost-benefit problem: whether noiseless information regarding outstanding derivatives positions (i.e., elimination of the "counterparty risk externality") will improve the accuracy of counterparty risk modeling by an amount that is greater than the loss in accuracy of such models by virtue of a CCP's inferior ability to model market risk and its apparent unwillingness to include, as model inputs, estimates of dealer firms' balance sheet risk. The next Part explores the implications of this cost-benefit problem.

[216] *See* Pirrong, *supra* note 192, at 43-45.

IV. IMPLICATIONS

The cost-benefit problem set forth in Part III, although resistant to simple answers, holds a number of implications for assessing the Dodd-Frank Act's adoption of a mandatory CCP-clearing rule and the continuing debate over the regulation of OTC derivatives in Europe.

A. *Clearing as "Shock Absorber" or "Shock Accelerator"?*

First and foremost, the cost-benefit problem suggests that a mandatory CCP-clearing rule for OTC derivatives, without regard for issues of information asymmetry, is not as obviously Pareto-improving as its proponents have made it out to be. In particular, this cost-benefit problem suggests that far from acting as a "shock absorber," a CCP for OTC derivatives could realistically act as a "shock accelerator" depending on how the calculus works out in practice.[217] To see this, it might help to think about a CCP as an insurance provider.[218] When an individual purchases insurance for, let's say, the risk of getting into a car accident, the insurance company must confront the challenge of how to price that risk through insurance premiums so as to minimize the likelihood that the individual will take on more or less risk than she would in the absence of insurance. To this end, the insurance company gathers various bits of information on the insured that helps it to model the driver's risk of accident. If the insurance company misses an important piece of information, for example, the driver's proclivity for rush-hour drag racing, premiums may be lower than they would if that piece of information had been included in the actuarial calculation. In the face of lower premiums, the driver is paying less than it should on an actuarial basis for the risk of reckless driving and will likely engage in more of it.

The same general logic applies to CCPs, who, after all, act as insurers of counterparty risk. If the counterparty risk models used by a CCP to price collateral (which can be thought of as a sort of insurance premium) are less accurate than those used by counterparties in the bilateral markets, a distinct possibility in light of the information asymmetries highlighted in Part II, then a mandatory CCP-clearing rule would lead to less optimal risk-taking than that provided for by bilateral markets. This increased "model risk" could lead to one of two outcomes, depending on the output of the

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[217] Aline Vanduyn & Jeremy Grant, *OTC Clearers Pose Fresh Dilemma*, FIN. TIMES, Jan. 14, 2010, at C1.

[218] I'm not the first to analogize collateral to insurance. *See* Pirrong, *supra* note 192, at 32.

CCP's model, and therefore requires consideration of two cases.

The obvious case is where the CCP model underprices counterparty risk relative to bilateral markets. Dealer firms will look for these opportunities and exploit them, and as illustrated by our experience with credit rating agencies prior to and during the financial crisis, dealer firms are extraordinarily agile at gaming models created by third-parties.[219] In that case, a mandatory CCP-clearing rule could actually lead to an increase in counterparty risk among OTC derivatives dealers, which in turn could increase systemic risk. The ultimate result would be an increase in the frequency and possibly magnitude of government bailouts of systemic institutions, which of course would include the CCPs. While CCPs have proven to be remarkably stable in futures and equity markets, they are not foolproof, and CCPs have been known to fail in the past.[220] If such an outcome were to materialize, it would be hard to think of another law that more epitomized the principle of unintended consequences than the mandatory CCP-clearing rule.

But what if information asymmetries affect CCP models in a different way and in fact produce the opposite effect, leading CCPs to overprice risk relative to bilateral markets? At first blush, one might be inclined to think that such an outcome wouldn't be particularly objectionable. After all, if the financial crisis stands for any principle in particular, it might be that market actors at large Wall Street banks, including OTC derivatives dealer firms, are inclined to assume an inefficiently high degree of risk, which can lead to disastrous results.[221] Thus, less risk-taking might come as a breath of fresh air. Indeed, numerous commentators have essentially taken this position with respect to the financial sector in general.[222]

Even this case may lead to an increase in systemic risk, however, if

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[219] *See* TETT, *supra* note 20, at 100 (recounting how Moody's decision to make its CDO model publicly available allowed bankers to exploit loopholes in the model).

[220] For example, Paris in 1973, Kuala Lumpur in 1983 and Hong Kong in 1987. *See* Raymond Knott & Alastair Mills, *Modelling Risk in Central Counterparty Clearing Houses: A Review*, 13 FIN. STABILITY REV. 162, 164 (2002). Also, if one takes a longer view, CCPs do not appear quite as robust. For example, in the 19th century, the "Bourse" in Paris, which was essentially an early derivatives exchange, had to be bailed out by the Banque de France more than once. *See* Angelo Riva & Eugene N. White, *Danger on the Exchange: How Counterparty Risk Was Managed on the Paris Bourse in the Nineteenth Century* 3 (Nat'l Bureau of Econ. Research, Working Paper No. 15634, 2008).

[221] *See, e.g.*, Lucian A. Bebchuk & Holger Spamann, *Regulating Bankers' Pay*, 98 GEO. L. J. 247 (2010).

[222] *See, e.g.*, Claire Hill & Richard Painter, *Berle's Vision Beyond Shareholder Interests: Why Investment Bankers Should Have (Some) Personal Liability*, 33 SEATTLE U. L. REV. 1173 (2010).

dealers are required to post additional collateral that is unexpected because of inaccuracies in the way the CCP's counterparty risk model estimates market risk. In other words, the CCP might overprice risk on a static basis but underprice risk on a dynamic basis. For example, the CCP might overprice risk because it over-estimates the dealer's "probability of default," perhaps because it over-compensates for the lack of information available to it on balance sheet risk. Thus, the dealer might have to initially post $5 million cash collateral whereas in the bilateral markets, it would only have to post $2 million. By contrast, as a general matter, the CCP might underestimate the "expected exposure" because it under-estimates market risk—perhaps it underestimates the probability that the price of the derivatives will fluctuate by more than a reasonable range in a given day. If, contrary to the model's prediction, the price does fluctuate outside of this reasonable range, then the dealer will have to post additional collateral. Since this collateral posting requirement is by definition "unexpected," the dealer may be forced to sell assets in another market in order to meet the collateral obligation in the OTC derivatives market. If that second market is one of the "new markets" discussed in Part II, the sale of assets in the new market and the corresponding downward pressure on price in the new market could cause that market the type of stress that caused the CDO market to freeze up. In this way, a CCP's model risk relative to bilateral markets can actually result in the transmission of shocks from the OTC derivatives market to other, entirely distinct markets.

B. *Reframing the Debate Part I: "Information Asymmetries" and "Standardized Terms"*

As an encapsulation of the analysis in Part III, the cost-benefit problem also suggests that the debate concerning a mandatory CCP-clearing rule for OTC derivatives itself has overlooked, or at least minimized the importance of, information asymmetries in the modern financial innovation process in general and the OTC derivatives market in particular. Consequently, it suggests that a fundamental reframing of the discussion is in order. Part III proceeded on the assumption that the proposed mandatory CCP-clearing rule would require the mandatory CCP clearing of all OTC derivatives. In actuality, however, this isn't quite right. Rather, the Dodd-Frank Act requires the mandatory CCP clearing of only those derivatives that the CCP or the SEC deems suitable for clearing.[223] The commentary that

[223] *See* Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. No. 111-203, § 723(a), 124 Stat. 1376, 1675-81 (2010).

preceded adoption of this mandatory clearing provision of the Dodd-Frank Act made clear that the decision as to what type of derivatives were to be subject to clearing ultimately was a decision as to whether the derivative was "standardized" or not.[224] However, as explored throughout this article, the standardization of terms is only one of the drivers of the process by which products migrate to markets, whether from banks to arm's length transactions or from arm's length transactions to CCPs and exchanges. The absence of information asymmetries, of course, is the other key driver, and, as argued at some length in Part III, there is reason to believe that in the case of OTC derivatives, there is the potential for substantial asymmetries between dealers and a CCP. Nor is it the case that a "standardized" product will necessarily be free of substantial information asymmetries between the financial intermediary and the market. Indeed, one need look no further than asset-backed CDOs for an example of a security that was sufficiently standardized to migrate from financial intermediaries to markets but that still exhibited substantial information asymmetries. Thus, a mandatory CCP clearing rule will only be effective to the extent that the relevant decision-maker takes into account not only whether a derivative exhibits a standardization of terms but also whether the product in question creates relatively few information asymmetries between the CCP and market participants. Yet, the debate about mandatory clearing has focused almost exclusively on the importance of standardized terms.

C. *Reframing the Debate Part II: Who Decides What Gets Cleared?*

The cost-benefit problem set forth in Part III suggests the need not only for a reframing of the inputs that must enter the decision regarding what gets cleared in the OTC derivatives market, but perhaps also a reframing of who—market actors, regulators, or CCPs themselves—should make the decision in the first place. Proponents of a mandatory CCP-clearing rule would allocate decisionmaking authority to regulators,[225] and indeed this is the approach taken by the Dodd-Frank Act.[226] At first blush, this is not necessarily the most intuitive choice, even if one endorses the standard argument for mandatory CCP clearing, which rests on two pillars:

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[224] *See supra* note 150.

[225] *See* Letter from the Committee on Capital Markets Regulation to the U.S. Senate Committee on Banking, Housing and Urban Affairs and to the House Financial Services Committee 2 (March 4, 2010), *available at* http://www.capmktsreg.org/pdfs/10-Mar-4_Committee_Derivatives_Letter.pdf.

[226] *See* Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. No. 111-203, § 723(a), 124 Stat. 1376, 1675-81 (2010).

multilateral netting and resolution of the "counterparty risk externality."[227] Yet on their face, these two pillars suggest that market participants themselves should prefer markets cleared by CCPs since these pillars confer private benefits on market actors.[228] After all, multilateral netting should lead to a reduction in costly collateral requirements, since netting would take place over a larger number of contracts. And by taking into account all outstanding derivatives positions among dealer firms in order to model a firm's probability of default, thereby resolving the "counterparty risk externality," a cleared OTC derivatives market should at a minimum reduce uncertainty concerning a dealer's probability of default and may also lead to a reduction in collateral requirements.[229]

Thus, to maintain that regulators, not market actors, must decide what gets cleared while at the same time endorsing the standard argument for mandatory CCP clearing, one must point to some inefficiency in the market preventing market actors from making the socially efficient choice, which according to proponents of the mandatory rule, is a migration to a cleared market. These potential inefficiencies come in essentially two varieties: market failures and incentive problems. The account developed in Part III regarding information asymmetries complicates these inefficiency stories because it suggests that there might be a different explanation for why OTC derivatives have not migrated to CCP-cleared markets.

1. Market Failure: Systemic Risk as an Externality

One possible reason why financial intermediaries haven't moved OTC derivatives contracts to CCP-cleared markets is that bilateral OTC derivatives markets exhibit a market failure due to externalities. "An *externality* occurs whenever the activities of one economic agent affect the activities of another agent in ways that are not reflected in market transactions."[230] The paradigmatic example of an externality is the costs that a firm imposes on other firms as a result of pollution.[231] Perhaps two firms are located on a river, and the downstream firm's output decreases as the

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[227]Letter from the Committee, *supra* note 225, at 2-3.

[228]Others have made the point that the benefits of a cleared market are largely private. *See, e.g.*, Bliss & Steigerwald, *supra* note 66, at 25 (noting that the delegation of credit risk management to CCPs typically reduces costs to dealers); Pirrong, *supra* note 192, at 48 ("[I]f the information [each dealer] produces is transferred to the CCP, the members benefit collectively.").

[229]*See* Part III.B.1.

[230]NICHOLSON, *supra* note 175, at 730.

[231]John A. Rothchild, *The Social Costs of Technological Protection Measures*, 34 FLA. ST. U. L. REV. 1181, 1204 (2007).

upstream firm dumps more pollution into the river. The polluting firm does not take into account these social costs and therefore produces more pollution than is efficient from a societal standpoint.[232] If the polluting firm were forced to internalize these costs, for example through an excise tax equivalent to the cost of the externality, then the market might be able to overcome this inefficiency.

In the case of dealers in bilateral OTC derivatives markets, instead of pollution, the externality in question is thought to be systemic risk, or the risk that one financial institution's failure will cause a domino effect of failures at other major financial institutions.[233] Thus, the counterparty risk of one firm imposes costs on other firms, not just counterparties who are able to force the risky firm to internalize these costs through mechanisms like the use of collateral. The risk also imposes on other firms that are not involved in derivatives transactions as a result of the domino-like effect of systemic risk. The costs imposed on this second group of firms—those who aren't involved in the derivatives transactions—are the source of the externality. Thus, if the lion's share of the benefits from clearing falls on these third-parties instead of on the dealers themselves, dealers will have little incentive to move to CCPs.

The problem with this argument, however, is that it is not evident that the lion's share of the benefits from a CCP-cleared market falls on third parties. In the paradigmatic externality case, the polluting firm is not on its own initiative going to scale back production in light of the costs imposed on the third-party because it would bear all of the costs and none of the benefits. Thus, policy makers can conclude with near certainty that the firm's behavior is not socially efficient and intervene in the market. But according to the "standard argument" for mandatory CCP clearing itself, dealers in bilateral markets would reap substantial benefits from moving to a CCP.[234] Of course, third parties would gain as well by this move. But because these third-party benefits are bundled with benefits that redound to the dealers themselves, there is no way of inferring from dealers' refusal to move to CCP-cleared markets that this failure to act is socially inefficient. CCPs do not price collateral so as to force dealers to internalize the costs of default to society as a whole (i.e., systemic risk).[235] Rather, they price collateral so as to force dealers to internalize the costs of default as applied solely to the other

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[232] *See, e.g.*, *id.* at 731.

[233] *See, e.g.*, Duffie, *supra* note 142.

[234] *See* Andrew M. Kulpa, *Minimal Deterrence: The Market Impact, Legal Fallout, and Impending Regulation of Credit Default Swaps*, 5 J.L. ECON. & POL'Y 293, 307-08 (2009) (explaining how a CCP acts as a guarantor for derivatives).

[235] *See*, Pirrong, *supra* note 192, at 18-19.

members of the CCP. Thus, the metaphor of the polluting firm is entirely misleading as applied to OTC derivatives clearing.

The more apt metaphor paints a considerably more complex regulatory problem. It might go something like this: The polluting firm is overproducing for a reason independent from the externality, for example, its failure to efficiently manage its own cost structure. In other words, because of a lack of information, coordination or sheer human error, the polluting firm thinks that its costs of production are much lower than they actually are and has to decide whether to outsource management of its cost structure to some third party (call it "Cost Crusading Pirates" or "CCP" for short). In that case, the polluting firm would reap substantial benefits from hiring "Cost Crusading Pirates" to manage its cost structure, and the firm located downstream would also obtain benefits if production were curbed. But, unlike in the case of the paradigmatic externality example, regulators cannot even be reasonably comfortable (let alone certain) that the polluting firm's failure to incur the costs to hire Cost Crusading Pirates is socially inefficient. The same is true of the "counterparty risk externality" in the OTC derivatives market. Consequently, the argument that market failure due to a "systemic risk externality" requires that regulators and not market actors decide what gets cleared is weak at best.

2. Incentives

In addition to arguments about market failure, incentive-based arguments have also been deployed to explain why market participants are incapable of reaching the socially efficient result of when to move particular OTC derivatives contracts to a CCP.[236] One prominent example of this type of argument focuses on the notion that dealers might reap higher profits in a bilateral market to the extent that it is less liquid than a cleared market.[237] Dealers who buy and sell OTC derivatives on behalf of clients are market makers in these securities. They match up buyers with sellers and profit from the spread between the two prices. Thus, a dealer might have one client, Client B, who wants to buy a derivative at a certain price, say $10, and another client, Client S, who wants to sell the same derivatives for another price, say $9.50. The dealer in a sense, buys the derivatives from Client S for $9.50 and sells it to Client B for $10. The spread between these two prices is the "bid-ask" spread, and it represents the profit that the dealer

[236] *See* Duffie, *supra* note 142, at 10-11.
[237] *See, e.g.*, *id.* at 7-8.

makes for facilitating the transaction.[238]

Dealers of course would prefer a wider "spread" since that would imply greater profits, and the width of the spread is in part a function of the liquidity in the market.[239] The greater the transparency regarding the quantities being traded and the prices at which those quantities are being traded, the greater the liquidity in the market and the narrower the spread.[240] OTC derivatives markets are likely less liquid than CCP-cleared markets because CCP-cleared markets increase transparency regarding prices and quantities of securities traded.[241] Thus, the crux of this argument is that dealers prefer bilateral markets because they lead to less transparency, wider spreads, and therefore higher profits.

This liquidity-based argument certainly seems plausible, but it is unclear why this argument supports the notion that regulators instead of market actors should decide what derivatives products get cleared. After all, there are ways of increasing transparency in OTC derivatives markets, for example through central information depositories, that do not require the implementation of a mandatory CCP-clearing rule.

These arguments based on market failure and misaligned incentives in the OTC derivatives market may support a mandatory CCP-clearing rule, although even that proposition is problematic because, as discussed above, a CCP does not really resolve the market failure problem and is not the only way to resolve the incentive-based problem. The possibility of substantial information asymmetries, however, complicates these arguments even further because they offer a reason why the decision of "what gets cleared and when" should be allocated to those with greater information: the dealers.

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[238]Stanislav Dolgopolov, *Insider Trading and the Bid-Ask Spread: A Critical Evaluation of Adverse Selection in Market Making*, 33 CAP. U. L. REV. 83, 88-89 (2004).

[239]*Id.* at 89 ("The importance of the spread is that it represents . . . the 'cost of trading and the illiquidity of a market.'" (quoting Hans R. Stoll, *Market Microstructure, in* 1A HANDBOOK OF THE ECONOMICS OF FINANCE 562 (George Constantinides et al. eds., 2003))).

[240]*See* Joel Hasbrouck, *Measuring the Information Content of Stock Trades*, 46 J. FIN. 179, 179 (1991) ("Central to the analysis of market microstructure is the notion that in a market with asymmetrically informed agents, trades convey information and therefore cause a persistent impact on the security price.").

[241]*See, e.g.*, Bliss & Steigerwald, *supra* note 66, at 26 (explaining that one of the benefits of a CCP-cleared market is increased liquidity); Cecchetti et al., *supra* note 164, at 49.

D. *Reframing the Debate Part III: The "New" Governance and the Search for a "Third Way" for Regulating the Financial Innovation Process*

At a high level of generality, the mandatory CCP clearing argument goes something like this: The OTC derivatives market, predominantly unregulated, proves unable to regulate counterparty risk on its own as evidenced by its contributing role in the most severe economic downturn since the Great Depression.[242] Therefore, the regulatory fix is to shift the risk-management role from private market actors to a third-party operating under the watchful eye of regulators. Underlying this argument, there is an assumption that the choice here is between bottom-up solutions and top-down prescriptions, regulation versus deregulation, the administrative state versus the private market actor. It is common to characterize the history of financial regulation as a pendulum swinging back and forth between these two regulatory poles, and the rhetoric pertaining to the most recent financial crisis is no different.[243] Yet, as we have seen, the regulatory problem presented by OTC derivatives itself is considerably more complex than is suggested by these simple dichotomies. Along certain dimensions, CCP-cleared markets provide advantages over bilateral markets, and market failures and misaligned incentives may prevent unregulated market actors from capturing these benefits. Yet, at the same time, significant information asymmetries between financial intermediaries and CCPs threaten not only to undermine the potential benefits of cleared markets but, paradoxically, to create a system that is even more sensitive to economic shocks and systemic events than the current one.

This type of regulatory problem simply requires a different regulatory paradigm than that provided by the starkness of New Deal-era categories.[244] This new paradigm must be able to harness the greater expertise and information of private market actors and supplement it with

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[242] *See,* Duffie , *supra* note 142, at 1.

[243] *See* Joseph E. Stiglitz, *Principles of Financial Regulation: A Dynamic Portfolio Approach*, 16 WORLD BANK RES. OBSERVER 1, 1 (2001); Jackie Calmes, *Both Sides of the Aisle See More Regulation, and Not Just of Banks*, N.Y. TIMES, Oct. 13, 2008, at A15 (quoting Robert E. Litan, an economist with the Brookings Insitution as asking rhetorically whether "the pendulum [is] going to go completely over in the other direction" [(i.e., away from deregulation)]); Bob Davis et al., *Unraveling Reagan: Amid Turmoil, U.S. Turns Away from Decades of Deregulation*, WALL ST. J., July 25, 2008, at A1 (characterizing financial regulatory history as a "pendulum swinging back and forth"); Lawrence Summers, *The Pendulum Swings Towards Regulation*, FIN. TIMES, Oct. 27, 2008, at 13.

[244] *See* Orly Lobel, *The Renew Deal: The Fall of Regulation and the Rise of Governance in Contemporary Legal Thought*, 89 MINN. L. REV. 342, 343 (2004).

government-sponsored institutions that can pick up the slack or help correct for private market actors' misaligned incentives. Framed in these terms, the regulatory problem presented by the modern process of financial innovation, in general, and the OTC derivatives market, in particular, bears some resemblance to regulatory problems that contemporary legal thought has sought to address through what has been referred to as the "new governance paradigm."[245]

Motivated in part by "new levels of complexity, unpredictability, and dynamic change in society,"[246] this new regulatory paradigm emphasizes, among other things, collaboration between market participants and regulators with due regard for the "localness" of human knowledge.[247] Below I sketch the broad outlines of two potential alternatives to a mandatory CCP-clearing rule that seek to fit within this description of the new governance paradigm. The first alternative draws on collaboration between dealers and regulators to overcome the type of information asymmetries that threaten to undermine the effectiveness of CCPs. The second alternative solves this problem in a different way: by centralizing elements of bilateral markets and subjecting these elements to regulatory oversight but maintaining management of and liability for default risk with dealers. Each has its benefits and deficiencies, although the second may ultimately hold more promise.

1. Centrally-Cleared Markets with Bilateral Features

The first possible alternative to a mandatory CCP-clearing rule is not so much an alternative to the rule itself—indeed, under this proposal, there would still be a mandatory rule—but rather a modification to the way in which the typical CCP-cleared market functions. Typically, a CCP develops its own counterparty risk models without input from its members, the dealer firms.[248] The approach suggested here, by contrast, would require the dealer firms to share their models with CCPs so that CCPs could benefit from dealers' greater expertise and proximity to products. Perhaps the parties could even collaborate on the development of the model to be used by the CCP. The benefits of such an approach should be obvious: harness dealer firms' comparative advantage at modeling counterparty risk, particularly

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[245] *See id.*; *see also* IAN AYRES & JOHN BRAITHWAITE, RESPONSIVE REGULATION: TRANSCENDING THE DEREGULATION DEBATE (1992).

[246] Lobel, *supra* note 244, at 358.

[247] *Id.* at 382.

[248] *See* Pirrong, *supra* note 192, at 34 (describing how a CCP prices risk internally).

market risk, while preserving a CCP's informational advantage regarding outstanding positions and the benefits from multilateral netting. Would dealer firms be willing to share these models with the CCP? They might, but once dealers share these models initially, they would subsequently have an extremely strong incentive to develop better models to exploit circumstances where the CCP underprices counterparty risk, thus leading right back to the same concerns that animated the discussion in Part III.A. in the first place. Thus, dynamic concerns constitute a significant hurdle to this type of institutional alternative.

Is there a way of addressing these dynamic concerns? Not without some sort of mandatory rule requiring dealers to update the CCP regarding model upgrades and improvements, provided that such a rule is actively enforced with sanctions. But even if the enforcement costs of such an arrangement were not prohibitive (a big "if"), there are potentially significant costs from encouraging that level of homogeneity in risk modeling, as homogeneity can cause markets to overreact to unexpected market shocks, potentially causing asset fire sales and plummeting prices.[249] And even if one were to overcome these admittedly severe drawbacks, there are limits even then to how much of a benefit this type of institutional alternative would provide. In addition to market risk, dealers have an informational advantage with respect to estimating a trading party's "balance sheet risk." Yet, it would most likely not be cost-effective for dealers to share with the CCP information concerning these risks, as this information changes constantly. And even if dealers did engage in such information sharing, this type of information, gathered through informal networks, is more likely to be deployed in the type of flexible, backroom negotiating that takes place in bilateral markets over collateral calls[250] rather than in the rigid modeling of CCPs.

2. Bilaterally Cleared Centralized Markets

A potentially more promising institutional alternative might be a modified version of bilateral markets that seeks to capture many of the benefits of a CCP while at the same time avoiding the information

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[249] *See* Erik F. Gerding, *Code, Crash, and Open Source: The Outsourcing of Financial Regulation to Risk Models and the Global Financial Crisis*, 84 WASH. L. REV. 127, 184 (2009) (discussing Carol Alexander, *The Present and Future of Risk Management*, 3 J. FIN. ECONOMETRICS 3 (2005)).

[250] For an example of this type of negotiating, see TETT, *supra* note 20, at 232 (describing how J.P. Morgan entered into a negotiation with Lehman Brothers over collateral that Lehman owed).

asymmetries that may increase a CCP's model risk. In some respects, bilateral OTC derivatives markets have been moving in this direction for some time now.[251] Yet, they have been evolving without regulatory oversight and in the presence of potentially misaligned dealer incentives. What this proposal would accomplish would be to create an institutional alternative to a CCP that is subject to proper regulatory oversight and that accounts for the complexities of the modern financial innovation process, including its increasing product and institutional complexities and potentially fragile markets. The proposal focuses on two elements: (a) netting counterparties and (b) increased transparency.

a. *"Netting Counterparties"*

One of the clear benefits of a CCP is the availability of multilateral netting. Because the CCP is a party to every contract, there is greater opportunity to reduce outstanding default risk exposure through netting than in the bilateral markets. Nevertheless, netting in bilateral markets could be improved substantially through the use of mandatory netting counterparties. Like a CCP, these netting counterparties would perform netting services for dealer firms. However, unlike a CCP, they would not insure against default risk and therefore wouldn't manage default risk; nor would they, as a legal matter, become a party to any OTC derivatives contracts between dealers. The benefit of this structure over bilateral markets would arise from the counterparty's detecting redundant positions and notifying dealers of these redundancies so that dealers can take appropriate steps to eliminate them. For example, recall the depiction of bilateral clearing in Figure 3(a). A netting counterparty might reduce the exposures in this case by identifying the fact that there is a redundancy in the D–A–C–D path. This redundancy could be eliminated by subtracting $100 from each cash flow depicted in that path, which would reduce each dealer's default risk exposure by $100, leaving Dealer C with no exposure at all. To be sure, the reduction in default risk exposure overall would not necessarily be as great as with a CCP, as illustrated by comparing the exposure outcomes described here to those depicted in Figure 3(c). But the benefit would likely be substantial, and the more redundancies, the greater the benefit.

Netting counterparties would be feasible for two reasons. First, there is a historical precedent. The Chicago Board of Trade ("CBOT") didn't establish a CCP until 1925; instead, beginning in 1883, it successfully

[251] Chander & Costa, *supra* note 168, at 655 (describing how Lehman Brothers "faced dealer and customer counterparties" in bilateral derivatives markets).

operated an institution that had no liability in the event of default and simply calculated net margin obligations, just like a netting counterparty as defined here.[252] Second, there are already private parties, such as a company called TriOptima, that offer the type of netting services that would be performed by a netting counterparty.[253] These private services are relatively new, but have proven useful for those dealer firms that have decided to use their services.[254] There are a number of issues that would need to be worked out, of course, and this article leaves those issues for another day. It is worth noting, however, that any netting counterparty would likely need to be subject to close regulatory oversight. It is likely that netting would be optimized under a single netting counterparty,[255] and therefore regulators would need to ensure that the counterparty's monopoly position didn't detract from netting quality. Regardless, however, even alternative industry structures would likely need regulatory oversight considering the value of the service provided.

b. *Increased Transparency*

As explained in the preceding subpart, dealers may prefer the relative opaqueness of OTC derivatives markets to the extent that it decreases liquidity, bid-ask spreads and ultimately the dealers' profits. For this reason, proponents of mandatory CCP clearing tout the benefits of the increased transparency that accompanies a CCP-cleared market.[256] Yet, there are other means of increasing market transparency without having to resort to mandatory CCP clearing. One way would be to encourage the establishment of central information depositories,[257] perhaps in connection with the creation of a netting counterparty. Such a depository would need to be accessible to other dealers through the internet, and would need to include

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[252]Craig Pirrong, *The Industrial Organization of Execution, Clearing and Settlement in Financial Markets*, 44-45 (Jan. 23, 2007) (unpublished manuscript), *available at* http://www.isnie.org/ assets/files/papers2007/craig.pdf.

[253]*See* Bliss & Steigerwald, *supra* note 66, at 27; Elisabeth Ledrut & Christian Upper, *Changing Post-Trading Arrangements for OTC Derivatives*, BIS Q. REV. 83, Dec. 2007, at 92-93.

[254]*Id.* at 92.

[255]*See* Darrell Duffie & Haoxiang Zhu, *Does a Central Clearing Counterparty Reduce Counterparty Risk?* 4 (Rock Ctr. for Corp. Governance at Stanford Univ. Working Paper No. 46, 2010) (finding that the benefits of netting are greater where there is a single CCP in the market), *available at* http://ssrn.com/abstract=1348343.

[256]*See,* Duffie, *supra* note 142, at 17-18. ("Improving the price transparency of the OTC derivatives markets could also increase the competitiveness and the efficiency of risk sharing, by making it easier for investors to determine 'going prices.'").

[257]Ledrut & Upper, *supra* note 253, at 92.

information concerning prices and quantities of derivatives traded. Further, the depository would need to be archived so that dealers could access historical trading patterns as well.

There are already attempts to create such depositories, along with the successful creation of an information depository for certain OTC derivatives,[258] but these efforts are not being coordinated and in some cases they are focused solely on collecting data on trade volumes, not pricing.[259] That is where regulators would come in. Regulators would oversee the creation of such depositories and then monitor them on an ongoing basis to ensure that information regarding new products is making its way into such depositories. Such information depositories would go a long way to create increased transparency in bilateral markets, thereby minimizing dealers' incentives to seek refuge in the bilateral markets from increased pressure on dealer profits.[260] But in addition, information depositories would also improve the currently noisy signals that dealers in the bilateral markets rely on to estimate outstanding derivatives positions, which as explained in Part III, is a central variable in calculating default risk.

I have provided here only a very rough sketch of what a bilaterally cleared centralized market might look like. The goal of such a market structure should be first and foremost centralization – of both information and netting activities – but importantly not centralization of default risk. Bilaterally cleared centralized markets structured with this primary goal in mind would avoid the information asymmetries of a mandatory CCP-clearing rule while capturing many of the other benefits of a pure, centrally cleared market. Importantly, this type of structure would also improve incentives among dealers to move derivatives contracts to centrally cleared markets, and because the decision of what gets cleared would remain with market actors, the products that migrate to CCPs would likely be only those that satisfy the two prerequisites to market migration: the elimination of information asymmetries and the standardization of terms.

For proponents of a mandatory CCP-clearing rule, including the rule adopted by the Dodd-Frank Act, both of the alternatives presented here will inevitably be unacceptable. They lack the "elegance" of the mandatory CCP-clearing rule and in any case fail to articulate a satisfactorily proportionate response to what most perceive as a dramatic failure of private ordering.

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[258] *See id.* at 93; Jeremy Grant, *Interest Rate Swap Data Go Public*, FIN. TIMES, Apr. 29, 2010, at 28 (describing TriOptima's information depository for interest rate derivatives).

[259] *See* Duffie et al., *supra* note 18, at 17-18.

[260] *But see* Aline van Duyn, *Transparency of Derivatives Becomes Key Battleground*, FIN. TIMES, Mar. 11, 2010, at 33 (describing dealers' opposition to such disclosure efforts on the ground that it would decrease liquidity "because rivals could detect what positions were held").

Because this article began with an insight from the "New Institutional Economics" literature, however, it seems only fitting to end with another insight from that same literature: the importance of eschewing hypothetical ideals by focusing on the least flawed of competing policy alternatives.[261] As Part III demonstrated, the standard argument for mandatory CCP clearing is based on a conception of the trade-offs of the problem that ignores, or at the very least discounts substantially, the importance of information asymmetries created by the financial innovation process. Thus, the mandatory CCP-clearing rule may simply be a hypothetical ideal. Are the alternatives sketched here perfect? Of course not; nor do they purport to be. They hopefully, however, will serve as guideposts in a reframing of the debate.

V. CONCLUSION

In this article, I have argued that any approach to financial regulation in the wake of the most significant financial crisis since the Great Depression must take into account the modern financial innovation process and its effect on instruments, institutions and markets. I have attempted to develop an account of this process by focusing on the dynamic relationship between financial intermediaries and markets, arguing that banks and markets are at once substitutes and complements in the provision of financial products and the management of risk, and that this relationship predicts increasing product complexity, increasing institutional complexity, and the emergence of new markets that may exhibit fractures in times of stress. This pattern, I concluded, complicates the economics of financial regulation by increasing informational asymmetries between market participants and regulators and implies the need for a new regulatory paradigm that eschews New Deal-era dichotomies between bottom-up solutions and top-down prescriptions. I explored these claims by conducting a critical analysis of the rule, adopted by the Dodd-Frank Act and still the subject of debate in Europe, to regulate the financial innovation process by forcing a migration of OTC derivatives from bilateral markets to markets that are "cleared" by a centralized clearing party. My analysis suggests that that the debate over mandatory centralized clearing overlooks important information asymmetries that result from the complicating effect that the financial innovation process

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[261] *See, e.g.*, Oliver E. Williamson, *Foreword* to NEW INSTITUTIONAL ECONOMICS: A GUIDEBOOK, at xxiii, xxiv (Éric Brousseau & Jean-Michel Glachant, eds., Cambridge Univ. Press 2008) ("With the benefit of hindsight, key features of the [new institutional economics] projects include . . . eschewing hypothetical ideals by focusing, always and everywhere, on feasible alternatives, all of which are flawed.").

has on instruments, institutions and markets. Instead of a mandatory CCP-clearing rule, the economy would likely be better served by an alternative institutional structure that capitalizes on the local knowledge of market participants concerning product and institutional complexity, but that seeks to capture some of the benefits of a CCP-cleared market. While I sketch two such alternatives, these are merely suggestions that will hopefully serve as useful guideposts in the ongoing policy debate regarding the regulation of the OTC derivatives market in particular and the financial innovation process in general.