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Abstract

This dissertation examines the construction and regulation of over-the-counter derivatives markets before and after the 2007-2009 global financial crisis. It addresses two questions: How did the market for derivatives traded outside traditional exchanges grow so large and crisis-prone with so little public regulation? And, why, given derivatives' contribution to the 2008 financial crisis, were post-crisis regulatory reforms so limited? I argue that the answer lies in the authority of financial market actors and in public regulators' perception of them as competent managers of risk, based on a set of practices that assured regulators that banks were valuing assets consistently, allowing the price mechanism to function, and guarding against default. I find that particular market practices, including risk models and standardized accounting methods, made regulators overly confident in the benefits of derivatives and the abilities of market actors to prevent crises. However, because of pervasive uncertainty, opacity, and complexity in the market that financial actors constructed through these practices, many of the practices failed to predict and prevent systemic contagion during the 2007-2009 financial crisis. Indeed, the widespread use of some of these practices produced correlation in trading strategies that made the market less predictable and more vulnerable to crisis. Nonetheless, because these practices were so deeply entrenched in the operation of the market, the space for post-crisis regulatory change was and remains highly constrained. Because these practices are constitutive of the market, fundamentally altering them would jeopardize the existence of a market that regulators still perceive as providing a valuable social function by distributing risk. My conclusions are based on an interpretive analysis of an original body of primary source regulatory and industry speeches, testimony, and reports.

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I would like to thank Stephen C. Nelson, my advisor at Northwestern University and co-chair of my dissertation committee for his unwavering belief in this project, his encouragement and empathy along the way, and his insightful feedback on chapter drafts. Steve's IPE seminar was a critical juncture in my short scholarly path; were it not for that class, I doubt I would ever have regarded international finance as anything other than the more tedious and impossibly equation-riddled half of the International Economics class I took at the LSE as an undergraduate. Steve's research and teaching have been a model for how to study the global economy through the lens of politics. Thank you for always guiding me back to my research question and thesis when my interests and readings threatened to drag me in a thousand directions and for never doubting that I had something important to say.

If Steve's IPE seminar was one cornerstone of this project, Ian Hurd's seminars on – and approach to – IR theory and qualitative methods are the other. Thank you for your gentle insistence that I not obsess over whether this project was sufficiently "political science" or "IR" and instead model my work off of scholars whose work has changed my thinking. I can only hope that I've begun to approach the clarity with which scholars like Kathleen McNamara, Eric Helleiner, Tony Porter, and Jonathan Kirshner analyze the political consequences of technically complex financial practices and institutions. Thank you, too, for sharing your gift for diving into a mess of findings and half-formed theoretical building blocks to help me identify what I am really trying to say.

McNamara, Porter, Helleiner, and Kirshner are my exemplars from IPE of how to write about finance, and Bruce Carruthers – the third member of this dissertation committee – is a model for how to do so in Sociology. I have benefited tremendously from his inexhaustible

knowledge of financial history and from taking his writing on credit rating, in particular, as a model for drawing lines between the historical context of contemporary financial practices and their present-day consequences.

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List of Abbreviations

ABS (asset-backed security)
BCBS (Basel[1] Committee on Banking Supervision)
BIS (Bank for International Settlements)
CCP (central counterparty)
CDO (collateralized debt obligation)
CDS (credit default swap)
CEA (Commodity Exchange Act)
CFMA (Commodity Futures Modernization Act)
CFTC (Commodity Futures Trading Commission)
CME (Chicago Mercantile Exchange)
CMPI (Committee on Payments and Market Infrastructures)
CPSS (Committee on Payment and Settlement Systems)
CRMPG (Counterparty Risk Management Policy Group)
DPG (Derivatives Policy Group)
DTCC (Depository Trust Clearing Corporation)
EMIR (European Market Infrastructure Regulation)
EU (European Union)
FASB (Financial Accounting Standards Board)
FRBNY (Federal Reserve Bank of New York)
FSA (Financial Services Authority)
FSB (Financial Stability Board)
FVA (fair value accounting)
G20 (Group of Twenty)
G30 (Group of Thirty)
G7 (Group of Seven)
GAO (Government Accountability Office)
IAS (International Accounting Standard)
IASB (International Accounting Standards Board)
IMF (International Monetary Fund)
IOSCO (International Organization of Securities Commissions)
ISDA (International Swaps and Derivatives Association)
LTCM (Long Term Capital Management)
MBS (mortgage-backed security)
MPR (macroprudential regulation)
OTC (over-the-counter)
PWG (President's Working Group on Financial Markets)
SEC (Securities and Exchange Commission)
SFAS (Statement on Financial Accounting Standard)
SRO (self-regulatory organization)
VaR (Value-at-Risk)

[1] Sometimes spelled "Basle" in documents published in the 1990s.

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Introduction

The over-the-counter, or OTC, derivatives market is big, it is unregulated, and it is crisis-prone. In early 2008, on the eve of the financial crisis, the value of all outstanding over-the-counter derivatives contracts stood at $683 trillion, according to the Bank for International Settlements.[1] By way of comparison, the total value of global trade at the same time was just under $20 trillion, and global GDP stood at $63 trillion, making the value of the derivatives market roughly ten times as large.[2] (See Figure 1.) The derivatives market has grown nearly nine-fold in the past 20 years, and while it was impacted by the 2008 global financial crisis, it recovered quickly and by 2011 had surpassed its pre-crisis peak. (See Figure 2.)

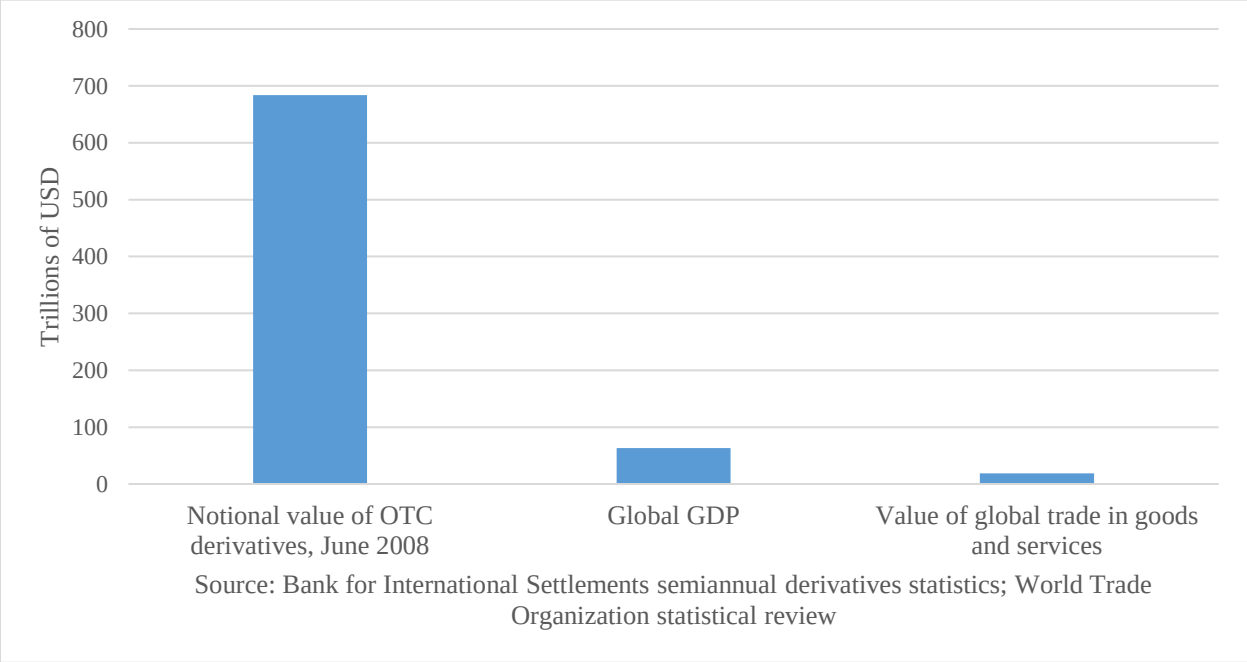

Figure 1: The global derivatives market in context

[1] Bank for International Settlements, "OTC derivatives market activity in the second half of 2008" (Basel: Bank for International Settlements, 2009), 1.
[2] World Trade Organization, *World Trade Statistical Review* (WTO, 2016), 10.

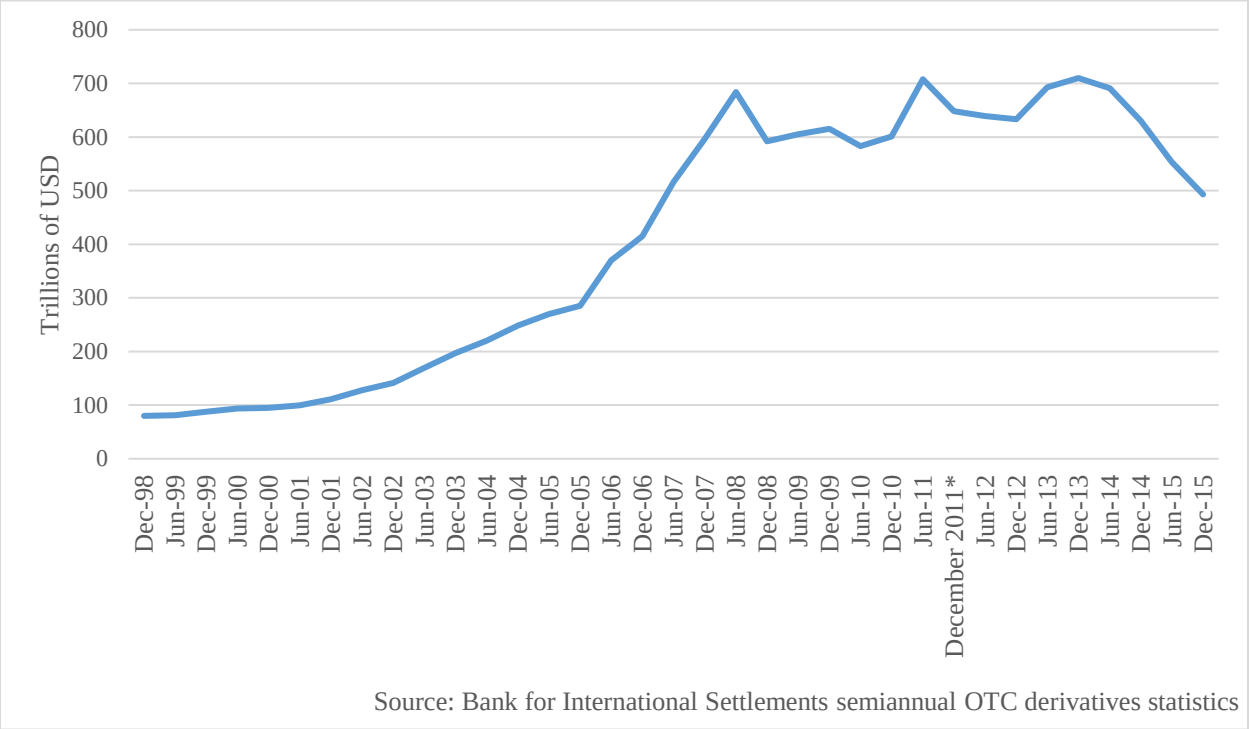

Figure 2: Notional value of the global OTC derivatives market, 1998-2015

This is an almost unimaginably huge market, and governing a market this large poses significant challenges, but the market is distinctive not only in virtue of its size but also in light of its unregulated nature. “Over-the-counter” derivatives are referred to as such to distinguish them from financial products that are traded on organized, publicly regulated exchanges, such at the Chicago Mercantile Exchange. Derivatives exchanges are highly rule-bound, both formally and informally, and the products traded on them are standardized and relatively predictable. In contrast, over-the-counter derivatives are bought and sold bilaterally, usually through a broker, which is often a major investment bank. They are highly customizable and often quite complex is structure, limiting participation in this market to major financial institutions, hedge funds, and some large commercial enterprises. This lack of centralization results in very complex networks of contracts and exposures, as all big banks have multiple counterparties.

Until the 2007-2009 global financial crisis, OTC derivatives were largely immune from public regulation. From their debut in the 1980s until the crisis, supervision and regulation of the market for non-exchange-traded financial derivatives was largely confined to private sector actors, coordinated by industry groups such as the G30, the International Swaps and Derivatives Association (ISDA), and the Derivatives Policy Group. The Basel Committee for Banking Supervision – the main international public actor to take up the issue of transnational market regulation – deferred to the derivatives industry on matters of risk measures and confined its role largely to oversight and measurement, producing statistical reports on the volume of derivatives trading (based on voluntary disclosure) and intended to better enable self-regulation.[3]

The lack of direct public regulation is not to say that the market for derivatives was ungoverned – indeed, ISDA worked quite conscientiously to develop standardized contracts and practices – but that its governance was primarily concerned with serving private ends such as counterparty evaluation, and ensuring flexibility and profitability. Governance measures aimed at promoting public ends and protecting the public from the consequences of financial crisis through measures such as limiting position taking and leverage ratios, trading and reducing systemic risk were largely excluded from the agenda, as were any redistributive measures.

By 2000, the exemption of OTC derivatives from the forms of national and international public regulation that govern markets for securities, insurance products, and exchange-traded derivatives was a matter of law in the two largest regulatory jurisdictions in the OTC market: the United States and the United Kingdom. In the UK, the legality of over-the-counter transactions

[3] Eleni Tsingou, "The Governance of OTC Derivatives Markets," in *The Political Economy of Financial Market Regulation: The Dynamics of Inclusion and Exclusion,* eds. Peter Mooslechner, Helene Schubert, and Beat Weber (Cheltenham, UK: Edward Elgar, 2006), 177.

was established in the 1986 Financial Services Act, which was followed by the establishment of private self-regulatory organizations. The *de facto* self-regulation of the OTC market in the United States was formalized in the 2000 Commodity Futures Modernization Act, which prevented both the Commodity Futures Trading Commission and the Securities and Exchange Commission from regulating OTC derivatives, making it effectively illegal for any US actor to try to regulate this market.

In addition to the size and unregulated nature of the market, derivatives' complex relationship with the future, risk, and uncertainty makes governing them different from regulating other products. Derivatives are contracts that work like insurance against future changes in the value of some underlying asset (e.g., a bushel of wheat, a stock option, the dollar-pound exchange rate, or a bundle of mortgages) and which can be bought and sold, regardless of whether the buyer or seller owns the underlying asset. Credit default swaps, for example, allow a buyer who wishes to insure some form of debt she holds to pay a regular fee to a derivatives seller in exchange for a guarantee that the buyer will be compensated in the event that the bond owner or mortgage holder defaults. Credit derivatives can be used to construct another kind of financial asset that has become notorious in the aftermath of the financial crisis: synthetic collateralized debt obligations (CDO), which further securitize the risk of default underlying CDS and other financial derivatives by combining them into portfolios on which are issued another set of notes.

Derivatives can be a powerful tool for managing risk. However, unlike traditional insurance markets, where the act of purchasing insurance does not make an adverse event more likely for the buyer or for anyone else in the market, the market for derivatives generates opaque securitized products, complex networks, and reflexive feedback loops that produce dynamics that

cannot be predicted ahead of time. As a result, large volumes of derivatives contracts can both affect the risks they are insuring against, as well as generate wholly unpredictable systemic consequences. This makes the prediction, mechanisms of transparency, and risk management practice that underlie traditional forms of market regulation necessarily incomplete – and sometimes even complicit in provoking and exacerbating crises.

These dynamics were presciently anticipated as early as the mid-1990s,[4] but OTC markets remained unregulated by public regulatory agencies until after the 2007-2009 financial crisis, when the nightmare scenarios envisioned by regulators nearly two decades earlier came to life. In 2007 and 2008, waves of highly correlated defaults began to sweep through the United States residential mortgage market. Derivatives, especially those written on structured, securitized bundles of subprime mortgages, magnified these losses, pushing many large investment banks – and eventually the global financial system itself – into crisis. Systemic risk; the difficulty of accounting for correlations among assets, highly leveraged investments; a lack of understanding about the intricacies of multiply securitized financial products; and a general opacity surrounding the workings of credit derivatives markets all contributed to the inadequacy of banks' estimates of the likelihood and magnitude of financial losses. Those losses spilled over into the real economy as major financial institutions collapsed and credit dried up, causing business to scale back. By 2010, 8.8 million jobs had been lost in the United States – most belonging to people who had likely never heard of collateralized debt obligations, super-senior

[4] See Chapter 2, Section V.

risk, or special purpose vehicles – and the crisis produced the first decline in world GDP since World War II.[5]

Historically, new and heightened financial regulations have followed on the heels of crises, often requiring financial actors to find new ways to frame and legitimize speculative activities.[6] As the extent of the economic damage from the collapse of the subprime mortgage market was revealed, many observers at the believed the financial crisis had undermined the legitimacy and authority of the derivatives industry, which was widely and correctly blamed for having greatly exacerbated the crisis. Indeed, proposals that emerged in the immediate aftermath of the crisis – such as an outright ban on the speculative trade in derivatives and moving the entire OTC market onto regulated exchanges – would have had the potential to fundamentally restructure global finance. The actual regulatory changes that were made, however, have done little to alter the size of the market or its underlying risk management and contracting practices.

The remarkable growth of an unregulated market that at least some observers and participants knew to be highly risky and fragile – and the failure of the crisis to radically reconfigure global financial governance motivates the two central research questions of this dissertation: How was it possible that the market for OTC derivatives grew so large and so crisis-prone with so little public regulation? And why, given derivatives' compounding of the 2007-2009 financial crisis, were post-crisis regulatory reforms so limited?

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[5] Christopher Goodman and Steven Mance, "Employment loss and the 2007-09 recession: an overview," *Bureau of Labor Statistics Monthly Labor Review* (April 2011), 3; Meredith Crowley and Xi Luo, "Understanding the Great Trade Collapse of 2008-09 and the subsequent recovery," *Federal Reserve Bank of Chicago Economic Perspectives* 20 (2011): 54.

[6] There are numerous examples of crises driving regulatory change. For example, the 1982 debt crisis was followed by a series of bilateral agreements, increases in IMF capitalization, economic liberalization, and the first Basel Accord. (Ethan B. Kapstein, *Governing the Global Economy: International Finance and the State* [Cambridge: Harvard University Press, 1994), 87-102.)

The field of International Political Economy (IPE) has a limited toolkit for studying the politics and power of this market. Scholars of IPE typically think about the governance of markets as being about well-defined competing public and private interests. Perhaps the most common understanding of power in International Relations (IR) – economic or otherwise – is in terms of coercion. Similarly, most approaches to studying financial politics understand financial power in transactional terms: an actor with the superior material capabilities can use those capabilities to coerce an opponent to bend to her will. This is the understanding of power that underlies the characterization of financial governance as an instance of regulatory capture, in which public goals were subverted for private ends, through the relative strength of the financial industry and the relative weakness of organized consumer interests.[7] These studies are not entirely wrong – the financial industry's efforts to influence the post-crisis regulatory agenda, in particular, are well-documented – but they are incomplete. Conventional accounts of big banks "buying off" regulators fit poorly with regulators' own statements that an unregulated derivatives market served the public good by efficiently allocating risk and enhancing the liquidity of the financial system. A regulatory capture framework similarly fails to shed light on financial authority post-crisis, where significant increases in public regulation – such as the requirement that OTC derivatives be cleared through centralized clearinghouses – have been endorsed, not resisted, by the financial industry. In contemporary global financial governance, the line between

[7] E.g., Andrew Baker, "Restraining regulatory capture? Anglo-America, crisis politics and trajectories of change in global financial governance," *International Affairs* 86:3 (2010): 647-663; Matías Braun and Claudio Raddatz, "Banking on politics: When former high-ranking politicians become bank directors," *World Bank Economic Review* 24:2 (2010): 234-279; Deniz Igan, Prachi Mishra, and Thierry Tressel, "A Fistful of Dollars: Lobbying and the Financial Crisis," *NBER Working Paper No. 17076* (May 2011); Simon Johnson and James Kwak, *13 Bankers: The Wall Street Takeover and the Next Financial Meltdown* (New York: Pantheon, 2010). Chapter 2 of this dissertation engaged with the regulatory capture perspective in greater detail, as does Section 1 of Chapter 3.

"public and "private interests is so often blurred as to undermine the usefulness of the regulatory capture approach.

An alternative approach to theorizing financial power can be found in studies that look at how financial actors persuade regulators of the virtues of their preferred regulatory outcomes. In this mode of power, the exchange of reasons ultimately changes regulators' beliefs. For example, some scholars look at regulatory capture as a cognitive or social, rather than material, phenomenon.[8] Others look at how norm entrepreneurs have been able to shift the beliefs of regulatory actors in the post-crisis environment.[9] However, demonstrating actors' true beliefs is notoriously difficult, and I am ultimately more interested in what both market and regulatory actors *do* than in what they *think*. Moreover, accounts of power-as-persuasion still tend to fall back on separate and separable public and private interests.

In contrast to both of these accounts, I argue that the power of derivatives markets is best understood not purely in terms of competing interests or lobbying expenditures, but rather in terms of derivatives market participants' *authority*, where authority is understood as having the *right* (as opposed to the ability) to make politically consequential decisions. Authority is distinct from relations of power based in persuasion and coercion for two reasons: First, it is taken-for-granted, rather than argued for, and second, it is rooted in social relations of recognition and trust, rather than in material capability. I find that derivatives dealers and traders did not have to coerce or persuade regulators to allow the market to develop as it did; they just had to ensure

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[8] William Buiter, "Lessons from the North Atlantic Financial Crisis," Paper prepared for the "Role of Money Markets" conference jointly organized by Columbia Business School and the Federal Reserve Bank of New York, New York, 2008; Steven Solomon, "The Government's Elite and Regulatory Capture," *New York Times DealBook,* June 11, 2010, https://dealbook.nytimes.com/2010/06/11/the-governments-elite-and-regulatory-capture/.

[9] Andrew Baker, "The New Political Economy of the Macroprudential Ideational Shift," *New Political Economy* 18:1 (2013): 112-139.

they were seen as credibly by regulators with pre-existing ideational frameworks about what constituted legitimate market activity.

Specifically, I argue that the authority of financial market actors lies in public regulators' perception of them as competent managers of risk, despite pervasive incalculable uncertainty in the market. I find that market practices, such as risk models and standardized accounting practices, made regulators overly confident in the benefits of derivatives and the abilities of market participants to prevent crises. Many of these practices failed to limit losses and systemic effects during the 2007-2009 financial crisis, but because they were so deeply entrenched in the operation of the market, the space for regulatory change was highly constrained.

Unlike studies of coercion – where we can (at least in theory) measure material capabilities – and studies of persuasion – where the object of inquiry is the exchange of reasons – the appropriate object of inquiry in studying authority is less clear. I argue that focusing on practices – what actors do and how those actions are perceived – helps make visible the structure of authority relations. In particular, this dissertation develops and deploys the concept of *authoritative practices*, which I define as practices that, when competently performed, constitute certain actors as having the right to make politically consequential decisions. The designation of "competence" is necessarily intersubjective – an actor cannot unilaterally declare herself to be competent – and accordingly, practice-as-competent-performance provides a bridge to the concept of "authority" which is similarly relational. In the early days of the financial derivatives market, much of the regulatory debate centered on who could be considered a "sophisticated" investor, understood as someone sufficiently competent to be exempt from regulatory protection.

One of the contributions of this dissertation is a methodological strategy for studying practices. In particular, I am interested in perceptions of practices: how regulators understood

market participants' actions as shoring up their right to govern themselves. Key to derivatives traders' authority was that their actions were recognizable as constituting a *market* – a legitimate form of social interaction and one that can be distinguished from gambling, fraud, and exploitation. I identify three requirements for any recognizable modern market: 1) a common method of valuing assets which ensures the commensurability of products; 2) sufficient liquidity and transparency in the market for the price mechanism to operate; and 3) trust between counterparties. This is not a functionalist argument; I contend that these requirements can be – and were – met in a variety of ways. The development of market practices was contingent, driven by developments in financial economics, private rule-making, incorporation into public regulation, and historical institutionalist dynamics. Moreover, had different practices become conventional, they likely would have had different distributional consequences.[10]

Although these three market requirements – *valuation*, *liquidity*, and *counterparty trust* – have to be met in any market, there are three attributes of OTC derivatives that make meeting these market requirements and constituting a recognizable market especially challenging: *uncertainty*, *opacity*, and *complexity*. Valuation of future-oriented financial products is especially difficult in an environment of where probabilistic modelling provides an incomplete – and unreliable – vision of the future. Market liquidity is often thought to hinge on transparency, and the opaque structured and securitized financial assets that had developed by the early 2000s threated this relationship. Finally, the complex networks and layers of transactions, obligations, and exposures generated by complex financial products makes measuring and managing

[10] For example, models for measuring risk are very sensitive to changes in parameter values, and since banks' capital requirements are tied to their risk measures, the practice of deciding the model's inputs – and who performs it – can have important consequences for banks' investment strategies, size, and riskiness.

counterparty risk very challenging. In order to constitute a recognizable market for OTC derivatives, financial actors had to develop practices to meet each of these market requirements while contending with these challenges.

A recognizable market is a necessary but not sufficient condition for financial authority. Markets can be recognizable as such without public audiences recognizing their right to exist and to govern themselves. Almost all markets are more highly publicly regulated than OTC derivatives were prior to the crisis, and different publics have drawn different lines regarding the acceptability of markets in things like military-grade weapons, narcotics, and human organs. Financial authority also requires that financial assets and markets be seen as *legitimate*, as a socially acceptable practice that contributes to – or, at a minimum does not threaten – the public interest. Prior to the crisis, derivatives trading was – unique among other forms of international exchange – simultaneously isolated from public regulation and regarded as legitimate. Unlike other licit markets, such as those for stocks or even commodity futures,[11] the OTC derivatives market has been unique in its lack of public supervision and oversight. But unlike other markets characterized by a lack of public oversight, such as smuggling and illicit drug trafficking,[12] the OTC market has come to be seen as legitimate by public authorities. Legitimacy is a condition of possibility for financial authority: it is what permitted the constitutive market practices to be perceived by regulators as evidence of the market's capacity to govern itself.

Chapter 1 situates this dissertation in the context of existing research on financial governance and political authority. In Chapter 1, I develop the theoretical framework of

[11] As a contrasting example to OTC derivatives' lack of regulation, see Bernard Harcourt's documentation of the intricate public rule-making that governs the wheat futures market at the Chicago Board of Trade (2011: 12-16).
[12] For a discussion of such illicit economic practices, see: R.T. Naylor, *Wages of Crime: Black Markets, Illegal Finance, and the Underworld Economy*, (Ithaca: Cornell University Press, 2005).

authoritative practices sketched out in this introduction, explain my interpretive strategy for identifying authoritative practices, and discuss the regulatory and industry documents that serve as the core data source for my analysis.

Chapter 2 charts a history of the legitimacy of derivatives from the mid-1900s through the early 2000s, when self-regulation of OTC markets was formally sanctioned through the Commodity Futures Modernization Act. This chapter contends that one of the most fundamental axes of disagreement between regulators, legislators, and the derivatives industry (and within each of these categories of actors) has been over the *interpretation* rather than *regulation* of these products. In it, I identify a series of critical moments, often but not always culminating in a legislative or regulatory shift, when the public debate around the legitimacy of derivatives and their connection to the public interest changed.

Chapters 3-5 identify the authoritative practices through which the OTC derivatives market came to exist as a legible and legitimate mode of social interaction and economic activity. For analytical purposes, each chapter focuses on one market requirement (valuation, liquidity, and counterparty trust), through there is some overlap in the practices discussed in each. Table 1 provides an overview of the structure of these chapters.

Chapter 3 focuses on authoritative practices of valuation. While asset valuation can be difficult for many reasons, this chapter focuses primarily on the difficulty of valuing a portfolio of financial assets in an environment of risk and uncertainty. Being able to do was essential to the development of a liquid market for derivatives. In conjunction with pricing practices like the Black-Scholes option pricing model and the Gaussian copula (a means of accounting for default correlation), a risk model known as Value-at-Risk (VaR) provided a way of taking market risk into account in portfolio valuation. VaR became a constitutive practice of the market for

complex derivatives, signaling to regulatory authorities that financial market participants were capable of self-regulation. But while it worked reasonably well in the short-term, VaR was unable to account for uncertainty, even as its widespread use actively made the market more vulnerable and less predictable. Nonetheless, t has allowed investment banks to satisfy calls for greater banking regulation while simultaneously making uncertain financial practices seem tractable and manageable. By privileging prediction and control as modes of preparing for future financial events, reliance on VaR simultaneously makes it more difficult to acknowledge uncertainty and to respond to it in alternative ways, helping us understand one important limit on regulatory imagination and practice.

Chapter 4 focuses on transparency and liquidity in the OTC market. This chapter analyzes how regulators contended with and enabled the opacity of the OTC derivatives market; how the same private market practices they relied on to gain a limited measure of insight into the market compounded the 2007-2009 financial crisis; and how they have struggled to make the OTC market more transparency in the aftermath of crisis. Specifically, I show that regulators were reluctant to demand greater disclosures from the OTC markets in light of these products' contribution to market efficiency and liquidity. I show that financial liquidity and the price discovery mechanism became a proxy for transparency-via-disclosure, supplemented by standardized accounting practices. However, these practices work poorly during periods of crisis, and during the 2007-2009 crisis, actively contributed to the illiquidity of financial markets that caused the collapse and bail-outs of large financial institutions. The post-crisis regulatory response has been to demand much greater transparency of over-the-counter derivatives markets. This transparency has only been imperfectly accomplished however, and risks driving investors outside the scope of regulatory oversight once again.

Chapter 5 focuses on practices of counterparty trust, analyzing the range of practices that market participants have relied on to maintain confidence in their counterparties' ability to fulfill their contractual obligations. This chapter represents something of a hard case for my argument that pre-crisis source of financial authority have significantly constrained post-crisis regulation because it is the aspect of the market that has undergone the most extensive regulatory changes as a result of the financial crisis: mandated central clearing of most OTC derivatives in almost all national regulatory jurisdictions. However, the clearing requirement has been met with a series of unintended consequences and has reproduced many of the same characteristics of financial markets that were identified as exacerbating and magnifying the 2008 financial crisis. I argue that although there has been a significant shift in who regulates OTC markets, much less has changed at the level of the specific practices that govern these markets. Central counterparties rely on the same set of practices – collateralization, netting, and risk models – to manage counterparty risk as those cited by key regulatory authorities prior to the crisis as guaranteeing the markets' capacity to govern itself.

The dissertation concludes with some reflections on how this project helps us understand both the resilience and the contingency of financial authority; how the concept of authoritative practices might productively be applied to other relations of power in international politics; and future avenues of research in the area of financial practices and governance.

Market Requirement	Attribute of OTC Derivatives Market	Authoritative Practices	Consequences of Practices for the Crisis	Post-Crisis Reforms
Valuation	Uncertainty	• Pricing models and formulae (Black-Scholes, Gaussian copula) • Risk models (Value-at-Risk)	• Failed to account for levels of asset correlation in the mortgage market • Produced correlation in investor behavior that made the market more vulnerable to endogenous drivers of uncertainty • Failed to account for losses during the crisis	• Very few: the same risk models and pricing models are still used, albeit supplemented by judgement
Liquidity and Transparency	Opacity	• Standardized contracts (ISDA Master Agreement) • Electronic trading • Voluntary central clearing • Disclosure of risk exposure • Mark-to-market accounting	• Mark-to-market accounting depends on a liquid market, so when liquidity began to dry up, this method produced values for assets that no one was willing to trade at, making the market even more liquid • Exacerbated the financial crisis	• Changes to accounting standards have been slow • Regulators have imposed greater transparency on OTC markets through central clearing, requiring the use of swap execution facilities, and the use of trade repositories for financial reporting
Counterparty Trust	Complexity	• Collateralization • Netting • Risk management techniques (including VaR)	• Did not sufficiently protect against counterparty default	• Mandatory central clearing has reproduced collateralization and netting in multilateralized form • Risk management techniques by central counterparties are the same as those used by derivatives counterparties pre-crisis

Table 1: Overview of dissertation structure

Chapter 1:
Studying Financial Authority: Literature Review, Theory, and Methodology

I. Financial Politics and Regulation in IPE

Academic inquiries into global financial politics can be grouped along two main axes. The first axis addresses the question of the extensiveness of financial regulation before and after the global financial crisis. The second axis seeks to explain regulatory outcomes in terms of the relative influences of domestic and international (or transnational) factors. In what follows, I sketch out how these axes structure much of the existing scholarship on derivatives market governance, but leave open the question of *how* claims to authority – on the part of both market actors and regulators – are constructed and changed.

A. Comparing the extensiveness of financial regulation pre- and post-crisis

The extent to which the governance of derivatives, in particular, has changed as a result of the financial crisis is contested. One way to approach the question is to examine regulatory changes following the crisis. Scholars of international political economy (IPE) tend to fall into two broad camps regarding the extent of regulatory change. One the one hand, some scholars identify a significant shift in the acceptance – by both policymakers and the industry – of public regulation of the derivatives trade, pointing to a politicization of derivatives markets and the recent proposal and adoption (albeit slow and uneven) of substantial regulatory reforms. On the other hand, even as derivatives regulation has shifted from the industry itself to public agencies, there is continuity both in the involvement of financial actors in setting regulatory standards, and the centrality of particular practices, such as risk-modeling and collateralization, that both make possible and delimit market activities.

1. Change

The predictions Eric Helleiner and Stefano Pagliari are representative of the first camp, and argue that domestic political pressure in the US and the UK, in conjunction with shifting preferences, resulted in recommendations that public regulators incentivize the use of central clearing parties (CCPs) to act as intermediaries between the parties to credit derivatives and to hold collateral that can help cover losses resulting from the financial failure of counterparties to the derivatives contract.[1] They point to a "widespread backlash against the lack of regulation in derivatives markets," a series of Congressional and Parliamentary bills dealing with moving OTC derivatives onto exchanges or banning them outright,[2] recommendations by the G20 that contracts be standardized and cleared through CCPs, and derivatives dealers' support for the use of CCPs (though not the listing of derivatives on exchanges) as evidence of the politicization of the derivatives trade and the emerging consensus that the public has a right and responsibility to regulate this market. While more stringent policies, such as bans on CDS and proposals to ban "naked" CDS were defeated, the right to publicly regulate over-the-counter derivatives markets was confirmed with the passage in the US of the Dodd-Frank Wall Street Reform and Consumer Protection Act (most notably Title VII which deals explicitly with OTC swaps). Dodd-Frank imposes new regulatory requirements on dealers (registration with the SEC, new capital and margin requirements, new reporting and record-keeping obligations), requires the use of "derivatives clearing organizations," and requires that swaps be traded either on established boards of trade or "swap execution facilities." These legislative initiatives, and equivalent,

[1] Eric Helleiner and Stefano Pagliari, "The end of self-regulation? Hedge funds and derivatives in global financial governance," in *Global Finance in Crisis: The Politics of International Regulatory Change*, eds. Eric Helleiner, Stefano Pagliari, and Hubert Zimmerman (New York: Routledge, 2010): 82-83.

[2] In the United States, Representative Maxine Waters has been one of the most forceful voices opposing credit default swaps, introducing legislation (the Credit Default Swap Prohibition Act of 2009, H.R. 3145, 111th Congress) that would have essentially banned CDS.

though less developed, efforts in the EU, substantiate the idea that derivatives regulation has been reinterpreted as appropriately handled by public authorities.

2. Continuity

There are, however, good reasons to be measured in assessing the impact of the global financial crisis on derivatives markets. Although the passage of regulatory legislation suggests that the post-crisis politicization of derivatives trading was, at least, in the short-term, effective, public opinion polling – an admittedly imperfect and limited indicator of politicization – reflects a lack of sustained or widespread consensus on the need to regulate the financial industry. Gallup polling shows that the percentage of Americans who believe there is "too little" regulation of business and industry remained fairly stable before, during, and after the crisis (2006: 28%; 2008: 27%; 2010: 27%; 2012: 26%).[3] Additionally, the extent to which credit default swaps became, as Helleiner and Pagliari claim, a "household phrase" can be countered with the finding that 23% of Americans had never heard of Goldman Sachs, suggesting that the activities of even high-profile derivatives participants remained outside many people's political awareness.[4] While these polling data are limited to the United States, and hardly conclusive, they do suggest that the politicization of the financial industry – at least in the direction of support for greater public regulation – is far from uniform and that continuity, as well as change, has characterized the authoritative status of the OTC derivatives industry.

The governance of credit derivatives has certainly garnered the attention of those following financial news for personal or professional reasons, but we should be cautious in our

[3] Gallup Poll data, in "Business Issues in the News," *PollingReport.com,* http://www.pollingreport.com/business.htm, accessed June 21, 2015.
[4] Fox News/Opinion Dynamics Poll, May 4-5, 2010, in "Business Issues in the News," *PollingReport.com,* http://www.pollingreport.com/business.htm, accessed June 21, 2015

evaluation of how broadly this market has been politicized and to what effect. The audience for derivatives market legitimization has historically been limited to a small, transnational epistemic community of often sympathetic financial experts, many of whom served in both regulatory and business capacities.[5] Indeed, explaining derivatives traders' *lack* of need to publicly, or at least widely, justify their authority prior to the financial crisis represents an important part of this dissertation research. The audience for financial actors' legitimating claims has certainly expanded, but how broad that audience is and ought to be remains an open question. As Franz van Waarden writes in his discussion of the governance of risk regulators, public organizations are characterized by having a "demos" to whom they can be held politically accountable, but financial globalization has shifted that demos from being territorially to functionally defined.[6] Given the relatively high epistemic barriers to knowledge of and participation in the world of financial derivatives, this makes a certain amount of sense, but the population of people affected by financial market is risks is much broader than the still-tight networks of public and private regulators, raising concerns of a democratic deficit in financial market governance.[7]

A second reason to be measured in assessing post-crisis regulatory change is that, while the actors responsible for governance may have changed, many of the practices that underlie regulatory measures – whether private or public – have remained the same. Tony Porter draws

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[5] Eleni Tsingou, "The Governance of OTC Derivatives Markets," in *The Political Economy of Financial Market Regulation: The Dynamics of Inclusion and Exclusion,* eds. Peter Mooslechner, Helene Schubert, and Beat Weber (Cheltenham, UK: Edward Elgar, 2006).

[6] Franz van Waarden, "Where to find a 'demos' for controlling global risk regulators? From private to public regulation and back" in *Transnational Private Governance and its Limits*, eds. Jean-Christophe Graz and Andreas Nölke (New York: Routledge, 2008): 92; 95-97.

[7] See, for example: Tony Porter, "The Democratic Deficit in the Institutional Arrangements for Regulating Global Finance," *Global Governance* 7 (2001): 427-439. Dani Rodrik raises similar concerns about the gap between nationally constituted demoi and democratic governance of financial markets, though at a more general level in *The Globalization Paradox: Democracy and the Future of the World Economy* (New York: W.W. Norton, 2012).

attention to the central place technical practices such as credit rating and risk modelling continue to play in post-crisis financial governance, particularly at the transnational level. He writes that:

> [D]espite its boldness, Basel II and the adjustments that are being made to it also display strong elements of continuity in their emphasis on ever more elaborate technical solutions to regulation. While these technical developments strengthen the transnational aspects of financial regulation, they rely too heavily on the ability of risk modeling itself to manage risk, at the expense of the more difficult governance changes that are needed to strike an appropriate balance between the private interests of powerful financial actors and the public interest in systemic stability.[8]

While Porter discusses important changes to the use of risk models, including increasingly sophisticated attempts to model endogenous risk and the supplementing of risk model-based regulation with "macroprudential measures" (such as stress testing), he contends that a predominantly model-based strategy for responding to financial uncertainty is inherently limited. Moreover, it remains depoliticizing, as risk models are represented as politically neutral technologies, when in fact they are better understood as governance mechanisms.

Nor is Porter the only one to critique the conservatism of post-crisis regulatory changes. Although Basel III does more to acknowledge endogenous risk than Basel II by shifting from Value-at-Risk to Expected Shortfall modeling, Jon Danielsson, Director of the Systemic Risk Centre at LSE, comes to a similar conclusion about its shortcomings, contending that "the Basel Committee has taken three and a half steps backwards and half a step forward."[9] Stefano Micossi, too, criticizes the enduring dependence on risk modeling, in any form, to assign capital requirements: "The continuing reliance – for the determination of capital requirements – on

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[8] Tony Porter, "Risk models and transnational governance in the global financial crisis: The cases of Basel II and credit rating agencies," in *Global Finance in Crisis: The Politics of International Regulatory Change,* eds. Eric Helleiner, Stefano Pagliari, and Hubert Zimmerman (New York: Routledge, 2010): 57.

[9] Jon Danielsson, "The new market-risk regulations," *VoxEU,* 2013, http://www.voxeu.org/article/new-market-risk-regulations.

banks' risk-weighted assets calculated with unwieldy probabilistic econometric models of dubious analytical foundation that leave ample room for gaming the system and, more importantly, that are by construction unable to deal with systemic shocks hitting the banking and financial system."[10] Porter, Danielsson, and Micossi's concerns about the implication of risk modeling practices in the financial crisis and their continued centrality to financial governance is mirrored in Andreas Nölke's analysis of accounting practices. Nölke contends that while mark-to-market accounting is particularly ill-suited to times of crisis – and may even have exacerbated the global financial crisis by forcing companies to try to sell assets for which there was no market – it is still the dominant approach to accounting, despite the existence of alternatives.[11] Although the governors of derivatives markets may have changed radically, many of the mechanisms of governance have done so only incrementally.[12]

A final limitation to the post-crisis transformation of derivatives governance has to do with the persistent influence of a transnational policy community of regulators, central bankers, finance officials, global industry associations, and key individuals both before and after the crisis. A growing body of studies has documented the political power and governance authority of private actors in international economics.[13]

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[10] Stefano Micossi, "A viable alternative to Basel III prudential rules," *VoxEU*, 2013, http://www.voxeu.org/article/viable-alternative-basel-iii-prudential-rules.

[11] Andreas Nölke, "The politics of accounting regulation: responses to the subprime crisis," in Helleiner, Pagliari, and Zimmerman, *Global Finance in Crisis*, 37-55.

[12] For an excellent institutional analysis of this incremental change, focusing on the influence of financial industry groups and their ability to adapt to the post-crisis regulatory environment, see: Stefano Pagliari and Kevin Young, "The Wall-Street–Main-Street nexus in financial regulation: business coalitions inside and outside the financial sector in the regulation of OTC derivatives" in *Great Expectations, Slow Transformations: Incremental Change in Post-Crisis Regulation*, eds. Manuela Moschella and Eleni Tsingou (Colchester: ECPR Press, 2013).

[13] Timothy J. Sinclair, *The New Masters of Capital: American Bond Rating Agencies and the Politics of Creditworthiness* (Ithaca: Cornell University Press, 2005); Geoffrey R.D. Underhill and Xiaoke Zhang, "Setting the rules: private power, political underpinnings, and legitimacy in global monetary and financial governance," *International Affairs* 84:3 (2008): 535-554; Timothy Büthe and Walter Mattli, *The New Global Rulers: The Privatization of Regulation in the World Economy* (Princeton: Princeton University Press, 2011); Heather McKeen-

Eleni Tsingou's work, in particular, has focused on this community and its relationship to public regulatory authorities, [14] arguing that "the transnational policy community does not explicitly distinguish between the public and private, all the while legitimizing the role of the private sector and internalizing its preferences."[15] For example, Tsingou wrote in 2006 that, "The fact that [the International Swaps and Derivatives Association or ISDA] is essentially a private-sector actor looking after the interests of private financial institution is largely considered to be an efficient arrangements that is not questioned." [16] While the adequacy of self-regulation has come under intense questioning by public-sector actors after the financial crisis, Tsingou argues that industry bodies have retained a considerable amount of influence over and involvement in regulatory changes.[17] She points to the influence that industry-produced reports and recommendations had on the shape and extent of public regulatory measures.[18] Furthermore, she observes that states are limited in their regulatory scope by the close relationship between the financial industry and state economies, especially in terms of extending credit to individuals and the use of finance as a growth strategy, and by the necessity of maintaining close ties to market participants in order to know what needs to be regulated.[19] Tsingou's analysis points to the limits of conceptualizing financial governance in terms of the public-private distinction, but it also

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Edwards and Tony Porter, *Transnational Financial Associations and the Governance of Global Finance: Assembling Wealth and Power* (New York: Routledge, 2013).

[14] Tsingou, "Governance"; Eleni Tsingou, "Transnational private governance and the Basel process: Banking regulation and supervision, private interests and Basel II," in Nölke and Graz, *Transnational Private Governance*, 58-68; Eleni Tsingou, "Regulatory reactions to the global credit crisis: analyzing a policy community under stress," in Helleiner, Pagliari, and Zimmerman, *Global Finance in Crisis*, 21-34.

[15] Tsingou, "Regulatory reactions," 24.

[16] Tsingou, "Governance," 183.

[17] Tsingou, "Regulatory reactions."

[18] Specifically, the Financial Stability Board (formerly Forum), the Institute for International Finance, the Counterparty Risk Management Policy Group, the G-30, the Geneva Report, the de Larosière Report from the High Level Group on Financial Supervision in the EU, and the Turner Review.

[19] Tsingou, "Regulatory reactions," 29; 32.

points to the central role claims to expertise – by both public and private actors – play in governing markets. As Büthe and Mattli write, although "the language accompanying these processes is technical; the essence of global rule-making […] is political."[20] Examining this authority and its politicality in more detail is one of the goals of this dissertation.

B. The determinants of regulatory policymaking

As is implicit in this literature review, scholars differ in terms of the relative importance placed on domestic, interstate, and transnational politics in shaping global financial markets. Many scholars characterized the pre-crisis governance of financial markets as an instance of regulatory capture, arguing that public goals have been subverted for private ends, while disagreeing about the political channels through which those interests are promoted and translated into policy. For example, while Tsingou emphasizes the epistemic authority of the transnational policy community, David Singer analyzes the central role the US leadership has played in post-crisis financial regulatory reform[21] and Helleiner and Pagliari argue that changes in the contours of derivatives markets reflect the politicization of financial markets in US and UK domestic politics.

1. Regulatory capture

Narratives of regulatory capture emphasize lobbying and corruption – the exchange of material incentives for favorable legislative and regulatory treatment. While lobbying has certainly played an important role in derivatives regulation (and continue to happen, as the prolonged battle over Dodd-Frank implementation demonstrates[22]), it is not clear that this is the

[20] Büthe and Mattli, *New Global Rulers*, 12.
[21] David Andrew Singer, "Uncertain leadership: The US regulatory response to the global financial crisis," in Helleiner, Pagliari, and Zimmerman, *Global Finance in Crisis*, 93-107.
[22] One need only look at the public schedule of meetings and communications that the Federal Reserve has undertaken regarding the implementation of Chapter VII of Dodd-Frank (derivatives markets and products) to see

primary mechanism through which regulatory attitudes are formed and it fails to account for the shifting narratives that have been used to legitimize financial derivatives, as well as considerable dissent within and between regulatory agencies in terms of how derivatives were interpreted, let alone regulated. Methodologically, capture is also difficult to convincingly demonstrate since it requires that we assume separable and separate interests on the part of regulators and industry. This is especially difficult to do empirically, given that "winners" and "losers" in financial policy outcomes has been more difficult than in other spheres of IPE, such as international trade and central bank independence.[23] Moreover, as Chapter 2 will show, there is little evidence that there was ever an *ex ante* point at which regulators clearly understood financial derivatives as contrary to the public interest prior to some moment of capture. On the contrary, while regulators have viewed derivatives with varying levels of skepticism and even alarm at certain points, they have consistently sought the input of the financial industry in interpreting derivatives markets and have framed financial derivatives as furthering the public interest in a variety of ways (improving market liquidity, efficiently distributing risk, protecting small-scale and individual investors) to justify regulatory changes over time. This framing also tends to overlook how the financial industry responded to regulatory scrutiny: regulators' concerns have not always or exclusively been met with lobbying money; the industry itself has changed risk management and trading practices (often via greater standardization) in response to private and public criticism.

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the strong influence of the private sector on financial reform. Singling out just a few of the biggest investment banks, there were five meetings with Goldman Sachs, five with Citigroup, and four with JPMorgan in the five years following the signing of Dodd-Frank. ("Communications with the Public: Derivative Markets and Products," *Board of Governors of the Federal Reserve System,* November 6, 2015, https://www.federalreserve.gov/newsevents/reform_derivatives.htm.)

[23] C.f., the open economy politics model of analyzing IPE, which begins with individuals, sectors, or factors of production as the units of analysis, then derives their interests over economic policy from their position within the international economy, and examines how those interests are aggregated through institutions. (David Lake, "Open Economy Politics: A Critical Review," *Review of International Organizations* 4 (2009): 219-44.)

2. Neoliberalism and ideological change

Scholars have also focused on transnational ideational forces through which the would-be interests of the state are subordinated to the interests of financial elites in the private sector. The converging interests of finance and the state is central to neoliberal accounts of financial politics that posit an inexorable process of financialization and marketization of all sectors of society, with the complicity of the state and its regulatory tools.[24] While this mode of explanation affords a greater place to conflicts over interpretation and legitimation than regulatory capture does, it is nonetheless premised on theoretically separate state and financial interests in a way that is difficult to account for empirically.[25] Indeed, I contend that this exercise quickly becomes meaningless, given that imbrication in a world of globalized capital is partially constitutive of what it means to be a contemporary state in the first place. Neoliberal theorists might concede this point, but if that is the case, that does not give us much analytical leverage over conflicts that do in fact occur within the contemporary configuration of states and financial markets.

Even if neoliberalism provides an accurate macro-level perspective, the specific processes that produce this result are worth understanding on their own terms, from both an analytical and a critical perspective. From an analytical perspective, specific moments of contestation over the place of derivatives in society have benefited different actors at different times and have had unforeseen consequences that disrupted any intended relationship between

[24] Philip Mirowski, *Never Let a Serious Crisis Go to Waste: How Neoliberalism Survived the Financial Meltdown* (New York: Verso Books, 2014).

[25] To take a recent example from another area of IPE, it is relatively easy to interpret vulture funds' legal victory over creditors willing to allow for Argentine sovereign debt restructuring as a victory of finance over the state and its citizens, given its distributional consequences, clearly benefiting private hedge funds over the Argentine domestic economy. But can the same be said of Argentina's ability to tap into foreign capital markets in the first place? This is, I think, a much more difficult case to make given the counterfactual assumptions it requires us to make about what a contemporary state's interests would be in the absence of financial globalization.

policy and outcome. (In whose interest was the 2008 crisis? This is itself an interpretive question.) From a critical perspective, these moments of contention testify to the incompleteness and reversals in a process of financialization that is often depicted as unidirectional and monotonic. These moments of contingency and conflict can inform efforts to reform, resist, and reject the power and authority of finance. Accordingly, the theoretical starting point for this project is to take conflicts over derivatives on their own terms rather than as universally symptomatic of the colonization of the public sphere by the private.

Left largely unexplored in both strands of theorizing about the determinants of regulatory policymaking is the question of *how* this has happened. What are the mechanisms through which the financial industry has been able to convince (or avoid having convince) regulators of their capability and indeed right to self-regulate? What practices have constituted the derivatives market as a repository of expert authority? What happens when these practices are thrown into crisis and what new authoritative practices have emerged in the wake of the financial crisis? How has the way in which participants in the derivatives trade legitimize – and are called upon to legitimize – their activities changed as a result of the financial crisis?

This dissertation is positioned in contrast to those who think that debates over the extent of public regulation are the main or most important or only site of financial politics. I am neither arguing directly against those who contend that the crisis has ushered in dramatic changes in financial governance by moving the primary locus of rule-making away from industry into the public sector, nor siding unequivocally with those who argue that little has changed in terms of financial governance by identifying limitations in derivatives regulation and continuity in the identity of rule-makers. Rather, I am arguing against those who think that comparing pre- and post-crisis regulation exhausts the question of how the financial crisis has altered the over-the-

counter (OTC) credit derivatives industry operates legitimately in the global financial system. The authority that actors in the derivatives industry held prior to the crisis should not be understood in terms of their ability to pressure or persuade public regulators to leave them alone, nor can we readily use the extent of current derivatives regulation to evaluate the authority of the credit derivatives industry today.

II. A Theory of Authoritative Practices

This dissertation looks to move beyond the debate about whether public governance has supplanted private governance in derivatives markets. Comparing the role of public regulation pre- and post-crisis is an important part of an inquiry into authority in financial markets, but I argue that it does not exhaust the ways in which financial authority is constituted, reproduced, contested, and reconfigured. As Tsingou observes in her discussion of the close relationship between public regulators and financial market actors, the distinction between "public" and "private" distinction is somewhat tenuous in the context of financial market regulation, where private governance has enjoyed the legitimacy afforded to it by public actors and public governance highly influenced by the interests and expertise of private actors.

Moreover, framing an analysis of financial authority in terms of more/less or public/private regulation risks reproducing a dichotomy between the market as a would-be autonomous sphere, on the one hand, and external, political rules and standards on the other. While this separation may at times be analytically useful, far from being free realms governed only by price mechanisms, markets are in fact constituted by rules, standards, routinized practices, and ruling ideas. As Bernard Harcourt writes, "[W]hen we look at the Chicago Board of Trade or the New York Stock Exchange, we do not see the intricate web of regulations regarding closing periods and trading hours, price control, surveillance, and computer

monitoring."[26] While the OTC derivatives trade has, of course, historically been free of some of these particular regulations, it has nonetheless never been the apolitical realm of unfettered market forces Harcourt argues we tend to see when looking at financial markets. Indeed, the very idea that markets can and should be self-regulating – that there is such a thing as a free market – is inseparable from its contingent, political past.

A. Practices

Rather than framing this inquiry in terms of the amount of regulation derivatives markets are subject to, my starting point is instead the interaction between the practices that are regarded by both public and private regulatory actors as authoritative – as creating meanings that are acted on in consequential ways – and the broader context in which those practices are understood as authoritative. The application of the concept of practice to IR is not entirely new, though it is relatively recent.[27] For example, Didier Bigo outlines what an explicitly Bourdieusian understanding of practice has to offer IR, focusing on Bourdieu's rejection of a distinction between theory and empirical research, as well as his emphasis on relations, rather than specific actors.[28] Emanuel Adler and Vincent Pouliot provide a definition of practice that I find particularly compelling in reference to this research project. They define practices as "socially meaningful patterns of action, which, in being performed more or less competently, simultaneously embody, act out, and possibly reify background knowledge and discourse in and

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[26] Bernard Harcourt, *The Illusion of Free Markets: Punishment and the Myth of Natural Order* (Cambridge: Harvard University Press, 2011): 16-17.
[27] Emanuel Adler and Vincent Pouliot, eds., *International Practices* (Cambridge: Cambridge University Press, 2011).
[28] Didier Bigo, "Pierre Bourdieu and International Relations: Power of Practices, Practices of Power," *International Political Sociology* 5 (2011): 225-258.

on the material world."[29] I regard practices as a fruitful entry point into an analysis of authority in the global derivatives trade for three reasons.

First, focusing on practices is a useful way of moving beyond the public-private dichotomy which I have argued is particularly troublesome in the context of derivatives governance, since a focus on practices does not start from a set of actors who are generally discussed as either public or private.

Second, because Adler and Pouliot's conception of practices is inherently social, what it means for a practice to be "competent" is always subject to interpretation and contestation. This is particularly important in the context of financial politics where what Barnett and Finnemore term "expert authority" plays a particularly salient role. The high level of technical sophistication and quantitative mastery required to fully understand (let alone profitably engage in) financial derivatives transactions means that expertise is central to the characterization of an action as competent and of an actor as authoritative – and the opacity and complexity surrounding credit derivatives can also be used to insulate the industry from scrutiny. As Chapter 2 recounts, the development and legal formalization of the concept of a "sophisticated investor," whose expertise and experiential knowledge of financial markets exempted her from regulatory protection, played an important role in the construction of financial market authority.[30] But at the same time, claims to objectivity, neutrality, technical competence[31] – and, in the case of derivatives, market efficiency[32] – rest on contingent assumptions about the public good. The

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[29] Emanuel Adler and Vincent Pouliot, "International Practices," *International Theory* 3:1 (2011): 4.
[30] See Chapter 2, Section III of this dissertation.
[31] See, for example: Theodore Porter, *Trust in Numbers: The Pursuit of Objectivity in Public Life* (Princeton: Princeton University Press, 2005). Particularly relevant is Chapter 6, in which Porter discusses the connections between public utility and quantitative cost-benefit analysis.
[32] For a history of how rational market theory has shaped market and regulatory behavior, see: Justin Fox, *The Myth of the Rational Market: A History of Risk, Reward, and Delusion on Wall Street* (New York: Harper Business,

inherent contingency built into what is or is not a competent performance represents a promising way to think about the way financial authority has been constructed and reconstructed that moves beyond the question of what policies have been passed.

Finally, while discussions of legitimacy and authority often focus primarily on rhetorical and discursive strategies, [33] Adler and Pouliot insist that practices "weave together the discursive and material worlds."[34] This is particularly important in the case of OTC derivatives where the industry did not, prior to the financial crisis, often have to publicly justify its activities. While moments of contestation did occur, the market was better characterized by its opacity to both public regulators and the general public. In this case, looking at what derivatives traders *did* may be more productive than focusing on what they said. During and after the financial crisis, on the other hand, there was a strong discursive component to authority in derivatives markets, as their legitimacy was openly challenged, defended, and reformulated. The ways in which particular practices were criticized or justified as competently performed in this context had an obvious rhetorical component. Christian Reus-Smit's theorization of legitimacy crises provides a useful way of conceptualizing the consequences of crisis for financial authority. According the Reus-Smit, a legitimacy crisis occurs when "the level of social recognition that [an institution's] identity, interests, practices, norms, or procedures are rightful declines to the point where the actor or institution must either adapt (by reconstituting the social bases of its legitimacy, or by

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2009); see also, Donald MacKenzie, *An Engine, Not a Camera: How Financial Models Shape Markets* (Cambridge, MA: The MIT Press, 2008), in which MacKenzie gives a more technical, though briefer overview of how the efficient markets hypothesis emerged (55-67) and goes on to explain how its assumptions lent legitimacy to efforts to persuade the Security and Exchange Commission to establish an options market through the Chicago Board of Trade (147-150).

[33] See, for example: Ian Hurd, "The Strategic Use of Liberal Internationalism: Libya and the UN Sanctions, 1992-2003," *International Organization* 59:3 (2005): 495-526; Charlotte Epstein, *The Power of Words in International Relations: Birth of an Anti-Whaling Discourse* (Cambridge, MA: The MIT Press, 2008);

[34] Adler and Pouliot, "International Practices," 7.

investing more heavily in material practices of coercion or bribery) or face disempowerment."[35] If the financial crisis did indeed constitute a legitimacy crisis for the OTC derivatives market, we should expect to see derivatives market participants either adapting or being disempowered. While they certainly have not been disempowered, it is more difficult to gauge the extent to which they have adapted.

An additional concept from Reus-Smit's discussion of legitimacy crises is helpful at this point. Reus-Smit distinguishes between "the realm of political action" (the realm in which the consequences of an actor's decisions are felt) and "the social constituency of legitimation" (the group of actors from whom legitimacy is actually sought, granted, or both).[36] I argue that prior to the financial crisis, the social constituency of legitimation for derivatives markets was quite narrow and that this was partially a function of the perception that their "realm of political action" – the audience to whom derivatives trading mattered – was also quite narrow. In fact, prior to the financial crisis, the credit derivatives industry made very few explicit legitimacy claims at all. However, after the financial crisis, the disjuncture between those political spaces was exposed. Many more people were affected by the fall-out of what became the financial crisis than had had any awareness or, let alone oversight or input in derivatives markets. At that point, the social constituency or audience for the derivatives industry expanded to include a group of influential and concerned public regulatory authorities. Focusing on practices allows for an analytical recognition of both the realm of political action (where legitimacy claims may be unspoken) and the social constituency of legitimation (where legitimacy claims are made)

[35] Christian Reus-Smit, "International Crises of Legitimacy," *International Politics* 44 (2007): 158.
[36] Ibid., 164.

because it does not require determining in advance whether the discursive or material world is to be privileged as a site of financial politics and authority.

B. Authority

I am interested, in particular, in what I call *authoritative* practices – practices that, when competently performed, produce effective meanings and constitute certain actors as having the right to make politically consequential decisions. For example, marking exams or papers is an authoritative practice for a professor. When competently performed, it helps to constitute the professor as an authority vis-à-vis the students, without having to justify her right to govern in the classroom and without having to resort to coercive force.

Authority, as distinct from power or coercion, is frequently evoked in the IR and political science literature, [37] and Barnett and Finnemore's treatment of the authority of IOs provides a useful starting point for thinking about the authority of both public and private actors. However, while I find their elaboration and application of epistemic authority, in particular, to be very useful, their broader definition of authority, which hinges on consent, is problematic for the puzzle that motivates this dissertation project. They write that, "When actors confer authority and defer to the authority's judgment, they grant a right to speak and to have those statements conferred credibility. There are always a range of opinions about any contentious political problem, but not all views receive equal weight or equal hearing. Authority helps an actor's voice be heard, recognized, and believed. The right to speak credibly is central to the way authority produces effects."[38] While I agree with the latter half of this definition – that authority

[37] See, for example: Steven Lukes, *Moral Conflict and Politics* (Oxford: Oxford University Press, 1991); Michael Barnett and Martha Finnemore, *Rules for the World: International Organizations in Global Politics* (Ithaca: Cornell University Press, 2004).
[38] Barnett and Finnemore, *Rules for the World*, 20.

confers a right to speak (and I would add, act) credibly – that this credibility is premised on consent is problematic in the context of derivatives markets. Not only is consent notoriously difficult to identify at the international level,[39] it seems inaccurate to claim that either the realm of political action (i.e., those affected by derivatives markets) or the social constituency of legitimation (international and domestic public regulators) formally consented to the authority of those engaging in credit derivatives trading. Rather, this period was characterized by an *absence* of justificatory statements and explicit authorization.

For this reason, I contend that Hannah Arendt's conception of authority as distinct from coercion or persuasion, provides a better way to conceptualize authoritative practices.[40] For Arendt, authority is instead a positional and relational concept. She writes, "The authoritarian relation between the one who commands and the one who obeys rests neither on common reason nor on the power of the one who commands; what they have in common is the hierarchy itself, whose rightness and legitimacy both recognize and where both have their predetermined place."[41] In its taken-for-grantedness, this concept of authority is similar to Steven Lukes's specification of the relationship between reason and authority. He writes, "to accept authority is precisely to refrain from examining what one is being told to do or to believe. It is to act or believe not on the balance of reasons, but rather on the basis of a second-order reason that precisely requires that one disregard the balance of reasons as one sees it. Likewise, to exercise

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[39] Allen Buchanan, *Justice, Legitimacy, and Self-Determination: Moral Foundations of International Law* (Oxford: Oxford University Press, 2007): 244.

[40] "Since authority always demands obedience, it is commonly mistaken for some form of power or violence. But authority precludes the use of external means of coercion; where force is used, authority itself has failed. Authority, on the other hand, is incompatible with persuasion, which presupposes equality and works through a process of argumentation … Against the egalitarian order of persuasion stands the authoritarian order, which is always hierarchical." (Hannah Arendt, "What is Authority?" in *Between Past and Future: Eight Exercises in Political Thought* [New York: Viking Press, 1968], 92-93.

[41] Arendt, "What is Authority?" 93.

authority is precisely not to have to offer reasons, but to be obeyed or believed because one has a recognized claim to be."[42]

C. Authoritative practices

In the context of OTC credit derivatives markets, authoritative practices are distinct from other mechanisms of garnering political power, such as a crude view of the regulatory hypothesis which holds that banks have "bought off" regulators or the argument that the privileged place of financial experts is the result of a rational dialogue between public officials and industry representatives. While both financial power and persuasion play important roles in (re)assembling authority in derivatives markets, the concept of authority pushes me to look at the ways in which particular practices were accepted as commanding obedience and respect without either financial force or extensive argumentation.

The identification of authoritative practices presents a methodological challenge: How does one determine whether a given practice constitutes an authoritative practice? While it is tempting to characterize as authoritative any practice that allowed banks to successfully ward off regulation, doing so would be problematic for two reasons. First, pre-crisis, it was not the case that derivatives markets were unregulated; they were extensively privately regulated, mostly by ISDA rule-making. Regulation has always been constitutive of derivatives trading, and while it is true that rule-making has shifted from the industry-level to public regulatory bodies, to regard the market as having fended off regulation prior to the crisis is inaccurate, even as it was largely immune from public scrutiny and oversight.

[42] Lukes, *Moral Conflict,* 92.

The second reason "ability to fend off regulation" is a poor indicator of authority is that while derivatives markets are much more publically regulated now, they are necessarily without authority as this potential indicator would imply. Industry groups, especially on the buy side, played a significant role in shaping post-crisis regulation,[43] for example in pushing for centralized clearing parties, by which they hoped to forestall moving derivative trading onto public exchanges.[44] More fundamentally, however, OTC derivatives trading persists as a legitimate activity. That certainly does not mean the industry got everything it wanted – in the US, almost all derivatives trading is now subject to much greater public disclosure through the mandatory use of electronic trading platforms and it is likely the EU will follow suit.[45] But even with higher capital ratios and leverage limits, the practice of commodifying the risk on financial assets is still regarded as an important market function. For these two reasons, I contend that it is best to avoid indicators of authority that position markets and regulation as involved in a zero-sum relationship where increases in regulation necessarily imply losses in authority. Instead, I have developed a three-pronged approach to identifying and analyzing authoritative practices in the credit derivatives market.

Prong 1: Attentiveness to context

What makes a practice authoritative (or for that matter, a practice) can only be determined with reference to the broader political, intellectual, and cultural climate in which it is embedded. Part of identifying authoritative practices is analyzing the governing ideas that have enabled and circumscribed the existence of a market for financial derivatives. These concern, of

[43] Tsingou, "Regulatory reactions," 33.
[44] Eric Helleiner, "Towards cooperative decentralization? The post-crisis governance of OTC derivatives," in Tony Porter, ed., *Transnational Regulation after the Financial Crisis* (Routledge: New York, 2014): 129.
[45] "The Path Forward for EU-US Derivatives Regulation," *International Financial Law Review,* August 27, 2013, http://www.iflr.com/Article/3247985/The-path-forward-for-EU-US-derivatives-regulation.html.

course, the relationship between private actors and the state, as well as between efficiency and competing values. But beyond the sometimes stale debate about neoliberalism and the privileging of economic values and ends, derivatives are enmeshed in more specific ideational settings. Crucial to the development of a market for derivatives and its subsequent operations has been the evolving status of risk as something to be measured, managed, valued, pursued, and limited.[46] The derivatives industry behaves, in both Keynes's and MacKenzie and Millo's terms, *as if,* financial uncertainty is calculable risk,[47] and the sustainability of this practice as an unproblematically authoritative response to uncertainty has been called into question by the dramatic failure of risk models to capture losses incurred in the global financial crisis. How the relationship between uncertainty and risk gets cashed out is another important part of the context in which OTC derivatives trading is situated.

Relatedly, the changing division between what is considered legitimate economic activity and what is seen as illegitimate speculation or gambling has created and closed off spaces for economic activities.[48] The context in which quantitative and statistical practices are seen as authoritative has a similarly rich and relevant history.[49] Finally, the public's interpretation of the financial crisis and the role of credit derivatives represents an important piece of the broader

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[46] See, for example: Ian Hacking, *The Taming of Chance* (Cambridge: Cambridge University Press, 1990); Peter L. Bernstein, *Against the Gods: The Remarkable Story of Risk* (New York: John Wiley & Sons, 1998); Michael Power, *Organized Uncertainty: Designing a World of Risk Management* (New York: Oxford University Press, 2007).

[47] "The necessity for action and for decision compels us as practical men to do our best to overlook this awkward fact and to behave exactly as we should if we had behind us a good Benthamite calculation of a series of prospective advantages and disadvantages, each multiplied by its appropriate probability, waiting to be summed" (John Maynard Keynes, "The General Theory of Employment," *Quarterly Journal of Economics* 51:2 (1937), 213-214); also Annelise Riles, *Collateral Knowledge: Legal Reasoning in the Global Financial Markets* (Chicago: University of Chicago Press, 2011), 802.

[48] Marieke de Goede, *Virtue, Fortune, Faith: A Genealogy of Finance* (Minneapolis: University of Minnesota Press, 2005).

[49] Theodore Porter, *Trust in Numbers: The Pursuit of Objectivity in Science and Public Life* (Princeton: Princeton University Press, 1995).

context in which derivatives markets are embedded. The narrative of bankers' greed and corruption, as evidenced by widespread outrage about executive compensation, seems particularly salient here, as it attributes responsibility at the individual, rather than systemic or collective level.

Prong 2: Authoritative practices as revealed in crisis

The challenge is that "authority" in the sense I am using it is hard to identify when it is at work, precisely because it doesn't involve public justifications or coercion. It is therefore less readily visible than other forms of rule. However, authoritative practices can be made visible in a moment of crisis, when the practices that were previously understood to constitute the derivatives industry as authoritative were revealed as inadequate. This contention is not new; for example, although Bourdieu refrains from an explicit engagement with methodology, he writes that it is precisely in moments of crisis that formerly unquestioned ways of doing things are transformed into public objects of discourse and argumentation.[50] By moving the undiscussed (what Bourdieu terms *doxa*) into discussion, the self-evidence of particular practices is destroyed; they can be critiqued, contested, and altered. It is for this reason that Bourdieu writes that, "Crisis is a necessary condition for a questioning of doxa."[51]

During the 2008 financial crisis and its regulatory aftermath, many of practices that were constitutive of the pre-crisis credit derivatives market (for example collateralization or lack thereof) were contested and challenged. In the moment of crisis, such practices moved into Arendt's realm of persuasion and argumentation, as they were no longer merely performed, but

[50] Pierre Bourdieu, *Outline of a Theory of Practice,* trans. Richard Nice (Cambridge: Cambridge University Press, 2008): 174.
[51] Ibid., 169.

were now identified as problematic, debated, and in some cases, subjected to reform. During the crisis, financial authority *was* contested and the industry did have to justify and argue for its activities, making visible formerly authoritative practices. However, insofar as authoritative practices were constitutive of the very market for credit derivatives, eliminating them entirely is generally not an option as long as the market is to endure. Accordingly, contestation following the financial crisis constitutes the second prong of my strategy for the empirical identification of authoritative practices.

Prong 3: Authoritative practices recognizably constituting a legitimate form of social action

The insight that the legitimacy of a market for credit derivatives depends on a set of practices that make it recognizable *as a market* to the public and other market actors provides a third step in my method of identifying authoritative practices. Specifically, there are three main requirements that must be a fulfilled for a set of social and economic interactions to be recognizable as a legitimate market: there must be a consistent method of assigning value to the goods or services being bought and sold; there must be sufficient liquidity in the market such that prices are meaningful signals; and there must be some mechanism through which the creditworthiness of a counterparty and its assets can be determined and the risk of counterparty default or bankruptcy guarded against. The practices that were used to meet these market requirements can therefore be understood as constitutive of the authority the derivatives industry possessed prior to the financial crisis, and the study of how these practices emerged in the development of the OTC market; whether and how they were contested during the financial crisis; and how they have been maintained, modified, or replaced following the crisis provides the empirical component of this dissertation.

While I argue that fulfilling these functions was a perquisite for the perception of financial authority, it is important to note that my argument here is not a functionalist one. As the empirical chapters of this project show, how these requirements are met owes as much to contingency and convention as it does to market logic, efficiency, and objectivity. Moreover, the particular practices that were developed, performed, reproduced, and modified to constitute the market for derivatives have been highly politically consequential, structuring how millions of dollars in financial resources are distributed; constituting certain actors as authoritative while disempowering others; and at times producing unintended consequences that have extended the impact of financial activities far beyond the social constituency of legitimation. It is for this reason that I contend that financial authority should be understood as a specifically *political* form of authority.

III. Methodology & Data

While practices are often studied via participant observation, this project is distinct from the ethnographic studies of financial market practices that characterize much of the anthropological and sociological scholarship on the subject.[52] These detailed studies of particular firms and units within firms provide an important contribution to understanding financial practices at the level of the firm, and they inform my dissertation in two ways. First, I have used them in the aggregate to identify common industry practices that cut across firm location (from Japan to France to the United States) and type (from back offices to trading desks to fund managers). Second, these ethnographic accounts provide insight into how these practices fit into

[52] Riles, *Collateral Knowledge*, 2011; Vincent Antonin Lépinay, *Codes of Finance: Engineering Derivatives in a Global Bank* (Princeton: Princeton University Press, 2014); Hirokazu Miyazaki, *Arbitraging Japan: Dreams of Capitalism at the End of Finance* (Berkeley, CA: University of California Press, 2013); Horacio Ortiz, "Financial value: Economic, moral, political, global," *Journal of Ethnographic Theory* 3:1 (2013): 64-79.

the broader activities of financial firms and serve as an important check on the potential to regard either public or private regulators' perspectives on these practices as definitive.

Ethnographic accounts, however, offer a limited perspective on the question that interests me: how those practices contribute to and indeed constitute the authority of derivatives market actors in their relationship with the state. The strength of these detailed accounts lies in their attention to how practices are actually performed in highly specific contexts. However, this provides only a partial analysis of practices and one that is relevant primarily to politics internal to financial markets. More fundamentally, I contend that we cannot make sense of practices without a consideration of how they are perceived, represented, and narrated. Indeed, the definition of practices as competent performances requires the discussion to take place on the terrain of actors' interpretation and representation of practices since this is what tells us what counts as "competent." The same set of actions can be narrated quite differently, with radically different consequences for the legitimacy and authority of the actors involved. Actions become meaningful practices when they are embedded in a social context, but as this context can be interpreted differently, so too can the actions.

Take, for example, the practice of bundling of subprime loans with ones with high credit ratings to create a mortgage-backed security. On the one hand, this could be narrated as an efficient distribution of risk that improves liquidity in the financial system as a whole, provides access to credit (mortgages) to low-income home-buyers formerly excluded from home-ownership and the financial system.[53] Indeed, although the Federal Reserve was attentive to the

[53] For example, see Federal Reserve Governor Alan Greenspan's comments before the 1999 Financial Markets Conference of the Federal Reserve Bank of Atlanta: "When American banks stopped lending in 1990, as a consequence of a collapse in the value of real estate collateral, the capital markets were able to substitute for the loss of bank financial intermediation. Interestingly, the then recently developed mortgage-backed securities market kept residential mortgage credit flowing, which in prior years would have contracted sharply. Arguably, without the

difficulties of accurately measuring the risk associated with financial derivatives, they viewed securitization as a positive market development, in light of its potential for improving market efficiency and liquidity, prior to the 2008 crisis.[54] Alternatively, however, the same series of actions could be narrated as part of an intentional conspiracy on the part of dealer banks to defraud investors by misrepresenting the value of assets constructed out of shoddy components. Arjun Appadurai's characterization of mortgage-backed securitization is representative of this point of view: "subprime mortgages could be bundled together with mortgages with superior credit ratings and, with the connivance of the credit rating agencies, toxic loans were in effect laundered by bundling them together with better loans, disguising them under an overall superior rating."[55] Whether or not securitization should be considered a competent performance is clearly contingent on how it is perceived and described – and by whom.

Because how practices are perceived is essential to identifying authoritative practices, public regulatory discourse is my main subject matter in this project.

A. Data

I argue that "authoritative practices" are both constitutive of the market for financial derivatives and a key source of authority for market actors. In constituting the market for derivatives as a recognizable, legitimate social form, these practices are taken as evidence of

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capital market backing, the mild recession of 1991 could have been far more severe." (Alan Greenspan, "Do efficient financial markets mitigate financial crises?" Speech given to the Financial Markets Conference of the Federal Reserve Bank of Atlanta, Sea Island, Georgia, October 19, 1999.)

[54] For example, see Federal Reserve Governor Susan Phillips's 1997 summary of the increased use of asset-backed securities at the Atlanta Society of Financial Analysts: "As in the case of the emerging derivatives markets and the direct conduct of nontraditional financial activities, we wholeheartedly support the development of securitization by banks. The technique has permitted the 'slicing and dicing' of the risks associated with a pool of assets in ways that permit each investor to choose positions that most closely reflect desired risk versus return." (Susan Phillips, "Risk management for banks and banking regulators in the 21st century," Speech given at the Atlanta Society of Financial Analysis, Atlanta, Georgia, February 14, 1997)

[55] Arjun Appadurai, *Banking on Words: The Failure of Language in the Age of Derivative Finance* (Chicago: University of Chicago Press, 2016): 107.

market actors' sophistication, discipline, and capacity for self-regulation – in short of their authority. To substantiate this argument, I need to answer two main questions: First, through what practices were the necessary components of a legitimate market (valuation, counterparty trust, liquidity) met? And second, what is the relationship between those practices and authority?

To determine which practices are constitutive of the market for over-the-counter financial derivatives, I analyze a set of industry organization documents related to OTC derivatives. These include major investment banks' publications for investors and clients; contracts; documentation and publications from clearing houses involved in the OTC trade; publications by the main industry organization the International Swaps and Derivatives Association (ISDA) and other relevant industry organizations (e.g., the Counterparty Risk Management Group). In conjunction with secondary sources such as the ethnographic studies of financial markets discussed above and informational interviews with market participants, this has allowed me to generate a list of practices that constitute a recognizable and functioning global market for over-the-counter financial derivatives.

Counterfactual analysis helps determine the extent to which these practices can be said to be constitutive of the market: could the market exist without each of them? Such an analysis must take into account the range of ways in which the practices in question could be performed differently, and to avoid a narrowly functionalist analysis, I am interested in whether these practices allowed the market to develop *as it actually did*, not in claiming that these practices were the only possible way to fulfill a market requirement. Accordingly, the reference point is not an abstract model of a rational and efficient market for risk, but rather the real-world market for over-the-counter financial derivatives in all its opacity, uncertainty, and complexity.

The second question – the relationship between practices and authority – requires identifying those practices that were taken by public actors as evidence of the OTC market's capacity for self-regulation. This question is a fundamentally interpretive one and to answer it, I have assembled a database of United States Federal Reserve, Commodity Futures Trading Commission, Securities and Exchange Commission, and Bank of England public speeches and testimony before the relevant legislative body (Congress and Parliament) from the early 1990s through 2015 that mentions derivatives, financial or banking regulation, securitization, or crisis. In addition to speeches, testimony, and public statements, my archive also includes key pieces of legislation (e.g., 1936 the Commodity Exchange Act, the 2000 Commodity Futures Modernization Act, the 2010 Dodd-Frank Wall Street Reform and Consumer Protection Act, the 2012 European Markets Infrastructure Regulation) and the associated legislative debate. Table 1 provides an overview of this core data set, with the number of pages from each source indicated to give a sense of the comprehensiveness of this archive.

Main Sources	**Pages of Documents Relating to Derivatives, Financial/Banking Regulation, Securitization, Crisis (1990-2015)**
Commodity Futures Trading Commission (US)	967
Securities and Exchange Commission (US)	1079
United States Federal Reserve	286
Bank of England (UK)	2401
Financial Services Authority (UK)	691

Table 2: Core regulatory texts

I have supplemented this core regulatory archive with documentation from transnational financial regulatory agencies (the Financial Stability Board, the International Organization of Securities Commissions, the Committee on Payment and Settlement Systems, the Basel Committee on Banking Supervision, the Bank for International Settlements, and the Group of

Twenty), industry organizations (the Group of Thirty, the International Swaps and Derivatives Association, and the Counterparty Risk Management Policy Group) and derivatives market participants and consultants (J.P. Morgan/JPMorgan Chase, Deloitte). These additional data sources are emphasized to varying degrees throughout the subsequent empirical chapters of this dissertation. For example, documents from the Basel Committee on Banking Supervision figure heavily in Chapter 3, given the centrality of the BCBS to endowing the Value-at-Risk model will authoritative status. Chapter 4 draws more heavily on documents from European central bankers, for whom the transparency was a major concern, whereas Chapter 5 engages the professional, academic, and transnational regulatory debate on the relationship between counterparty and systemic risk. All documents were obtained via digital archives and, in some cases, Freedom of Information Act request.

The Anglo-American bias of these sources merits further comment. Although the market for financial derivatives is indeed global, the US and the UK have, for most of the market's history, set the global regulatory agenda for this market. There are some notable exceptions to this, in the form of multilateral international organizations such as the Basel Committee on Banking Supervision and international industry organizations such as the International Swaps and Derivatives Association, and indeed, regulatory documents and debate from both of these actors is referenced when relevant. However, this project is primarily concerned with explaining and contextualizing the development of a massive, licit market in OTC financial derivatives. This is, empirically speaking, an Anglo-American story, because the US and the UK represent the two main regulatory jurisdictions in which the main derivatives dealer-banks are located. As far as the broad strokes of derivatives policy is concerned, other states are overwhelmingly

policy-takers.[56] Attempts to deviate from US policy tend are either directly discouraged through bilateral foreign policy (such as the Japan-US Yen-Dollar Commission of 1984[57]) or indirectly punished by the globalizing financial system, as was illustrated when, faced with high levels of exchange and interest rate volatility in the late 1980s, the Japanese Diet overturned prior restrictions on derivatives trading to allow Japanese investors to participate in foreign derivatives markets, to create domestic derivatives markets, and to offer derivatives based on Japanese stock indices abroad.[58]

That being said, there were and are important national-level variations in derivatives policy, a phenomenon that is manifest in frequent calls throughout the 1990s, on the part of both industry participants and regulators, for cross-border harmonization of accounting standards, trading reporting, and the enforceability of specific contract provisions such as netting. However, these differences do not, for the most part, reflect significant differences in the legitimacy and legality of OTC derivatives on the whole, and are only included in this dissertation when relevant (for example, when the International Accounting Standards Board broke the US Financial Accounting Standards Board over accounting practices for distressed assets during the financial crisis)[59].

B. Interpretive Strategy

[56] See Michael Mastanduno, "System Maker and Privilege Taker: U.S. Power and the International Political Economy," *World Politics* 61:1 (2009) for a broader discussion of the United States, in particular, as a "system maker and privilege taker" in the post-war global political economy. U.S. leadership on derivatives policy falls into the model.
[57] Miyazaki, *Arbitraging Japan*, 14.
[58] Brian W. Semkow, "Emergence of Derivative Financial Products Markets in Japan," *Cornell International Law Journal* 22:1 (1989): 40.
[59] See Chapter 4.

I have searched these texts for references to the set of practices generated from my analysis of industry documents to see the context in which they are discussed (i.e., as evidence of market discipline, as contributing to broader financial (in)stability and firm-level (in)solvency, as needing reform, as solving previously identified problems, and/or as a source of vulnerability and weakness). For each reference to a practice, I consider the valence it is assigned, the audience before whom it is being discussed, and whether it is explicitly narrated as contributing to financial market actors' authority or not. This analysis is divided into three periods: the pre-crisis era (1980s-2007); the financial crisis (2007-2009); and the post-crisis era (2009-2015). I track how the context and valence of references to authoritative practices changes over time and in response to changes in the market.

My analysis of references to practices in regulatory texts allows me to identify four indicators of financial authority, which taken together allow me to determine whether or not it makes sense to regard a given practice as authoritative or not. First, often particular practices are explicitly cited by regulators as providing evidence of the market's capacity for self-governance. In these cases, the relationship between practice and authority is fairly straightforward. Second, practices are sometimes referenced in the justifications for (de)regulatory decisions. In such cases, the authority of financial market actors is implicitly contested and the references to practices allow us to track that contestation. Third, references to practices delimit the range of regulatory possibilities: regulatory change are most often incremental changes to existing practices or the shifting of practices from the private to the public sector. Only rarely are wholly new regulatory tools developed (central clearing is perhaps the best example), and when they are, they owe much to previous practices. Finally, references to practices provide insight into public perceptions of the derivatives market. They provide a consistent means of tracking changes in

perceptions and narratives of the OTC market over time and offer a substantive answer to the question of how derivatives were understood during each of the periods of interest.

Ultimately, how we know whether a given practice is authoritative is a fundamentally interpretive question. However, I take the following criteria as providing compelling evidence of a practice's contribution to financial authority:

First and most obviously, multiple mentions of a given practice as evidence of self-regulatory capacity or market discipline offers fairly straightforward support of that practice's authoritativeness. For example, repeated references to a given practice in the context of discussions of "effective risk management" are an indicator that a practice is authoritative, given the close relationship between risk management and financial authority discussed in further detail in Chapters 3 and 5. Along similar lines, references to a given practice in conjunction with references to "sophisticated investors/market participants" also provides compelling evidence that a practice is authoritative, given the central role the concept of the "sophisticated investor" plays in legitimating derivatives markets (discussed in greater length in Chapter 2).

Second, practices are sometimes referenced in the justifications for regulatory or deregulatory decisions. In such cases, the authority of financial market actors is implicitly contested and the references to practices allow us to track that contestation. For example, as recounted in Chapter 4, the failure of mark-to-market accounting standards was widely discussed by regulators in their analyses of the financial crisis, and helped provide the justification for increased reporting and disclosure requirements.

Third, because constitutive market practices delimit the range of regulatory possibilities, I focus on the content of regulatory changes themselves as these are often incremental changes to existing practices or the shifting of practices from the private to the public sector. For instance,

the specific risk-management practices required of central clearinghouses have their origins in pre-crisis market practices, as Chapter 5 explains. This interpretive method is summarized in Figure 3.

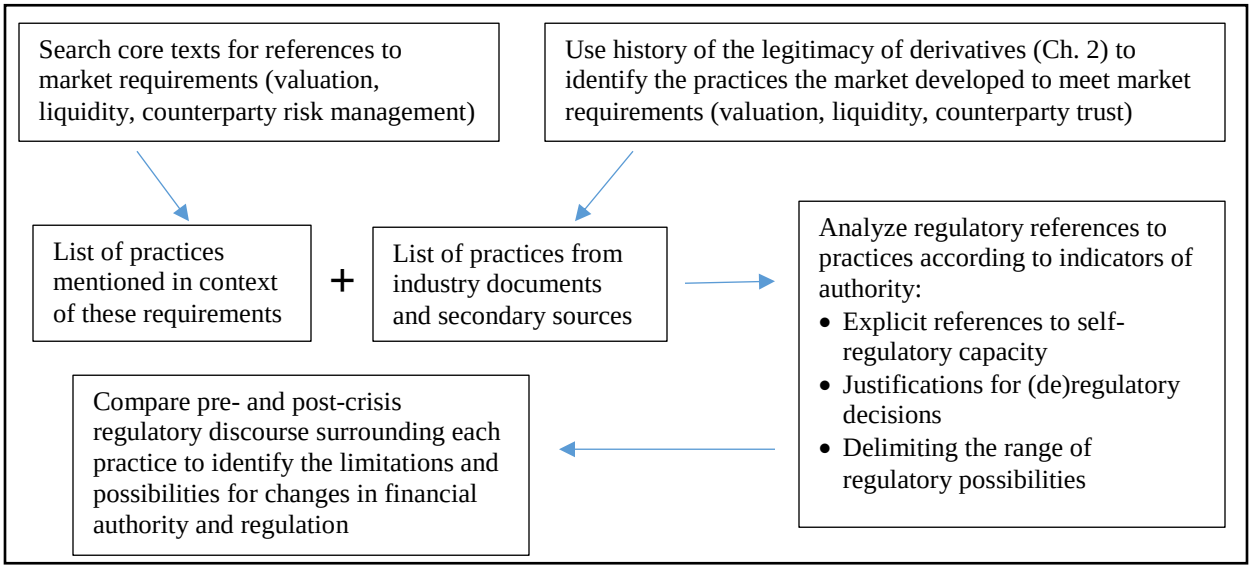

Figure 3: Interpretive strategy

This interpretive strategy allows me to distinguish *references to financial market practices in the context of discussions of the market's right to govern itself* from a simple count of references to a given practice. For example, as Figure 4 depicts, compared to a total count of references to "collateral" or "margin"[60] in my core data set, the references that provide evidence of collateralization's contribution to financial authority are much smaller in number. The discrepancy in this case is particularly acute because "collateral" does sometimes appear in relation to counterparty risk, but at other times it refers to the Bank of England's or the Fed's own collateral standards in their capacity as lender of last resort – and sometimes it is used to refer to the "collateral" damage of the financial crisis. Authoritative practices are only

[60] As Chapter 5 describes, collateralization is a core authoritative practice in the area of counterparty risk management. In the context of central counterparty clearing, collateral is referred to as "margin."

identifiable as such through an interpretive analysis and thorough reading of these texts with an attentiveness to the speaker, the audience, and the time and broader context.

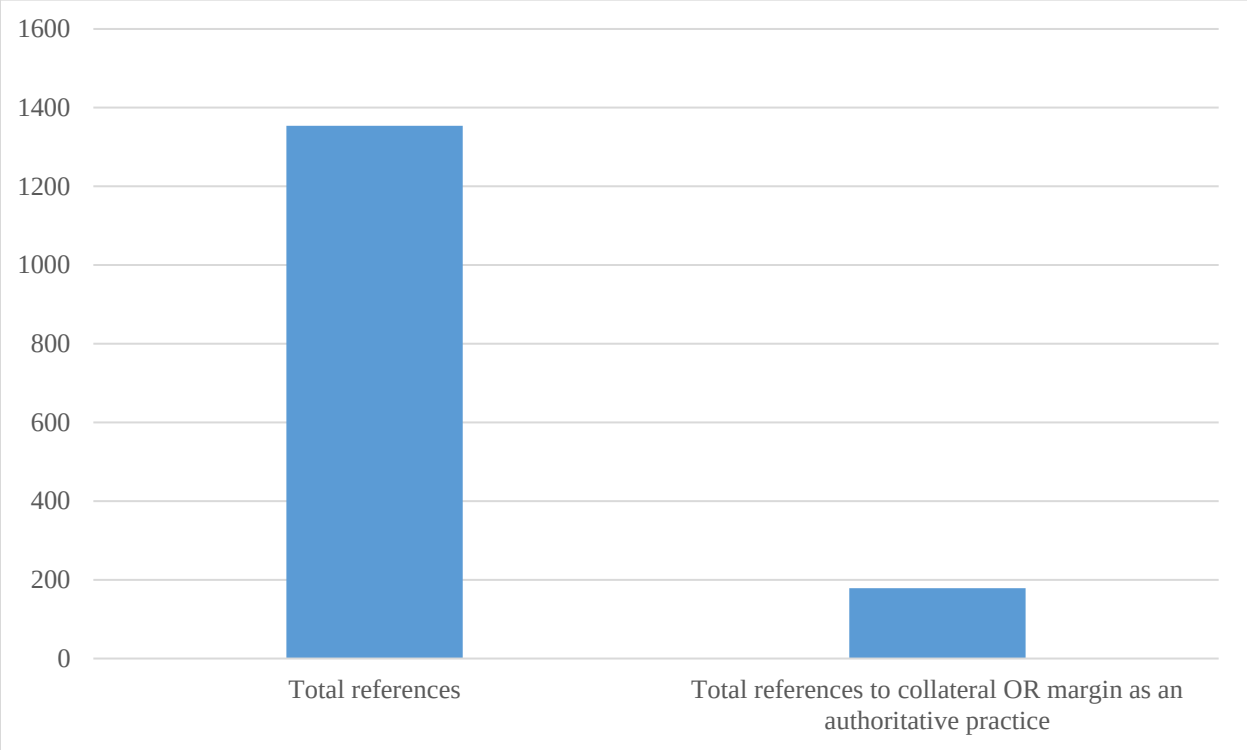

Figure 4: Total references to "collateral(ization)" or "margin" vs. total references to "collateral(ization)" or "margin" as an authoritative practice

Not all financial practices are constitutive of the authority of financial market actors. Much of the routine work of derivatives traders and their supporting staff goes wholly unremarked upon by regulators. If a practice, if performed differently, would do little to alter public perceptions of the OTC market (for example, using a different trading platform or trading strategy), it should not be interpreted as an authoritative practice. Such practices may be significant in other respects, but they tell us little about the enduring authority and power of the derivatives market. Banks' and hedge funds' trading strategies, for example, are enormously

significant to their self-understanding and, in many cases, their profitability, but they are rarely commented on by either private or public regulators.

Practices are not the only source of financial authority. Actors' material capability and expertise, governing ideas and norms, and both market actors' and regulators' institutional and structural power all matter, too. It is for this reason that Chapter 2 relates a history of the legitimacy of derivatives. Because practices must be understood as meaningful, as socially embedded, and as linguistic *and* material, Chapters 3-5 are incomplete without the context provided by Chapter 2. However, practices remain an important analytical focus of this dissertation insofar as they provide an analytically tractable empirical entry point into discussions of financial authority.

IV. Using Authoritative Practices to Understand the OTC Derivatives Market

Authoritative practices in the context of derivatives markets are those that the market has developed to constitute itself as a recognizable market in an often uncertain, opaque, and complex environment and that regulators identify as evidence of the market's capacity for self-governance. Tracking these practices sheds provides a novel way to answer the two questions that motivate this dissertation: How was it possible that the market for OTC derivatives grew so large and so crisis-prone with so little public regulation? And, why, given derivatives' contribution to the 2008 financial crisis, were post-crisis regulatory reforms so limited?

In response to the first question, tracing authoritative practices allows us to see how that market was constructed in response to both the requirements of a recognizable market (valuation, liquidity, and counterparty trust) and the specific challenges posed by OTC derivatives (uncertainty, opacity, and complexity). Analyzing regulatory discourse provides a window into

the process through which financial market actors constructed a market, and in so doing, constructed their own authority. This framework and method shows us how regulators justified their decisions (and non-decisions) to exempt the OTC market from regulatory scrutiny and reveals the basis of their confidence in the market's self-regulatory ability and benefits to the financial system as a whole. As we shall see, the particular practices that developed were necessarily imperfect and were limited in their attempts to overcome and master the uncertainty, opacity, and complexity of the derivatives market. Moreover, the widespread use of these practices often contributed to market instability and vulnerability. Analyzing the consequences of these practices helps us understand both the crisis-prone dynamics of the OTC market and why regulators did not do more to temper those dynamics in advance in the crisis.

In response to my second research question, identifying practices that constituted the market and that regulators recognized as doing so in a responsible way helps us understand why post-crisis regulatory reforms did not go further and why there was such limited adaptation in response to the largest legitimacy crisis the OTC derivatives market had ever faced. As subsequent chapters will show, the very existence and functioning of the market had become so dependent on the practices that market participants developed to value assets, maintain market liquidity, and manage counterparty risk that fundamentally altering these practices would have jeopardized the very existence of a market for over-the-counter derivative contracts. Moreover, when regulators did seek to impose more stringent transparency and risk management requirements on the market, they often looked to those practices that they had previously deemed authoritative, this time mandating their use, rather than depending on the voluntary adoption of those practices by market actors. As a result, over-the-counter derivatives markets today not only

close resemble those of the pre-crisis period in many respects, they also are subject to many of the same vulnerabilities and instabilities.

Chapter 2:
From Bets to Bombs to Financial Boons: The Legitimacy of Global Derivatives Markets before the 2008 Crisis

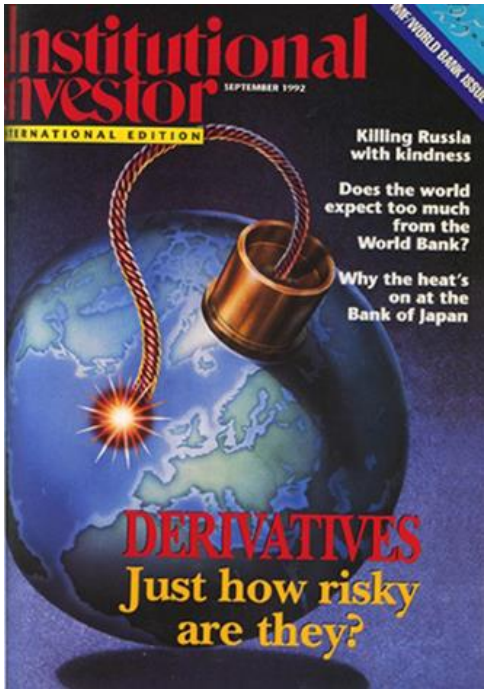

Figure 5: Cover of Institutional Investor, a financial trade publication, in September 1992

"The very modest credit losses that have appeared in derivatives portfolios at US banks are a testament to the effectiveness of market discipline in this area … the benefits of derivatives, in my judgment, have far exceeded their costs"
- United States Federal Reserve Chair Alan Greenspan, 2003[1]

I. Introduction

A. Interpreting derivatives

At the core of the 2009 financial crisis was a massive, unregulated market of complex financial products called derivatives, which transmitted losses in the US residential mortgage market throughout the global financial system. In 2008, this market was valued at over $683

[1] Alan Greenspan, "Corporate Governance," Speech at the 2003 Conference on Bank structure and Competition (via satellite), Chicago, May 8, 2003.

trillion.[2] How did this market grow so large and so risky with so little public supervision and regulation? The short answer is that the Commodity Futures Modernization Act of 2000 expressly prohibited the regulation of large swaths of the financial derivatives market by the two main regulatory agencies in the United States: the Commodity Futures Trading Commission (CFTC) and the Securities and Exchange Commission (SEC). But understanding how derivatives market actors came to be seen as sufficiently capable of governing themselves to justify the *prohibition* of regulation is more complicated. At the heart of the answer, I contend, is the legitimacy of the market for derivatives: the perception by key regulators that derivatives trading was a recognizable and socially acceptable form of market activity. Through a detailed interpretive analysis of regulatory documentation, I show that this outcome was not inevitable; at various moments in time, regulators could have (and at times did) perceive derivatives very differently – as systemically risky, as dangerous, as too complex to trust in the hands of ordinary investors. Understanding why they ultimately came to view derivatives as needing to be legally protected from attempts at regulation requires a careful reading of the regulatory history of these products.

This chapter contends that one of the most fundamental axes of disagreement between regulators, legislators, and the derivatives industry (and within each of these categories of actors) has been over the *interpretation* rather than *regulation* of these products: What are derivatives? Are they akin to insurance? To securities? To commodity derivatives? Do OTC derivatives minimize financial risk or blow it up, as the trade magazine depicted in Figure 5 suggests? Are they better viewed as a tool for hedging or for speculation? Does their famous complexity and

[2] Bank for International Settlements, "OTC derivatives market activity in the second half of 2008" (Basel: Bank for International Settlements, 2009), 1.

mathematical sophistication help ensure they will not be used by "unsophisticated" investors or does it just ensure that such investors will not understand the risks they are taking? These are irreducibly interpretive questions: derivatives are social objects whose value is perhaps less tethered to materiality than any other good or service. These interpretive questions certainly have regulatory implications, but the central thesis of this chapter is that the politics of financial derivatives go beyond regulatory outcomes to include the structural, ideational, and material channels through which finance has come to occupy a position of power and authority in global politics. Central to all of these are debates over what derivatives are, how their risks should be evaluated, and how we can understand their effects.

The goal of this chapter is not so much to determine the causes of particular regulatory decisions, some of which were certainly influenced by financial lobbying and occurred in a broader context of financialization and neoliberal ideology, but to understand the processes through which key actors, who would have had the power to change the dynamics of the global market for financial derivatives, came to regard the market for financial derivatives as legitimate and financial actors as having the right to make politically consequential decisions, the effect of which was a very high degree of market self-regulation. While subsequent empirical chapters document the specific practices that constituted the market and that explain its resilience through the 2008 global financial crisis, this chapter is concerned with the development of a legitimate market for financial derivatives prior to the crisis. This chapter provides historical, social, and political context for subsequent crisis and post-crisis developments in financial market regulation without which the resilience of financial market authority and the limited scope of public (or private) regulatory reform and change cannot be fully understood. A central contention of this dissertation is that the market for financial derivatives as understood in terms of existing

markets, requiring ostensibly objective methods of valuation to distinguish the market from speculation (Ch. 3), sufficient liquidity for market dynamics to operate (Ch. 4), and mechanism to ensure counterparty trust (Ch. 5). Subsequent chapters investigate the *recognizability* of the market for derivatives, a necessary but not sufficient condition of its *legitimacy.* This chapter tackles the question of legitimacy head on, explaining how the market for financial derivatives came to be perceived as having social value (or, at a minimum, as not being destructive of the public interest).

B. Methodology

This chapter focuses on a series of critical moments, often but not always culminating in a legislative or regulatory shift, when the public debate around the legitimacy of derivatives and their connection to the public interest changed. These are moments of contestation, only occasionally rising to the level of widespread public debate, but nonetheless extending beyond the industry itself to draw the interest of lawmakers and regulators in the United States and the United Kingdom.

This chapter is based on a reading of US and UK regulatory and legislative documentation related to derivatives and associated issues from the early 1900s up to the financial crisis. (Taken together, these two jurisdictions accounted for roughly two-thirds of the derivatives market.) Because financial derivatives did not become widespread until the 1980s, following the collapse of Bretton Woods and the attendant exchange and interest rate volatility that followed from globalizing capital markets, the majority of documents analyzed are from 1985-2007. They include speeches and testimony from the Federal Reserve, the New York the Bank of England, the SEC, and the CFTC; legislation in the US and UK; and commissioned

reports by the Government Accountability Office, the Treasury Department, and the President's Working Group on Financial Markets among others.

I take these documents as representative of the range of public regulatory perceptions of derivatives in the period in question. As I will discuss, these sources are not univocal in their representations of derivatives. For example, the early 1990s were marked by strong differences between individual SEC commissioners regarding OTC derivatives' contribution to systemic risk. It is impossible to know whether these public speeches, congressional testimony, and published reports reflect what regulators were "really thinking." There are strong institutional and bureaucratic reasons for regulators to express particular positions at particular times, regardless of their own true opinions. However, for my purposes, the inevitable methodological inability to access individuals' private assessments of derivatives is not particularly troubling. I am interested in how these products were understood, framed, narrated, and represented, and these concerns are independent of what regulators and policymakers "actually" thought. I am chiefly concerned with the public legitimation of these products to and by the set of actors with the institutional capacity and political authority to delegitimate them, should they so choose.

An important source that informs regulators' public statements on derivatives are a set of reports by influential industry bodies such as the G-30 and the International Swaps and Derivatives Association, many of which were published in explicit response to regulatory concerns and subsequently referenced in later regulatory speeches and testimony. Accordingly, these industry documents also constitute source material for this chapter. Finally, because this period does include moments during which the social constituency of legitimation[3] extends

[3] Christian Reus-Smit, "International Crises of Legitimacy," *International Politics* 44 (2007): 158.

beyond regulatory agencies to include a wider public, I also draw upon media coverage of these moments, focusing on accounts given in trade publications such as *Institutional Investor* and *Risk*, as well as coverage of events like the Orange County bankruptcy and Long-Term Capital Management failure in the national news media.

Through my reading of these primary texts, I am able to identify a series of key moments of potential change in regulatory attitudes toward, and the legitimacy of, the market for OTC financial derivatives. These moments are significant in their own right, but I am especially interested in them insofar as they are representative of shifts in how derivatives are legitimated and how limited public regulation is justified. While not all of these moments resulted in substantive policy changes, such outcomes were not predetermined: the dramatic and unfettered growth of financial derivatives markets did not occur in the absence of scrutiny and opposition and at several key moments, different outcomes are conceivable. This contingency pushes back on narratives of financial globalization that regard the expansion and deregulation of markets as inevitable and unidirectional.

C. Overview of the chapter

This chapter divides the pre-crisis history of financial derivatives into sections (summarized in Table 3), beginning first with the popularization of commodity derivatives starting in the mid-19th century and the regulation of these markets by the 1936 Commodities Exchange Act. Broadly speaking, derivatives during this period were understood as benefiting agricultural interests who nonetheless required protection from the price volatility derivatives were thought (probably erroneously) to cause.

This regulatory justification was further specified in the 1974 Commodity Futures Trading Act, which formalized the distinction between "professional" and "unsophisticated"

investors, with the latter requiring certain regulatory protections that the latter were thought, in their presumed (if somewhat tautological) sophistication not to need. The need to protect individual and small-scale investors was the main sociopolitical concern guiding regulators throughout the 1980s when financial derivatives proliferated, the period covered by the next section.

By the early 1990s, however, alarmed by a speech by E. Gerald Corrigan to the New York State Bankers Association, regulators and lawmakers had become increasingly concerned about derivatives' potential to exacerbate and transmit crisis, with this concern providing a systemic, rather than investor-specific, justification for potential derivatives regulation and provoking a series of reports by the Government Accountability Office and the G30 which offered competing interpretations of the relationship between financial derivatives and global financial stability. While these concerns were somewhat allayed by greater standardization of risk management and accounting practices, the risks associated with the legal ambiguity of derivatives contracts soon offered a subsequent justification for public rule-making on derivatives as national jurisdictions sought to ensure the enforceability of derivatives contracts. This period of contestation, ambiguity, and uncertainty constitutes the third section of this chapter.

In the mid-1990s, derivatives again came under public scrutiny, this time for their contribution to several well publicized failures (the municipal bankruptcy of Orange County, California and the collapse of the hedge fund Long-Term Capital Management) discussed in the fourth section of this chapter, but the dominant narrative in these cases attributed the failure to poor risk management and individual poor decision-making, rather than to the use of derivatives per se.

The fifth section looks at the period of pre-crisis self-regulation. By the late 1990s, the discourse around financial derivatives was occurring in a context that privileged innovation over stability and that saw mid-20th century justifications for the regulation of commodity derivatives as wholly irrelevant to the regulation of 21st century financial derivatives, culminating in the Gramm-Leach-Bliley Act (1999) and the Commodity Futures Modernization Act (2000), which prevented the regulation of OTC financial derivatives markets, setting the stage for the next eight years of regulatory laissez-faire. While this eight year long period of self-regulation was largely uncontested, it is important not to forget the much higher degree of public scrutiny and various framings of derivatives that preceded it, both to understand how this taken-for-granted attitude toward financial un-regulation (financial derivatives were never regulated in the first place, as the more familiar "deregulation" presumes) came about and to consider the alternative framings of derivative that were possible in the aftermath of the financial crisis.

II. Protecting Farmers and Preventing Commodity Price Volatility (1865-1970s)

Financial derivatives have their origins in a long history of similar financial products, most notably insurance contracts, securities, and commodity derivatives. Unlike insurance contracts, derivatives contracts can be bought and sold by actors with no interest in the underlying asset. Unlike securities, the value of derivatives is derived from but not solely a function of the underlying asset. Financial derivatives are perhaps most similar to commodity derivatives, though they differ in some important respects, most notably in that the underlying asset is not a tangible one: there is no question of delivery of the underlying. Valuation is also more difficult because it is fundamentally about market perceptions rather than any "objective" quality of the good or market pricing. Finally, as will become increasingly important later in the history of derivatives, financial derivatives are frequently traded over-the-counter, rather than on

centralized, standardized exchanges like the Chicago Mercantile Exchange. Despite these differences, commodity derivatives and their regulation constitute the context against which financial derivatives have been understood for much of their history. It is therefore worth going into in some depth to sketch out the main areas of contention in derivatives markets prior to the advent of financial and OTC derivatives.

This regulatory history – as told through legislation, Supreme Court cases, and administrative, regulatory, and expert testimony – points to an enduring concern with the effects of futures/options markets on the price of underlying commodities, a concern with "speculation," and a privileging of the interests of agricultural producers for whom futures markets were understood to constitute a form of insurance against the deleterious effects of price volatility. Throughout the first half of the 20th century, derivatives regulation was enacted when regulators believe that manipulation of the market price mechanism as occurring and was scaled back when they were convinced otherwise. Regulators' primary concern was with the effects of derivative markets on the underlying market and these concerns were addressed by confining trades to regulated exchanges, the establishment of recordkeeping and reporting requirements, and preventing price manipulation and the dissemination of false crop and market information.

Forward contracts, which allow buyers and sellers to specify a price at time *t* for delivery of goods at time *t+1*, have been commonly used for corn, wheat, and other grains since 1850. Trading was centralized on the Chicago Board of Trade by 1859 and the contracts themselves were highly standardized by 1865.[4] The first recorded instance of federal regulation of

[4] Alan Greenspan, "Government Regulation and Derivatives Contracts," Remarks by Federal Reserve Chairman Alan Greenspan at the Financial Markets Conference of the Federal Reserve Bank of Atlanta, Coral Gables, Florida, February 21, 1997.

derivatives was the Anti-Gold Futures Act of 1864,[5] which was enacted because the US dollar was trading at a significant discount to gold, but the act was repealed two weeks later when it caused a further drop on the value of the dollar relative to gold.[6]

However, the perception that futures markets distort prices or produce excessive price volatility in markets for the underlying commodity persisted and was the justification for more enduring regulatory efforts in the early 20th century, largely based in concern for farmers and agricultural interests.[7] Indeed, the image of a small-scale farmer locking in prices in order to have some measure of financial security has historically been a common aspect of the legitimation of derivatives; even many contemporary explanations of and justifications for financial derivatives begin with the image of a farmer living hand-to-mouth.[8] But just as protecting farmers was used a justification for futures markets in the first place, so too did it

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[5] An Act to prohibit certain Sales of Gold and Foreign Exchange, 13 Stat., Chapter 127, 38th Cong. (1864): 132.
[6] Greenspan, "Government Regulation," 1997.
[7] See for example, the language in a 1921 Senate Committee on Agriculture and Forestry report on commodity futures regulation: "Every member of a grain exchange who testified before this committee acknowledged that there is at times excessive speculation and undesirable speculation in the futures market. Furthermore, it was brought out that a few big traders at grimes influence prices – manipulate the market – by the great volume of their operations. Also, it was show that a continually fluctuating, and not a stable, market is the desire of speculators. Such a market is against the interests of the producer; he must have stable prices in order to market his crop to best advantage. A market without wide and frequent price fluctuations would greatly benefit the producer." (Sen. Report No. 212, 67th Cong. Qtd. in *Board of Trade of City of Chicago v. Olsen* 1923.)
[8] See for example the "Futures Fundamentals" section of the Chicago Mercantile Exchange's website, which begins: "Let's say you're in the business of making corn flakes. You're at risk of corn prices rising and cutting into your profits, simply because a hot, dry summer reduced the season's harvest." ("The Global Derivatives Marketplace," *Chicago Mercantile Exchange Futures Fundamentals,* http://futuresfundamentals.cmegroup.com/get-the-basics/introduction-to-derivatives/, accessed 24 July 2016.) The example continues in the next section: "In the summer of 2012, the United States experienced its most severe drought since the Dust Bowl of the 1930s. The drought had perhaps the biggest impact in the Midwest Corn Belt. As the season became dryer and hotter, corn farmers and country elevators that store corn for later sale bought corn futures at a certain price, for a certain date of sale. This guaranteed a level of profit, which helped plan for a year in which production and supply of their crop would most certainly be lower than normal." ("Futures and Options: Tools for Navigating Business and Financial Risks," *Chicago Mercantile Exchange Futures Fundamentals,* http://futuresfundamentals.cmegroup.com/get-the-basics/futures-and-options/, accessed 24 July 2016.) BBC News's "Derivatives – a simple guide" begins similarly: "Traders bought and sold 'future' contracts - an agreement to buy coffee, say, in three months time at a certain price - protecting themselves from the worry that a crop failure might drive up the price of coffee in the intervening months." (*BBC News,* "Derivatives – a simple guide," November 3, 2003, http://news.bbc.co.uk/2/hi/business/2190776.stm.)

provide the justification for regulating them. As Marieke de Goede notes, state-level 19th century prohibitions on "bucket shops" were an attempt to prevent gambling (as distinguished from "virtuous" financial activity), but in addition to being seen as immoral on their own terms, these speculative activities were also delegitimated insofar as they negatively affected agricultural interests.[9] This concern was echoed in an 1874 Illinois statute that criminalized spreading false rumors to affect commodity prices or corner markets, and lay behind 164 subsequent attempts to regulate agricultural futures trading that eventually led to the Grain Futures Act of 1922 which was intended to reduce "sudden or unreasonable fluctuations" in the price of grain by banning agricultural futures trading that occurred outside of organized exchanges.[10]

In the debate over commodity derivatives regulation, the public interest was explicitly equated with the unimpeded operation of supply and demand in the primary market for commodities.[11] This equation of the public interest and commodity markets free from the

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[9] Marieke de Goede, *Virtue, Fortune, Faith: A Genealogy of Finance* (Minneapolis: University of Minnesota Press, 2005): 50-75.

[10] Greenspan, "Government Regulation and Derivatives Contracts." The 1922 Grain Futures Act was actually preceded by the Futures Trading Act of 1921 which imposed a 20 cent/bushel tax on grain futures contracts traded off of exchanges. However, this law was declared unconstitutional later that year in *Hill v. Wallace*. The 1922 law was also challenged, but upheld as constitutional in 1923 in *Board of Trade of City of Chicago v. Olsen* since it was based on the Commerce Clause, rather than taxation authority. Even though the plaintiff pointed out that no corners had been run in 15 years, that few speculators have enough capital to affect the market, and that futures do not affect prices which are regulated by supply and demand, the Court ultimately ruled that "Manipulations of grain futures for speculative profit, though not carried to the extent of a corner or complete monopoly, exert a vicious influence and produce abnormal and disturbing temporary fluctuations of prices that are not responsive to actual supply and demand and discourage, not only this justifiable hedging, but disturb the normal flow of actual consignments. A futures market lends itself to such manipulation much more readily than a cash market." (*Board of Trade of City of Chicago v. Olsen* 262 U.S. 1 [1923])

[11] For example, in the lead-up to the passage of the 1921 Futures Trading Act, then Director of the short-lived United States Food Administration Herbert Hoover testified before the House Committee on Agriculture: "The second form of manipulation and the one that I feel does at times take place, is the making of a drive on the price by either the sale or the purchase of such quantities as will affect the price by the volume of material coming to the market at that particular time. I would regard those transactions as an attempt to dislocate the normal flow of the law of supply and demand, and any attempt of any individual to dislocate a free market must be against the public interest" (qtd. in *Board of Trade of City of Chicago v. Olsen* 1923). There is a certain irony in the director of an institution whose entire purpose was intervening in the wheat market to stabilize prices and secure the US food supply objecting to futures markets on the basis of price distortion, but the Food Administration was primarily concerned with protecting the food supply, not with maintaining market prices.

influence of speculators was reflected in the language of a United States Department of Agriculture circular explaining the Grain Futures Act: "Transactions in grain involving the sale thereof for future delivery as commonly conducted on boards of trade and known as 'futures' are affected with a national public interest." Large trading volumes, the use of US grain prices as a global benchmark and the basis for the hedging strategy of those involved in the grain industry, and the susceptibility of grain prices to manipulation "render regulation imperative for the protection of such commerce and the national public interest therein."[12]

The Grain Futures Act was strengthened and superseded in 1936 by the Commodity Exchange Act (CEA), which, like its predecessor, was explicitly intended to discourage speculation that was thought to cause excessive price volatility by requiring all commodities and commodity futures (not just grains and grain futures) to be traded on exchanges. The CEA established the Commodity Exchange Commission which then took the further step of establishing position limits on futures contracts, another regulatory tool intended to prevent futures markets from affecting commodity markets. Although, as we shall see, the applicability of these two policy tools – organized exchanges and position limits – to financial derivatives was contested and ultimately rejected over the next seventy years, they would return to the regulatory discourse after the 2008 crisis, this time justified not with reference to the volatility-enhancing effects of derivative markets on underlying markets but this time out of a concern for the formers' contribution to systemic risk.

[12] Grain Futures Act, 1922: General rules and Regulations of the Secretary of Agriculture with Respect to Contract Markets, United States Department of Agriculture Office of the Secretary, Miscellaneous Circular No. 10, June 22, 1923: 10-11.

Debates over industry-specific derivatives regulation during this period revolved around their effects on specific markets, with agricultural interests pushing for greater regulation and financial interests opposing it, to mixed results. After a successful attempt to corner the onion futures market at the Chicago Mercantile Exchange in 1955 depressed onion prices to below the value of the bags that held them, ultimately driving many onion farmers into bankruptcy, Congress passed the Onion Futures Act of 1958.[13] While outright bans on futures trading were very uncommon (a similar attempt to ban potato futures, though passed by the Senate in 1964, did not become law[14]), they are evidence of the dominant interpretation of derivatives at the time: as secondary in importance to, and a potential disrupter of, commodity markets and as only narrowly separated from gambling and illegitimate speculation.[15]

III. Protecting Unsophisticated Investors (1970s)

Preventing commodity price volatility remained the primary regulatory concern until the passage of the Commodity Futures Trading Commission (CFTC) Act of 1974. The CFTC Act formally legalized derivatives contracts written on nearly all underlying assets, including financial instruments, as long as they were traded on organized exchanges. On the one hand, this can be read as a broad legitimation of new financial instruments; on the other, by requiring that

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[13] Emily Lambert. *The Futures: The Rise of the Speculators and the Origins of the World's Biggest Markets,* (New York: Basic Books, 2010): 42.

[14] "US Futures Trading and Regulation Before the Creation of the CFTC." (No date.) *US Commodity Futures Trading Commission,* http://www.cftc.gov/about/historyofthecftc/history_precftc, accessed 27 July 2016.

[15] See de Goede, *Virtue, Fortune, Faith* for a greater focus on the interpretive and social work that went into distinguishing legitimate financial activity from illegitimate gambling. While this was certainly the broad context in which the history of the (de)legitimation of derivatives took place, it does not account for the specific shifts in the interpretation and regulation of derivatives, and later financial derivatives, markets. While derivatives, broadly speaking, have been interpreted as a legitimate economic tool (rather than gambling) for the past 150 years, the justifications for that legitimacy have shifted dramatically and the scope and nature of regulation has changed in kind.

formerly off-exchange trades be brought onto exchanges, the CFTC Act subjected financial derivatives to more regulatory oversight than previously when they had been largely unregulated.

This broad regulatory scope was quickly contested by the financial industry and by the Treasury Department, which saw the Act as encroaching on its regulatory turf over the banking industry. As a result, the Treasury Department proposed (and Congress adopted) what came to be known as the Treasury Amendment, which excluded financial derivatives[16]from the CFTC's requirement that all derivatives be traded on organized exchanges.[17] Just as the justification for commodities derivatives regulation was linked to famers' lack of financial sophistication and their concomitant need for public protection in the face of speculative, avaricious financial interests, the financial sophistication of large institutional investors was used to justify this regulatory exemption. As the Treasury Department noted in its letter to Congress on the subject:

> Virtually all futures trading in foreign currencies in the United States is carried out through an informal network of banks and dealers. This dealer market, which consists primarily of large banks, has proved highly efficient in serving the needs of international business in hedging the risks that stem from foreign exchange rate movements. The participants in this market are sophisticated and informed institutions, unlike the participants in the *organized* exchanges, which, in some cases, include individuals and small investors who may need to be protected by some form of government regulation. [18]

From 1974 to the early 1990s, the central regulatory concern surrounding derivatives was no longer the effect they had on underlying markets, but rather the "sophistication" of market participants. Currency markets, in particular, were seen as being much too deep and therefore

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[16] At the time, these were largely limited to currency futures and derivatives written on government securities.
[17] "Nothing in this Act shall be deemed to govern or in any way be applicable to transactions in foreign currency, security warrants, security rights, resales of installment loan contracts, repurchase options, government securities, or mortgages and mortgage purchase commitments, unless such transactions involve the sale thereof for future delivery conducted on a board of trade." (*Commodity Futures Trading Commission Act*, 7 U.S.C.§ 2(ii), 1974.)
[18] Qtd. in Camden R. Webb, "*Salomon Forex, Inc. v. Tauber* – The 'Sophisticated Trader' and Foreign Currency Derivatives Under the Commodity Exchange Act," *North Carolina Journal of International Law and Commercial Regulation* 19 (1994): 597.

difficult to manipulate for the justification behind the CEA to apply,[19] and participation in financial derivatives market was, in practice at least, limited to large banks and corporations who were not regarded as needing the same forms of state protection as the small-scale traders and agricultural interests involved in the Chicago Mercantile Exchange and Chicago Board of Trade. Derivatives were interpreted as being so technical and complex that individual investors were unlikely to buy and sell them in the first place.

What constituted a "sophisticated" investor was not specified in either the Treasury Amendment or the letter that provided the justification for exempting financial derivatives from regulatory requirements under the CEA. Despite its frequent use in regulatory discourse, the term did not receive greater clarification until the case of *Salomon Forex, Inc. v. Tauber,* decided by the Fourth Circuit Court of Appeals in 1993.[20] Salmon Forex, Inc., a large foreign exchange trading firm, sued Lazlo Tauber, an individual trader for breach of contract over sixty-eight currency options and futures trades.[21] Tauber argued that he was not responsible for his debt since the trades were illegal, having been conduct over-the-counter, rather than on an organized exchange as required by the CEA. The CFTC sided with Tauber, contending that the Treasury Amendment should not be interpreted as applying to currency options trades and that these derivatives should be subject to regulation just as commodity futures and options were. To make this case, they appealed to the same justification that undergirded state-level regulations of derivatives during the late 19th and early 20th century, arguing that exempting currency options

[19] Greenspan, "Government Regulation and Derivatives Contracts."
[20] Salomon Forex, Inc. v. Tauber, 4th Circuit Court of Appeals, 1993.
[21] Webb, "*Salomon Forex*," 582.

from regulation would mean a return to "bucket shops and boiler rooms, the very types of fraudulent businesses Congress sought to outlaw in enacting the CEA."[22]

Ultimately, however, the court ruled that the currency derivatives in question were legal, despite being carried out off of organized exchanges, because Tauber, despite being an individual rather than a large bank, was a "sophisticated trader." As Webb notes, "Individuals who participate in the interbank market, if sophisticated, are exempt from the CEA … *Tauber* presents a novel but potentially disruptive approach to commodities futures regulation because the holding permits a class of sophisticated traders, who are subject to no federal oversight, to trade over the counter."[23] This decision was based on the fact that Tauber maintained foreign bank accounts to facilitate his trading, monitored his trades using a computer network that tracked exchange rates, and offset transactions rather than actually receiving the currency in question, suggesting his motives had more to do with speculation and profit-seeking than insurance.[24] The court's reasoning appealed to and strengthened the interpretation of derivatives as warranting regulation only in cases where they were traded by amateur investors; regulation justified less with reference to the product itself and more with reference to who was trading it. Financial derivatives traded by small-scale investors on organized exchanges could be legitimately regulated in the name of protecting the public interest, but this justification was not extended to over-the-counter trading by large-scale institutions.

IV. The Proliferation of OTC Financial Derivatives (1980s)

[22] Qtd. in Thomas Tormey, "A Derivatives Dilemma: The Treasury Amendment Controversy and the Regulatory Status of Foreign Currency Options," *Fordham Law Review* 65:5 (1997): 2317, fn. 13.
[23] Webb, "*Salomon Forex*," 582.
[24] Ibid., 582-583.

The spread of financial derivatives and the development of a liquid global market during the 1980s and early 1990s was fueled by investors' desire to guard against increased interest rate and exchange rate volatility, facilitated by advances in financial theory, information processing, and communications technology, and motivated by a desire to avoid the regulations attached to more conventional financial strategies.[25] The practices that enabled the market to grow to its pre-crisis size are discussed in the subsequent chapters of this dissertation; the focus here is on the competing interpretations of derivatives held by market participants, the CFTC, the SEC, the Federal Reserve, and the Bank of England. While the *Tauber* case clarified and reiterated the "sophisticated investor" justification for not publically regulating derivatives, by the mid-1990s, financial derivatives had proliferated well beyond the products that were imagined by the CFTC Act and the Treasury Amendment, and regulatory debates concerning derivatives hinged on new and different interpretations of the financial products as well. This section sketches out these developments with the goal of providing greater context for the influential regulatory debates of the 1990s and early 2000s.

The first financial futures contracts – written on Government National Mortgage Association certificates – were approved by the CFTC in 1975 and began trading on the Chicago Board of Trade. The over-the-counter financial derivatives market took off a few years later. While currency futures and forwards traded at small volumes by the early 1980s, the first large-scale over-the-counter financial derivative transaction of the kind that was to change the financial landscape for the next thirty years was a currency swap between IBM and the World

[25] Clifford Smith, Charles Smithson, and Lee Wakeman, "The Evolving Market for Swaps," University of Rochester Managerial Economics Research Center Working Paper Series, (Rochester, NY: Managerial Economics Research Center, Graduate School of Management, University of Rochester, 1986).

Bank, brokered by Salomon Brothers in 1981. Compared to the credit derivative contracts that were to come, the swap was relatively straightforward: IBM needed cash in dollars and had excess quantities of Swiss francs and Deutschmarks and the World Bank needed cash in non-dollar currencies. The swap deal allowed each counterparty to obtain the currency they needed directly without having to buy and sell dollars on the currency market, circumventing currency controls.[26] This innovation and variations on it, including interest rate swaps, as well as swaps and options on securities and other forms of underlying debt, spread quickly as market participants with complementary needs and different expectations were brought together in off-exchange transactions by large commercial and investments banks that increasingly took on a role as both dealer and broker of derivatives transactions.

A. Regulatory response in the United Kingdom

Britain's response to the proliferation of financial derivatives was quick and decisive compared to the interpretive and regulatory conflicts that characterized this period in the US. The 1986 Financial Services Act made all financial derivatives – both over-the-counter and exchange-traded – legally enforceable in the United Kingdom. Significantly – and in a departure from a distinction that had long underlay US financial regulation[27] – British regulators did not distinguish between hedging and speculation. Section 63 of the Act specifically rendered derivative contracts, which might otherwise have been considered speculative and therefore contrary to the Gaming Act of 1845, legal as long as one party enters into the contract for a "business purpose."[28] The Financial Services Act was part of a broader financial deregulatory

[26] Gillian Tett, *Fool's Gold: The Inside Story of J.P. Morgan and How Wall St. Greed Corrupted Its Bold Dream and Created a Financial Catastrophe* (New York: Free Press, 2009), 63.
[27] de Goede, *Virtue, Fortune, Faith.*
[28] Robert J. Schwartz and Clifford W. Smith Schwartz, *Derivatives Handbook: Risk Management and Control* (New York: John Wiley & Sons, 1997): 183. Schwartz and Smith note that, "The limits to what the proper business

effort under Margaret Thatcher, and in lieu of the public regulatory agencies established in the United States, it set up five "self-regulatory organizations" (SROs).[29] Somewhat like the legal category of "sophisticated investor" in the United States, the goal of the Act was to ensure investor protection by ensuring that participation in the financial industry was limited to "authorized persons," which in the British case meant members of recognized SROs and actors certified by recognized professional organizations.[30] While anti-fraud and anti-manipulation provisions still applied to OTC markets as enforced by the Securities and Investment Board,[31] deregulation – or rather, self-regulation – of financial derivatives was achieved more decisively and earlier in the UK than in the US. This did not remove OTC financial derivatives from the realm of contestation, as we shall see, but it did definitively establish a norm of industry self-regulation.

B. Regulatory response in the United States

Compared to the UK, the US regulatory response to the proliferation of financial derivatives was less decisive. Although the Treasury Amendment ostensibly exempted financial derivatives from regulation by the CFTC, the law had been written at a time when currency futures and forwards were the predominant form of financial derivative. The development of swaps and options, both public and private debt, was unforeseen by the legislation and existed in

purposes of a bank conducting derivatives transactions are for these purposes have yet to be fully tested, although the cases to date suggest that the English courts will be most unwilling to hold that the Gaming Acts render void derivatives contracts made between banks or other commercial institutions" (183).

[29] The public Securities and Investment Board did play an important role in the regulatory structure established by the Financial Services Act, albeit a more minor one than the SEC and CFTC in the United States.

[30] Jan Peeters, "Re-Regulation of the Financial Services Industry in the United Kingdom," *University of Pennsylvania Journal of International Business Law* 10:3 (1987): 389.

[31] United States Commodity Futures Trading Commission, Office of International Affairs, "Working Paper on National Laws Relating to Over-the-Counter Derivatives Transactions and the Public Policy Objectives of Financial Regulation (2000), 23.

a legal grey area. For example, the question of whether or not currency options could be regulated by the CFTC was undecided as late as 1997.[32] Funk and Hirschman contend that the ambiguity of these financial innovations – and of swaps in particular – allowed them to evade regulatory scrutiny in a system organized according to different product classes.[33] Because OTC swaps were (as discussed earlier in this chapter) distinct not only from commodity futures but also from securities and loans, the pre-existing regulatory structure for governing them was limited in both its conceptual architecture and in its ability to keep pace with the velocity of financial innovation. This very conceptual ambiguity further fueled the growth of financial derivatives in the United States, as London-based derivatives groups in the 1980s expanded their operations to the US upon realizing that neither the CFTC nor Glass-Steagall (which governed, and distinguished between, commercial and investment banking) prohibited the industry.[34]

Efforts to regulate swaps and other financial derivatives in the 1980s were limited. The Securities and Exchange Commission and the Financial Accounting Standards Board made initial attempts to make the industry more transparent and move swaps onto banks' official balance sheets – limited regulations compared to those governing exchange-traded derivatives.[35] These efforts were quickly rebuffed through lobbying by the newly formed International Swap Dealers Association[36] (ISDA), an industry organization formed in 1985 when bankers from Salomon Brothers, BNP Paribas, Goldman Sachs, J.P. Morgan, and others met in Palm Beach to

[32] Tormey, "A Derivatives Dilemma," 2316-2317.
[33] Russell J. Funk and Daniel Hirschman, "Derivatives and Deregulation: Financial Innovation and the Demise of Glass-Steagall," *Administrative Science Quarterly* 59:4 (2014): 669.
[34] Funk and Hirschman, "Derivatives and Deregulation," 686. See also Tett, *Fool's Gold*, 17-18.
[35] Ibid., 688.
[36] Initially founded as the International Swap Dealers Association, ISDA later changed its name to the International Swaps and Derivatives Association, as it is known today, to better reflect the range of financial products with which it is concerned beyond the interest rate swaps that constituted much of its original business.

agree on industry standards for swaps deals.[37] The most serious regulatory challenge to OTC financial derivatives during this period came in 1987 from the CFTC, which proposed treating swaps as futures for regulatory purposes.[38] Doing so would have required that they be traded on organized exchanges, since this interpretation of derivatives would not have qualified for the Treasury Amendment exemption. However, faced with lobbying by ISDA as well as a flight of derivatives dealers from the US,[39] the CFTC relented and ruled that swaps were indeed exempt from regulation, provided they were only offered to sophisticated investors.[40]

Throughout the 1980s, the lack of clear regulatory responsibility or authority for the new forms of financial derivatives meant that the dominant interpretation of these products came from the industry itself. The regulatory agencies' responses were reactive and lagged behind the rapid developments in financial strategy and innovation. As Hirschman and Funk observe, their ability to interpret these developments was constrained by the pre-existing regulatory categories that characterized their division of labor, but beyond this, there was little sense of urgency as far as derivatives regulation was concerned as long as these products remained in the realm of well-capitalized large institutional investors thought to be familiar with financial strategy and dynamics.

V. Financial Derivatives and Systemic Risk (early 1990s)

[37] Tett, *Fool's Gold*.
[38] Funk and Hirschman, "Derivatives and Deregulation," 688.
[39] Roberta Romano, "A Thumbnail Sketch of Derivative Securities and Their Regulation," *Maryland Law Review* 55:1 (1996). Regulatory competition also played a significant role in Japanese derivatives regulation during this era. As discussed in the introductory section of this chapter, a Japanese attempt to restrict listed futures and OTC derivatives tied to Tokyo Stock Exchange pushed the futures business to Singapore and OTC deals to New York and London. As a result, Japanese firms were at a competitive disadvantage until the Ministry of Finance granted permission to trade derivatives abroad
[40] Funk and Hirschman, "Derivatives and Deregulation," 688-689.

A. Derivatives as taken-for-granted

It is tempting to attribute the exponential growth of derivatives to the broader trend of financialization initiated in the 1970s with end of Bretton Woods era capital restrictions. Global capital mobility and the heightened interest rate and exchange rate volatility that accompanied it certainly played a defining role in the proliferation of financial derivatives, but they did not make self-regulation inevitable. By the early 1990s, the SEC, the CFTC, and the Federal Reserve Bank of New York[41] paid much more attention to the still-growing derivatives industry, interpreting these products in new ways and sparking contestation not only between the industry and regulators but also between regulatory agencies and even within individual agencies. The Savings & Loan crisis that came to a head in the late 1980s instigated a shift in regulatory perceptions of derivatives. Derivatives did not play a role in depositors' decision to move their money out of savings and loan institutions and into money market funds, pushing banks to take on increasingly risky investments. Nonetheless, the wave of insolvency and liquidations of well-established banks focused regulators' attention on the nexus of risk, unconventional financial strategy, and crisis. During this period, the potential for systemic crisis rose to the fore, though regulators were divided on what this potential meant for how derivatives should be regulated. This section summarizes these debates, as well as the contestation over how derivatives should be understood.

Securities and Exchange Commissioner Mary Schapiro's 1991 speech on stock index swaps and options is one of the first regulatory speeches on the subject in the US and provides a clear picture of her interpretation of these new financial derivatives. Schapiro begins by listing a

[41] The vast majority of the derivatives business in the United States was concentrated in New York, falling under the jurisdiction of the New York Fed.

series of advantages provided by OTC derivatives markets, emphasizing their flexibility with respect to the size of the contract, the underlying index, the expiration date, the strike price, and the currency of payments.[42] She identifies the lack of liquidity in the market, as well as the difficulty of measuring counterparty credit risk as the main limitations, but her statement on the regulatory implications of this analysis is fairly neutral.[43] Nonetheless, Schapiro's speech is significant in two respects. First, it is illustrative of how the existence of OTC markets – and their continued growth – had come to be regarded as inevitable. Schapiro's statement that "with or without their drawbacks, the market exists and it is growing, and it likely would be counterproductive to try to stop it"[44] demonstrates how these financial products had come to be taken for granted, essentially ruling out any form of regulation that would eliminate or fundamentally constrain the market. Second, Schapiro's speech includes one of the earliest references to the potential for global OTC markets to contribute to systemic risk. If there were too much conformity in hedging strategies, she argued, correlated losses could exceed the limited liquidity of the market, leading to widespread losses.[45]

B. Bombs made by rocket scientists

While the SEC's interpretation of financial derivatives at this point was fairly measured, E. Gerald Corrigan of the New York Federal Reserve portrayed derivatives in a much more negative light. In 1992, Corrigan gave a speech to the New York State Bankers' Association

[42] Mary L. Schapiro, "The Growth of the Synthetic Derivative Market: Risks and Benefits," speech before the National Option & Futures Society, Washington, DC, November, 13, 1991: 9.
[43] "As with most developments in the market, these new products do not lend themselves to the absolute concept of good or bad and right or wrong. They are innovative, they are born from competition and they are filling effectively a legitimate market need. If functioning properly, they permit the precise tailoring of risk and exposure." (Schapiro, "The Growth of the Synthetic Derivative," 9.)
[44] Schapiro, "The Growth of the Synthetic Derivative," 9.
[45] Ibid., 12-13.

which set off a wave of alarmist rhetoric about derivatives' potential for massive financial disruption and drew an unprecedented amount of public attention to the industry, provoking what SEC Commissioner J. Carter Beese referred to as "mild hysteria in the press."[46] Corrigan's actual discussion of derivatives reads somewhat obliquely with its references to "off-balance sheet activities," but it is unusually pointed and direct among regulatory speeches addressed to industry:[47]

> [W]here it is relevant, you had all better take a very, very hard look at off-balance sheet activities, including the payments, clearance and settlement risks associated with many of those activities. The growth and complexity of off-balance sheet activities and the nature of the credit, price, and settlement risk they entail should give us all cause for concern, […] High-tech banking and finance has its place, but it's not all that it's cracked up to be. For example, the interest rate swap market now totals several trillion dollars. Given the sheer size of the market, I have to ask myself how it is possible that so many holders of fixed or variable rate obligations want to shift those obligations from one form to the other. Since I have a great deal of difficulty in answering that question, I then have to ask myself whether some of the specific purposes for which swaps are now being used may be quite at odds with an appropriately conservative view of the purpose of a swap, thereby introducing new elements of risk or distortion into the marketplace – including possible distortions to the balance sheets and income statements of financial and nonfinancial institutions alike. I hope this sounds like a warning, because it is. Off-balance sheet activities have a role, but they must be managed and controlled carefully, and they must be understood by top management, as well as by traders and rocket scientists.[48]

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[46] J. Carter Beese, "The Future of the OTC Derivatives Market: Where Do We Go from Here," Speech given at the Risk Magazine/CATS Software Symposium, London, December 1, 1992: 4.

[47] Corrigan's address to the New York State Banker's Association was preceded by a significant meeting between Corrigan and J.P. Morgan derivatives enthusiasts Peter Hancock and Dennis Weatherstone. Gillian Tett portrays this meeting as being motivated primarily by information-gathering, which is consistent with the fairly neutral position taken by the SEC at the time (*Fool's Gold,* 24). Accounts in the financial press from the time, however, suggest that the meeting quickly turned antagonistic, with the J.P. Morgan bankers adopting an attitude of condescension. As the *Institutional Investor* related: "The responses [Corrigan] heard back were not comforting. They [bankers] admitted they didn't really understand derivatives or how much money they could lose if something went haywire. To be helpful, they offered to introduce Corrigan to their head of derivatives traders. Big blunder. The million-dollar-a-year swaps experts proceeded to brush off Corrigan's concerns as if he were some Luddite in a pin-striped suit: 'Jerry, Jerry baby, you don't understand the business. We know what we're doing. Now don't go and spoil the party.' Thus does one top banker, who was hastily deployed to placate Corrigan, characterize the swappers' condescending attitude." (Kevin Muehring and Saul Hansell, "Why Derivatives Rattle the Regulators," *Institutional Investor* 26:10 [September 1992])

[48] E. Gerald Corrigan, "Remarks Before the 64th Annual Mid-Winter Meeting of the New York State Bankers Association," New York, January 30, 1992.

The reaction to Corrigan's speech was dramatic. As one industry publication wrote at the time, "Corrigan's speech hit the bankers like a billy club, putting a whole new spin on discussions of derivatives. Soon, in press reports, in political speeches, even in cocktail party chatter, derivatives were being talked about in worried tones as the possible cause of a financial melt-down."[49] Observers' main concern was the potential for systemic risk inherent in Corrigan's portrayal of a massive, opaque, complex market being used primarily for speculative ends, as Corrigan implies when he questions whether investors had a legitimate (that is, business or hedging) interest in swapping variable for fixed rate debt. In addition to regulators, industry participants also recounted derivatives' potential for crisis in often hyperbolic (and often prescient[50]) rhetoric. Felix Rohatyn, then a senior partner at the investment bank Lazard Frères & Co., for example, was quoted as saying, "Twenty-six-year-olds with computers are creating financial hydrogen bombs [...] These bombs must be defused, but I am afraid there will be an explosion first."[51] The equation of derivatives with explosives echoed the Royal Bank of Canada chairman's remarks that derivatives were "a time bomb that could explode just like the LDC crisis did, threatening the world financial system."[52] Corrigan's speech drew attention not only to

[49] Muehring and Hansell, "Why Derivatives Rattle the Regulators."
[50] A 1992 *Institutional Investor* article, for example, outlined a scenario for financial crisis that closely parallels what happened in 2008: "The World Derivatives Nightmare I is that derivatives trading itself could cause a major bank to fail. It would take some doing, but a bank could conceivably wipe out its capital this way. The regulators' Worst Derivatives Nightmare II is in some ways a lot more hair-curling, because it is less predictable and therefore would be harder to cope with. That is the prospect that derivatives, simply because they now invisibly permeate the entire financial system, could turn an ordinarily containable situation – one that isn't even caused by them – into a full-blown financial crisis … Suppose more competition prompts several large dealers to build huge books of derivatives on a particular market. And suppose they all make the same mistaken assumption in their kindred hedging models, counting on liquidity that isn't there. Presumably this would send derivatives prices and the underlying market into turmoil. Then if a bank actually defaulted on its counterparty obligations, those defaults would go ripping across countless banks' balance sheets. Who knows what financial chaos would result? regulators worry" (Muehring and Hansell, "Why Derivatives Rattle the Regulators").
[51] Heidi Fiske, "Where Do We Go From Here?" *Institutional Investor* 26:8 (1992): 213.
[52] Qtd. in Muehring and Hansell, "Why Derivatives Rattle the Regulators."

derivatives' potential to magnify and transmit crisis, but also to the industry's inadequate risk management practices.[53] The interpretation of derivatives as dangerous and uncontrolled – and especially the implication that bank mangers (and even traders themselves) did not understand the products they were buying and selling – was, of course, disputed by other financial actors. Deutsche Bank's executive vice-president for treasury operations commented that, "Some bankers are getting downright testy at what they see as grandstanding by government officials. They seemed to suggest that top management doesn't know what derivatives are and that the place is out of control. It was a little hard to stomach."[54]

C. Derivatives, systemic risk, and contestation over regulatory implications

Despite industry resentment at allegations of their incompetence and excessive risk-taking, the interpretation of derivatives as dangerous implied for the first time that derivatives might directly threaten the public interest by making financial crisis more likely and more severe. This interpretation questioned the very legitimacy of OTC derivatives and instigated a lengthy debate over derivatives' contribution to systemic risk and what that meant for regulatory oversight and rule-making. As Howard Kramer, Senior Special Counsel at the SEC said in 1993, "Perhaps no subject has received as much media attention and regulatory scrutiny over the past year than OTC derivatives."[55] This period represents a moment of contingency when derivatives were not only ambiguous with respect to regulatory conceptual schemes but actively contested.

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[53] Corrigan's speech was followed up by a strongly worded letter from New York Fed executive vice-president Chester Feldberg to all New York bank CEOs stating that the Fed had found "basic internal-control weaknesses" in derivatives-trading operations (Muehring and Hansell, "Why Derivatives Rattle the Regulators").
[54] Qtd. in Muehring and Hansell, "Why Derivatives Rattle the Regulators."
[55] Howard L. Kramer "New Derivatives Instruments: The Role of the Regulator," Speech given before the Euromoney Seminar on Investing in Global Derivatives, Tokyo, June 15 1993: 7.

How derivatives were understood produced widely varying regulatory proposals, each of which might have fundamentally altered the trajectory of the OTC markets over the next two decades.

1. Banning OTC derivatives

At the one extreme, some commentators called for an outright ban on derivatives. This was enough of a possibility that an economist at the Kansas City Fed, citing Corrigan's speech, wrote an article in response to "whether banks should be prohibited from participating in derivatives markets."[56] Other commentators, alarmed by "the excesses of Wall Street" and the subsequent wave of losses from the Savings and Loan crisis, called for "severe restrictions" on trading, most notably moving all OTC contracts onto organized exchanges subject to regulation under the Commodity Exchange Act.[57] Such a move, while not a total ban on financial derivatives, would have dramatically transformed and reduced the market, given that some of the main engines of growth in OTC markets had to do with the contracts' flexibility, customization, and exemption from disclosure and position limit requirements – all of which would have been substantially curtailed by highly standardized and regulated exchanges. The 1992 Futures Trading Practices Act seemingly ruled out this possibility by formally granted the CFTC the authority to exempt off-exchange transactions between "appropriate persons" (specifically, regulated financial intermediaries, large business, and others deemed appropriate by the CFTC)

[56] Sean Becketti, "Are Derivatives Too Risky for Banks?" *Federal Reserve Bank of Kansas City Economic Review*, Third Quarter, 28 (1993). Becketti ultimately concluded that "The challenge posed by the apparent complexity of derivatives valuation may well be overstated. Even the most complicated derivatives are composed of individual building blocks – individual options and forwards – which are well understood, and the values of these complex derivatives literally are equal to the sums of the values of the individual pieces [this is not strictly true, or wouldn't be, by the time credit default swaps entered the scene]. In fact, the ability to express the value of a derivatives in a mathematical formula can be regarded as evidence that valuing derivatives is less complicated than evaluating the quality of some traditional bank assets" (38).

[57] J. Carter Beese, "A Roadmap to SEC Regulation of Derivatives Activities," Speech given at the International Swaps and Derivatives Association Conference, Washington, DC, November 3, 1993. Beese himself did not advocate this, nor did the SEC, but his speech references groups of commentators who called for this.

from the CEA.[58] The CFTC used this authority to exempt interest rate swaps and most other OTC derivative contracts from exchange-trading requirements, but while this clarified what had been a legal grey area concerning the legal enforceability of financial derivatives not specified in the Treasury Amendment,[59] in practice, it did little to settle the contestation over how dangerous derivatives were and whether they should be publically regulated.

2. Complete self-regulation

At the other extreme, some regulators responded to Corrigan's speech and the attendant wave of worries about crisis with arguments for completely self-regulated markets, similar to Britain under the Financial Services Act. In response to the interpretation of derivatives as weapons of mass destruction, some regulators, like SEC chair Richard Breeden, made the case that concerns were greatly exaggerated, "There is too much alarmist rhetoric involving these products. We've seen 2,500 banks fail because of credit risk. We have a long way to go before the swaps market is as threatening."[60] On this side of the debate, too, the Savings and Loan crisis cast a long shadow, but the $159 billion bailout at the taxpayers' expense was instead cited as justification for the complete distancing of the market from the public responsibility. [61] Federal

[58] Alan Greenspan, "Government Regulation and Derivative Contracts," speech at the Financial Markets Conference of the Federal Reserve Bank of Atlanta, Coral Gables, Florida, February 21, 1997.
[59] President George H.W. Bush's signing statement is evidence that the intent of this bill was primarily to clarify the legality of derivatives: "The bill also gives the Commodity Futures Trading Commission (CFTC) exemptive authority to remove the cloud of legal uncertainty over the financial instruments known as swap agreements. This uncertainty has threatened to disrupt the huge, global market for these transactions. The bill also will permit exemptions from the Commodity Exchange Act for hybrid financial products that can compete with futures products without the need for futures-style regulation." The law did not, however, fully resolve the interpretive question of who constituted "appropriate persons," as the Orange County case will show.
[60] Quoted in Muehring and Hansell, "Why Derivatives Rattle the Regulators."
[61] This was the estimated cost over 10 years of bank failures between 1989 and 1992, plus interest payments, with taxpayers covering 75% of that total. (Nathaniel Nash, "Totaling Up the Thrift Bailout Plan," *New York Times,* August 27, 1989, http://www.nytimes.com/1989/08/27/business/totaling-up-the-thrift-bailout-plan.html, accessed July 29, 2016.)

Reserve vice-chair David Mullins, Jr.[62] argued that, "The swaps dealers are a big adult market now […] They have responsibilities they can't ignore. Either they create an SRO [self-regulatory organization] with teeth and submit to its discipline, or, if there are problems, they might not like the alternatives that could be produced for them here in Washington." Despite the threat of greater public regulation, Mullins' preference was clearly for self-regulation, as he added, "I'm not especially impressed by the ability of the regulators and Congress to design optimum rules for new and evolving financial markets."[63]

3. A middle ground: standardization, transparency, and other regulatory tools

In the end, OTC derivatives were neither banned nor left wholly untouched by public regulation, despite influential arguments on both sides. Despite calls for banning them entirely, regulators generally took the continued existence of derivatives for granted, [64] citing the regulatory arbitrage and capital flight that accompanied the short-lived Japanese ban on derivatives.[65] The sheer size of the market and its deep imbrication in the strategies of smaller firms in addition to large banks was taken as evidence that banning derivatives was an untenable strategy. Regulators also made positive arguments in favor of derivatives' continued existence, focusing on their contribution to firms' risk management strategies, and going so far as to argue that "it's possible that in the future courts may find it irresponsible – or worse, impose legal

[62] He would later go on to become a partner in Long-Term Capital Management.
[63] Qtd. in Muehring and Hansell, "Why Derivatives Rattle the Regulators."
[64] SEC Commissioner J. Carter Beese: "There seems to be a common misperception that the regulators, like Marshall Dillon, are about to run the outlaws out of town. The question, however, is not how to run them out of town, but how to make sure that we have stable, but innovative, markets … Most of us now recognize that these products can allow users to manage risk in a far more sophisticated and effective manner than they had been able to before (Beese, "The Future of the OTC Derivative Market," 7).
[65] "Although it is possible that national policies could change and inhibit such a fee flow of funds, the trend toward interlinked global markets seems unstoppable at this point." (Beese, "The Future of the OTC Derivatives Market," 2.)

liability – on those who do not take advantage of the benefits that derivative markets do provide."[66] The use of derivatives by actors outside of investment banks played an important role in this perception of derivatives as inextricable from contemporary economic life.[67]

Even as this middle ground in the early 1990s debates took the continued existence of derivatives as indisputable and essential to the management of risk, there was a growing recognition of the additional risks specific to derivatives themselves.[68] One of the most significant of these was credit risk – the risk that one's counterparty would not be able to fulfill the contract by its date of execution. The competing interpretations of derivatives – as a stabilizing part of risk management and as a destabilizing source of further risks – led regulators to search for regulatory strategies that would ensure the continued existence of the market while reducing its independent contributions to both firms' and the financial system's instability. Not surprisingly, given this balancing act, these policies frequently involved both a public and private

[66] J. Carter Beese, "Derivatives: Fundamentally Changing Corporate Finance, Asset Management … and the Retail Industry?" Speech at the 1993 Annual Meeting of the Southern District Securities Industry Association, May 8, 1993: 2.

[67] "This is not just an exclusive club of cutting-edge players anymore. Firms in businesses as diverse as fast food restaurants, oil, mining, and tractor companies have come to Washington to tell Congress how indispensable these products have become to their operation. McDonalds uses OTC derivatives to reduce risks it takes in its overseas operations. KLLM Transport, a national trucking company, uses OTC derivatives to limit the effects on its business of volatility in the price of oil. Even Sallie Mae advertised in *Smithsonian*, a favorite among Washington policy wonks, that swaps have become indispensable in meeting its mission to provide affordable student loans." (J. Carter Beese, "OTC Derivatives: Encouraging Innovation and Managing Risk," Speech given at the Federal Reserve Bank of Atlanta Conference on Financial Markets, March 4, 1993: 2). Kramer made a similar argument in the same year: "While this market began with only the most sophisticated institutions, the customer base may be reaching the next tier of institutions. These products may not be suitable for all institutions, and it is important for dealers to keep this in mind as they shop these products" ("New Derivatives Instruments," 12).

[68] Kramer's 1993 address lists the following as deserving of regulatory attention: leverage (traditional capital requirements forced derivatives out of regulated broker-dealers and into affiliated entities with no few or no capital requirements), market impact/liquidity; credit risk; concentration; internal controls; systemic risk; "suitability" of institutions buying and selling derivatives ("New Derivatives Instruments," 12).

regulatory component. Regulators proposed addressing credit risk through publically mandated capital requirements for firms and through better industry-led risk management strategies.[69]

Finally, in addition to credit risk, a new concern with derivatives' contribution to systemic risk entered the constellation of meanings surrounding derivatives. As SEC Commissioner Beese noted in 1993, "More than anything else has in years, the OTC derivatives market has increased the probability that a meltdown in one financial sector will spread to others."[70] His colleague Mary Schapiro, who had been fairly sanguine about derivatives' risks two years earlier, concurred, and her remarks are especially reflective of regulators' simultaneous appreciation for and concerns about derivatives:

> The true measure of the impact of derivatives business, however, lies not in the raw numbers but in the ways that new instruments have capitalized on the easing of regulatory restrictions on cross-border activity. The net effect has been to strengthen economic linkages across markets and across national borders. If new issues of systemic risk can be effectively addressed, the derivatives markets may be able to help to provide the kind of stability that cross-border participants need to make long-term commitments of capital. The effect of financial innovation in stimulating cross-border activity should be seen as a healthy economic development … Systemic concerns are especially acute where OTC products serve as a direct substitute for trading in listed markets, and where trades in the one serve as a necessary hedge or offset for positions in the other. The credit risk inherent in derivatives trades yields a different kind of systemic concern … Given

[69] "These products present risks that must be controlled and accounted for. Our challenge is to devise effective capital rules that will ensure that broker-dealers and their affiliates will remain financially stable and strong enough to withstand a potential market disruption caused by a firm failure, for whatever reason […] The most troubling issue for regulators and – I've heard – also for many CEOs, is the credit risk firms take when they enter into these transactions […] The credit risk involved in these transactions is the first long-term risk brokerage houses have assumed on a systemic basis. It's also the first time that broker-dealers have been in the business of credit assessment […] I recognize that credit risk can be measured, monitored and, in theory, controlled. But even banks have certainly shown that it's not always as easy as it sounds […] The dealers in this market need to take this seriously. (Beese, "OTC Derivatives: Encouraging Innovation," 2-3) Beese sided squarely with the self-regulatory perspective as far as risk management was concerned, noting that, "The biggest question is whether firms are adequately monitoring risk. I've spent a fair amount of time with OTC derivatives dealers over the last six months discussing these issues, and I have to admit: they make a good case that their risk management systems are in good shape." (Beese, "Derivatives: Fundamentally Changing Corporate Finance," 5)

[70] Beese, "Derivatives: Fundamentally Changing Corporate Finance," 5.

> this concentration, we should be concerned that a crisis involving any one major dealer could quickly and substantially affect the others.[71]

The regulatory measures aimed at addressing credit risk (which, at the time, was thought to be the main contributor to systemic risk) are discussed in greater detail in Chapter 5; for now, it is important to understand them as the result of charting a course between two competing interpretations of the relationship between derivatives and risk. Were the story wholly one of regulatory capture or the merciless march of financialization, we might have expected to see the interpretation of derivatives as purely efficient distributers of risk win out. While the regulatory measures that were proposed and, in many cases, implemented during this period (capital requirements tied to derivatives exposures, stress testing, standardized accounting practices[72]) fell well short of a ban on derivatives, they nonetheless reflect shifting perceptions of derivatives' relationship to the public interest, which, after the S&L crisis of the late 1980s, now included financial stability.

4. Settling the debate: the G-30 and the GAO reports

The three competing interpretations outlined above circulated without clear regulatory consensus until the mid-1990s. Central to this settling of perceptions were two reports published in the years following Corrigan's influential speech. The first of these, the Group of 30's *Derivatives: Practice and Principles,* was conducted by market participants with the explicit goal of addressing regulatory concerns outlined above – that the OTC derivatives industry is "complex and obscure, potentially subject to abuse that might lead to the failure of individual

[71] Mary L. Schapiro, "The Derivatives Revolution and the World Financial System," Speech at the Eighth Annual Symposium for the Foundation for Research in International Banking and Finance," Lugano, Switzerland, October 14, 1993.
[72] Accounting practices, in particular, are covered in much more extensive detail in Chapter 4.

firms or even to a crisis in the financial system."[73] The seventy-eight page report primarily advocated for regulatory and legal recognition of existing industry practices (e.g., netting provisions in derivatives contracts), insisted upon the ordinariness of the risks associated with derivatives, and emphasized their similarities to more familiar markets.[74] The report detailed extant industry practices for managing risk, acknowledging the challenges particular to options and dynamically hedged portfolios, in particular, with the goal of reassuring regulators that industry participants' understanding of the market was sophisticated and technical.

The report also acknowledged regulatory concerns about systemic risk, contending that the only way to eliminate it would be to ban the market entirely.[75] Instead, **t**he G- 30 report explicitly argued against any further public regulation of the industry, contending that such efforts might "inhibit new product innovation or discourage firms from developing the individualized, robust risk management systems on which they should rely."[76] Regulatory efforts should be limited to eliminating legal uncertainty (citing the Hammersmith & Fulham case in the UK) and providing guidance on reporting and accounting standards. Compared with this very

[73] Global Derivatives Study Group, "Derivatives: Practice and Principles," *Group of 30,* July 1993, 2.
[74] "What makes derivatives important is not so much the size of the activity, as the role it plays in fostering new ways to understand, measure, and manage financial risk. Through derivatives, the complex risks that are bound together in traditional instruments can be teased apart and managed independently, and often more efficiently … the risks involved in derivatives activities are neither new nor unique […]The risks to end-users and dealers involved in derivatives can be broadly categorized as market, credit, operational, and legal. These risks are of the same types that banks and securities firms have faced in their traditional lines of business – taking deposits and making loans, or purchasing and financing securities positions. The risks of derivatives, in other words, are not new." (Global Derivatives Study Group, "Derivatives," 2; 39)
[75] "Supervisory authorities, who have studied the systemic issues posed by derivatives, have defined systemic risk as 'the risk that a disruption (at a firm, in a market segment, to a settlement system, etc.) causes widespread difficulties at other firms, in other market segments or in the financial system as a whole.' This definition makes it clear that systemic risk arises in the course of ordinary market activities. Therefore it may be difficult to eliminate without curtailing these activities." (Global Derivatives Study Group, "Derivatives," 39)
[76] Ibid., 3.

modest role for public regulation, the report outlined a lengthy agenda for industry participants.[77] The report echoed existing rhetoric about the sophistication and expertise of derivatives dealers and traders, positioning those most involved in derivatives trading as best versed in its risks.[78] Finally, it noted that actual losses from the observed sources of risk in derivatives market to date had been very small and confined to individual institutions.

The G-30 report was widely read and cited by its intended audience, and overall, had a mollifying effect. One notable hold-out was SEC Commissioner Mary Schapiro who argued for public regulators' superior ability to monitor the financial system as a whole even as she acknowledged the merits of a well-functioning derivatives market.[79] In contrast, Commissioner Beese reported he was reassured by the report, and in particular by its detailed depiction of industry practices.[80] Most significant, however, was E. Gerald Corrigan's reaction to the report. The former New York Fed President whose 1992 speech had touched off a wave of public and

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[77] Recommendations for dealers and end-users included: value derivatives positions at market; quantify market risk under adverse market conditions/stress tests; use master agreements with close-out netting provisions; independent (of dealing) market and credit risk functions; measure, manage, report risks in a timely manner; and voluntarily adopt accounting and disclosure practice for international harmonization and transparency.

[78] Recommendation 16 for market participants reads: "*Dealers and end-users must ensure that their derivatives activities are undertaken by professionals in sufficient number and with the appropriate experience, skill levels, and degrees of specialization. These professionals include specialists who transact and manage the risks involved, their supervisors, and those responsible for processing, reporting, controlling, and auditing the activities.* To establish good management, derivatives activities must be staffed by talented, well-trained, and responsible professionals. There is a danger, however, in relying on a few specialists, and it is essential that their managers understand not only derivatives but also the broader business context. Derivatives support functions are technical and generally require a level of expertise higher than for other financial instruments or activities. […] The Survey indicates that, for the majority of respondent dealers, senior management is confident about the general quality of its derivatives professionals. To the extent it is concerned about issues of professionalism, it is more worried about its own lack of understanding, about insufficient understanding of derivatives by other functions, and about over reliance on a few specialists." (Ibid., 17)

[79] "I must say, however, that I am less sanguine than the authors of the [G-30] report with regard to systemic risk issues […] Individual market participants are fully capable of making prudent decisions concerning their own business but they do not have a natural inclination or, more important, responsibility to look at the 'big picture.'" (Schapiro, "The Derivatives Revolution," 13).

[80] "The Group of Thirty's study on derivatives makes a significant contribution to the better understanding and management of the derivatives market. I have long believed that the real issue is not how regulators should regulate this market, but how dealers and end-users should manage it." (Beese, "A Roadmap," 13.)

regulatory scrutiny was now a senior executive at Goldman Sachs. In 1994, he testified before the House Subcommittee on Telecommunications and Finance that the potential for problems with derivatives had diminished as self-regulatory practices had become more standardized and transparent: "I am hard pressed to think of sensible things that might be done through legislation that would better equip the Fed or other bodies to cope with a financial disruption of consequence … There is far less risk today than in the past of something happening. All major financial intermediaries have dramatically increased their internal-control and risk-management systems."[81]

Whether this change of mind was purely a function of his trip through the revolving door between industry and regulators, or whether the G-30 report and its concomitant industry practices genuinely convinced Corrigan, his advocacy of a narrative in which derivatives' risks were effectively managed by market participants was significant. Nonetheless, by itself, it was insufficient to convince Congress that derivatives should not be a matter of public concern. Representative Edward Markey, chair of the House Subcommittee on Telecommunications and Finance admitted that, "I am not at all convinced that voluntarism by the dealers and incremental adjustments of existing regulation will be sufficient to respond to the new risks created by derivatives."[82] He went on to outline a series of issues he regarded as insufficiently addressed by the industry at that time.[83]

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[81] Quoted in: Saul Hansell, "Panel Is Told Derivatives Are No Cause for Alarm," *New York Times*, May 11, 1994, http://www.nytimes.com/1994/05/11/business/panel-is-told-derivatives-are-no-cause-for-alarm.html, accessed June 10, 2016.

[82] Ibid.

[83] Specifically, the possibility of supervision for derivatives dealers (like insurance companies and affiliates of brokerage firms); whether internal risk management and controls should be subject to mandatory independent audits; and enhanced disclosure of positions and risks.

While the G-30 report pushed many regulators and lawmakers towards an interpretation of derivatives as consistent with the public interest, by itself, it was insufficient to bring about this interpretation. Pursuant to both Rep. Markey's concerns and a letter by Senator Donald Riegle to the Federal Reserve Board of Governors, the Federal Deposit Insurance Corporation, and the Office of the Comptroller of the Currency, the General Accounting Office (GAO) conducted its own report on derivatives.[84] The GAO report was published in 1994, following reports by some firms (perhaps most notably Proctor & Gamble) of major losses from derivatives use. The report addressed continued congressional concerns over the growth and attendant risks of OTC derivatives, and offered a much more negative assessment than the industry had. It acknowledged, far more directly than the G-30 report, the possibility of a systemic crisis.[85] Moreover, and in marked contrast to the industry's own representation of derivatives, it concluded that, "no comprehensive industry or federal regulatory requirements existed to ensure that US OTC derivatives dealers followed good risk-management practices."[86] In addition to expressing concerns about the sophistication of market participants that underlay the exemption from CFTC regulation,[87] the report found that accounting principles for derivatives had not kept pace with business practices and protection of internationally linked financial systems required better coordinated international efforts.

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[84] United States General Accounting Office, *Financial Derivatives: Actions Needed to Protect the Financial System* (GAO: Washington, DC, 1994).

[85] "Derivatives serve an important function in the global financial marketplace, providing end-users with opportunities to better manage financial risks associated with business transactions … This combination of global involvement, concentration, and linkages means that the sudden failure or abrupt withdrawal from trading of any of these large dealers could cause liquidity problems in the markets and could also pose risks to others, including federally insured banks and the financial system as a whole" (GAO 1994: 7)

[86] GAO, *Financial Derivatives,* 8.

[87] "GAO also noted that in such a rapidly growing and dynamic industry, new participants are likely to enter the market. Some of these new entrants may not be as knowledgeable as present dealers or may take on unwarranted risk in an attempt to gain market share or increase profits. In either case, systemic risk could increase" (GAO, *Financial Derivatives*, 7).

Nonetheless, the GAO report concluded that such risk-management was an industry, not a regulatory responsibility. It acknowledged the disruptive effect major regulatory change would have on the industry, defining the public interest not only in terms of financial stability but also – notably – in terms of continued financial innovation – a framing that would only increase in salience over the second half of the decade.[88]

Following publication of the GAO report, major legislative and regulatory proposals for transforming the OTC derivatives market largely receded into the background. That government regulation should be limited to oversight and that risk management was best conducted by the industry itself approached a consensus that had been much in doubt ever since Corrigan's speech to the New York State Bankers Association. Evidence for this can be seen in a third influential report, this one written by the Derivatives Policy Group (DPG), a group of both regulators and industry representatives formed in 1994 at the suggestion of Arthur Levitt of the SEC, with the cooperation of Mary Schapiro (who was initially skeptical of the G-30's interpretation of derivatives and who was then the chair of the CFTC). The Group published a *Framework for Voluntary Oversight* in 1995, a document that explicitly equates voluntary self-regulation with the public interest and outlines a series of goals and processes associated with risk management (subject to external verification), reporting, and counterparty relationships for firms to voluntarily adopt.[89]

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[88] "Strong corporate governance is critical to the success of any risk-management system but it particularly crucial for managing potentially volatile derivatives activities. Primary responsibility for risk management rests with boards of directors and senior management … The issue is one of striking a proper balance between (1) allowing the U.S. financial services industry to grow and innovate and (2) protecting the safety and soundness of the nation's financial system" (Ibid., 8).

[89] Derivatives Policy Group, *Framework for Voluntary Oversight: The OTC Derivatives Activities of Securities Firm Affiliates to Promote Confidence and Stability in Financial Markets,* 1995.

The DPG's conclusions were echoed by Federal Reserve Chair Alan Greenspan's testimony before the House Subcommittee on Telecommunications and Finance soon after the report's publication. [90] In addition to reiterating the desirability and effectiveness of self-regulation, Greenspan made a positive case for derivatives' legitimacy. Noting that derivatives have enhanced economic efficiency and allowed risks associated with interest rate and exchange rate volatility, Greenspan interpreted derivatives as not only not antagonistic to the public interest but as actively furthering it, implicitly (and in other speeches, explicitly) equating smoothly functioning markets with the public interest.

The small number of public supervisory and oversight measures that both industry and government spokespeople agreed were desirable by this point were addressed in the 1995 Windsor Declaration, a joint regulatory effort by the CFTC in the US and the Securities and Investment Board in the UK. The agencies committed to sharing information about large institutional exposures to risk, agreed to procedures for dealing with market crises, and committed themselves to enhanced transparency in their oversight procedures.[91] In conjunction with industry practices intended to better measure and manage credit and other forms of risk, CFTC Commissioner Joseph Dial concluded that: "Taken together, these steps should minimize the systemic effects of any future market disruptions, along with enhancing existing regulatory safeguards."[92] His statement is illustrative of the general consensus at this point that, owing to incremental changes by both industry and regulators, derivatives' potential to exacerbate

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[90] Alan Greenspan, "Testimony before the Subcommittee on Telecommunications and Finance of the Committee on Energy and Commerce, US House of Representatives," May 25, 1994.
[91] *Windsor Declaration*, Commodity Futures Trading Commission, May 1995, http://www.cftc.gov/International/InternationalInitiatives/oia_windsordeclaration, accessed 12 June 2016.
[92] Joseph B. Dial, "The U.S. Commodity Futures Trading Commission's Plans for Derivatives Regulation," Speech given at the Fourth International Conference on Derivatives Regulation, London, October 25, 1996.

systemic risk was no longer cause for alarm. The panic following Corrigan's 1992 speech and the subsequent moment of contestation and contingency about how derivatives should be understood, was effectively settled at this point. While it didn't result in slowdown in derivatives growth (quite the opposite), the period detailed in this section was more than a flash in the pan; it left its mark in more complex risk management systems, new industry practices, and greater international regulatory coordination.

VI. Derivatives in Crisis (mid 1990s)

The interpretation of derivatives as, on balance, greater tools of risk management than risk magnification and transmission may have been largely settled by the mid-1990s, but a new interpretive question had emerged on the scene. As worries about systemic risk and global financial crisis disappeared (not to reappear until 2008), a series of more limited crises once more opened the possibility for a radical reinterpretation of the legitimacy of derivatives. Unlike the hypothetical (though certainly not fanciful) concerns about a global financial crisis that emerged in the early 1990s, derivatives were clearly and definitively implicated in these crises. Although some commentators used these crises as evidence of the dangers of derivatives, the dominant interpretation of these crises laid the culpability at the feet of investors (often portrayed as insufficiently sophisticated – hearkening back to a legitimation strategy that emerged in the 1970s) rather than the products they used. Nonetheless, this period is another moment of contingency in the history of derivatives' legitimacy – a much more negative judgement of derivatives – and a harsher regulatory response – was certainly possible.

The early 1990s were marked by a series of private industry losses and bankruptcies related to new financial instruments like options and swaps, often undertaken with very high levels of leverage. Metallgesellschaft lost $1.6 billion after it was unable to post sufficient

margin in the oil futures market in 1993; Procter & Gamble and Gibson Greeting Cards incurred large losses from interest rate swaps in 1994 and 1995, respectively; and Barings lost $1.4 billion and ultimately collapsed following a series of speculative losses on Nikkei index futures in 1995.[93] With the exception of the Barings collapse, these losses attracted relatively little regulatory attention, and when they were mentioned, were attributed to fraud[94] and insufficient public disclosure of involvement in OTC markets.[95] CFTC Commissioner Sharon Brown-Hruska went so far as to characterize these losses as "bumps in the road," attributable to firm-level malpractice and misjudgment, and not to derivatives themselves.[96] This view was further reflected in her response to the Enron crisis, in which she praised "sophisticated and savvy" derivatives users and contended that "perhaps derivatives are a convenient scapegoat because of their relative complexity."[97] Greenspan's testimony before the House Telecommunications and

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[93] Laurent L. Jacque, *Global Derivative Debacles: From Theory to Malpractice* (Hackensack, NJ: World Scientific, 2010), 11.

[94] SEC Chair Arthur Levitt, for example, attributed the Gibson Greetings collapse to fraud, rather than the normal operations of derivatives markets: "I remain committed to the need for regulators to pursue those who violate the securities laws. As an example of this, the SEC and CFTC brought enforcement actions against BT Securities Corporation in connection with the sale of derivatives to Gibson Greetings. We found that 'Bankers Trust' had violated antifraud and other provisions of the securities and commodities laws by, among other things, misleading Gibson about the value of the company's OTC derivatives positions. We will not hesitate to act in such cases – for the sake of investors, but also for the sake of our markets." (Arthur Levitt, "Derivatives Use in the 1990s," Speech before the IBD/ISDA Conference, November 9, 1995, Washington, DC.)

[95] In 1997 SEC Commissioner M.H. Wallman testified before the Senate Subcommittee on Securities that, "the last time there were major movements in interest rate and foreign currency markets, several headline stories about losses from derivatives and other market risk sensitive instruments by corporate end-users and dealers alike surprised investors and the markets. These stories include the losses incurred by Bankers Trust, Dell Computers, Gibson Greetings, and Proctor & Gamble, among others. The surprise accompanying such losses demonstrates the need for more public disclosure of what market risks are and how the registrants in which the public invests its money are managing those risks." (M.H. Wallman, "Testimony Concerning Disclosure of Accounting Policies for Derivatives and Disclosure of Quantitative and Qualitative Information about Market Risk Inherent in Market Risk Sensitive Instruments," Before the Senate Subcommittee on Securities, Committee on Banking, Housing, and Urban Affairs, March 4, 1997. See also: Arthur Levitt, "Testimony Concerning FASB's Proposed Accounting Rules for Derivative Financial Contracts," Before the House Subcommittee on Capital Markets, Securities and Government Sponsored Enterprises, October 1, 1997.

[96] Sharon Brown-Hruska, "Market and Regulatory Innovation in a Global Environment," Speech before the Futures Industry Association/Futures Option Association International Derivatives Conference, London, June 29, 2004.

[97] Sharon Brown-Hruska, "Remarks to the International Swaps and Derivatives Association," Speech at the Energy and Developing Products Conference, Houston, Texas, March 26, 2003.

Finance Subcommittee are also representative of this deflection of blame away from derivative contracts, "The risks to individual institutions have been underscored by press reports of losses on certain derivatives contracts in the wake of the recent sharp increases in interest rates here and abroad. […] [I]t would be wrong to draw sweeping conclusions from these events. […] Many entities undoubtedly decreased their vulnerability through use of derivatives, and many others that elected not to use derivatives undoubtedly suffered losses."[98]

The Barings example was frequently referenced as a failure of the banks' internal risk management strategies and lack of oversight of its traders (and in particular of the "rogue" trader Nick Leeson, who concealed millions of pounds in losses related to speculative arbitrage trading on stock index futures).[99] This was seen as a justification for enhanced internal and external supervision of individual banks,[100] but not for changing the regulation of derivatives directly. Arthur Levitt of the SEC was perhaps most explicit on this score, stating that:

> Over the past two years, the headlines have been filled with significant derivatives losses by corporate and municipal end-users and dealers alike. The collapse of Britain's Barings Bank; the problems at MetallGesellschaft, and, in the United States, the "Bankers Trust" enforcement action are all still fresh in our minds. These events have heightened concern over whether derivatives are being used properly […] [W]e must avoid the temptation to demonize derivatives, which are a vital tool in modern financial markets. They are so useful in managing risk that if they didn't exist, we would surely have to invent them. Like any financial instrument, derivatives require certain ground rules, and regulators can provide that. But we must resist the siren call for stringent regulation that occurs in the wake of every new loss – especially since the typical derivatives loss is less a failure of regulation, than a failure of oversight by the parties involved.[101]

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[98] Alan Greenspan, "Testimony by Alan Greenspan Chairman, Board of Governors of the Federal Reserve System before the Subcommittee on Energy and Commerce, US House of Representatives," May 25, 1994.
[99] See, for example: Susan M. Phillips, "Risk Management for Banks and Banking Regulators in the 21st Century." Speech given at the Atlanta Society of Financial Analysis, Atlanta, February 14, 1997.
[100] See, for example: Laurence Meyer, "Why Risk Management Is Important for Global Financial Institutions," Speech before the Bank of Thailand Symposium, Risk Management of Financial Institutions, Bangkok, Thailand, August 31, 2000.
[101] Arthur Levitt, "Derivatives Use in the 1990s," Speech given at the IDB/ISDA Conference, Washington, DC, November 9, 1995.

A notable exception to this sanguinity was CFTC Chair Brooksley Born who, citing the financial losses from the Barings collapse, argued that the price discovery function of markets was a legitimate public interest in need of regulatory protection, even if sophisticated investors were not.[102] In contrast to regulators who regarded firm-level oversight and organizational changes as sufficient to prevent excessive derivatives losses, Born contended that public regulation was required to protect the system as a whole from contagion and panic. Despite its prescience, her interpretation of derivatives as having consequences outside of individual banks, justifying systemic regulation, was in the minority at the time. It would, however, return in the debates leading up to the Commodity Futures Modernization Act in 2000.

In addition to private-sector losses, this period also saw a series of municipal bankruptcies related to derivatives. The most prominent of these was that of Orange County, California which lost $2 billion in December 1994, after the county treasurer Robert Citron pursued a highly leveraged investment strategy involving reverse repurchase agreements ("repos") and interest rate swaps that would only pay off if interest rates fell, which they did not.[103] As a *Fortune* magazine article from the time noted, "In a way that the corporate disasters had not done, Orange County, with its mean effects on millions of citizens, triggered alarm in Washington."[104] The effects on Orange County were dramatic: in addition to filing for bankruptcy, the county's collateral was seized despite a petition to the SEC and S&P cut its credit rating from AA to CCC. Reporting from the time shows that the Orange County

[102] Brooksley Born, "Caveat Emptor – Let the Buyer Beware," Speech before the End-Users of Derivatives Association, Inc. Third Annual Conference, April 11, 1997.
[103] Jacque, *Global Derivative Debacles*.
[104] Carol J. Loomis, "Untangling the Derivatives Mess," *Fortune,* March 20, 1995.

bankruptcy provoked a spike in popular skepticism surrounding derivatives, and the Senate Banking Committee held hearings on derivatives shortly after the bankruptcy in response to this concern. However, much as the Barings bankruptcy was attributed to the bank's failure to oversee trader Nick Leeson's investments, regulators (and subsequent legal proceedings) attributed the Orange County bankruptcy to Citron's own decision-making and the county's lack of internal controls, rather than to the products themselves.[105] Indeed, the absence of a systemic crisis following Orange County's bankruptcy was cited as evidence that, contra Born's arguments, there was no need for systemic regulation of derivatives markets.[106]

Another crisis that threatened to restructure derivatives regulation was the collapse of the hedge fund Long-Term Capital Management (LTCM) in 1998. Derivatives were a core component of LTCM's trading strategy; indeed, Myron Scholes and Robert Merton, who won the 1997 Nobel Prize in Economics for their work on options pricing, were partners. The hedge fund's strategy was based on arbitrage trading – taking advantage of small price differences in otherwise identical or very similar assets, such as Treasury bonds with slightly different dates of issue and the difference between Treasury bonds and different interest rate swaps ("interest rate swap spreads"), a strategy which is only profitable with very high leverage to take advantage of

[105] "The treasurer's aggressive use of leverage compounded losses in the investment pools. The treasurer's actions should have been identified and addressed by an effective internal controls system." (Richard R. Lindsey, "OTC Derivatives in the U.S. Financial Markets," Testimony before the Senate Committee on Agriculture, Nutrition, and Forestry, December 16, 1998.)

[106] "[A]t Senate Banking Committee hearings on derivatives in early January [1995], a troop of top-level regulators were largely reassuring. In particular, they noted the absence of systemic risk last year. That is, no deep problem — extreme distress, say, at a major derivatives dealer — clutched the financial market and, by chain reaction, choked off the liquidity on which the system lives. Fears of such a crisis have ballooned with the prodigious growth of customized, over-the-counter derivatives. But a meltdown obviously didn't happen in the otherwise wretched year of 1994, and that has left regulators feeling relief. At the hearings, they went on to say they did not see themselves as needing new authority to deal with the hazards at hand" (Loomis, "Untangling."). See also Alan Greenspan's testimony that, "The trouble with legislation is that it is very likely in this type of market to become rapidly obsolete, and could very readily become counterproductive to the required flexibility that we need to address the types of problems that we are addressing" (qtd. in Loomis, "Untangling").

these small differences.[107] By early 1998, LTCM was already in trouble as their trading strategy was increasingly adopted by competitors, pricing away the arbitrage opportunities at the core of their strategy,[108] and when Salomon Brothers began selling of many of its (relatively illiquid) positions, this drove down the price of LTCM's assets. These reflexive dynamics (discussed in greater detail in Chapter 3) were summarized by LTCM creator John Meriwether: "The hurricane is not more or less likely to hit because more hurricane insurance has been written. In the financial markets this is not true. The more people write financial insurance, the more likely it is that a disaster will happen, because the people who know you have sold the insurance can make it happen."[109] LTCM's arbitrage trading strategy incurred irrecoverable losses a few months later when Russia unexpectedly defaulted on domestic bonds, a scenario wholly unanticipated by LTCM's pricing models, and one which left them exposed to substantial losses when Russian banks also defaulted on the derivatives contracts LTCM had used to hedge their Russian bond positions.[110] LTCM ultimately lost $4.4 billion, $3 billion of which was from their derivatives positions (interest-rate swaps and stock index options), losing $550 million on August 21, 1998 alone, following the Russian default, when other firms rushed to sell off positions that mimicked those of LTCM.[111]

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[107] LTCM was extremely highly leveraged when they collapsed, with $4.7 billion in equity capital, debt of $125 billion, and off-balance-sheet derivatives exposure of more than $1 trillion (Roger Lowenstein, *When Genius Failed: The Rise and Fall of Long-Term Capital Management* [New York: Random House, 2000], 191.) Their strategy in fact had three pillars: very high amounts of leverage, financing through the repurchase ("repo") market, and risk management through the use of the Value-at-Risk model (Jacque, *Global Derivatives Debacles*: 250).
[108] Michael Lewis, "How the Eggheads Cracked," *The New York Times Magazine,* January 24, 1999, http://www.nytimes.com/1999/01/24/magazine/how-the-eggheads-cracked.html; Jacque, *Global Derivatives Debacles,* 265.
[109] Qtd. in Lewis, "How the Eggheads Cracked."
[110] Tett, *Fool's Gold*, 74; Jacque, *Global Derivatives Debacles,* 266.
[111] Lewis, "How the Eggheads Cracked."

In response to this panic, the New York Fed organized a consortium of 14 banks to provide a $3.6 billion bail-out package to LTCM.[112] Due to the opacity and complexity of the OTC market, many of these banks were unsure about their exact exposure, should LTCM default on its contracts, but at the New York Fed's urging, they determined their risks to be sufficient to justify contribution to the bail-out.

Given that regulators' chief justification for not regulating derivatives after previous crises was that losses were largely confined to single financial institutions, this acknowledgement of systemic contagion might be expected to generate stronger regulation. However, the predominant reaction to this crisis was two-fold: first, to double down on financial risk models, making them more complex and incorporating historical crisis data[113]; and second, to attribute the crises to individual-level failings, on the part of either specific people or banks.

Robert Litan and Jonathan Rauch's 1997 Treasury Report, written in response to Congressional calls for analysis of the strengths and weaknesses of a rapidly growing financial system, is explicit that responsibility for derivatives-related crises lay with individual traders: "There have been a number of celebrated instances in recent years – the $1.4 billion loss by the British bank Barings in particular – in which financial institutions have suffered major losses associated with derivatives. A common factor in most of these cases is that management failed to monitor and control rogue traders who put their institutions at risk.[114] The report concludes with a series of policy recommendations which are not aimed at reining in derivatives trading, but

[112] Jacque, *Global Derivatives Debacles,* 269.
[113] Lewis, "How the Eggheads Cracked."
[114] Robert Litan and Jonathan Rauch, *American Finance for the 21st Century* (Washington, DC: United States Department of the Treasury, 1997), 50.

rather at "eliminating outmoded barriers to competition."[115] This perspective was echoed in trade publications and in Senate Banking Committee hearings as well.[116]

Most strikingly, this same narrative – that of crisis being confined to individual institutions and therefore not of regulatory concern – extended to regulatory responses to LTCM's collapse as well. In his 1998 testimony before the House Committee on Banking and Financial Services, Fed Chair Alan Greenspan began by noting that, "What is remarkable is not this episode [the failure of LTCM], but the relative absence of such examples over the past five years. Dynamic markets periodically engender large defaults."[117] This perspective, he went on to argue, was entirely consistent with the New York Fed-orchestrated bailout of LTCM. Although the rapid unwinding of LTCM's complex portfolio amounted to a "fire sale" (that is, in inaccurate pricing of assets), "a fire sale that transfers wealth from one set of sophisticated market players to another, without any impact on the financial system overall, should not be a concern for the central bank."[118] Here again, the notion that both LTCM and its rescuers were sophisticated market actors justified a lack of regulatory response. This message was fairly consistent throughout the US regulatory community; Gerald Corrigan, who by this point had moved to the New York Fed, organized a group of bankers to write a report on lessons learned from LTCM's collapse and refinancing which concluded with a list of recommendations for firms, but nothing about governmental intervention or heightened regulations of derivatives trading.

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[115] Ibid., preface (unnumbered)
[116] See, for example, Loomis, "Untangling."
[117] Alan Greenspan, "Private-sector refinancing of the large hedge fund, Long-Term Capital Management," Testimony before the Committee on Banking and Financial Services, US House of Representatives, October 1, 1998.
[118] Ibid.

These crises throughout the 1990s drew heightened scrutiny to derivatives. Yet in subsequent reports, congressional testimony, and speeches, regulators asserted that defaults related to derivatives were the fault of individual actors making poor decisions and that they did not generate the systemic consequences that would justify increased regulatory measures. As such, responsibility for both cause and consequence of derivatives-related crises began and ended with individual financial institutions in the private sector.

VII. Definitive Deregulation (early 2000s)

By the early 2000s, the legitimacy and self-regulatory authority of the derivatives industry had sedimented, culminating in the 2000 Commodity Futures Modernization Act which definitively excluded most over-the-counter derivatives from the regulatory authority of the CFTC and SEC. As the former general counsel to the Federal Reserve Scott Alvarez reflected in response to an interview with the Federal Crisis Inquiry Commission in 2010, the "mind-set was that there should be no regulation; the market should take care of policing, unless there already is an identified problem. We were in the reactive mode because that's what the mindset was of the '90s and early 2000s."[119]

Debates during these years over derivatives regulation in the United States occurred against a backdrop of broader pro-market reform and sentiment. The Treasury Department report *American Finance for the 21st Century* reflects and performatives a sense that the United States had entered a new era of financial development, calling for a new regulatory paradigm. As the report's authors write in the introduction (in a formulation that already seems breathlessly quaint itself): "That stolidly reassuring world of 1967, which had remained comparatively stable over

[119] Quoted in Martin Wolf, *The Shifts and the Shocks: What We've Learned – and Have Still to Learn – from the Financial Crisis* (New York: Penguin Press, 2014).

the postwar period, now seems part of a quaint past. Interest rate controls have collapsed, and the array of options available to ordinary savers have grown beyond all recognition: derivatives markets and securities firms have invented whole new categories of financial instruments, cash is rapidly losing group to plastic, and checks are yielding to electronic exchange […]"[120]

The new array of financial products, the report goes on to argue, demands a new regulatory regime. The then-current regulatory regime had largely been developed in response to the Great Depression and as such was chiefly concerned with preventing concentration in banking and promoting stability in a national context. The Treasury Department, however, had growing concerns that Depression-era regulation would "smother" the financial services industry, stifling innovation and potentially pushing capital overseas in pursuit of more lenient regulations. In contrast, Litan and Rauch called for a regulatory regime that emphasized "competition and failure containment," echoing the language that the Federal Reserve had used to justify not responding to the bank and hedge fund failures of the 1990s with greater regulation:[121]

> [T]he time has arrived for federal policy to embrace competition in financial services wholeheartedly and open-mindedly. It is no longer necessary or desirable to view competition as the enemy of marketplace stability or to preslice and segregate entire markets to protect consumers or investor […] in an increasingly competitive financial world, periodic upsets in financial markets – sometimes very large ones – are inevitable, and the foremost goal of policy should not be to prevent upsets but to *contain* them […][122]

[120] Litan and Rauch, *American Finance*, 1. They go on to write, reinscribing the centrality of sophistication to financial market activities), that, "Arguably, the new world of finance is somewhat more treacherous for investors who are uninformed or underequipped, those who assume, erroneously, that their money market fund is federally insured or who lack the equipment or know-how to log on to the World Wide Web" (2).
[121] Ibid., 4.
[122]Ibid., 6-7.

The Treasury Department was not the only regulatory actor calling for a more limited approach to financial regulation to promote financial growth; under Greenspan's leadership, the Fed too emphasized financial innovation and competition, emphasizing the negative effects of "one-size-fits-all" regulation on financial markets that were profitable in virtue of their highly customizable products.[123] The inadequacy of a Depression-era regulatory paradigm for this brave new world of globalized financial markets was evident as well in the passage of the Gramm-Leach-Bliley Act of 1999 in the United States, which repealed Glass-Steagall's separation of investment and commercial banking, as well as in the Financial Services and Markets Act of 2000 in the UK.

Although the exclusion of the derivatives from regulatory authority under the Treasury Amendment of the 1936 Commodity Exchange Act had been a *de facto* norm following the Futures trading Practices Act of 1992, the increased public attention that the Orange County and LTCM crises drew to the market raised concerns in the industry that the CFTC might revoke that exemption, in spite of the broader movement away from Depression-era regulation. Of particular alarm to the industry were CFTC Chair's Brooksley Born's now-prescient criticisms of credit default swaps and her vocal opposition to legally exempting over-the-counter derivatives from the CEA.[124]

In 1998, the Fed Board of Governors specifically addressed industry concerns that the CEA might be held to apply to financial derivatives, subjecting them to CFTC regulation, in a statement submitted to the House Subcommittee on Risk Management and Specialty Crops.

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[123] See, for example: Greenspan, "Government Regulation and Derivative Contracts."

[124] In a 1997 speech at the FIA/FOA Fourth International Derivatives Conference in London she said referenced pending legislation before Congress that would amend the CEA and which could "dramatically reduce federal government oversight of our markets and, in my view could expose these markets to unnecessary risk." (Brooksley Born, "Regulation in an Era of Change," Remarks before the FIA/FOA Fourth International Derivatives Conference, London, June 5, 1997.)

They expressed concern about the uncertainty of the legal enforceability of derivatives contracts as long as the application of the CEA to these contracts remained ambiguous, citing the costs of pushing this industry offshore to more predictable legal regimes.[125] Contesting a 1997 GAO report that had documented substantial losses on the part of end-users of derivatives, they emphasized instead that the majority of end-users surveyed by the GAO reported being satisfied with derivatives dealers' sales practices, concluding that "these results call into question the need for additional government regulation of sales practices of OTC derivatives dealers." And calling for broad statutory exclusion of institutional OTC transactions from the CEA to resolve the legal ambiguity.[126]

In an indirect rebuke to Born's advocacy of greater derivatives regulation in the wake of large losses and the potential for systemic consequences, Alan Greenspan further reinscribed the view outlined in the 1997 Treasury Report that institutional failure was an acceptable cost of innovation in his 1998 testimony to the House Committee on Banking and Financial Services, stating that, "I have no doubt derivatives losses will mushroom at the next significant downturn as will losses on holdings of other risk assets, both on and off exchange. Nonetheless, I see no reason to question the underlying stability of the OTC markets, or the overall effectiveness of private market discipline, or the prudential supervision of the derivatives activities of banks and other regulated participants. The huge increase in the volume of OTC transactions reflects the judgments of counterparties that these instruments provide extensive protection against undue

[125] Board of Governors of the Federal Reserve System, "Application of the Commodity Exchange Act to Transactions in Over-the-Counter Derivatives," Statement submitted before the Subcommittee on Risk Management and Specialty Crops of the Committee on Agriculture, US House of Representatives, June 10, 1998.
[126] Ibid.

asset concentration risk."[127] The size of the market was taken as evidence of its value to the economy which was, in turn, taken as evidence of the effectiveness and superiority of private market regulation.

In 1999, in response to these competing interpretations of the need for public derivatives regulation and mounting industry concerns, the chairs of the Senate and House Agriculture Committees called upon the heads of the Treasury Department, the Fed, the SEC, and the CFTC (collectively referred to as the President's Working Group on Financial Markets) to issue a joint report on over-the-counter derivatives and the applicability of the CEA. Brooksley Born had resigned as CFTC chair in June 1999, and she was succeeded by William Rainer, who joined in consensus with the other agency heads in recommending that the CEA be changed to "promote innovation, competition, efficiency, liquidity, and transparency in OTC derivatives market" and concluding that "there is no compelling evidence of problems involving bilateral swap arrangements that would warrant regulation under the CEA; accordingly, many types of swap agreements should be excluded from the CEA."[128]

With Born gone, there was little resistance to the now-dominant interpretation of derivatives as an industry whose continued growth and innovation were very much in the public interest, insofar as the US economy was become increasingly financialized. In contrast to Born's warnings about the complexity and opacity of derivatives and her calls for greater regulation, Sharon Brown-Hruska, the CFTC Commissioner most vocal on the subject of derivatives, struck a markedly different tone, urging caution even in enacting regulations to make the market more

[127] Alan Greenspan, "The Regulation of OTC Derivatives," Testimony before the Committee on Banking and Financial Services, US House of Representatives, July 24, 1998.
[128] President's Working Group on Financial Markets, *Over-the-Counter Derivatives Markets and the Commodity Exchange Act,* November 1999, 14-15.

transparent and touting the benefits of derivatives in terms of enhancing price discovery, managing risk, and diversifying portfolios.[129] Older justifications for financial regulation rooted in concern for protecting unsophisticated investors, preventing market manipulation, and controlling the size of individual financial institutions were abandoned in favor of a regulatory paradigm that championed competition and innovation and regarded occasional failure as an acceptable price to pay for these goals. Anything that jeopardized US competitiveness in the derivatives market was suspect, under this interpretation, and that included the legal uncertainty over the enforceability of derivatives contracts.

Following on the recommendations of the PWG's 1999 report, in 2000 Congress passed the Commodity Futures Modernization Act, which definitively exempted derivatives from CFTC and SEC regulatory authority, codifying their previously de facto deregulation in law and ending the legal uncertainty that industry participants and regulators alike cited as inhibiting US competitiveness in this market. The vote was 377-4, indicating the extent to which financial deregulation had become common-sense.[130]

In the years that followed, regulators continued to champion the growth of derivatives markets, which grew at an unprecedented rate (see Figure 2 in Chapter 1). While credit derivatives were not even addressed in the 1999 Counterparty Risk Management Policy Group report, the group's 2005 report dedicated an entire section to the industry, citing the market's

[129] Sharon Brown-Hruska, "Market and Regulatory Innovation in a Global Environment," Keynote Address at the Futures Industry Association (FIA)/Futures Option Association (FOA) International Derivatives Conference, London, June 29, 2004. The regulatory debates over how transparent the OTC derivatives market should be made are covered in much more extensive detail in Chapter 4 of this dissertation.
[130] Included in those voting for the bill was Bernie Sanders.

exponential growth and significance to counterparty risk.[131] Fed Governor Susan Bies's 2004 speech to the Global Association of Risk Professionals is illustrative of the way in which the growth of the derivatives interest was interpreted as being in the public interest. She noted, "By their design, derivative instruments segment risk for distribution to parties most willing to accept them […] reducing or more evenly redistributing the risk within the banking system – where such credit risk has been traditionally concentrated–would seem to be a clear benefit."[132] Although some regulators acknowledged concerns about the concentration of risk outside the banking system[133] and of the ever-present risk of systemic shocks and financial panics, aggravated by highly leveraged banks and complacency in the face of low volatility,[134] the lack of public regulation of derivatives would be uncontested until the 2009 global financial crisis.

VIII. Conclusion

The wave of financial deregulation that began in the 1990s and accelerated in the early 2000s is often portrayed as an inevitable outcome of the inexorable march of global capitalism. While there are certainly structural features of capitalism and of neoliberalism in particular that make the accommodation of the state to finance likely, it is – I contend – both an empirical and normative error to regard this accommodation as inevitable. This chapter purports to provide an extended, historically and textually grounded argument for why the absence of public regulation in one especially significant financial market was a lengthy political project, marked by

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[131] Counterparty Risk Management Policy Group II, *Towards Greater Financial Stability: A Private Sector Perspective,* CPRMG, July 27, 2005: 107. See especially Section V ("Complex Financial Products: Risk Management, Risk Distribution and Transparency") and Appendix A ("Complex Financial Products").
[132] Susan Bies, "Qualitative Aspects of Effective Risk Management," Speech at the Global Association of Risk Professionals Fifth Annual Convention, New York, February 25, 2004.
[133] Alan Greenspan, "Risk Transfer and Financial Stability," Speech to the Federal Reserve Bank of Chicago's Forty-first Annual Conference on Bank Structure, Chicago, May 5, 2005.
[134] Timothy Geithner, "Liquidity Risk and the Global Economy," Speech at the Federal Reserve Bank of Atlanta's 2007 Financial Markets Conference – Credit Derivatives, Sea Island, Georgia, May 15, 2007.

contingency and shifting interpretations of the relationship between finance and the public good. At various moments, actors in a position of power and authority to change the trajectory of the growth of derivatives chose not to do so, but these choices could have been different. Absent the "sophisticated investor" figure that lay behind the 1974 Treasury Amendment to the CFTC Act, there would have been a clear justification for regulating financial derivatives, given the regulatory paradigm of that era. Had Gerald Corrigan's interpretation of derivatives as a powerful driver of potentially devastating systemic risk triumphed in the early 1990s, it would have been much easier for the CFTC and SEC to assert regulatory authority over the market, potentially banning over-the-counter derivatives entirely. Had Brooksley Born's interpretation of unregulated financial derivatives as contrary to the public interest dominated, we might never have seen the Commodity Futures Modernization Act.

At the same time, it is a mistake to conclude that because derivatives were not regulated that the derivatives industry "captured" regulators who would otherwise have imposed much more stringent regulations on the market. While Gerald Corrigan at the New York Fed expressed alarm at the size and riskiness of the growing derivatives market, regulators at the SEC at the same time were much more sanguine in their assessment of these products and their risks. While Brooksley Born interpreted the collapse of LTCM as clear evidence of the need for greater federal regulation of derivatives, regulators at the Fed disagreed sharply. "Regulators" refers to a heterogeneous group of actors, whose interpretations of their role, the public interest, and the products, markets, and actors they are tasked with regulating vary across time, agency, and individual. The regulatory capture view, in which a clear public interest is subsumed by private interest, falls apart in the face of this heterogeneity of beliefs about what derivatives are and how they relate to the public interest.

Revealing this heterogeneity and contingency is important not only for the empirical project of understanding how a $600 trillion crisis-prone market developed without public financial regulation, but making visible this history matters, too, for those who advocate for a less powerful role for financial markets in contemporary global politics. Because of the sheer size of these markets, their power is often understood in exclusively material terms; $600 trillion is, after all, a shocking number. But in addition to squaring poorly with the history of derivatives regulation, as documented by regulatory discourse, this exclusively material conception of power reinscribes a tendency – inherent in approaches that foreground regulatory capture and neoliberalism – to regard financial power as inexorable and states and publics as wholly overpowered (willingly or unwillingly) by this dominance. To the extent that politics is about conflict and contestation, however, there is no politics in this account, since the outcome of any conflict with "finance" is predetermined (and, in the neoliberal account, overdetermined). There is little possibility of political resistance in such a world, which is a poor starting point for a political project. In contrast, identifying the moments of contingency and contestation in the history of derivatives regulation allows us to see how things could be different – alternative possible framings of the public good, of derivatives, and of financial markets. That these interpretations were not, in fact, victorious at particular historical moments does not mean they cannot be adapted and mobilized in our own historical moment nor does it preclude alternative interpretations which might make possible new forms of governance.

Year	Event	Short description	Change in framing/legitimation of derivatives regulation
1936	Commodities Exchange Act (CEA)	Bans manipulation of commodity futures prices and requires commodity futures to be traded exclusively on exchanges	Responds to concerns that unregulated derivatives markets distorted prices and increased volatility in underlying commodity markets
1974	Commodity Futures Trading Commission (CFTC) Act + Treasury Amendment	CFTC Act allowed for trading financial futures but only on exchanges; Treasury Amendment excluded derivative transactions in foreign currency, government securities, and other financial instruments from exchange trading requirement	Acknowledges that regulation was needed to protect individuals, but not "sophisticated" or "professional" investors
1981	World Bank/IBM currency swap, brokered by Salomon Brothers	One of the first large-scale OTC derivative transactions based on a financial variable, rather than a commodity	Introduces financial derivatives to the global stage
1986	Financial Services Act (UK)	Makes all financial derivatives (whether for hedging or speculation) legally enforceable under British law	Based on the principle of self-regulation to ensure investor protection; considers derivatives distinct from speculation and gaming;
1992	G. E. Corrigan's speech to the New York State Bankers Association	Corrigan expresses concerns about the size, riskiness, complexity, and lack of regulation of derivatives markets, provoking a "mild hysteria" in the press and attracting public scrutiny of derivatives	Emphasizes risk exposures, size and complexity of derivatives market, potential to exacerbate crisis
1992	Futures Trading Practices Act + CFTC exemption of most OTC transactions from the CEA	Granted the CFTC the authority to exempt OTC transactions between regulated broker-dealers and large businesses from the CEA requirement that derivatives be traded on regulated exchanges; CFTC uses this authority to exempt interest rate swaps and most other OTC derivative contracts from exchange-trading requirement	Addressed industry concerns that OTC contracts might be legally unenforceable; privileged market stability and the strength and competitiveness of US financial markets over other public policy goals

1993	G-30 report on derivatives, followed by GAO report (1994)	An industry effort to assure regulators of derivatives benefits and of the industry's capacity to effectively manage the risks associated with financial derivatives and their potential to exacerbate crisis GAO report responds to same regulatory and congressional concerns and emphasizes systemic risk and lack of comprehensive regulatory structure	Derivatives' contribution to systemic risk in global finance is emphasized (GAO) and responded to (G-30)
1994	Orange County bankruptcy	Orange County loses $2 billion on highly leveraged portfolio of investments (including derivatives) managed by the county treasurer and declares bankruptcy	Derivatives are widely implicated in the municipal bankruptcy, but many popular narratives focus on the poor decision-making and character of Robert Citron, the Orange County treasurer
1997	Treasury Department report: *American Finance for the 21st Century*	Emphasizes the disjuncture between the existing regulatory system and modern financial developments	Frames financial firms' failure as an acceptable cost of innovation; prioritizes innovation over investor protection
1998	Long-Term Capital Management failure	Highly leveraged hedge fund specializing in arbitrage trading and interest rate swaps collapses after sustaining $4.4 bn in losses following Russian default on domestic debt and rush in the market to sell portfolios highly correlated with LTCM's; NY Fed organizes 14 banks to provide a $3.6 bn bail-out package	Derivatives are implicated but reform proposals focus on improving internal risk management systems (better models) and emphasize that losses were largely confined to the hedge fund and did not trigger a systemic crisis
1999	President's Working Group on Financial Markets report, *Over-the-Counter Derivatives and the Commodity Exchange Act* + Gramm-Leach-Bliley Act	PWG report concludes there is no need for regulation of OTC transactions between professional counterparties; GLBA overturns Glass-Steagall separation of commercial and investment banking activities	Both the report and the law are representative of the strong preference for financial deregulation and confidence in the strength of financial markets
2000	Commodity Futures Modernization Act	Prohibited the federal regulation of OTC derivatives markets; provided statutory exemption from the CEA requirement that futures be traded on regulated exchanges	Justification was given in terms of the irrelevance of the public policy goals of the CEA (preventing price distortion in underlying markets) to modern OTC markets, as well as maintaining US competitiveness vis-à-vis the UK

Table 3: Changes in the framing and legitimation of derivatives regulation

Chapter 3:
Predicting the Unpredictable: Valuation under Uncertainty

"By 'uncertain' knowledge, let me explain, I do not mean merely to distinguish what is known for certain from what is only probable. The game of roulette is not subject, in this sense, to uncertainty […] The sense in which I am using the term is that in which the prospect of a European war is uncertain, or the price of copper and the rate of interest twenty years hence, or the obsolescence of a new invention […] About these matters there is no scientific basis on which to form any calculable probability whatever. We simply do not know. Nevertheless, the necessity for action and for decision compels us as practical men to do our best to overlook this awkward fact and to behave exactly as we should if we had behind us a good Benthamite calculation of a series of prospective advantages and disadvantages, each multiplied by its appropriate probability, waiting to be summed."
- John Maynard Keynes[1]

"In many respects, the current crisis is about valuation. To be sure, factors underlying and affecting the crisis are many. Yet, what is particularly striking is that uncertainty about the true value of complex financial instruments (structured products) undermined global markets' confidence, raised uncertainty about counterparties' risk positions, and lead to contagion across asset classes, markets, and regions […] Sound valuation is central to internal risk measurement and management, capital requirements, solvency analysis, and more broadly, financial stability. As such, it is critical both as an input for the smooth function of financial markets and institutions, as well as an output form financial systems in their role of allocating capital efficiently across the economy. In other words, valuation issues are at the heart of today's modern, market-based, and risk-sensitive financial systems.
- Christian Noyer, former Governor of the Bank of France, 2008[2]

I. Introduction

The most basic requirement of any market is a consistent method for assigning value to assets being bought and sold. Without a set of shared beliefs about what something is worth, there cannot be a market for that product. The question of valuation has been a defining theme of both economics and political economy from the 18th and early 19th century labor theories of value of Adam Smith, David Ricardo, and Karl Marx, which held that the input of labor was the

[1] John Maynard Keynes, "The General Theory of Employment," *Quarterly Journal of Economics* 51:2 (1937): 213-214.
[2] Christian Noyer (2008) "Valuation challenges in a changing environment," in *Valuation and Financial Stability,* Banque de France Financial Stability Review 12, October, i.

fundamental measure of commodities' value,[3] to the late 19th century's marginalist revolution, which forms the basis of modern microeconomics and describes value as a function of a good's marginal utility to buyer and seller as they intersect in the marketplace.[4] Although John Stuart Mill confidently declared in 1848 that, "Happily, there is nothing in the laws of Value which remains for the present or any future writer to clear up; the theory of the subject is complete," modern financial markets pose challenges to conventional theories of value.[5] As Frank Knight and John Maynard Keynes realized, the future-oriented nature of financial assets complicates theories of value based in probabilistic models of expected utility. While such models work reasonably well in environments of calculable risk, they perform poorly in situations characterized by incalculable uncertainty.[6]

This chapter contends that derivatives markets represent one such environment. As I will discuss, the endogeneity of measurements and models to the world they purport to describe,

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[3] Adam Smith held that the exchange value of a commodity was equal to the quantity of labor it enabled one to purchase ("Labour […] is the real measure of the exchange value of all commodities […] It was not by gold or by silver, but by labor, that all the wealth of the world was originally purchased […]"), while Karl Marx famously held that commodities had an exchange value in excess of their embodied labor, with capitalists extracting the surplus as profit. For Ricardo, as for Smith, labor was a key determinant of the price level ("The value of a commodity, or the quantity of any other commodity for which it will exchange, depends on the relative quantity of labour which is necessary for its production, and not on the greater or less compensation which is paid for that labour."). (Adam Smith, *The Wealth of Nations, Books I-III*, Book I, Chapter V [New York: Penguin Classics, 1982]; Karl Marx, "Capital," in *Karl Marx: Selected Writings,* ed. David McLellan, 2nd ed. [New York: Oxford University Press, 2000], 492-508 ["The Production of Surplus Value"]; David Ricardo, *On the Principles of Political Economy and Taxation,* 3rd ed. [London: John Murray, Albemarle-Street, 1821], http://www.econlib.org/library/Ricardo/ricP1.html#Ch.1, On Value, Ch. 1, Sec. 1.1)

[4] William Stanley Jevons was strongly influenced by Jeremy Bentham's utilitarianism, and his Theory of Exchange holds that the ratio of exchange (i.e., the price of one good in terms of another) of any two commodities is the reciprocal of the ratio of the final (or marginal) degrees of utility of the quantity of the commodity; that is, the point of exchange is given by the equilibrium where an infinitely small amount of a commodity will bring neither gain nor loss to either trading partner. (William Stanley Jevons, *The Theory of Political Economy* [New York: Palgrave Macmillan, 2013]: 75-166. This theory was further refined by Alfred Marshall and others to form the basis of modern microeconomics.

[5] John Stuart Mill, *Principles of Political Economy, with Some of Their Applications to Social Philosophy* (London: Longmans, Green and Co., 1909), Book III, Chapter 1.

[6] Keynes, "General Theory of Employment"; Frank Knight, *Risk, Uncertainty, and Profit* (New York: Houghton Mifflin, 1921).

constant innovation that disrupts probability distributions based in historical data, and the irreducibly human and social dimensions of markets (Keynes's animal spirits) mean that financial actors operate in – and contribute to – a world of uncertainty. As a result, asset valuation is difficult, and when valuation practices inevitably break down, so too do markets. Nonetheless, many of these valuation practices persist and are even mandated by national and international regulation. Tracing the history of one authoritative valuation practice – the Value-at-Risk (VaR) model helps make sense of this puzzle.

While asset valuation is difficult for many reasons, including illiquidity and counterparty risk,[7] this chapter focuses primarily on the difficulty of valuing a portfolio of financial assets in an environment of risk and uncertainty. Being able to do was essential to the development of a liquid market for derivatives written on bundles of securitized assets since end-users needed a way to measure the maximum possible loss associated with those contracts. VaR provided a way of doing so and became a constitutive practice of the market for complex derivatives, signaling to regulatory authorities that financial market participants were capable of self-regulation. But while it worked reasonably well in the short-term, VaR was unable to account for uncertainty, even as its widespread use actively made the market more vulnerable and less predictable.

This chapter proceeds in seven sections. In Section II, I discuss the challenge of valuing derivatives and make the case for why valuation practices are constitutive of the derivatives market, touching briefly on two valuation practices discussed elsewhere in the literature: the Black-Scholes option pricing model and the Gaussian copula. In Section III, I introduce the Value-at-Risk method of measuring financial risk and sketch out the puzzle its continued use

[7] Addressed in Chapters 4 and 5, respectively.

presents. This methodology underlies a group of risk models widely used by the risk managers of banks, brokerage firms, hedge funds, mutual funds, and clearing houses to assess the probability of loss on a portfolio of financial assets. The VaR of the portfolio is the smallest number such that the probability of a loss exceeding that amount falls outside a given confidence interval.[8] VaR is widely used throughout the financial system and has been internationally institutionalized by the Basel Committee on Banking Supervision (BCBS) as the preferred measure of market risk used to determine capital requirements. However, VaR's ability to accurately predict future financial losses has a poor empirical track record and the model has visibly failed to account for losses incurred in the 1997 Asian financial crisis, the 1998 Russian financial crisis, and most recently, the subprime mortgage crisis originating in the US Nonetheless, VaR methodology has remained at the core of banks' risk management strategies and international regulations.

In Section IV, I argue we can make sense of this puzzle if we understand VaR not as an approximately accurate measure of an objective reality, but rather as a conventional, contestable practice that is itself implicated in the workings of financial markets. I introduce two concepts – Keynesian uncertainty and Barnesian performativity – that explain both the limitations of risk modeling and why it is political. In an environment of both quantifiable risk and Keynesian uncertainty, risk modelers' claims to objectivity and accuracy are contestable. Far from neutrally describing market dynamics, the practical use of risk models constructs markets, making economic processes sometimes conform to and other times diverge from the model. I argue that the performative effects of risk modeling push us to examine its productive power – the practices and interpretations it makes possible and precludes.

[8] For example, if a bank says the daily VaR of its portfolio is $40 million at the 99% confidence level, that means there is a 1 in 100 chance that a loss greater than $40 million will occur.

In the second half of the paper I draw on documents from international regulatory bodies, derivatives market participants, and trade publications to identify how the use of VaR enables particular financial and regulatory practices, while rendering others less authoritative. In Section V, I focus on VaR's performative and counterperformative effects. I argue that the use of VaR can result in losses consistent with VaR predictions by producing authoritative meanings of "risk" and "value," which, when acted on, produce convergent investment strategies that limit volatility. However, this performative effect is temporary and fragile, often yielding to counter-performative effects in which the widespread use of VaR fuels financial market volatility and unpredictability by creating incentives for excessive and undisclosed risk-taking and even for manipulating the model itself.

In Section VI, I consider how, despite VaR's complicity in financial collapse, it has allowed investment banks to satisfy calls for greater banking regulation while simultaneously making uncertain financial practices seem tractable and manageable. By privileging prediction and control as modes of preparing for future financial events, reliance on VaR simultaneously makes it more difficult to acknowledge uncertainty and to respond to it in alternative ways. I contend that responding to uncertainty primarily through probabilistic risk management does not guarantee the prevention of – and may even contribute to – financial crises, the costs of which are incurred not just by banks but by the public. The chapter concludes with some reflections about how this analysis helps us make sense of the two guiding questions of this dissertation: How did the market for financial derivatives become so crisis-prone in the absence of regulatory authority? And, how does the construction of the market help us make sense of limited regulatory reforms post-crisis?

II. Valuation Practices as Constitutive of the Derivatives Market (Black-Scholes and the Gaussian Copula)

The structure of modern, complex derivatives transactions poses a unique challenge to conventional practices of pricing assets, and financial economists have developed a series of pricing models and formulas which derivatives dealers (and to a less extent, end-users) have adopted and implemented to make derivatives transactions and markets possible. Early commodity futures markets had to contend with valuation challenges of their own, given the immense amount of variation in quality of grains. As William Cronon recounts, as standardized hierarchical system of categorizing grain according to "grades" allowed different crops to be mixed together to create uniform, liquid commodities that could then be traded and ensured on Chicago's nascent commodities exchanges.[9] Given a standardized underlying asset, the relationship between the price of grain and the value of a grain future contract is relatively straightforward, given sound methods for calculating the expected future value of grain.[10] While there are future unknowns associated with grain crops, over the short run, these variables tend to be amenable to probabilistic calculation in a way that the risks attached to more complex derivatives are not. Rainfall, for example, is completely exogenous to the number of grain futures contracts traded on the Chicago Mercantile Exchange, but – as this chapter will describe – the risks associated with many financial derivatives are endogenous to the structure and volume of other investors' decisions.

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[9] William Cronon, *Nature's Metropolis: Chicago and the Great West* (New York: W.W. Norton, 1992), 97-132.

[10] There are different methods for doing this, depending on whether or not comparable contracts already exist in the market. If so, arbitrage pricing allows future values to be calculated based on the interest rate, the expiration date of the contract, and the present value of the contract. If not, prices are based on expectations of future asset prices. The price of the futures contract will also reflect grain storage costs.

While derivatives that require the future sale of an underlying material asset (like grain) at a designated date (futures and forward contracts) are comparatively easy to price, derivatives that give the buyer the option of selling a financial asset (like a stock, security, or bond) at a designated future date at a predetermined price (strike price) and those written on bundles of securitized financial assets are significantly more challenging to value. Innovations in financial economics – including the Modigliani-Miller theorem,[11] the Capital Asset Pricing Model,[12] and the efficient market hypothesis[13] – were constitutive of the development of equity and capital markets in the second half of the 20th century.[14] While these developments began as theoretical and analytical exercises, they were adopted by financial practitioners who used them to develop and profit from new products like index funds. Economists had attempted to apply some of the underlying assumptions of these innovations to the challenge of options pricing, but the econometric analysis associated with options pricing turned out to be quite challenging. As Donald MacKenzie recounts, it was not until the Black-Scholes[15] options pricing model was developed in 1973 that financial derivatives exchanges emerged.[16] The Black-Scholes model[17] is appropriately understood as an authoritative practice, drawing on the definition of this concept in

[11] Stating that the value of a firm is unaffected by its financing strategy (issuing stock vs. selling debt)
[12] Asset pricing model that accounts for how stock prices reflect a trade-off between market risk and expected return
[13] Holds that an asset's price fully reflects all available information in the market, underpinning contemporary theories of rational markets.
[14] Donald MacKenzie, *An Engine, Not a Camera: How Financial Models Shape Markets* (Cambridge, MA: MIT Press, 2008): 28-29.
[15] Robert Merton, working separately, developed a different approach that led to the same methodology, so it is sometimes referred to as the Black-Scholes-Merton model or method. Black and Scholes based their model on the random-walk/geometric Brownian motion assumption of stock market behavior that also underlay the efficient markets hypothesis and the Capital Asset Pricing Model; in contrast, Merton based his approach in assumptions about continuous trading which provided a better justification for the risk-free rate of return in the model (Robert McDonald, *Derivatives Markets*, 2nd ed. [Boston: Addison Wesley, 2006], 679; MacKenzie, *An Engine*, 134-136.)
[16] MacKenzie, *An Engine*, 32.
[17] Fischer Black and Myron Scholes, "The pricing of options and corporate liabilities," *Journal of Political Economy* 81 (1973): 637-659

Chapter 1: Not only did the pricing model make widespread trading of stock options possible, it also reassured the Securities and Exchange Commission and the Commodity Futures Trading Commission that stock options were not wagers or bets, but rather objectively measurable investments.[18] This allowed them to be traded on the Chicago Mercantile Exchange, constituting the market and rendering it legitimate in the eyes of regulators.

We should understand the Black-Scholes model as a *practice,* however, and not as an approximate accurate depiction of an objective market reality. Through arbitrage trading, the widespread use of the model brought exchange-traded options prices closer to those generated by the model.[19] However, as Idier et al. have demonstrated, several of the core assumptions of the Black-Scholes model are rejected by empirical data.[20] As a result, the model overvalues some options (so-called "at-the-money" options, where the strike price equals the security price) and undervalues others (the more liquid in-the-money and out-of-the-money options), relative to historical empirical measurements.[21] The competent use of the model, however, allows its user to act within and constitute the world of options trading.

The Black-Scholes option pricing model began before there was much practical or professional demand for an options pricing model. In contrast, a second example of a constitutive

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[18] MacKenzie, *An Engine*, 172-173.
[19] Ibid., 32-33.
[20] Specifically, 1) While the volatility of the rate of return on the risk asset underlying the option is assumed to be constant, this has not been verified empirically; 2) The price of the underlying asset is assumed to follow a geometric Brownian motion and therefore the rate of return is assumed to follow a Gaussian distribution, but the empirical distributions of underlying assets have fat tails and negative returns are more frequent (the skewness coefficient is negative and the distribution has both a fat and long left tail); and 3) The model assumes that market data follows a stochastic process which only depends on past observations and other market variables, when in reality a small number of market participants with homogeneous investment strategies can unilaterally or in concert influence market prices, as can their risk measurements. (Julien Idier, Caroline Jardet, Gaëlle Le Fol, Alain Monfort, and Fulvio Pegoraro, "Taking in account extreme events in European option pricing," in *Valuation and Financial Stability*, Banque de France Financial Stability Review 12, October, 2008: 40-42.)
[21] Idier et al, "Taking in account," 39.

valuation practice – the Gaussian copula – was developed in response to a longstanding problem in financial markets: measuring correlation between defaults. The prices and risks of assets within a portfolio are not uncorrelated, and this poses a problem for the pricing of structured financial products, like mortgage-backed securities, where multiple assets are bundled together, and especially for the securitized derivative products used to trade the credit risk associated with those bundles of securities. David Li, a financial economist with RiskMetrics, developed a formula that purported to account for this correlation, which, because it assumed a normal distribution of correlation, became known as the Gaussian copula. Both investors and ratings agencies seized on Li's formula to help price the risk associated with collateralized debt obligations, allowing the market for these products to explode.[22] As MacKenzie and Spears document, the Gaussian copula family of models became deeply embedded in the organization culture of dealer banks.[23]

Quants like Paul Wilmott and Jon Gregory rightly questioned its underlying assumption that credit default swap markets can accurately price default risk and its reliance on a short window of historical data.[24] But technical disagreements like these did not rise to the level of bank managers, let alone regulators, and the use of the formula by banks and rating agencies widely interpreted to be a sound private-sector method of governing the future.[25] As late as

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[22] Sam Jones, "The formula that felled Wall St," *FT Magazine,* April 24, 2009, https://www.ft.com/content/912d85e8-2d75-11de-9eba-00144feabdc0.
[23] Donald MacKenzie and Taylor Spears, "'A device for being able to book P&L': The organizational embedding of the Gaussian copula," *Social Studies of Science* 44:3 (2014): 418-440; Donald MacKenzie and Taylor Spears, "'The formula that killed Wall Street': The Gaussian copula and modelling practices in investment banking," *Social Studies of Science* 44:3 (2014): 393-417.
[24] Qtd. in Felix Salmon, "Recipe for Disaster: The Formula that Killed Wall Street," *Wired,* February 23, 2009, https://www.wired.com/2009/02/wp-quant/.
[25] Tony Porter, "Risk models and transnational governance in the global financial crisis: The cases of Basel II and credit rating agencies," in *Global Finance in Crisis: The Politics of International Regulatory Change,* eds. Eric Helleiner, Stefano Pagliari, and Hubert Zimmerman (New York: Routledge, 2010): 62-64.

March 2007, Federal Reserve Board Donald Kohn stated that, while there was substantial model risk involved in pricing default correlation, he expected these estimates to improve as the credit derivative market, on which the default risk estimates were based, continued to grow.[26] Ben Bernanke, too, referenced the "sophisticated modeling techniques" that allowed for the valuation of tranches of highly customized CDOs, though he sounded a note of caution about the difficulties associated with these models.[27] Bernanke's caution was well-warranted: the Gaussian copula dramatically underestimated the extent of asset price correlations in 2007-2009, with profound effects: "The underestimation of correlation enabled financial institutions to hold insufficient amounts of liquidity and capital against the puts that underpinned the stability of the shadow banking system, which made these puts unduly cheap to sell. As investors also overestimated the value of private credit and liquidity enhancement purchased through these puts, the result was an excess supply of cheap credit."[28]

The Black-Scholes options pricing model and the Gaussian copula illustrate how valuation practices have allowed derivatives markets to develop in particular ways and have reassured both private and public financial regulators of the market's competence, despite profound limitations to the models. In what follows I examine a third authoritative valuation practice and consider how it contended with financial market uncertainty.

III. The Rise – and Puzzling Failure to Fall – of VaR

[26] Donald Kohn, "Asset-Pricing Puzzles, Credit Risk, and Credit Derivatives," Speech at the Conference on Credit Risk and Credit Derivatives, Washington, DC, March 22, 2007.
[27] Ben Bernanke, "Regulation and Financial Innovation," Speech the Federal Reserve Bank of Atlanta's 2007 Financial Markets Conference (via satellite), May 15, 2007.
[28] Zoltan Pozsar, Tobias Adrian, Adam Ashcraft, and Hayley Boesky, "Shadow Banking," Federal Reserve Bank Staff Report No. 458 (February 2012), 2-3.

Hedge fund manager David Einhorn characterizes the Value-at-Risk (VaR) approach to measuring financial risk as "an airbag that works all the time, except when you have a car accident."[29] Since VaR's formal institutionalization in the 1996 Basel Accord, several disastrous accidents have occurred in global financial traffic, but VaR is still used by investment firms and regulators to foresee and protect against large-scale losses. The persistent use of this method of modeling financial risk, despite widely publicized failures to predict catastrophic financial losses, is puzzling. When a model fails to fulfill its intended function – in this case, predicting the largest possible loss on a portfolio of investments – we might expect to see it substantially revised or perhaps abandoned altogether. And yet, VaR has endured throughout several financial crises, including ones in which its use was directly implicated as a contributing factor. In this chapter I analyze VaR modeling not as an apolitical technology that risk managers use to make money and guard against loss, but as an authoritative practice that structures financial markets operating in a context of both calculable risk and incalculable Keynesian uncertainty.

The VaR model is a compelling case for demonstrating the political power of financial models for three reasons. First, although, as I shall argue, VaR operates under conditions of both risk and uncertainty, it models future financial losses statistically, as if they were governed solely by risk. Second, VaR exemplifies the performative qualities that are both a response to and productive of unmanageable uncertainty in financial markets. And finally, as the following history sketches out, the authoritative meanings of "value" and "risk" that VaR helps constitute are acted on financially and politically.

[29] David Einhorn, "Private Profits and Socialized Risk," *Global Association of Risk Professionals* 42 (2008): 12.

VaR was developed by the commercial and investment bank J.P. Morgan in response to high interest rate volatility and unforeseen losses in the late 1980s. As financial markets became increasingly globalized, the bank wanted to be able to apply the concepts of value and risk to portfolios of assets that were denominated in different currencies and subject to different interest rates. This would allow them to measure the riskiness of the portfolio as a whole and "manage" it through quantitative limits and off-setting investments, or hedges.[30] A group of mathematically trained risk managers in the operations research department developed the VaR methodology over the course of three years, settling on an approach based on three main components: position data (the components of a portfolio of financial assets); the risk factors associated with those components (interest rates, exchange rates, equity and commodity prices) and their associated volatilities; and measurement parameters (the holding period over which the value of the investments could change, the historical period over which risk factors are measured, and the confidence interval).[31] The model produces a statistical distribution of a portfolio's probable future losses and gains and generates a single, easily understood number: the maximum possible loss on a portfolio likely to occur a given percent of the time. That number can then be compared with the maximum amount of risk the bank is willing to take on and off-setting positions and trades can be made accordingly.

By 1990, the methodology and mechanics for risk reporting were well established within J.P. Morgan, which Till Guldimann attributes to the clarity of the VaR output, citing the fact that Marcus Meier, the head of international trading, would request a daily one-page report showing

[30] Till Guldimann, "The Story of RiskMetrics," *Risk* (January 2000): 56.
[31] Basel Committee on Banking Supervision, *An internal model-based approach to market risk capital requirements,* (Basel: Bank for International Settlements, 1995), 6.

aggregate risks and forward it on to J.P. Morgan chair and CEO Dennis Weatherstone just after trading closed at 4:15pm.[32] In 1994, J.P. Morgan decided to publish the VaR methodology for free, citing a desire for transparency and standardized risk measurement across the financial industry,[33] as well as a desire to avoid what the then-leader of the bank's risk committee referred to as "the consequential risks" of selling the system as a definitive way of controlling financial risk.[34] A project team, which later became an independent group called RiskMetrics, published their VaR datasets and methodology online as a simple spreadsheet into which any user could enter positions and calculate their VaR. Although other banks were using similar approaches to estimate market risk, they converged around the RiskMetrics approach. Guldimann cites the disclosure of major risk management accidents, the industry's engagement with academically trained quants, and the relative ease of the model as fueling its rapid diffusion throughout the financial industry.[35] Glyn A. Holton writes that the "timing for the release of RiskMetrics was excellent, as it came during a period of publicized financial losses" which created "a flurry of interest" in VaR.[36]

This method of measuring risk was also quickly endorsed by regulatory bodies eager to rein in excessive financial risk-taking and impose a measure of transparency on the rapidly growing derivatives trade. As documented in the previous chapter, in response to growing public and regulatory scrutiny of derivatives, in 1993, the G30 commissioned a consultative group of bankers, financiers, and academics, led by J.P. Morgan CEO Dennis Weatherstone, to produce a report on derivatives. The G30 report concluded that derivatives were no less predictable than

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[32] Guldimann, "The Story of RiskMetrics," 7.
[33] J.P Morgan/Reuters, *RiskMetrics: Technical Document*, 4th ed. (New York: Reuters, 1996), 1.
[34] Guldimann, "The Story of RiskMetrics," 8.
[35] Ibid., 8.
[36] Glyn Holton, *Value-at-Risk: Theory and Practice* (San Diego, CA: Academic Press, 2003), 19.

other financial products and included a recommendation that investment banks use VaR daily to calculate the market risk of their derivatives positions and compare it to predetermined risk limits to prevent unexpected financial losses.[37]

Although the G30 study intentionally eschewed regulatory implications, the Basel Committee on Banking Supervision (BCBS), a group of central bankers and regulators from the G-10 states, explicitly linked VaR to financial regulation. In 1988, the BCBS had responded to public concerns about the effects of developing countries' debt crises on capital markets and the moral hazard of investment banks' trades in increasingly complex financial instruments by setting capital adequacy requirements – an amount of capital the international supervisory authority saw as advisable for banks to have on hand as a cushion for future financial shocks. The 1988 Basel Accord was primarily concerned with losses that result from counterparties being unable or unwilling to fulfill contractual obligations (credit risk). But by the early 1990s, it was apparent that extreme swings in asset prices (market risk) posed an equal, if not greater, threat to financial institutions' solvency. Needing a way to tie capital requirements to the market risk of a bank's total investments, the BCBS readily took up VaR for consideration. As Philippe Jorion writes, "central bankers implicitly recognized that risk management models in use by major banks are far more advanced than anything they could propose."[38]

In 1996, an amendment to the 1988 Basel Accord was adopted to require banks to hold enough capital to be able to meet market risks, calculated according to either a standardized methodology or a bank's own VaR model. This gave banks the option of adjusting the data and

[37] Global Derivatives Study Group, *Derivatives: Practices and Principles* (Washington, DC: G30, 1993), 10.
[38] Philippe Jorion, *Value at Risk: The New Benchmark for Controlling Market Risk* (Chicago: Irwin Professional Publishers, 1997), 41.

parameters used to calculate their maximum probable losses. The amendment was framed in explicitly regulatory terms: "Introducing the discipline that capital requirements impose is seen as an important further step in strengthening the soundness and stability of the international banking system and of financial markets generally."[39] The amendment specified that measures of market risk would then be used to assign a capital charge to banks, on top of the capital requirements in the original 1988 Basel Accord.[40] Like the original Accord, the 1996 Market Risk Amendment depended on domestic enforcement and, crucially, industry consent for its efficacy.[41]

In accordance with the 1996 Amendment – and in particular the provision that allowed banks to develop their own internal VaR risk models – VaR methodology diffused throughout the financial industry in the late 1990s, often in conjunction with other proprietary risk management techniques. VaR was used by (among others) Standard & Poor's, Moody's, Long Term Capital Management, and over 60 international commercial banks, including the ten largest US banks.[42] It has remained the Basel Committee's recommended method of internally modeling market risk to assign capital charges throughout both the 2004 and 2010-11 renegotiations of the Basel Accords (Basel II and III), though the latter document adds leverage ratios to risk-based capital requirements and implements stricter VaR requirements.[43] Following the 2008 financial

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[39] Basel Committee on Banking Supervision, *Overview of the Amendment to the Capital Accord to Incorporate Market Risk* (Basel: Bank for International Settlements, 1996), 1.
[40] Ibid., 6.
[41] Ibid., 7.
[42] Christophe Pérignon and Daniel Smith, "The level and quality of Value-at-Risk disclosure by commercial banks," *Journal of Banking and Finance* 34:2 (2010): 363. Büthe and Mattli note the effects of the Basel Committee's recommendations extend well beyond the regulators that participated in setting them: "Numerous public regulators who had no voice in setting these capital adequacy standards thus ended up adopting them" (Tim Büthe and Walter Mattli, *The New Global Rulers: The Privatization of Regulation in the World Economy,* [Princeton: Princeton University Press, 2011], 22).
[43] Basel Committee on Banking Supervision, *International Convergence of Capital Measurement and Capital Standards, A Revised Framework* (Basel: Bank for International Settlements, 2006), 191-203; Basel Committee on

crisis, in which commercial banks' losses were significantly higher than the minimum capital holdings required under Basel II, the BCBS revisited their standards for calculating market risk, imposing an additional requirement on banks to include a "stressed value-at-risk calculation" that takes into account a one-year observation period in which "significant losses" were sustained, in addition to calculating VaR based on the most recent one-year observation period.[44] Banks are also now required to justify to the relevant supervisory authority any variables they use in pricing assets but leave out of their VaR calculations, in order to account for the possibility that banks would intentionally omit factors to make their risk burden appear smaller.[45] These reforms are anticipated to double or triple the capital that international banks would have to keep to protect against market risks.[46] Nonetheless, they remain anchored in the same basic VaR methodology popularized by J.P. Morgan twenty years ago. Similarly, one of the centerpieces of post-crisis financial regulation in the United States and endorsed by the BIS – the requirement that over-the-counter derivatives be cleared through central counterparties – continues to rely heavily on historical VaR in its calculation of the amount of collateral banks are required to post.[47]

The history of VaR's initial diffusion is relatively straightforward, but explaining its continued authority as a response to financial uncertainty is puzzling given that VaR falls well short of predictive accuracy. Its history is remarkable for the lack of organized interests opposing

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Banking Supervision, *Basel III: A Global Regulatory Framework for More Resilient Banks and Banking Systems* (Basel: Bank for International Settlements, 2011), 3; Andrew Haldane, "The dog and the Frisbee," speech at the Federal Reserve Bank of Kansas City's 36th Economic Policy Symposium – "The Changing Policy Landscape," Jackson Hole, Wyoming, August 31, 2012: 22.

[44] Basel Committee on Banking Supervision, *Consultative Document: Revisions to the Basel II Market Risk Framework* (Basel: Bank for International Settlements, 2009), 1.

[45] Ibid., 3.

[46] G. Gopalakrishna, "Inaugural speech by Mr G Gopalakrishna, Executive Director of the Reserve Bank of India," Federal Reserve System Market Risk Analysis Seminar, New Delhi, January 21, 2013: 1.

[47] Matt Cameron, "Margin Models Converge as CCPs Battle for Dealer Support," *Risk Magazine*, October 31, 2011, http://www.risk.net/risk-magazine/feature/2111799/margin-models-converge-ccps-battle-dealer-support.

banks' and regulators' preference for VaR. While banks did have to persuade the BCBS to permit them to choose their own model parameters, the methodology itself was never seriously disputed. The uncontested use of the model might be relatively unproblematic were it performing a purely descriptive function, but its poor predictive track record makes its continued use harder to explain. Systematic econometric tests of banks' VaR predictions against historical price and volatility data show that forecast losses bear little resemblance to what actually happened, particularly when a distribution based on historical data is used. For example, in their analysis of 60 banks' VaR numbers compared with data about the ensuing trading volatilities, Christophe Pérignon and Daniel R. Smith find that there is "at best a weak relationship" between VaR predictions about the maximum likely loss and subsequent trading prices.[48] Nor did banks' forecasts of losses improve with time. They ultimately conclude that, "bank VaR computed using Historical Simulation helps little in forecasting the volatility of future trading revenues […]."[49]

VaR's shortcomings have not been confined to econometric analyses: VaR has been implicated in high-profile financial disasters, such as the collapse of Long Term Capital Management (LTCM) in 1998.[50] VaR was the main approach the firm used to calculate market risk, but it was unable to account for unforeseen financial crises in Asia and Russia and the financial losses sustained by the firm as a result, leading to the firm's collapse.[51]

More recently, VaR models prominently failed to account for losses on super-senior tranches of risk in collateralized debt obligations. For example, the investment bank UBS's VaR-

[48] Pérignon and Smith, "The level and quality," 372.
[49] Ibid., 376.
[50] Robert Litzenberger and David Modest, "Crisis and Noncrisis Risk in Financial Markets," in *The Known, the Unknown, and the Unknowable in Financial Risk Management,* eds. Francis Diebold, Neil Doherty, and Richard Herring (Princeton, Princeton University Press, 2010), 77-78.
[51] Nicholas Dunbar, *Inventing Money: The Story of Long-Term Capital Management and the Legends Behind It* (New York: Wiley, 2000), 140-147.

based risk models had predicted that these securities would not lose more than 2% of their value, which was $50 billion by early 2007.[52] However, super-senior risk accounted for two-thirds of UBS's losses, or $12.5 billion dollars in 2007 – well in excess of the predicted 2% figure.[53] As Gillian Tett observes, the bank's VaR models had not foreseen the possibility of a highly correlated wave of mortgage defaults and the collapse of a market for even the ostensibly safest classes of assets, rendering their predictions spectacularly inaccurate.[54]

Within the financial world, the explosive growth in financial exchanges is widely taken as evidence of statistical modeling's successful predictions.[55] However, the repeated failures of VaR to foresee large-scale financial losses suggests the diffusion of VaR owes much more to its conventional status as a means of (ostensibly) standardizing risk measurements across a complex, closely integrated global financial system than to the success of its predictions. As Millo and MacKenzie argue in the case of the Black-Scholes-Merton option pricing model, ease of communication, compatibility with other model-based approaches, and institutionalization in regulatory instruments explain its widespread use despite demonstrated shortcomings.[56] Similar factors can account for VaR's persistence in risk management. Specifically, in the case of VaR, most sources emphasize the simplicity of the model's output, as well as the ease of adopting RiskMetric's well-publicized methodology and data.[57] Additionally, the inclusion of VaR in the

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[52] Gillian Tett, *Fool's Gold: The Inside Story of J.P. Morgan and How Wall St. Greed Corrupted Its Bold Dream and Created a Financial Catastrophe* (New York: Free Press, 2009), 138; 206.
[53] Stephanie Baker-Said and Elena Logutenkova, "UBS $100 Billion Wager Prompted $24 Billion Loss in Nine Months," *Bloomberg,* May 18, 2008, http://www.bloomberg.com/apps/news?pid=newsarchive&sid=a3sm9FOrsWcg; Tett, *Fool's Gold,* 210.
[54] Tett, *Fool's Gold,* 230.
[55] Yuval Millo and Donald MacKenzie, "The Usefulness of Inaccurate Models: Towards and Understanding of the Emergence of Financial Risk Management," *Accounting, Organizations and Society* 34 (2009): 638.
[56] Ibid., 639.
[57] Jorion, *Value at Risk,* 21; Joe Nocera, "Risk Mismanagement," *New York Times,* January 2, 2009, http://www.nytimes.com/2009/01/04/magazine/04risk-t.html?pagewanted=all&_r=0.

Basel Accord goes a long way to explaining the international adoption of the approach. But neither of these factors operates at the level of economic logic. The continued use and perceived authority of VaR cannot be explained with reference to its empirical accuracy, and this suggests that its use and effects have a specifically political dimension. In what follows, I contend that we can understand VaR's shortcomings, as well as its use, by viewing it as an authoritative response to Keynesian uncertainty with performative and counterperformative effects. Moreover, viewing risk modeling as an authoritative practice allows us to see how it produces particular political consequences.

IV. Productive, Not Predictive, Power: Why VaR is Political

I contend that practices are political when they are contestable and when doing things differently would empower different groups of actors. In this section I introduce three theoretical concepts that motivate my analysis of Value-at-Risk as a political practice: uncertainty, model performativity, and productive power. Viewing international finance through the lens of Keynesian uncertainty helps explain VaR's shortcomings. It also reveals that risk models are inherently limited in their ability to anticipate the probability and magnitude of financial losses and are therefore contestable as the dominant method of preparing for future financial events. The concept of performativity requires us to view financial models as active participants in, rather than neutral representations of, financial systems. If VaR accurately approximated an objective reality, the measures of financial "risk" and "value" produced by the model would be more difficult to contest. However, understanding risk modelers as constructing the world they purport to describe opens their claims of responsible risk management to critique and contestation. Acknowledging the performativity of financial models pushes us to consider their role in constituting and perpetuating particular practices, while making others less thinkable. I

argue that the concept of productive power is a useful analytical tool for understanding the political consequences of the use of VaR to model risk.

A. Uncertainty

In IR, uncertainty, risk, and ambiguity are sometimes used interchangeably to refer to situations in which outcomes are unknown.[58] My argument about the inherent limitations of probabilistic risk modeling relies on a specific conception of uncertainty, as distinguished from risk, most influentially articulated by John Maynard Keynes and taken up today by heterodox and post-Keynesian economists. Keynes powerfully and elegantly defined uncertainty in terms of future events about which we cannot make probabilistic predictions:

> By 'uncertain' knowledge, let me explain, I do not mean merely to distinguish what is known for certain from what is only probable. The game of roulette is not subject, in this sense, to uncertainty […] The sense in which I am using the term is that in which the prospect of a European war is uncertain, or the price of copper and the rate of interest twenty years hence, or the obsolescence of a new invention […] About these matters there is no scientific basis on which to form any calculable probability whatever.[59]

Whereas risk refers to decision-making in an environment of known probability of loss or gain, uncertainty refers to situations in which the probable distribution of outcomes itself is unknown.[60] Uncertainty characterizes outcomes in non-deterministic open systems, in which prediction is impossible not because of epistemological limitations on the part of the observer but

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[58] E.g., Brian Rathbun, "Uncertainty about Uncertainty: Understanding the Multiple Meanings of a Crucial Concept in International Relations Theory," *International Studies Quarterly* 51:3 (2007): 533-557.
[59] Keynes, "General Theory," 214.
[60] Rawi Abdelal, Mark Blyth, and Craig Parsons, "Introduction," in *Constructing the international Economy,* eds. Rawi Abdelal, Mark Blyth, and Craig Parsons (Ithaca: Cornell University Press, 2010), 12; Peter Katzenstein and Stephen Nelson, "Reading the right signals or reading the signals right: IPE and the financial crisis of 2008," *Review of International Political Economy* 20:5 (2013): 1101. My position in this chapter is not that markets "really are" governed by uncertainty rather than risk, but that is that it is analytically useful to view them as partially characterized by Keynesian uncertainty as this helps us see the way in which calculative tools like VaR construct them in contingent ways. I do not think risk and uncertainty are mutually exclusive, though I do think that the islands of predictability that do emerge in markets are not inherently so, but exist as social accomplishments

because the structure of the system is such that its behavior is not amenable to prediction.[61] That is, the system does not automatically tend toward stable equilibria (non-ergodicity), nor are events and outcomes in the system distributed according to a knowable pattern. When either estimating the probability of a given event or representing the set of future events is impossible, probabilistic models like VaR fail to capture the full range of empirical phenomena under consideration.[62]

There is good reason to think that outcomes in economic systems are at least partially uncertain. Keynes was one of the first economists to explicitly characterize financial markets as governed by uncertainty, referring to "the extreme precariousness of the basis of knowledge on which our estimates of prospective yield have to be made."[63] Contemporary international financial markets appear, in extreme cases, equally resistant to probabilistic prediction, as evidenced by the failure of financial models to account for losses more than twenty standard deviations from the predicted mean three times since 1987 alone.[64] The 2008 financial crisis is a stark example of neglected uncertainty in financial markets, given that credit rating agencies underestimated default rates for collateralized debt obligations derived from mortgage-backed

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[61] John Latsis, Guillemette de Larquier, and Franck Besis, "Are conventions solutions to uncertainty? Contrasting visions of social coordination," *Journal of Post-Keynesian Economics,* 32:4 (2010): 546; Sebastian Berger, ed., *The Foundations of Non-Equilibrium Economics: The Principle of Circular and Cumulative Causation* (New York: Routledge, 2009), 2.

[62] John Kregel and Eric Nasica, "Uncertainty and Rationality: Keynes and Modern Economics," in *Fundamental Uncertainty: Rationality and Plausible Reasoning*, eds. Silvia Marzetti Dall'Aste Brandolini and Roberto Scazzieri (New York: Palgrave Macmillan, 2011), 281.

[63] John Maynard Keynes, *The General Theory of Employment, Interest, and Money,* (Basingstoke: Palgrave Macmillan, 2007): 149.

[64] Mandelbrot and Taleb point to the 1987 stock market crash, the 1992 crisis in the EU exchange rate mechanism, and the 2007-8 financial crisis as events that, according to extant risk models, should only happen one in a googol (one, followed by a hundred zeros) times (Benoît Mandelbrot and Nassim Taleb, "Mild vs. Wild Randomness: Focusing on Those Risks That Matter," in Diebold, Doherty, and Herring, *The Known,* 51).

securities by 20,155% on average.[65] That such unpredicted events are repeatedly found in financial markets in which there is an abundance of information offers further evidence for the inadequacy of risk-based models to capture the totality of the financial system.[66] When objectively valid probabilities of gains and losses do not exist, the use of probabilistic models should be understood not as means of eliminating uncertainty through the quantitative mastery of a calculable system, but rather as a contingent, and inherently limited, response to uncertainty.

The ex post inaccuracy of VaR's predictions of volatility compared to historical data provides evidence for thinking that this risk model, in particular, operates in a world of Keynesian uncertainty. Pérignon and Smith conclude their econometric analysis of VaR's accuracy by acknowledging a "disconnect between Historical Simulation-based VaR and future volatility."[67] If financial markets are, in some respects, non-ergodic and therefore characterized by uncertainty in addition to risk, this is what we would expect to see. Indeed, Paul Davidson argues that probabilistic forecasting models are only accurate when the distribution of possible outcomes does not vary over time: "If, however, the economic future is nonergodic […] these forecasts can persistently differ from the time average which will be generated as the future unfolds and becomes historical fact."[68]

Why is historical data such a poor predictor of future outcomes in financial markets? Several mechanisms produce the uncertainty that limits the predictive accuracy of financial

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[65] Stephen Nelson and Peter Katzenstein, "Uncertainty, Risk, and the Financial Crisis of 2008," *International Organization* 68 (2014): 14; Nate Silver, *The Signal and the Noise: Why So Many Predictions Fail – But Some Don't* (New York: Penguin Press, 2012), 29.

[66] While these extreme cases fall outside the scope of what the models claim to be able to predict, the magnitude of losses speaks powerfully to why we should be concerned with the limitations of risk modeling.

[67] Pérignon and Smith, "The level and quality," 376.

[68] Paul Davidson, "Rational Expectations: A Fallacious Foundation for Studying Crucial Decision-making Processes," *Journal of Post-Keynesian Economics*, 5:2 (Winter 1982-3): 186.

models. According to Benoit Mandelbrot and Nassim Nicholas Taleb, stock price movements and other financial data sets are characterized by non-normal distributions and may have infinite variance.[69] Most risk models are based on a distribution with a known variance (Gaussian, log normal, or historical), but if price movements do not follow a knowable distribution, then models of future outcomes – like VaR – that rely on estimated mean and standard deviation are of limited utility.[70] Aaron Brown, a prominent financial trader and risk manager, likewise attributes the financial system's incalculability to the complexity of highly integrated markets, in which risks in one sector are hedged and bundled with positions in another, leading to highly complex correlations and new kinds of financial instruments to the point where the predictive validity of any historical precedents for price movements breaks down.[71]

That financial markets are constituted by human actors also fuels their incalculability. David Tuckett associates the uncertainty of financial markets with the unpredictability of emotional responses to financial gains and losses. He observes that these affective responses are difficult to model because behaviors like obsessively checking daily stock price movements despite their known inability to predict future patterns diverge from what actors with expectations consistent with rationalist models would do and lead financial traders to act in non-

[69] Mandelbrot and Taleb, "Mild vs. Wild," 48-53.
[70] VaR models can also be based on a Monte Carlo simulation which generates a distribution of possible outcomes by running multiple random hypothetical trials. In this case, financial gains and losses are assumed to be stochastic and thus amenable to probabilistic analysis, in contrast to the non-ergodic view of the financial system that underlies contemporary understandings of Keynesian uncertainty (Holton, *Value-at-Risk*, 193-198).
[71] Aaron Brown, "The Unbearable Lightness of Cross-Market Risk," *Wilmott Magazine* (March 2004), 20. Brown nonetheless defends VaR in a subsequent article, though he acknowledges its limitations, noting that "A 99% one-day VaR has to operate for about three years before you can trust it. A 99.97% one-year VaR, which some people use for economic capital, requires 26,000 years for the same level of confidence. That makes deep tail VaR a matter of faith and assumptions, not something you can observe with reasonable statistical certainty over a moderate time interval" (ibid.).

uniform ways.[72] Quantitative analyst Emanuel Derman also attributes uncertainty to the irreducibly agentic and social aspects of financial markets, contending that "we cannot know how the value of a security will change through time because we don't know how the future will affect the promises made by its sellers. Value is determined by people, and people change their minds."[73] This affective component of uncertainty was part of what caused losses on super-senior CDO risk to far exceed VaR predictions. The model not only failed to anticipate widespread mortgage defaults, it also neglected the possibility that no one would want to buy even highly rated debt due to investors' irrational fears.[74]

Although financial experts are operating in a world of both uncertainty and fully calculable risk – and are often aware of this – their response is nonetheless to attempt to statistically model future outcomes, claiming to have segregated manageable risk from incalculable uncertainty, or disregarding the latter entirely. Keynes observed this tendency to respond to uncertainty with probabilistic calculation, writing that "the necessity for action and for decision compels us as practical men to do our best to overlook this awkward fact and to behave exactly as we should if we had behind us a good Benthamite calculation of a series of prospective advantages and disadvantages, each multiplied by its appropriate probability, waiting to be summed."[75] Descriptively, Keynes's assessment remains apt; like the Black-Scholes model and the Gaussian copula, VaR is one among many attempts to confront uncertainty in financial

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[72] David Tuckett, *Minding the Markets: An Emotional View of Financial Instability* (New York: Palgrave Macmillan, 2011), 23, 51.
[73] Emanuel Derman, *Models. Behaving. Badly: Why Confusing Illusion with Reality Can Lead to Disaster on Wall Street and in Life* (New York: Free Press, 2011), 149.
[74] Tett, *Fool's Gold,* 230.
[75] Keynes, "General Theory," 24.

markets through practices that probabilistically model future outcomes. Risk modeling allows investment banks to value investments and make trades in the face of Keynesian uncertainty.

In her analysis of how collateral is documented in Japanese derivatives trading, Annelise Riles refers to the practice of acting as if collateral posted to cover future credit risks belongs to the counterparty as a "placeholder" – a cognitive strategy for dealing with unknowable future outcomes which she describes as "a kind of knowledge that is consciously false and for this very reason irrefutable […] a tool for practical intervention."[76] Risk modelers' use of VaR is best understood not as an epistemological commitment that future unknowns are fully knowable, but rather as this kind of "placeholder." In responding to criticisms of VaR, many risk modelers acknowledge its limitations, but contend that there is nothing else to be done about the truly uncertain. Jorion, for example, writes, "Practically speaking, there is no way to provide an estimate of the absolute worst outcome."[77] Similarly, Gregg Berman, co-founder of RiskMetrics, contends that not being able to account for losses that are predicted to occur less than 1% of the time is no reason not to use VaR, since such losses cannot be predicted in any case: "If you say that all risk is unknowable, you don't have the basis of any sort of a bet or a trade. […] To not use VaR is to say that I won't care about the 99 percent, in which case you won't have a business."[78] Treating uncertainty as risk allows risk modelers to proceed by cognitively bracketing the consideration of losses that cannot be accurately modeled. While this is understandable, I will argue that excessive reliance on VaR, especially on the part of the bank

[76] Annelise Riles, "Collateral Expertise: Legal Knowledge in the Global Financial Markets," *Current Anthropology* 51:6 (2010): 802.
[77] Philippe Jorion, "In Defense of VAR," *Derivatives Strategy,* April 1997, http://www.derivativesstrategy.com/magazine/archive/1997/0497fea2.asp.
[78] Nocera, "Risk Mismanagement."

managers, regulators, and the public who may be less familiar with the limitations of VaR is more problematic.

B. Model performativity

According to Marieke de Goede, modeling risk may have in fact perpetuated uncertainty by introducing further, less-than-fully calculable complexity into financial markets. In discussing international financial markets after the collapse of the Bretton Woods system of fixed exchange rates, she writes, "The response to increased uncertainty has been increasingly complex strategies of risk management, insurance, hedging, and speculation. Paradoxically, these increasingly complex financial strategies have fueled uncertainty and volatility rather than dispelled them."[79]

The idea that risk management itself affects the very outcomes it purports to model points to another, more insidious source of uncertainty. The concepts of "reflexivity" and "performativity" refer to the idea that economic models are not detached descriptions of objective, determinable economic processes but are themselves implicated in creating and altering the economy they purport to describe. The phenomenon of reflexivity has most notably been addressed in sociology[80] and philosophy of science,[81] but it can also be found in IR. For example, Alexander Wendt's claim that "anarchy is what states make of it" refers to the idea that states acting under an assumption of anarchy will create a world that is indeed anarchic, but only

[79] De Goede, *Virtue*, 50.
[80] Donald MacKenzie, Fabian Muniesa, and Lucia Siu, eds., *Do Economists Make Markets? On the Performativity of Economics* (Princeton: Princeton University Press, 2007); Anthony Giddens, *The Consequences of Modernity* (Stanford: Stanford University Press, 1990), 35-36.
[81] Roger Buck, "Reflexive Predictions," *Philosophy of Science* 30:4 (1963): 361-362; Michael Martin, "The Philosophical Importance of the Rosenthal Effect," *Journal for the Theory of Social Behavior* 7:1 (1977): 81-97.

contingently so.[82] Reflexivity is a source of uncertainty because it generates contingent outcomes at odds with the idea of objective or knowable probabilities.

Financial investor George Soros regards reflexivity as inherent to economic life. Soros argues that participants' views of the economy are always partial and distorted and that these skewed views influence the economy because they lead to "inappropriate" actions.[83] In situations characterized by reflexivity, there is significant slippage between intentions and actions and between actions and outcomes. Because economic actors manipulate their environment according to the (partial) knowledge they possess, knowledge can no longer be understood as an objective description of a world external to the economic actor.[84] Instead, knowledge and the world are implicated in a relationship Soros refers to as a "reflexive feedback loop," where necessarily distorted and partial knowledge is acted on in such as a way as to instantiate the misperceptions, resulting not in convergence toward an equilibrium but rather to dynamic disequilibrium. This slippage is why reflexivity is one source of uncertainty.[85] Soros characterizes financial markets, in particular, as reflexive, arguing that instead of neutrally reflecting an underlying reality, financial markets construct and change the fundamentals they are supposed to reflect.[86] According to such an understanding, crises and bubbles are not random deviations from equilibrium caused by exogenous shocks, but are rather a product of the disconnect between financial actors' expectations and the reality those expectations are

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[82] Alexander Wendt, "Anarchy Is What States Make of It: The Social Construction of Power Politics," *International Organization* 46:2 (Spring 1992): 391-425.
[83] George Soros, "General Theory of Reflexivity," *Financial Times*, October 26, 2009, http://www.ft.com/intl/cms/s/2/0ca06172-bfe9-11de-aed2-00144feab49a.html#axzz2bKLStmmt.
[84] Ibid.
[85] George Soros, *The New Paradigm for Financial Markets: The Credit Crisis of 2008 and What It Means* (New York: Public Affairs, 2008), 29; 31.
[86] George Soros, "Financial Markets," *Financial Times*, October 26, 2009, http://www.ft.com/intl/cms/s/2/dbc0e0c6-bfe9-11de-aed2-00144feab49a.html#axzz2bKLStmmt; Soros, *The New Paradigm*, 51ff.

enacting.[87] An important implication of this view is the impossibility of generating firm predictions about future outcomes because the act of formulating those predictions alters the very dynamics the model attempts to capture.[88]

Closely related to the idea of reflexivity is an ontological conception of financial markets – and the economy as a whole – as undergoing constant reconstruction and performance. Daniel Breslau writes that the economy only comes into being once a multitude of transactions are "recorded, abstracted from everyday experience, quantified, and then reassembled into a whole that seems to have a life of its own."[89] The idea that financial models construct the world of finance is memorably captured by Donald MacKenzie (paraphrasing Milton Friedman), who argues that financial models are "engines, not cameras."[90]

MacKenzie uses the idea of performativity to argue that not only are theories and models engines of change in economic processes, but that the use of models causes practices to be altered such that their conformity with the model is changed. MacKenzie distinguishes between *Barnesian performativity*,[91] in which economic processes are changed such that they better correspond to the model, and *counterperformativity*, in which economic processes undermine the accuracy of the model.[92] For example, as noted in Section II, MacKenzie finds that as the Black-Scholes-Merton options pricing model was used to identify under- or over-priced options relative

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[87] Soros, "Financial Markets."
[88] Soros, *The New Paradigm,* 19.
[89] Daniel Breslau, "Economics Invents the Economy: Mathematics, Statistics, and Models in the Work of Irving Fisher and Wesley Mitchell," *Theory and Society* 32:3 (2003): 380.
[90] MacKenzie, *An Engine.*
[91] Although MacKenzie uses the term "Barnesian performativity" to distinguish this phenomenon from a more general sense of performativity, in which economic theories are used in economic practice, in this paper "performativity" refers exclusively to MacKenzie's Barnesian variety, in which the practical use of models make economic processes more like their theoretical depiction. For an example of how MacKenzie's other forms of performativity can also be mobilized in IPE see: Lasse Henriksen, "Economic models and devices of policy change: Policy paradigms, paradigm shift, and performativity," *Regulation & Governance* 7:4 (2013).
[92] MacKenzie, *An Engine,* 19.

to their theoretical values, options prices converged on these theoretical values as discrepancies were eliminated via arbitrage.[93] In contrast to this performative effect, MacKenzie notes that models which assume that price movements are stochastic can become counterperformative if large numbers of economic actors base their decisions on these models, undermining the assumption of randomness on which such models depend.[94]

Another mechanism through which models can produce counterperformative effects that is important to my analysis of VaR is what Akos Rona-Tas and Stephanie Hiss refer to as "gaming the system." In their analysis of the declining validity of FICO scores, they attribute the disconnect between estimated and actual default rates to incentives for borrowers to improve their credit scores through practices that alter the variables used to calculate their score (such as getting added to the credit card of a stranger with better credit) without necessarily improving their creditworthiness.[95] VaR, as we shall see, has both performative and counterperformative effects, facilitating stability in which financial losses are confined to those predicted by the model in the short run, while ultimately producing a highly correlated, fragile system of leveraged investments that is vulnerable to losses far in excess of VaR numbers.

C. Productive power

Understanding VaR as a performative model operating in – and contributing to – a world of Keynesian uncertainty allows us to see two things: First, responding to uncertainty via probabilistic modeling is a political practice – one that is contestable because of its inherent

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[93] Ibid., 164.
[94] Ibid., 260.
[95] Akos Rona-Tas and Stephanie Hiss, "The Role of Ratings in the Subprime Mortgage Crisis: The Art of Corporate and the Science of Consumer Credit Rating," in *Markets on Trial: The Economic Sociology of the U.S. Financial Crisis: Part a (Research in the Sociology of Organizations, Volume 30A0,* eds., Michael Lounsbury and Paul Hirsch (Bingley, UK: Emerald Group Publishing Limited, 2010), 138-140.

limitations and, as I will argue in Section VI, empowers banks to have more discretion over their risk-taking than they would otherwise. Of course, if the financial future were fully predictable and risk models completely detached from market dynamics, political questions would still be present. In a world governed solely by risk, questions of distribution and fairness would remain, but they could be made based on confident estimates of future outcomes. In a world governed by both risk and uncertainty, the sites of politics include not just how resources are to be distributed, but also how we know what those resources will be. Even in a world of pure risk, the negotiation between banks and regulators over how much discretion banks should have concerning their risk models would be political. But in a world characterized also by uncertainty, the very practice of using probabilistic models to guard against large-scale losses is also political.

Second, the performative effects of VaR push us to consider what practices its use makes possible and precludes. Adopting a performative perspective on financial models helps explain their inability to accurately foresee future events, but it also shifts the question from one of representational accuracy to a consideration of the "constitutive and formative engagement of knowledge with the world."[96] Risk models play a powerful role in interpreting and constructing the world they purport to measure and describe, and as such, should not be understood as politically neutral technologies. As de Goede writes, citing David Campbell, although financial actors often assume economic outcomes to exist independently of their analysis, a performative understanding of markets considers instead "the manifest political consequences of adopting one mode of representation over another."[97] Mark Blyth similarly argues for the political power of

[96] Andy Pickering, "After Representation: Science Studies in the Performative Idiom," *Proceedings of the Biannual Meeting of the Philosophy of Science Association,* Vol. 2: Symposia and Invited Papers (1994): 417.
[97] De Goede, *Virtue,* 8.

financial ideas, like market integration and transparency, whose global authority cannot be explained in purely functional terms, observing that both the financial industry and states "have used these ideas to defend and extend the current regime *despite* the volatility and asymmetric distributions it produces."[98]

Many IPE scholars have recognized the political consequences of increasingly integrated global financial markets, even or especially when they are generally understood as apolitical. For example Jonathan Kirshner introduces his book on the politics of financial policies by observing that, as economic explanations for financial practices "become more modest and ambiguous, the demand for a political explanation must increase."[99] However, in IR, financial politics are often understood in state-centric terms.[100] As Kirshner goes on to argue, "Even though states have lost considerable power and autonomy to market forces in the past few years, the world is still a world of states, actors with strong preferences and the power to advance their interests."[101] While states and domestic interests within states do retain a great deal of influence over economic policy , understanding the politics and power of practices of modeling financial risk requires a conception of power that goes beyond IR's usual focus on states as the primary locus of political power and organized interests as the main drivers of political economy.

Risk modelers and managers wield considerable power that cannot be reduced to state interests. As Breslau writes, economic experts help constitute and perform the economy itself:

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[98] Mark Blyth, *Austerity: The History of a Dangerous Idea* (New York: Oxford University Press, 2013), 239.
[99] Jonathan Kirshner, ed., *Monetary Orders: Ambiguous Economics, Ubiquitous Politics* (Ithaca: Cornell University Press, 2002), 19.
[100] William Bernard, J. Lawrence Broz, and William Clark, "The Political Economy of Monetary Institutions," *International Organization* 56:4 (Autumn 2002): 693-723; Jeffrey Frieden, "Invested Interests: The Politics of National Economic Policies in a World of Global Finance," *International Organization* 45:4 (September 1991): 425-454; David Lake, "Open economy politics: a critical review," *Review of International Organizations* 4:3 (2009): 219-244.
[101] Kirshner, *Monetary Orders*, 20.

"The economy […] is in fact visible only through the mediation of economic experts."[102] A growing body of studies has documented the political power and governance authority of private actors in international economics.[103] Frank Partnoy, for example, reveals that credit rating agencies are not external observers of financial markets, but help to construct them, facilitating global capital mobility and leading financial instruments to be assembled to maximize ratings, rather than value.[104] (2007; see also Sinclair, 2005: 53). Tim Büthe and Walter Mattli identify the shift from domestic financial regulation to global private rule-making as a highly consequential political trend, noting that although "the language accompanying these processes is technical; the essence of global rule-making […] is political."[105]

Analyzing the non-state, non-coercive power exercised by financial experts and their models demands moving beyond the interest-based models that characterize many studies of international political economy and considering instead the broader political effects of this authority. Investment banks are undeniably powerful actors in the global political economy, and their interests are not irrelevant to the story of VaR; they underlie the push for internal risk models. But banks' material power and interests constitute a poor explanation for the continued use of VaR, given its repeated failures. For this reason, I contend that the practice of modeling itself should also be understood as powerful, insofar as it makes other practices possible and

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[102] Breslau, "Economics Invents," 388.
[103] Geoffrey Underhill and Xiaoke Zhang, "Setting the Rules: Private Power, Political Underpinnings, and Legitimacy in Global Monetary and Financial Governance," *International Affairs* 84:3 (2013): 535-554; Büthe and Mattli, *New Global Rulers*; Heather McKeen-Edwards and Tony Porter, *Transnational Financial Associations and the Governance of Global Finance: Assembling Wealth and Power* (New York: Routledge, 2013).
[104] Frank Partnoy, "How and Why Credit Rating Agencies Are Not Like Other Gatekeepers," in *Financial Gatekeepers: Can They Protect Investors?,* eds., Yasuyuki Fuchita and Robert Litan (Washington, DC: Brookings Institution Press); Timothy Sinclair, *The New Masters of Capital: American Bond Rating Agencies and the Politics of Creditworthiness* (Ithaca: Cornell University Press, 2005), 53.
[105] Büthe and Mattli, *New Global Rulers,* 12. See also Chapter 4 of this dissertation.

empowers banks vis-à-vis regulators and the public. The authority of VaR was in fact partially constitutive of the power of investment banks to stave off stricter regulation because it allowed them to claim to be limiting and planning for future losses.

In order to understand the politics of VaR, I use the concept of productive power, which Michael Barnett and Raymond Duvall define as referring to "the constitution of all social subjects with various social powers through systems of knowledge and discursive practices."[106] Productive power differs from more traditional conceptions of power in that it inheres not in actors' material capabilities, but rather in the relationships between them. Productive power shapes not only how social actors understand and conduct themselves, but also how particular systems of practice are constructed as meaningful and authoritative. In what follows, I consider how the use of VaR shaped risk modelers' and traders' understanding of their actions, but focus primarily on how its use produced unforeseen systemic effects. In broad terms, I argue that the perceived knowledge of financial experts and the practice of modeling risk using VaR helps constitute the political power of private investment banks over public actors.

As an analytical tool, productive power focuses on the conditions of possibility for, rather than coercive limits on, social practices. Michel Foucault writes that "power would be a fragile thing if its only function were to repress, if it worked only though the mode of censorship, exclusion, blockage, and repression […] If, on the contrary, power is strong this is because, as we are beginning to realise, it produces effects […] at the level of knowledge."[107] This conceptualization of power suggests that a study of VaR's political consequences must be

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[106] Michael Barnett and Raymond Duvall, "Power in International Politics," *International Organization* 59:1 (Winter 2005): 55.
[107] Michel Foucault, *Discipline & Punish: The Birth of the Prison,* trans. Alan Sheridan, (New York: Vintage Books, 1995), 59.

attentive to two dynamics of power. First, with respect to the enabling effect of power, one must consider what effective interpretations of financial markets and the future VaR produces and how these, in Clarissa Hayward's words, "define fields of possibility of social action."[108] But so too must one consider what meanings and practices are foreclosed by models' claims to objective evaluation of the financial system. This latter line of inquiry, in particular, has important implications for democratic politics. To the extent that financial modelers' authority to define risk (or more precisely, to represent uncertainty as risk) is unrivalled, alternative understandings of the financial system and alternative possibilities for contending with Keynesian uncertainty are marginalized.

V. Temporary Stability and Long-Run Volatility: VaR's (Counter)Performative Effects

Having made the case for *why* we should understand the use of VaR as political, I now turn to the question of *how* it is political by examining the practices its use facilitates and inhibits. To do this, I first specify and trace out the performative and counterperformative effects of VaR modeling, explaining how its use produces a system of highly correlated investments in which losses are limited to those foreseen by the model. However, the fragility of this system makes it more crisis-prone and ultimately more volatile and unpredictable, with losses far in excess of VaR predictions. After tracing out these effects, I turn to a discussion of the implications of these (counter)performative effects for authority and power in an uncertain financial system.

[108] Clarissa Hayward, *De-Facing Power* (Cambridge, UK: Cambridge University Press, 2000), 30.

VaR's performative and counterperformative effects are a product of its "nearly universal" use by investment banks[109] and by many hedge funds.[110] In the short run, the widespread use of VaR exhibits Barnesian performativity: financial losses largely conform to VaR predictions. The institutionalization of a common method of measuring risk in banks' risk management divisions causes investment strategies to converge, producing temporary stability, with few unexpected losses, in financial markets. Specifically, tying VaR to limits on risk-taking that traders are not allowed to breach creates incentives for traders to take on investments with a low probability of very large losses. VaR is only concerned with the maximum loss at a given confidence level; a 99% VaR, for example, says nothing about the size of losses that are expected to occur less than 1% of the time. Therefore traders have an incentive to look for investments with a very low probability of loss, regardless of the magnitude of that loss. This makes it significantly more likely that firms will take what the industry refers to as "asymmetric positions" – positions with small gains and rare but huge losses.

The tendency for VaR to produce similar, and therefore highly correlated, investment strategies is well documented, and the effects of this correlation are highly consequential. Stan Jonas, the managing director of the European investment bank Société Générale/FIMAT, observes that given sufficiently widespread use of VaR, the financial system comes to be defined by the model, closing the presumed separation between objective valuations of risk and the financial practices being modeled. His comments at a 1998 roundtable on VaR are worth quoting at some length: "[A]fter a given period of time, everybody has pretty similar trades. After 10

[109] Andrew Kuritzkes and Til Schuerman, "What We Know, Don't Know, and Can't Know about Bank Risk," in Diebold, Doherty, and Herring, *The Known*, 113.
[110] Dunbar, *Inventing Money*, 203.

successful years, everybody is doing the Thai baht carry trade. […] The statistics show that it's a risk-free trade. After eight years, it's an immutable fact –Thailand doesn't devalue. What results then is that people have portfolios that are diversified in virtually the identical fashion."[111] Jonas's analysis of VaR's effects on the global financial system provides a striking illustration of the way in which VaR creates apparently "immutable facts" in its image. With everyone calculating the market risk of common investments similarly, it is unlikely that the asset price will exhibit unexpected volatility, helping to ensure the accuracy of the VaR estimate of losses, and shoring up its apparent capacity to effectively manage risk.

This stability, however, is exceptionally fragile because it is not the result of objective risk calculations, but rather an artifact of highly correlated investments. When subjected to an unexpected shock, correlation does not produce stability, but rather unforeseen volatility. This is because when one firm's risk limits are breached, other firms' are likely to be as well. Firms then have two options: to hold more offsetting capital or to cut the unacceptably risky positions. When banks are highly leveraged, increasing capital allocations may be impossible, so cutting positions is likely. But with everyone attempting to reduce the same trading positions at the same time, there is insufficient liquidity in the market. As Jonas goes on to describe: "Under a VAR approach […] everybody tries to shrink the size of their aggregate portfolio. […] Then you can see that if everybody has a similar portfolio, everybody can't shrink their portfolio at once, because, in this world, the major fallacy of diversification is that somebody else has to be outside

[111] *Derivatives Strategy,* "Roundtable: The Limits of VAR," 1998, http://www.derivativesstrategy.com/magazine/archive/1998/0498fea1.asp

of the ostensibly diversified system to hold the risk."[112] The widespread use of VaR reduces the variation in estimates of value that investment banks and hedge funds profit from.

G. Gopalakrishna, of the Indian Federal Reserve Bank argues that this correlational effect is ultimately counterperformative, intensifying the sharp and unpredictable price changes that VaR purports to manage:

> The herd mentality that is so typical of the financial industry means that market sensitive risk management systems, such as VaR, actually make markets less stable and more prone to crisis. This is because financial institutions may have to sell assets in the affected classes when markets become volatile in order to keep within the VaR limits set by senior management; this depresses market prices even further and increases the volatility and correlation of the risk factors of these assets. This in turn might cause another set of financial institutions to exceed their VaR limits, forcing them to reduce their exposure by selling still more of the same assets – perpetuating a vicious cycle.[113]

As a result, the use of VAR acts as an endogenous source of market instability and unpredictability: When widespread use of VaR changes the behavior it purports to model objectively – when its use becomes endogenous to the system it claims to model – it fuels the unpredictability of the financial system as a whole. Moreover, this volatility magnifies the potential for crisis. As Robert Litzenberger, former Chief Risk Officer at Goldman Sachs, describes:

> [W]hen volatilities rise and there are some trading losses, VARs would be higher and tolerances for risk would likely be lower. For an individual firm, it would appear reasonable to reduce trading positions; however, if everybody were to act similarly it would put pressure on their common trading positions […] If many arbitrage traders have similar trades and the aggregate position sizes are very large, it is like dry grass building up and just needs a match to ignite it.[114]

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[112] Ibid.
[113] Gopalakrishna, "Inaugural speech," 3.
[114] Qtd. in Dunbar, *Inventing Money*, 203; 205.

Taleb argues that it is precisely this element of reflexivity – which cannot be captured by a statistical model that assumes a separation between its use and the world – that makes unreflective uses of, and over-reliance on, VaR a questionable strategy.[115]

This counterperformative effect is not merely a theoretical possibility; it helps explain the collapse of the hedge fund Long Term Capital Management (LTCM) in August 1998 when Russia unexpectedly restructured its debt, triggering a wave of VaR breaches. Although LTCM was not itself heavily invested in Russian securities, its core strategy of taking advantage of small differences in government bond prices depended on the assumption that, via arbitrage, prices on similar bonds would ultimately converge. However, when Russia defaulted on its domestic debt, investors rushed to cut their positions in Russian bonds, and the bond values that LTCM was betting would converge diverged in an unprecedented fashion, turning LTCM's anticipated profits into a $551 million loss on one day alone.[116] By the end of August, LTCM's losses were more than 14 standard deviations away from VaR predictions, "something that occurs once in several billion times the life of the universe."[117] Jon Danielsson is explicit about the role the model played in exacerbated LTCM's collapse:

> In mid year 1998 most financial institutions employed similar risk model techniques and often similar risk constrains because of regulatory considerations. When the crisis hit, volatility for some assets went from 16 to 40, causing a breach in many risk limits. The response was decidedly one sided, with a general flight from volatile to stable assets. This amplified price movements and led to a sharp decrease in liquidity. In other words, the presence of VaR based risk limits led to the execution of similar trading strategies, escalating the crisis.[118]

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[115] *Derivatives Strategy,* "The World According to Nassim Taleb," 1997, http://www.derivativesstrategy.com/magazine/archive/1997/1296qa.asp.
[116] Dunbar, *Inventing Money*,205.
[117] Joe Kolman, "LTCM Speaks," *Derivatives Strategy,* 1999, http://www.derivativesstrategy.com/magazine/archive/1999/0499fea1.asp.
[118] Jon Daníelsson, "The emperor has no clothes: limits to risk modelling," *Journal of Banking & Finance* 26 (2002): 1276.

Industry-wide reliance on the same risk model had produced events that diverged dramatically from the model's predictions.

The production of correlation is not the only way the use of VaR may destabilize financial markets. While Gopalakrishna's "vicious cycle" is an emergent consequence of attempting to model risk, the dominance of VaR also provides incentives for intentional changes in investment behavior that make unforeseen losses more likely. At work is the mechanism identified by Rona-Tas and Hiss, who contend that consumer credit rating models lead borrowers to behave in ways that improve their credit score while leaving their financial situation unaltered, making estimates of credit risk less accurate.[119] Similarly, VaR encourages practices that keep predicted losses low but do not necessarily make a portfolio less risky.

Jorion acknowledges this effect on investment behavior in his discussion of the limits of VaR, observing: "If a risk manager imposes a VAR system to penalize traders for the risks they are incurring, traders may have an incentive to 'game' their VAR. In other words, they could move into markets or securities that appear to have low risk for the wrong reasons. For instance, currency traders in 1994 could have taken large positions in the Mexican Peso, which had low historical volatility but high devaluation risk."[120] More recent examples of the kind of low-probability high-magnitude investments that VaR incentivizes are the mortgage-backed securities and credit default swaps that played an infamous role in the 2008 financial crisis. Although the risk of default, and therefore financial loss on these investments, was interpreted as very low at the height of the US housing bubble, the magnitude of the losses, particularly in a highly correlated investment market, was devastating. As Einhorn writes, "the risk models said

[119] Rona-Tas and Hiss, "The Role of Ratings."
[120] Jorion, "In Defense of VAR."

[these securities] had trivial VaR, because the possibility of credit loss was calculated to be beyond the VaR threshold. […] In the current crisis, it has turned out that the unlucky outcome was far more likely than the backtested models predicted."[121] VaR did not just fail to foresee losses in excess of its predictions; it contributed to investment practices that made such losses more likely by incentivizing banks to take on positions with potentially huge losses outside the VaR confidence interval. As Jonas observed of risk-taking prior to the Asian financial crisis, "the prevalence and apparent statistical comfort that VAR gave people probably increased the size and the risk of the exposure that banks were willing to take ex-ante."[122]

A further counterperformative effect was at work in the subprime mortgage meltdown: a false sense of security. As early as 2000, Guldimann had warned, in reference to VaR, that, "the danger is that we get lulled into complacency by the illusion of assured liquidity."[123] Nocera's description of the financial sector prior to the collapse of the housing bubble bears out Guldimann's warning: "[W]ith easy profits being made and risk having been transformed into mathematical conceit, the real meaning of risk had been forgotten. Instead of scrutinizing VaR for signs of impending trouble, [banks] took comfort in a number and doubled down, putting more money at risk in the expectation of bigger gains."[124] Indeed, when asked why their VaR models so dramatically underestimated the losses on super-senior CDO risk, UBS's chief financial officer, Marco Suter explicitly cited the bank's risk management models, commenting that, "Sometimes people start to fall in love with models, and they forget to look at notional values."[125] This confidence in having controlled future losses caused traders to disregard what

[121] Einhorn, "Private Profits," 12.
[122] *Derivatives Strategy*, "Roundtable."
[123] Guldimann, "The Story of RiskMetrics," 58.
[124] Nocera, "Risk Mismanagement."
[125] Baker-Said and Logutenkova, "UBS."

was excluded from the model – the multimillion dollar potential losses that were in the tail outside of the 99% confidence interval with which VaR is concerned, as well as the fundamental uncertainties inherent in the system. As Richard Hoppe writes, "believing a spuriously precise estimate of risk is worse than admitting the irreducible unreliability of one's estimate. False certainty is more dangerous than acknowledged ignorance."[126]

Rather than neutrally calculating objective probabilities of financial losses, VaR changed the very patterns of financial behavior it claimed to be measuring. The claim to be able to accurately account for future losses is, as we might expect in a world of uncertainty, at least partially illusory. And the illusion of control provided by VaR did not just affect how regulators saw the financial industry; it also changed how traders and risk managers acted, leading them to take on more risk than they might have otherwise have. By creating a perception of control, VaR made investors over-confident in their ability to foresee and manage financial losses.

A final mechanism through which VaR produces counterperformative effects involves the methodology's sensitivity to parameter and distribution choices. Because the 1996 Amendment allows banks to use their own, internally determined models to calculate their market risk, some scholars have suggested that "banks may be inclined to underestimate their VaR in order to reduce their market risk charge […] or to decrease the quality of its risk management system."[127] In 2013, these concerns were borne out by a US Senate Subcommittee investigation of JPMorgan Chase's derivatives trade. Among other findings, the report detailed that the investment bank – the largest financial holding company in the US and the largest derivatives dealer in the world – had intentionally manipulated their VaR model in order make

[126] Richard Hoppe, "VaR and the Unreal World," *Risk* (July 1998): 50.
[127] Pérignon and Smith, "The level and quality," 363.

their investments appear less risky and therefore subject to a lower capital charge: "Bank documents, emails, and recorded telephone conversations are clear that a key motivation for developing the new VaR model was to produce lower VaR and Risk Weighted Asset (RWA) results […] in order to lessen the bank's capital requirements under the upcoming Basel III rules."[128] The investigation found that the bank had responded to a series of risk limit breaches not by changing their investment strategy, but by changing their risk model to make their greatest possible loss appear smaller than under the previous model. In fact, the new model immediately reduced JP Morgan's VaR by 50%, from $132 million to $66 million.[129] Although media and congressional investigations ultimately uncovered the bank's self-serving manipulation of their risk model, it went unnoticed by regulatory agencies for several months,[130] drastically misrepresenting possible losses to investors, regulators, policymakers – and, as the Senate report notes, "the taxpaying public who, when banks lose big, may be required to finance multi-billion-dollar bailouts."[131]

The same model that, as I will argue, legitimized investment banks' claim to responsible self-regulation also made the financial system more vulnerable to crisis, changed financial behavior in unpredictable ways, and enabled the systematic misrepresentation of multimillion-dollar financial losses. These effects go well beyond objective apolitical calculation. They suggest that risk modeling is in fact an important site of power in the international financial system and that this power allows financial actors to maintain a substantial amount of authority

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[128] United States Senate, *JP Morgan Chase Whale Trades: A Case History of Derivatives Risks and Abuses* (Washington, DC: Permanent Subcomittee on Investigations, March 15, 2013), 171.
[129] Ibid., 180.
[130] Dawn Kopecki and Cheyenne Hopkins, "OCC Said to Admit Missing JPMorgan's VaR Change in Probe," *Bloomberg*, February 3, 2013, http://www.bloomberg.com/news/2013-02-01/occ-said-to-admit-it-missed-jpmorgan-var-change-in-senate-probe.html.
[131] United States Senate, *JPMorgan Chase,* 1.

irreducible to their technical proficiency. In the following section, I turn to the implications of these (counter)performative effects for power and authority in global finance.

VI. The Political Implications of Model (Counter)Performativity

VaR does not always, or even usually, fail, nor does it always produce devastating counterperformative effects. During normal times, and partially in virtue of its Barnesian performativity, portfolio losses conform to VaR predictions. To analyze VaR as performative is not to say that any arbitrary risk model could have had the same effects. If VaR had routinely and systematically produced financial losses, its users would soon have been outcompeted and the model abandoned. Indeed, VaR's authority, particularly in convincing the BCBS to allow banks to use internal risk models to calculate capital adequacy ratios, can be partially explained by its successful use by investment banks in the early 1990s. But in light of its well-publicized failures, it is worth considering what other sources of authority underlie the practice of risk modeling. In this section, I argue that even as reliance on VaR exacerbates market volatility, it also undergirds banks' authoritative claim to responsibly manage risk, a claim which limited the regulation of banks by the BCBS. To make sense of this tension, I then analyze how the authoritative status of VaR both immunizes private expertise from public scrutiny and precludes alternative responses to uncertainty.

A. VaR as an authoritative practice

Although VaR was designed by J.P. Morgan as a way to *measure* risk, its users quickly claimed to be able to *manage* risk – to foresee and limit future losses and to stake their claim to expertise on this ability. RiskMetrics carefully cautioned users of their methodology that, "no amount of sophisticated analytics will replace experience and professional judgment in managing risks. RiskMetrics is nothing more than a high-quality tool for the professional risk manager

involved in the financial markets and is not a guarantee of specific results."[132] But the distinction between tool of measurement and technology of control was quickly elided, and a 1997 textbook on VaR is prefaced with a discussion of the model's contribution to "controlling" risk.[133]

VaR did not allow for risk management on its own, but rather in conjunction with other financial practices, most notably capital requirements and firms' own risk limits and systems of allocating capital among traders. These latter practices, however, require a way to measure probable future losses prior to imposing limits on the risk or calculating a risk-weighted capital adequacy ratio. Without the ability to measure risk, there would be no way to limit risk-taking, make off-setting investments, or tie capital requirements to market risk. For example, Dunbar describes how LTCM's use of VaR shifted from measurement to control through the use of risk limits: "From its initial use as a passive radar system, the risk managers transformed VAR into an active tool intended to replace the stop-loss limit."[134] Even after LTCM's collapse, VaR's use as a technology that allowed banks to authoritatively claim to control and limit future losses was reproduced throughout the financial industry.

The centrality of claims of control has historically been central to the legitimation of financial practices. De Goede writes that in the earlier 20th century claims to be able to measure risk are precisely what separated legitimate financial speculation from illegitimate gambling: "Speculation came to be regarded as a technical and economically logical response to objectively existing business risks, which made possible the silencing of political critiques of the financial exchanges through the discursive, albeit unstable, separation of gambling from finance."[135] The

[132] J.P. Morgan/Reuters, *RiskMetrics Technical Document,* 4th Edition (New York: Reuters, 1996), 1.
[133] Jorion, *Value at Risk,* x; but c.f., McDonald, *Derivatives Markets,* 813-815.
[134] Dubar, *Inventing Money,* 147.
[135] Marieke de Goede, "Repoliticizing Financial Risk," *Economy and Society* 33:2 (2004): 204.

Black-Scholes model played an instrumental role in convincing the SEC and CFTC to permit the trading of stock options on organized exchanges.[136] The claim to be able to measure risk using VaR and therefore predict future price movements similarly allowed the financial industry to claim that practices like derivatives trading were controllable and controlled, depoliticizing them and strengthening the case for limited outside regulation. Former Bank of France Governor Christian Noyer's comments are illustrative of this regulatory attitude toward VaR, from an article that is otherwise very critical of self-regulation and firms' valuation practices: "Since the mainstreaming, in the mid-1990s, of risk metrics based on value-at-risk (VaR), financial institutions have significantly improved their capacity to identify, value, and manage the various risks they hold in their balance sheets."[137]

B. Limiting international regulation

The availability of an ostensibly objective model of maximum possible losses resulting from price volatility made it possible for the BCBS to link capital requirements to market risk. But allowing banks to develop their own specific VaR models grants banks a great deal of autonomy in terms of determining their own capital requirements. While central banks and public regulators were the principal participants in earlier Basel negotiations, the financial industry played a very active – and successful – role in defending its interests in the market risk negotiations in the early 1990s.[138] In April 1995, the BCBS developed a proposal for calculating capital charges based on market risk and solicited comments from central bankers and

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[136] MacKenzie, *An Engine*, 147-150.
[137] Christian Noyer, "Valuation challenges in a changing environment," in *Valuation and Financial Stability,* Banque de France Financial Stability Review 12, October 2008: ii.
[138] NatWest Associate Director for Trading Risk David Palmersaid of negotiations, "Throughout the process of preparing the new rules, the Basel Committee have shown their willingness to listen to the industry's comments and take action based upon them." (Qtd. in Portia Richardson, "Do the Basle Market Risk Proposals Make Sense?" *Derivatives Strategy,* 1995/6, http://www.derivativesstrategy.com/magazine/archive/1995-1996/0696rtbl.asp.)

investment banks.[139] The proposal was endorsed by the G-10 central bank governors,[140] but while private banks generally acceded to the need to account for market risk, they strongly advocated they be allowed to use their own, internal models to calculate VaR, rather than a standardized approach. A BCBS summary of industry comments concludes: "[A] strong common theme among the responses was the argument that proprietary risk management models developed by some of the more sophisticated banks produce far more accurate measures of market risk and that there would be costly overlaps if those banks were required to calculate their market risks in two different ways."[141] This corresponds with the financial industry's comments at the time. For example, David Palmer, Associate Director of Trading Risk at the British investment bank NatWest Markets, wrote in 1995 that "most people in the industry welcome the Basel Market Risk proposals because they introduce the concept of banks using their own VAR models to calculate capital charges."[142]

In response to strong insistence by banks that they be allowed to develop their own specific risk models, as an alternative (rather than a supplement) to the standardized risk measurement framework originally proposed, the BCBS ultimately permitted considerable bank discretion in determining model parameters, finding studies of internal risk models to be, in their words, "sufficiently reassuring for it to envisage the use of internal models to measure market risks."[143] The final version of the Amendment gave banks the choice between using a standardized risk model or using their own internal VaR models, subject to a series of

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[139] Basel Committee on Banking Supervision, *An Internal Model-Based Approach.*
[140] Basel Committee on Banking Supervision, *Overview.*
[141] Basel Committee on Banking Supervision, *Proposal to Issue a Supplement to the Basel Capital Accord to Cover Market Risks* (Basel: Bank for International Settlements, 1995), 2.
[142] Qtd. in Richardson, "Do the Basle Market Risk Proposals Make Sense?
[143] Basel Committee on Banking Supervision, *An Internal Model-Based Approach,* 2.

quantitative and qualitative standards and the approval of the bank's home country supervisory authority.[144] The 1996 Amendment is careful to specify that "no particular *type of model* is prescribed" and that banks are free to choose their own parameters and distribution (including "variance-covariance matrices, historical simulations, or Monte Carlo simulations") for calculating their maximum possible losses.[145]

Having an easily understood, quantitative model at hand that claimed to accurately capture the risks incurred by trade in complex financial instruments allowed the financial industry to legitimate its resistance to stricter international regulation. Regulators' turn toward VaR as a method for measuring risk was itself a result of its widespread use in the financial industry the Basel Committee sought to rein in. As Dunbar writes, "As regulators became aware of OTC derivatives in the early 1990s, the leading banks could point to VAR and Raroc as signs of their responsibility in controlling this expanding business. […] The regulators, in particular the Basel Committee, took the bait, and signalled that they would permit the use of 'internal models' in allocating capital for a derivatives business."[146] The result of this perception of effective technical risk management was that, in Blyth's words, "the biggest banks would be able to regulate themselves."[147]

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[144] Basel Committee on Banking Supervision, *Amendment to the Capital Accord to Incorporate Market Risks* (Basel: Bank for International Settlements, November 2005), 40. The qualitative standards for internal risk-models are: an independent risk management unit within the bank; back-testing of the model; senior management involvement in risk management; that the model be used in conjunction with the bank's trading and risk exposure limits; regular stress-testing; and independent external review of the model (ibid., 41-42). Quantitative standards include that the VaR be computed daily; a one-tailed 99% confidence interval be used; the historical observation period of past price data be at least a year; data sets be updated every three months; and the model capture the non-linear price movements of options (ibid., 44-47).

[145] Ibid., 46.

[146] Dunbar, *Inventing Money,* 140.

[147] Mark Blyth, "The Political Power of Financial Ideas: Transparency, Risk, and Distribution in Global Finance," in Kirshner, *Monetary Orders,* 249.

Were VaR doing nothing more than measuring objective probabilities of future financial losses (however incompletely) this degree of self-regulation might not be particularly problematic. However, VaR's counterperformative effects can produce a world in which the pattern of financial losses diverges sharply from the model's predictions. The use of VaR influences and interacts with financial behavior in ways that may heighten the vulnerability of the financial system – and the public – to the very crises that VaR was designed to foresee and prevent. For this reason, I turn now to a consideration of the alternative conceptions of and responses to the possibility of crisis that are marginalized by relying on VaR.

C. The depoliticization of uncertainty

VaR's authority may seem difficult to reconcile with its predictive failures and its contribution to the uncertainty and volatility that make such failures more likely. Viewing risk modeling not as a technical practice with accurate predictive power, but rather as a political practice with productive power helps makes sense of this tension. The concept of productive power pushes us to consider not only the practices VaR makes possible but also the other side of this coin – those it renders unthinkable. I argue that VaR precludes alternative ways of responding to uncertainty by depoliticizing both the financial future and risk modeling as a practice. Because the model systematically fails to acknowledge uncertainty, those who depend on VaR for preventing destructive financial losses are blinded to the possibility of much larger losses than those predicted by the model – and to Keynesian uncertainty itself. Moreover, VaR's authority and dominance in financial governance narrows the field of contestation about how to respond to uncertainty by privileging experts and predictive models as the primary response to the possibility of financial crisis. Alternative responses to uncertainty, such as subjective

judgment and systemic financial regulation, are crowded out, leaving few tools with which to face the unpredictable, besides inevitably limited attempts at control.

There are two reasons that VaR makes acknowledging uncertainty *qua* uncertainty difficult. First, its assumption that historical data are a reasonably accurate predictor of future outcomes obscures the possibility of unprecedented and unpredictable deviations from historical trends. Kolman argues that this is one reason LTCM was left vulnerable to ultimately devastating unanticipated losses: "the past is a poor guide to the future. In July 1998, Russia defaulted on its domestic debt but not on its foreign debt. Because an event of that nature had never occurred, a model would assign it a probability of zero. […] Even perfect data would not have helped them because the past is simply not adequate to predict the future."[148] Because, as we have seen, VaR creates the illusion of control over future losses, actors may not even consider the possibility of unpredictable events. .

Taleb argues that a predictive model will always be an inadequate way to anticipate future crises; historical data are inherently problematic because the experience of crises causes people to alter their behavior in ways not captured by the model's assumptions: "the casual quantitative inference in use in VAR (which consists of estimating parameters from past frequencies) is too incomplete a method […] there is no 'canned,' standard way to explore stressful events – they never look alike because humans adjust."[149] For example, Taleb notes that in response to an unanticipated financial crisis, risk modelers will "fatten the tails" of the underlying distribution of future losses, that is, add the possibility of higher losses than

[148] Kolman, "LTCM Speaks."
[149] Nassim Taleb, "Against VaR," *Derivatives Strategy,* 1997, http://www.derivativesstrategy.com/magazine/archive/1997/0497fea2.asp.

previously predicted into their model. But this in turn changes investment behavior and the price movements that the model is attempting to capture. Because of these performative effects, Taleb writes that "an after-the-fact adaptation to the stressful events that happened is dangerously naïve […] there is a tautological link between the harm of the events and their unpredictability, since harm comes from surprise."[150] Updating or modifying risk models in response to unpredicted financial crisis is thus both self-defeating, insofar as the model remains problematically based on historical data, and ineffective as a response to events that are, by definition, not amenable to probabilistic prediction. Moreover, using past events, even updated ones, as the basis for prediction continues to make losses that are fundamentally uncertain – and by definition unprecedented – unthinkable.

A second way the use of VaR blinds financial actors to the problem of Keynesian uncertainty is that it causes them to disregard the potentially devastating losses that are outside the confidence interval with which bank managers and regulators are concerned.[151] As hedge fund president David Einhorn writes, "A risk manager's job is to worry about whether the bank is putting itself at risk in the unusual times – or, in statistical terms, in the tails of distribution. Yet, VaR ignores what happens in the tails […] This, in my view, makes VaR relatively […] potentially catastrophic when its use creates a false sense of security among senior managers and watchdogs."[152] Financial actors and regulators ignore the losses in the neglected tails of the distribution at their peril. An empirical test of a variety of VaR measures against historic price data found that losses outside of the confidence interval were typically 30 to 40 percent larger

[150] Ibid.
[151] One method that does attempt to account for the magnitude of losses in the extreme tails of the VaR distribution is expected shortfall or conditional VaR, which approximates the expected loss during a given period, conditional on that loss being greater than the *X*th percentile of the loss distribution (Hull, 2007).
[152] Einhorn, "Private Profits," 11-12.

than VaR models predicted, leading Darryll Hendricks to conclude that "value-at-risk measures – even at the 99th percentile – do not 'bound' possible losses."[153]

Those inside the financial industry are, as we have seen, not unaware of these limitations of VaR. As financial trader and risk manager Aaron Brown writes, VaR "is not the worst-case loss: in fact, we expect to lose more than VaR two or three times a year."[154] However, the VaR numbers that are disclosed to investors, regulators, and the public convey no information about possible losses that fall outside the predictions of the model. Because VaR enjoys an exceptionally privileged place in public evaluations of financial risk, it tends to crowd out other, non-probabilistic methods of anticipating crisis, leaving banks – and the citizens who are asked to bail them out – unprepared for losses that VaR cannot predict. Bluford Putnam, former head of Cdc Investment Management Corporation writes that excessive reliance on VaR causes those who see only VaR numbers to ignore macroeconomic dynamics and events excluded from the model, producing a dangerously false sense of security:

> If one uses only historical price data of US short-term debt securities, VAR will tell you there is very little risk in the US interest rate market, since the historical standard deviation of the price series had been heading lower and lower as the Federal Reserve held short-term interest rates fixed. Of course in February 1994, fixed-income markets blew up. […] Value-at-risk calculation based solely on the recent history of the price series, by construction, will never see a storm coming, and worse, the message that will be sent is that life is getting increasingly less risky – until the storm hits and it is too late.[155]

The problem is not that VaR is unable to predict the unpredictable – an unfair critique – but rather that it makes the unpredictable unimagined. That is, it causes non-expert audiences for

[153] Darryll Hendricks, "Evaluation of Value-at-Risk Models Using Historical Data," *FRBNY Economic Policy Review* (1996): 56.
[154] Brown, "Unbearable Lightness," 20.
[155] *Derivatives Strategy*, "Roundtable."

VaR predictions, in particular, to disregard uncertainty precisely because it cannot be captured by a probabilistic model.

For all its counterperformative effects and limitations, the dominance of probabilistic calculation as a response to Keynesian uncertainty would be less politically consequential if there were no other possible ways to confront unknown unknowns. But this is not the case: VaR is one possible response to uncertainty, not a necessary one. However, because of the considerable power of VaR and of the financial actors whose authority derives, in part, from its use, other practices and sensibilities are marginalized or even rendered unthinkable. As Blyth concludes in his analysis of the dominance of transparency in discussions of international financial regulation: "Representing the current system as the 'only way' to organize capital flows ensures that the financial sector itself becomes largely immune from criticism and protected against calls for more fundamental reforms."[156] Like transparency, risk modeling is represented as an optimal, unproblematic way to prepare for adverse future events.

While a full elaboration of alternatives to risk modeling is beyond the scope of this chapter, two practices bear mention as both substantively distinct from VaR and marginalized by its dominance. First, in terms of banks' preparations for future outcomes, subjective judgment has historically been the main alternative to quantitative calculation. As Peter Bernstein writes, the history of risk is marked by "a persistent tension between those who assert that the best decisions are based on quantification and numbers, determined by the patterns of the past, and those who base their decisions on more subjective degrees of belief about the uncertain future."[157] VaR, and other model-based approaches to financial practice and governance, such as

[156] Blyth, "Political Power," 253.
[157] Peter Bernstein, *Against the Gods: The Remarkable Story of Risk* (New York: John Wiley & Sons, 1998), 6.

the capital asset pricing model, largely supplanted subjective judgment in latter half of the twentieth century. In his defense of a greater role for judgment in financial markets, Amar Bhidé explains how the move to quantification has worked to exclude case-by-case evaluations in modern finance, writing that statistical models are "utterly at odds with a decentralized, innovative economy where different individuals make different choices, depending on how they interpret the world around them and the facts that they uniquely observe."[158] One need not endorse the full-scale replacement of statistical modeling by judgment to recognize that the latter is diminished when VaR is represented as the best way to foresee financial losses.

At the level of regulation, the post-crisis turn towards macroprudential regulation (MPR) has been proposed as an alternative to the excessive reliance placed on standardized risk models and capital requirements.[159] In contrast to pre-crisis regulation, such as Basel II, that focused primarily on protecting individual banks, MPR regards risk as endogenous to the financial system as a whole and works specifically to counter the herding behavior produced by excessive reliance on standardized risk models.[160] Serious consideration of MPR during the 1990s was largely precluded by the BCBS's focus on VaR-linked capital requirements, leading Baker to characterize MPR as "relatively unpopular and very much on the sidelines" prior to the crisis.[161] As Borio wrote in 2009, "a decade ago, the term was barely used. And it would have been hard

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[158] Amar Bhidé, *A Call for Judgment: Sensible Finance for a Dynamic Economy* (New York: Oxford University Press, 2010), 103.
[159] E.g., Andrew Baker, "The New Political Economy of the Macroprudential Ideational Shift," *New Political Economy* 18:1 (2013): 112-139; Claudio Borio, "Implementing the Macroprudential Approach to Financial Regulation and Supervision," *Banque de France Financial Stability Review* 13 (2009): 31-41; Avinash Persaud, "Macro-Prudential Regulation: Fixing Fundamental Market (and Regulatory) Failures," *Crisis Response: Public Policy for the Private Sector*, World Bank Group: 2009.
[160] Andrew Baker, "Transnational Technocracy and the Macroprudential Paradox," in *Transnational Financial Regulation after the Crisis,* ed. Tony Porter (New York: Routledge, 2014).
[161] Baker, "New Political Economy," 112.

for supervisors to recognize that their tasks involved a significant macroprudential dimension, let alone that it would have been desirable to strengthen it."[162] Even today, this alternative to VaR reveals the dominance of quantitative models as a response to financial uncertainty. While MPR adds other tools, in addition to VaR, to the arsenal of anticipating future outcomes, it remains model-based and has been criticized for some of the same technocratic and depoliticizing tendencies I attribute to VaR.[163]

The dominance of VaR over responses such as these can be seen clearly in the BCBS's 1996 response to the limitations of VaR. The BCBS made clear that even VaR approaches that met the 1996 Amendment's standards did not fully capture the range and magnitude of potential future losses, regarding the model as a "a valuable starting point" for measuring the riskiness of a bank's portfolio.[164] They observed that, "Market price movements often display patterns (such as 'fat tails') that differ from the statistical simplifications used in modelling (such as the assumption of a 'normal distribution'); The past is not always a good approximation of the future (for example volatilities and correlations can change abruptly); [and] Models cannot adequately capture event risk arising from exceptional market circumstances."[165] In response, the Committee required that banks' VaR numbers be multiplied by three (an apparently arbitrary number) to account for greater than predicted losses. While the BCBS's identification of VaR's limitations was astute, their solution – that maximum predicted losses be multiplied by three – does little to move beyond prediction as a response to uncertainty, as it remains firmly grounded

[162] Borio, "Implementing the Macroprudential Approach," 32.
[163] Baker, "Transnational Technocracy," 34-37.
[164] Basel Committee on Banking Supervision, *Overview,* 4.
[165] Ibid., 4-5.

in the results of a probabilistic model.[166] Brown bluntly argues that the multiplication factor is a wholly inadequate way of preparing for losses in excess of VaR. The idea that multiplying VaR by three is a good representation of the largest possible loss is, in Brown's words, "a terrible assumption on both theoretical and empirical grounds."[167] The BCBS also specified that banks would be issued an additional charge for poor performance of their models, as measured against historical data, further reinforcing the centrality of probabilistic prediction to their approach to devastating financial losses.[168]

VaR's status as an objective practice used by financial experts lies at the heart of its authority and of BCBS's willingness to use it as the basis for linking capital requirements to market risk. However, rather than ensuring its neutrality, VaR's claim to objectivity and technicality is itself an act of political power. As Theodore Porter observes, claims to objectivity are often intended to depoliticize decisions in order to remove them from the realm of contestation. He writes, "A decision made by the numbers (or by explicit rules of some other sort) has at least the appearance of being fair and impersonal. […] Quantification is a way of making decisions without seeming to decide."[169] But this act of "making decisions without seeming to decide" is no less powerful for having been depoliticized – and may even be more so, insofar as the workings of power are obscured by its having been placed outside the scope of politics. To the extent that VaR is perceived as an approximately accurate, detached

[166] Richardson writes, "In theory, the multiplication factor compensates for many of the nonquantifiable factors that can influence the estimation of risk such as flawed distribution assumptions, the inadequacy of past events as a guide to future ones, extreme market movements, and other factors that may limit the accuracy of a VAR approach but its ability to accomplish this seems doubtful" ("Do the Basel Market Risk Proposals Make Sense?").
[167] Brown, "Unbearable Lightness," 20.
[168] Basel Committee on Banking Supervision, *Amendment,* 47.
[169] Theodore Porter, *Trust in Numbers: The Pursuit of Objectivity in Science and Public Life* (Princeton: Princeton University Press, 1995), 8.

representation of market processes, it is unlikely to be seen as a political practice – one that is contestable because it is necessarily unable to foresee devastating losses and one that serves to legitimate banks' claim to authority and responsibility.

The depoliticization of risk models narrows the field of popular deliberation and contestation about how to respond to Keynesian uncertainty by privileging experts and their predictive models as the only (or at least best) response to the possibility of financial crisis and an uncertain future. Uncertainty, however, is an irreducibly political problem: one that cannot be solved or dissolved through technical management. As Sanjay Reddy writes, "[C]onceptions of uncertainty in terms of 'risk' or potentially calculable probabilities divert attention from the truly radical and irreducible nature of our ignorance about the future world, which makes of it in turn an irreducibly political space."[170] In treating uncertainty as measurable and manageable by technical experts, VaR makes other political responses to uncertainty more difficult to implement. Alternative forms of financial regulation, such as limitations on the size of the financial industry relative to a domestic economy,[171] can be marginalized from the public debate when banks can make an authoritative claim to self-regulation. More generally, the perception that future financial losses can be accurately foreseen means that it is harder to imagine and persuasively advocate for societal practices and sensibilities, beyond financial regulation, that might better equip the world for unforeseeable financial events.

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[170] Sanjay Reddy, "Claims to expert knowledge and the subversion of democracy: the triumph of risk over uncertainty," *Economy and Society* 25:2 (1996): 242.

[171] For one detailed proposal for alternative forms of financial regulation see: The Warwick Commission on International Financial Reform, *In Praise of Level Playing Fields* (Warwick: University of Warwick, 2009). The introduction of leverage-based regulation in the Basel III framework represents another such shift. Nonetheless, as Andrew Haldane observes, risk-weighted capital ratios are still favored over leverage ratios in the current framework ("The dog and the Frisbee," 19-20).

The global financial crisis dramatically revealed that large-scale private sector losses, many times in excess of banks' predictions and capital reserves, have profound effects on the real economy and ordinary citizens' well-being. That the consequences of financial risk modeling are not confined to the financial industry makes its depoliticization – the fact that it is taken for granted, especially by those who poorly understand it, as the best or only way to contend with an uncertain future – highly consequential. To the extent that banks were held responsible for unpredicted losses and the financial crisis, they tended to be blamed for failing to measure and manage risk responsibly, implying that the response should be one of building better predictive models and adhering to them. But acknowledging that financial systems are characterized by a level of uncertainty that exceeds probabilistic modeling calls for a different political sensibility, one not driven solely by attempts at prediction and control. When uncertainty is understood precisely as that which cannot be neither predicted nor dissolved, and when crises are understood as endogenous to the system itself, the focus can and should expand beyond building better risk models to building a society with the flexibility, resources, and political will to weather unforeseeable financial shocks.

VII. Conclusion

Starting from an observation about Value-at-Risk's high-profile predictive failures, this chapter has attempted to make sense of its continued use by analyzing its productive, rather than predictive, power. This line of inquiry has led me to identify VaR's (counter)performative effects and the way in which it produces banks as authoritative, responsible managers of an uncertain financial future. Viewing financial markets through the lens of Keynesian uncertainty and model performativity helps explain VaR's failures by revealing VaR to be an inherently limited and potentially destabilizing practice. Its use participates in the construction of a financial system that

is only temporarily stable and controllable. At the same time, VaR is an important source of authority for banks vis-à-vis regulators because it represents the future as statistically calculable and expert prediction as the optimal, objective mode of preparing for that future. This, in turn, makes less thinkable responses to uncertainty that might be better suited to the possibility of devastating losses unforeseeable – and perhaps produced – by the widespread use of VaR. This analysis helps us understand both how the market was able to develop in the absence of greater public regulation, as well as why post-regulatory change has been so constrained.

My goal in this chapter is not to advocate specific financial regulatory reforms. Rather, by revealing the political consequences of attempts to manage risk and by acknowledging the non-necessity of responses to uncertainty which claim to be dictated by objective calculations, I hope to create space for alternative or additional ways to acknowledge, act in, and respond to a world of risk, uncertainty, and reflexivity. This should not be interpreted as an argument against professional skill in financial markets. In economic policy, economists, statisticians, and financial analysts have an important role to play in analyzing, informing, and creating well-informed policy. Rather, this chapter should be read as a call for critical inquiry into the nature and scope of expert authority in global finance to better identify the conditions under which that authority should be seen as legitimate and decisive. Nor should the claim that the financial system exceeds our capacity to fully predict and control be mistaken for political quietism in the face of unknown unknowns. Precisely the opposite; by recognizing the limitations of what we can capture probabilistically, we open up space for deliberation about how to proceed in the face of irreducible uncertainty.

Chapter 4:
Through a Mirror, Darkly: Opacity, Transparency, and Liquidity in the OTC Market

"[W]e do not have the capacity to put in place a transparency regime over markets that would give people a real-time picture of the incidence and magnitude of potential risks. The pace of change is too rapid, the number of positions, funds, and institutions too great, and the analytical challenge too complex to offer the promise of that type of early warning system."[1]
- Timothy Geithner, President of the Federal Reserve Bank of New York, 2007

"Since the 1980s when they were first developed, over-the-counter derivatives have been traded out of sight of regulators, market participants and the American public. An opaque market, concentrated within a small number of financial institutions, contributed to a financial system brought to the brink of collapse. We now must bring transparency to the derivatives markets. And this must not simply be transparency to regulators, as important as this is, but to the public as well … Regulatory reform will be incomplete if we do not bring sunshine to the opaque over-the-counter derivatives market."[2]
- Gary Gensler, Chair of the Commodity Futures Trading Commission, 2010

I. Introduction

Over-the-counter derivatives are described as "opaque" nearly 50 times in the core body of texts related to financial governance from the Federal Reserve, Securities and Exchange Commission, Commodity Futures Trading Commission, and Bank of England analyzed in this dissertation.[3] The lack of transparency in derivatives markets is repeatedly post-crisis analyses by both regulators and journalists. Only sometimes appearing on banks' balance sheets, multiply securitized and tranched, traded outside of regulated exchanges, and with prices and composition rarely disclosed, many over-the-counter derivatives are squarely at odds with the imperative of transparency that lies at the heart of modern governance. This chapter documents and analyzes how regulators contended with and enabled the opacity of the OTC derivatives market, how the

[1] Timothy Geithner, "Liquidity Risk and the Global Economy," Speech at the Federal Reserve Bank of Atlanta's 2007 Financial Markets Conference – Credit Derivatives, Sea Island, Georgia, May 15, 2007.
[2] Gary Gensler, "OTC Derivatives Reform," Keynote Address to the US Chamber of Commerce, Washington, DC, March 24, 2010.
[3] Author's own calculation.

same private market practices they relied on to gain a limited measure of insight into the market compounded the 2007-2009 financial crisis, and how they have struggled to, in the words of CFTC chair Gary Gensler "bring sunshine to the opaque over-the-counter derivatives market"[4] in the aftermath of the crisis.

Specifically, I show that regulators were reluctant to demand greater disclosures from the OTC markets in light of these products' contribution to market efficiency and liquidity. As the quotation above from Timothy Geithner (then the president of the New York Federal Reserve Bank) illustrates, prior to the crisis, regulators had little interest in rendering global finance fully legible. I show that financial liquidity and the price discovery mechanism became a proxy for disclosure to a centralized authority, supplemented by standardized accounting practices. However, fair value accounting standards and the practice of pricing assets based on their market value work poorly during periods of crisis, and during the 2007-2009 crisis, actively contributed to the illiquidity of financial markets that caused the collapse and bail-outs of large financial institutions. The post-crisis regulatory response has been to demand much greater transparency of over-the-counter derivatives markets. This transparency has been imperfectly accomplished, through requirements in the Dodd-Frank Act and similar requirements in the European Market Infrastructure Regulation. But bringing limited light to one class of financial assets risks pushing more business into the aptly labeled "shadow banking" sector and its unregulated "dark pools" of capital, suggesting that tensions between transparency and financial market governance persist.

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[4] Gensler's turn of phrase here evokes, perhaps intentionally, Louis Brandeis's famous formulation that, "Sunlight is said to be the best of disinfectants; electric light the most efficient policeman." (Louis Brandeis, *Other People's Money*, [New York: F.A. Stokes, 1914], 92.) Brandeis's advocacy for public financial disclosure by businesses – including J.P. Morgan – in the early part of the 20th century was influential in President Franklin Delano Roosevelt's support for the Securities and Exchange Act of 1934. (Mary Graham, *Democracy by Disclosure: The Rise of Technopopulism* [Washington, DC: Brookings Institution Press, 2002], 1-2.)

This chapter precedes in seven parts. In Section II, I review the literature on transparency and governance, especially as it relates to both financial markets and global governance, and explain why over-the-counter derivatives challenge the transparency-via-disclosure governance paradigm. I argue that the opacity of the market is due to both specific features of these financial products as well as political decisions. In Sections III and IV, I examine how regulators justified their lack of more detailed oversight of this market in the lead-up to the financial crisis. Drawing on an extensive archive of regulatory discourse, I find that derivatives' contribution to financial liquidity insulated them from more stringent disclosure requirements, with market liquidity regarded as something of a substitute for full transparency. Section III describes the market requirement of liquidity and analyzes its relationship to transparency. Regulators pointed to standardized accounting practices, in particular as both enabling liquid markets in derivatives and other financial products and as providing a measure of transparency (albeit a limited one), and Section IV recounts how private accounting standards and other practices satisfied regulators as to market liquidity. Section V recounts how these practices – and the liquidity they were meant to facilitate – failed during the financial crisis, compounding its severity, and Section VI looks at how regulators have responded with mandated practices intended to make the OTC market more transparent. The chapter concludes with some reflections about the limitations of transparency as a governance strategy.

II. The Puzzle of Governing Opaque Markets

A. Legibility, Transparency, and Accountability

The enduring opacity of derivatives markets into the 21st century presents is puzzling in light of the pervasiveness of transparency as a regulatory ideal. Modern governance and regulation is typically accomplished through standardization and categorization, mechanisms

which are accomplished through rendering an object of governance legible and transparent. For James C. Scott, high modernism is characterized by the goal of making social interactions controllable, and the prerequisite of centralized control is the administrative ordering of nature and society: before a realm of social interaction is to be governed, it must first be rendered legible.[5] This legibility can be accomplished by a variety of mechanisms; Scott identifies naming, mapping, architecture and city planning, and standardized measurements, among others. When joined with an authoritarian state and a weak civil service, Scott contends that attempts at large-scale social engineering are possible.[6]

The relevance of Scott's view of high modernist social engineering to an era when faith in the self-regulating power of markets in the US was on the rise may not be immediately evident, but the legibility that serves as a prerequisite for Scott's high modernism lives on in a more contemporary guise under the rubric of transparency. Legible objects of governance are a prerequisite for large scale-social engineering, but standardization and commensurability make possible other, less authoritarian, forms of control as well. The language of vision and visibility is central to our understandings of regulation and governance, and this language is not metaphorical. Being able to measure, categorize, and model markets depends, quite literally, on being able to *see* them. This is reflected in the idea of market "oversight" as a first (and sometimes only) step in financial market regulation. Market oversight means that regulators can see and represent financial transactions, even if they do not alter them. More significant constraints on markets – from bans to capital charge to leverage limits to collateral standards –

[5] James C. Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven: Yale University Press, 1998).
[6] Ibid., 4-5.

are premised on the ability of private or public regulators to apprehend the size and dynamics of the market.

While Scott was primarily interested in the forcible imposition of legibility on social objects by a coercive state apparatus, legibility via disclosure has emerged as a key technology of contemporary financial governance. The roots of transparency-via-disclosure go back to the 1930s when the United States Congress passed the Securities and Exchange Act, which required that companies selling securities to the public report on their officers, earnings, and liabilities.[7] Abetted by advances in communication and information technology, transparency-via-disclosure had become the dominant governing paradigm by the late 1980s and 1990s.[8] "Disclosure," she writes, "had become a form of regulation."[9] Fung et al. echo her conclusions about the centrality of disclosure to modern governance, observing that:

> In the United States, nutritional labeling, public school report cards, restaurant grading systems, campaign finance disclosure, toxic pollution reporting, auto safety and fuel economy ratings, and corporate financial reporting are among scores of transparency systems created by federal and state legislators. Internationally, infectious disease reporting, food and tobacco labeling, and multi-national financial reporting are among the disclosure systems designed to further nations' shared aims. A single idea unites these otherwise disparate systems. It is that public intervention to require the disclosure of factual information by companies, government agencies, and other organizations can create economic and political incentives that advance specific policy objectives.[10]

We might expect to see a high degree of transparency imposed on derivatives markets not only because transparency via disclosure has historically been essential to US regulation, but also because it has taken on an increasingly significant role in international politics. Thomas Hale, for

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[7] Graham, *Democracy by Disclosure*, 1-2.
[8] Ibid., 4.
[9] Ibid., 2.
[10] Archon Fung, David Weil, Mary Graham, and Elena Fagotto, *The Political Economy of Transparency: What makes disclosure policies effective?* (Cambridge, MA: Ash Institute for Democratic Governance and Innovation, John F. Kennedy School of Government, Harvard University, December 2004), 1.

example, argues that transparency represents an alternative to "command and control" governance for international and nongovernmental organizations because there is not an institutional democratic check on transnational actors and where hard law and more formal regulation is often difficult to implement and enforce.[11] For example, in their discussion of international standard-setting bodies, Tim Büthe and Walter Mattli argue for greater transparency in private transnational regulatory arrangements, contending that there is often insufficient public oversight of how these powerful rule are formulated.[12] Hale cites spillover from national transparency laws and policies as one of the drivers of the push for transparency at the international level and contends that transparency can help enable accountability for otherwise opaque and indirectly accessible international institutions.[13] International economic governance, in particular, has not been immune from this movement toward transparency, with the IMF foregrounding transparency in its requirements for emerging market economies[14] and scholars arguing for greater central bank transparency, in part in reaction to the opacity produced by the transnational shift to central bank independence in the 1990s. [15] Others have argued that

[11] Thomas Hale, "Transparency, Accountability, and Global Governance," *Global Governance* 14 (2008): 91, 74.
[12] Walter Mattli and Tim Büthe, "Global Private Governance: Lessons from a National Model of Setting Standards in Accounting," *Law and Contemporary Problems* 68:3/4 (2005): 225-262.
[13] Hale, "Transparency, Accountability," 74. Hale uses Andreas Schedler's definition of accountability as involving both the ability to know what an actor is doing and the ability to make the actor do something else to argue that transparency can help with both parts of this definition, not only making global governance institutions legible to a broader public but also enabling three forms of regulatory action: market pressure, shifts in internal norms, and influential external discourse about the institution.
[14] Susanne Soederberg, "Grafting stability onto globalization? Deconstructing the IMF's recent bid for transparency," *Third World Quarterly* 22:5 (2001): 849-864. It should be noted that Soederberg is critical of the IMF's imposition of transparency on developing economies, identifying it as an attempt to preserve the neoliberal status quo, with developing states at the periphery.
[15] David Stasavage, "Transparency, Democratic Accountability and the Economic Consequences of Monetary Institutions," *American Journal of Political Science* 47:3 (2003): 389-402.

corporate disclosure requirements would allow for greater influence over foreign labor practices ("regulation by shaming").[16]

Given the central place transparency occupies in both domestic regulation and transnational governance, why did derivatives markets remain so opaque? Although many works are critical of transparency, their critiques – while well-founded – offer little purchase on this question. For example, Kristin Lord argues that while increased global transparency may help undermine authoritarian governments, contribute to intercultural understanding, and enable clearer communication of intention and commitment in international conflict, it also has a much darker side, enabling the spread of misinformation, hatred, and incitement to violent conflict.[17] Aarti Gupta's analysis of GMO disclosure requirements under the Cartagena Protocol finds that disclosure requirements place a disproportionate burden on developing states.[18] And Graham warns that disclosure of distorted, incomplete, or misleading information wastes resources and risks causing "unwarranted panic."[19] There is, however, little evidence that regulators' reluctance to demand greater transparency in the case of OTC derivatives in the lead-up to the financial crisis was related to any of these concerns. Derivatives pose a problem distinct from these limitations of transparency-via-disclosure.

B. Why Derivatives Markets Resist Transparency via Disclosure

While the growing literature on transparency and global governance offers little purchase on the question of derivatives' opacity, James C. Scott's analysis of the incompleteness and

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[16] See for example: David Doorey, "Who Made That? Influencing Foreign Labor Practices through Reflexive Domestic Disclosure Regulation," *Osgoode Hall Law Journal* 43:4 (2005): 353-406.
[17] Kristin Lord, *The Perils and Promise of Global Transparency: Why the Information Revolution May Not Lead to Security, Democracy, or Peace* (New York: SUNY Press, 2006).
[18] Aarti Gupta, *Transparency to the Rescue? Assessing effectiveness of 'Governance by Disclosure,'* Global Governance Working Paper 38 (2009).
[19] Graham, *Democracy by Disclosure,* 5.

failure of attempts at social control reveals orients us toward the specific characteristics of the would-be objects of governance. Governance schemes fail, he argues, when they fail to account for the practical knowledge (*techne*), informal processes, and improvisation in the face of unpredictability on which they rest.[20] In this chapter I am less interested in the failure (or incompleteness) of attempts to govern unpredictable markets and more interested in the decision not to require greater transparency of OTC markets.[21] Nonetheless, Scott's insight that the power and forms of knowledge involved in objects of governance matters for how they can be governed provides a useful starting point for this question. Specifically, I argue that the opacity of the OTC derivatives market can be attributed to two factors: First, the profitability of derivatives markets depends, at least to some degree, on their opacity in a way that is distinct from other financial assets. While transparency is generally held to improve market liquidity and competitiveness, securitized assets benefit from coarse information. Second – and largely as a result of regulators' reluctance to contest the first factor – from 2000 until the passage of Dodd-Frank, there were statutory prohibitions on existing methods of regulation via disclosure. As a result, the complexity of the products and the number of parties involved made the market much less legible than on-exchange transactions

1. Profiting from opacity

[20] Scott, *Seeing Like a State*, 6. See also 309-341 for a more detailed description of the mismatch between forms of knowledge that aspire to make social interaction fully legible (*episteme*) and the phronetic, contextually specific kinds of knowledge that are best suited to responding to uncertainty with innovation (*techne*).

[21] For more engagement with the question of how *techne*-type knowledge allows for only partial and incomplete control of financial markets, see: Erin Lockwood and Stephen C. Nelson, "Incomplete Control: The Circulation of Power in Finance," in Peter Katzenstein and Lucia Seybert, eds., *Power in Uncertainty: Exploring the Unexpected in World Politics* (Cambridge: Cambridge University Press, 2018 forthcoming).

Financial transparency often entails threats to information that firms regard as proprietary and would prefer to remain confidential.[22] This tension between transparency and proprietary information provides a first pass at understanding the difficulties associated with making OTC markets more transparent, from the perspective of regulators who – as is discussed in Section IV of this paper – were invested in maintaining profitable, liquid, and deep derivatives markets. As Fed Governor Patrick Parkinson observed in 1999, "The challenge is to develop meaningful measures of risk that could be exchanged frequently without revealing proprietary information on strategies or positions. The revelation of proprietary information not only would jeopardize market participants' profits but could also significantly impair market liquidity and widen liquidity premiums for the assets traded." [23]Concerns about confidentiality are not an insurmountable obstacle and can be overcome through confidentiality agreements and therefore does not fully account for OTC markets' enduring opacity.[24] Nonetheless, dealer banks and end-users benefit from the confidentiality that over-the-counter markets provide, and made the case that heightened transparency requirements would threaten the viability of derivatives trading as risk management practice. As the European Central Bank noted in 2006, "The ongoing debate on the MiFID transparency requirements has led to some unease amongst market participants,

[22] A good overview of how the debate over transparency and confidentiality has played out in the context of the Dodd-Frank Act, as well as more generally, can be found here: Annette Nazareth and Margaret Thayar, "Transparency and Confidentiality in the Post-Financial Crisis World? Where to Strike the Balance?" *Harvard Business Law Review* 1 (2011): 145-193.

[23] Patrick Parkinson, "Hedge funds, leverage, and the lessons of Long-Term Capital Management," Testimony before the Committee on Banking and Financial Services, US House of Representatives, May 6, 1999.

[24] Fed Governor Donald Kohn noted in 2006, for example, that "For market discipline to be effective, counterparties must have a clear understanding of each other's risk profile. Such transparency can be promoted through sound policies regarding accounting and, where necessary and appropriate, public disclosure. However, a meaningful understanding of risk profiles often requires information that market participants regard as proprietary. Confidentiality agreements between counterparties may be necessary to make them comfortable sharing such information." (Donald Kohn, "The Evolving Nature of the Financial System: Financial Crises and the Role of the Central Bank," Speech at the Conference on New Directions for Understanding Systemic Risk, New York, May 18, 2006.)

commentators, and policymakers that a combination of financial innovation in the credit risk transfer markets and some regulatory initiatives could undermine the capacity of financial markets to be reasonably and consistently liquid."[25] Regulatory accommodation of dealer and end-users' confidentiality concerns helps accounts for the lack of transparency to the public, but it does not explain the opacity of these transactions to the counterparties involved.

A more fundamental challenge to making derivatives written on asset-backed securities (ABS) transparent can be found in the advantages to keeping these products' exact composition relatively opaque. Prospectuses for mortgage-backed securities, for example, usually only provided summary statistics about the typical claim in the underlying pool.[26] While the idea that less transparency can make a market more liquid may seem counterintuitive – at least to economists who expect market forces to induce disclosure in order to be able value and price assets[27] – economists have made the case that issuers and investors saw "considerable benefits in securitization based on relatively coarse information."[28] Pagano and Volpin contend that because so few derivatives end-users know how to price the systemic risk associated with the exact composition of asset-backed securities, releasing that information would cause pricing discrepancies in the market, reducing liquidity in the market for these products.[29] Instead, securities are sold in bundled blocks of assets which lowers the trading costs associated with

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[25]Marco Laganá, Martin Peřina, Isabel von Köppen-Mertes, and Avinash Persaud, *Implications for Liquidity from Innovation and Transparency in the European Corporate Bond Market,* European Central Bank Occasional Paper Series No. 50 (2006): 5.

[26] Marco Pagano and Paolo Volpin, "Securitization, Transparency, and Liquidity," *Review of Financial Studies* 25:8 (2012): 2418.

[27] Edward L. Glaeser and Hédi Kallal, "Thin Markets, Asymmetric Information, and Mortgage-Backed Securities," *Journal of Financial Intermediation* 6 (1997): 64.

[28] Pagano and Volpin, "Securitization, Transparency, and Liquidity," 2418.

[29] Ibid., 2419. They summarize: "In general, when some investors have limited ability to process information, releasing more public information may increase adverse selection and thus reduce market liquidity … the standard view (that transparency enhances liquidity) hinges on all market participants being equally skilled at information processing and asset pricing."

pricing the securitized assets based on their component parts. Rather than attempt to price the entire bundle, most buyers relied instead on private ratings agencies' assessments of the default probability.[30] In a separate analysis, Glaeser and Kallal concur with this analysis of the economics of the mortgage-backed securities market, concluding that issuers' refusal to disclose information about the component assets of a mortgage-backed security enhances liquidity by facilitating convergence in the asking price and the price buyers are willing to pay, smoothing out extreme values.[31] The problem of asymmetric information is equally acute for credit derivatives, and here too, the opacity of the contracts can help overcome the problem of adverse selection.[32]

It should be noted that these analyses are hardly dispositive arguments against requiring greater transparency of derivatives' composition, their dealers, and their end-users; that OTC markets have continued to be large and profitable even after post-crisis regulation imposed much greater transparency on the market proves that there is not a necessary trade-off between transparency and profitability. Moreover, as Pagano and Volpin note, while opaqueness may enhance liquidity on the primary market for ABS, where these securities are purchased directly from the company issuing them, it may also dramatically reduce liquidity on the secondary

[30] Crucially, these ratings failed to capture the systemic risk of the doubly opaque collateralized debt obligations built from these opaque asset-backed securities. The failure of conventional risk models to account for asset correlation and systemic risk is examined in greater detail in Chapter 3.

[31] Glaeser and Kallal, "Thin Markets," 64. More technically, they find that, "The equilibrium level of liquidity in this secondary market is found induce 'accurate' pricing of the asset, where accurate means that the intermediary's asking price reflects the expected value of the asset to the market, based on the intermediary's private information … Initial issue price of an asset will be a function of that asset's expected liquidity, so the issuer will choose bundling and optimal information disclosure to maximize liquidity" (66).

[32] Antonio Nicolò and Loriana Pelizzon, "Credit derivatives, capital requirements and opaque OTC markets," *Journal of Financial Intermediation* 17 (2008): 445. The authors go on to note, however, that "as the recent sub-prime crisis has highlighted, the growth in volume and diversity of credit derivative products has not mitigated the problem of the lack of transparency in such markets."

market, where neither party has information about the composition of the ABS.[33] Nonetheless, as is argued in the subsequent section, they do pose substantive challenges to imposing greater transparency, and, as I will go on to argue, regulators' interest in maintaining deep and liquid derivatives markets made them tolerant of the opacity the derivatives market had found optimal.

2. Statutory opacity

The opacity of the derivatives market in the face of transparency as foundational principle of both international governance and other realms of national financial regulation is the central puzzle of this chapter. It should be noted, however, that there is a relatively facile explanation for this outcome: the two main regulatory bodies in the US who might otherwise have had the capability to mandate transparency were prohibited from doing so by the Commodity Futures Modernization Act (CFMA) of 2000. [34] In exempting over-the-counter derivatives from regulation by either the Securities and Exchange Commission (SEC) or the Commodity Futures Trading Commission (CFTC), the CFMA prohibited these regulatory bodies from implementing the forms of mandatory disclosure that accompany other financial markets.[35] Equity markets, for example, have long been subject to significant disclosure requirements, and in 20002 the SEC extended these requirements to bond markets, mandating the instantaneous disclosure of over-the-counter fixed income securities and corporate bond trades via the Trade Reporting and Compliance Engine.[36] More generally, the centralization provided by designated

[33] Pagano and Volpin, "Securitization, Transparency, and Liquidity," 2420.
[34] See Chapter 1 for an explanation of the disproportionate role that US regulators have played in shaping the trajectory of derivatives regulation.
[35] See Chapter 2 for a more detailed analysis of the origins and effects of the CFMA.
[36] Financial Industry Regulatory Authority, "Trade Reporting and Compliance Engine (TRACE) – Overview," accessed 14 June 2017, http://www.finra.org/industry/trace. These requirements would not apply asset- and mortgage-backed securities until 2011 when Dodd-Frank superseded the CFMA's exemption of these markets from regulatory scrutiny. (Financial Industry Regulatory Authority, *Regulatory Notice 10-23: Trade Reporting and*

exchanges, where bids and offer prices are publicly quoted renders exchange-traded derivatives much more immediately legible to those tasked with oversight than a network of bilateral transactions. As CFTC chair Brooksley Born observed following the collapse of LTCM, "Transparency is, of course, one of the hallmarks of exchange-based derivatives trading in the US Recordkeeping, reporting, and disclosure requirements are established by the Commodity Exchange Act and the Commission's regulations; prices are discovered openly and competitively; and quotes are disseminated instantaneously. Positions in exchange-traded contracts are marked-to-market at least daily, thus ensuring that customers are aware of the profit or loss on their positions."[37]

While relatively little was made of this prohibition in the lead-up to the financial crisis, during crisis and prior to the passage of the Dodd-Frank Act, the SEC identified this statutory prohibition as a key source of OTC opacity. As SEC Chair May Schapiro stated in a press briefing in May 2009, "[C]urrent federal statutes significantly restrict the ability of financial regulators to obtain reporting or record-keeping in the OTC derivatives market. Yet these are the very types of tools that any regulator would need to identify suspicious trading patterns or better understand systemic risks.[38] Schapiro went on to testify before the Senate Subcommittee on Securities, Insurance, and Investment that, owing to the CFMA's exemption of OTC derivatives from regulatory oversight:

> In a recent study on a type of securities-related OTC derivative known as a credit default swap, or CDS, the Government Accountability Office found that "comprehensive and consistent data on the overall market have not been readily

Compliance Engine [TRACE], SEC Approves Reporting Asset-Backed Securities Transactions to TRACE and Related Fees, April 2011.)

[37] Brooksley Born, "Remarks at Fordham University School of Law's Derivatives & Risk Management Symposium," New York, January 28, 1999.

[38] Mary Schapiro, "Statement at Treasury Department Press Briefing on OTC Derivatives," Washington, DC, May 13, 2009.

> available," that "authoritative information about the actual size of the CDS market is generally not available," and that regulators currently are unable "to monitor activities across the market."[39]

Schapiro also testified that the transactions in question "are substantially similar to traditional securities transactions" and made clear that, but for the CFMA, OTC derivatives would fall under SEC jurisdiction.[40]

The CFMA not only prohibited regulators from using their conventional methods of requiring disclosure of OTC transactions, it also actively contributed to the opacity of the system, insofar as it enabled the market to grow nearly seven-fold between 2000 and 2007.[41] The market did not simply grow in one direction, however, because the proliferation of swaps means that, as Mike Konczal et. al write, "the party that assumes the risk in one transaction can similarly seek to offset it by entering into a separate swap agreement with a third party, and the third party with a fourth."[42] The result is a dense, complex network of correlated counterparty risk that is extremely difficult to make legible, let alone governable. That many of these OTC transactions were conducted via structured investment vehicles and other entities in the so-called "shadow banking system," outside the view of central banks and their liquidity provisions only heightened the opacity of the market.[43] The obvious role the CFMA played in obstructing transparency raises more questions than it answers. First, why were regulators content to see it implemented

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[39] Mary Schapiro, "Senate Testimony Concerning Regulation of Over-the-Counter Derivatives," Testimony before the Subcommittee on Securities, Insurance, and Investment, Committee on Banking, Housing, and Urban Affairs, United States Senate, June 22, 2009.
[40] Ibid.
[41] For more on how the legal certainty and lack of regulation codified by CFMA enabled the growth of the OTC market, see Chapter 2 of this dissertation.
[42] Mike Konczal, Katy Milani, and Andrew Hwang, *Doomed to Repeat: Debunking the Conservative Story About the Financial Crisis and Dodd-Frank,* Roosevelt Institute, June 6, 2017, http://rooseveltinstitute.org/doomed-repeat-dodd-frank/.
[43] Zoltan Pozsar, Tobias Adrian, Adam Ashcraft, and Hayley Boesky, "Shadow Banking," Federal Reserve Bank Staff Report No. 458 (revised February 2012).

and to allow the opacity of the market to be encoded in law? And second, why did they fail to challenge or question that opacity in between the passage of the CFMA and the financial crisis?

The next two sections of this chapter examines how regulators sought to govern a market that depends, at least to some extent, on its illegibility to remain profitable. I show that regulators were convinced that OTC derivatives performed a valuable social function in terms of enhancing market liquidity and that regulators were wary of imposing too much transparency at the expense of the market's continued profitability and therefore existence. As such, a core feature of modern markets – liquidity – came to stand in as a substitute for transparency-via-disclosure. Having ruled out control-through-transparency, regulators looked instead to the price mechanism and market selection dynamics as evidence of the market's capacity to govern itself. This logic was well in keeping with 20th century free market liberal understandings of the market that dominated American financial regulation at the turn of the 21st century.[44] As Hayek argued 50 years earlier, in lieu of centralized mechanisms of control that depend on a detailed and thorough understanding of individual transactions and their counterparties, prices serve to diffusely coordinate markets, imposing a measure of order and predictability even the absence of full transparency.[45] Prices coordinate the separate actions of individuals so effectively that participants in the market do not need to see anything beyond their own ease of acquiring inputs: the market itself, as a network of complex causes and effects need not – and according to Hayek cannot – be apprehended and known as a whole.[46] While regulators only occasionally referenced

[44] See Chapter 2.
[45] See, for example: Friedrich Hayek, "The Use of Knowledge in Society," *American Economic Review* 35:4 (1945): 526.
[46] Ibid., 525.

Hayek explicitly, this view of liquid markets as self-regulating permeated regulatory discourse in the decade preceding the financial crisis.[47]

While there were calls for greater transparency following the collapse of LTCM and the Asian financial crisis, regulators were largely satisfied with voluntary market practices – and those who were not, like Brooksley Born, were overruled. Following the statutory exemption of OTC derivatives from the oversight permitted by exchange trading, regulators pointed to a series of market practices as substitutes for disclosure of the specific composition and exchanges of derivative contracts, contending that electronic trade settlement, risk disclosure, and – above all – accounting standards provided a measure of transparency if not to regulators, at least to counterparties to derivative transactions.

III. Opaque Derivatives and Liquid Financial Markets

A. Regulators' perceptions of derivatives' opacity pre-CFMA

The opacity of the derivatives market was of concern to regulators long before the financial crisis. The specificity of highly customized OTC contracts was cited as an "obvious concern" by SEC Commission Mary Schapiro in 1991.[48] In the early 1990s, the development and

[47] Fed Governor Randall Kroszner cited Hayek on price discovery in October 2007 to make the case that the unfolding "recent events in U.S. financial markets" were attributable to a breakdown of the price discovery mechanism due to insufficient information and "general uncertainty among market participants" – factors that Hayek did not envision except as a result of governmental interference in markets. This, in conjunction with the much more frequent crisis and post-crisis references to breakdowns in the price mechanism (without Hayek citations) in other regulatory texts, suggests that a Hayekian view of markets was indeed the normative view of markets held by financial regulators. (Randall Kroszner, "Recent Events in Financial Markets," Speech at the Institute of International Bankers Annual Breakfast Dialogue, Washington, DC, October 22, 2007.) Fed Governor Kevin Warsh also cited Hayek in 2009 to make the case for the necessity of the rule of law to smoothly functioning markets and of the Fed adhering to its legal obligations – while observing that the loss of confidence in financial markets likely had more to do with violations of informal, unwritten norms and expectations, than with legal violations. (Kevin Warsh, "The Panic of 2008," Speech at the Council of Institutional Investors 2009 Spring meeting, Washington DC, April 6, 2009.)

[48] Mary Schapiro, "The growth of the synthetic derivative market: risks and benefits," Speech before the National Option & Futures Society, Washington, DC, November 13, 1991.

rapid adoption of the ISDA Master Agreement – a standardized contract that could be customized to suit counterparties' specific needs – had helped make the market much more legible to regulators in the late 1980s and early 1990s than it would be otherwise.[49] As Fed Governor Randall Kroszner reflected in 2007, "In more recent times, for example, the creation of the International Swaps and Derivatives Association (ISDA) master agreement for over-the-counter swaps and derivatives contracts has brought about the benefits of standardization while also allowing for product flexibility and customization. […] This standardization reduces uncertainty about the instruments, which lowers transaction costs and facilitates price discovery and market liquidity."[50]

However, by the mid-1990s, regulators had grown increasingly concerned about the systemic risk this opaque market might conceal.[51] While they were mollified by the industry's willingness to strengthen private governance, the 1995 Windsor Declaration, a cooperative agreement between the US and UK securities regulators, called for "enhanced transparency of market protection and procedures,"[52] a concerned echoed by Joseph Dial, of the CFTC, to an international audience of financial regulators.[53] Even Fed Chair Alan Greenspan, notable for his steadfast resistance to increased financial regulation, echoed this call to an audience of Japanese bankers in 1996, saying "risk management should be strengthened and transparency should be

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[49] Eric Helleiner, "Reining in the market: global governance and the regulation of OTC derivatives," in Dag Harald Claes and Carl Henrik Knutsen, eds., *Governing the Global Economy: Politics, Institutions, and Economic Development* (New York: Routledge, 2011), 134.
[50] Randall S. Kroszner, "Innovation, Information, and Regulation in Financial Markets," Speech at the Philadelphia Fed Policy Forum, Philadelphia, November 30, 2007.
[51] See Chapter 2, Section V.
[52] *Windsor Declaration,* Commodity Futures Trading Commission, May 1995, accessed June 12, 2016, http://www.cftc.gov/International/InternationalInitiatives/oia_windsordeclaration.
[53] Joseph Dial, "The U.S. Commodity Futures Trading Commission's Plans for Derivatives Regulation," Speech at the Fourth International Conference on Derivatives Regulation, Institute of Advanced Legal Studies, University of London, London, October 25, 1996.

improved […] I would like to emphasize the importance of transparency, by which I mean in this context enhanced reporting and public disclosure of financial activities."[54] (Greenspan stopped short of calling for mandatory disclosure policies, however, going on to say that market discipline had made major progress in enhancing transparency.[55])

Regulators' previously low-level concern with the opacity of derivatives markets spiked following the collapse of the hedge fund Long Term Capital Management in 1998. Brooksley Born at the CFTC was particularly (and, as ever, presciently) outspoken about the lack of transparency in LTCM's OTC derivatives holdings:

> While the CFTC and the US futures exchanges had full and accurate information about LTCM's US exchange-traded futures positions through the CFTC's required daily large position reports, no federal regulator received reports from LTCM on its OTC derivatives positions. Notably, no reporting requirements are imposed on most OTC derivatives market participants. […] Lack of price transparency may aggravate problems arising from volatile markets because traders may be unable accurately to judge the value of their positions or the amount owed to them by their counterparties. Lack of price transparency also may contribute to fraud and sales practice abuses, allowing OTC derivatives market participants to be misled as to the value of their interests. […] A number of questions that are now being asked about the lack of transparency in the OTC derivatives market in light of the LTCM matter are raised by the Commission's Concept Release on OTC Derivatives, including the need for recordkeeping and reporting requirements and for disclosure by OTC derivatives dealers to their customers. […] If reporting and disclosure requirements had been in place in the US, some of the difficulties relating to LTCM might have been averted.[56]

Born's concern about the lack of transparency in OTC markets was an important component of her advocacy for bringing the markets under the purview of the CFTC and treating OTC swaps

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[54] Alan Greenspan, "Banking in the Global Marketplace," Speech at the Federation of Bankers Associations of Japan, Tokyo, November 18, 1996; see also Alan Greenspan, "Risk Management in the Global Financial System," speech before the Annual Financial Markets Conference of the Federal Reserve Bank of Atlanta, Miami Beach, February 27, 1998.
[55] Greenspan, "Banking in the Global Marketplace."
[56] Born, "Remarks at Fordham University."

and options like the exchange-traded futures the commission was accustomed to regulating.[57] Nonetheless, by the late 1990s hers was a minority voice in the regulatory community and cut against the solidifying consensus around the desirability of self-regulation. Despite occasionally expressions of regulatory concern about the absence of OTC market transparency during the 1990s, disclosure could only be required in this market if either the CFTC or the SEC were to assert regulatory authority over it. As we know from Chapter 2, both agencies were unwilling to take this step, and the exclusion of OTC markets from their jurisdiction was written into law in 2000 in the Commodity Futures Modernization Act.

B. Justifying the opacity of derivatives markets post-CFMA

1. Derivatives' contribution to market liquidity

A key component of this *laissez-faire* attitude toward OTC markets lay in the weight regulators attached to derivatives positive contribution to overall financial market liquidity. Even in the late 1990s, regulators praised securitization as an important contribution to liquid financial markets.[58] Sharon Brown-Hruska, who became the leading voice on derivatives at the CFTC following Born's resignation, gave a series of speeches to industry and financial law associations that echoed this view of derivatives as enhancing market liquidity. The defense of derivatives as enhancing market liquidity is expressed clearly in this excerpt from Brown-Hruska's speech to an audience of financial professionals in 2004:

> And why is all the growth in the derivatives markets good? It is good for business and the economy because it expands businesses' and consumers' ability to

[57] See Chapter 2, Section VI for more on Born and her unsuccessful push for greater OTC regulation.

[58] "As in the case of the emerging derivatives markets and the direct conduct of nontraditional financial activities, we wholeheartedly support the development of securitization by banks. The technique has permitted the "slicing and dicing" of the risks associated with a pool of assets in ways that permit each investor to choose positions that most closely reflect desired risk versus return. Market efficiency and liquidity are enhanced." (Susan Phillips, "Risk Management for Banks and Banking Regulators in the 21st Century," Speech at the Atlanta Society of Financial Analysis, Atlanta, February 14, 1997.)

> manage their risks and diversify their portfolios. But it goes even beyond that. One of the unique byproducts of derivatives, particularly those traded on organized markets, is price discovery. Price discovery is really the lifeblood of a free market system. It is how the free market system is able efficiently to allocate scarce resources. It is what induces people to exchange goods and services. In essence, price discovery is the transparency of markets that participants seek to assure themselves that they are getting fair prices in their transactions. And as regulators, it is this price discovery process that we endeavor to encourage and protect.[59]

While Brown-Hruska singled out exchange-traded derivatives for their contribution to financial market liquidity in this speech, this view applied to OTC markets as well. In a 2006 report on the European corporate bond market, the European Central Bank (ECB) observed that OTC credit derivatives allowed investors to separate and trade the credit risk associated with their portfolios allowing for more efficient hedging strategies; that derivatives written on securitized credit products (e.g., collateralized debt obligations) had greatly reduced the cost of holding assets for long periods of time; and that the costs of pricing bonds were reduced because they could be priced based off of prices in the CDS market.[60] As a result, they contended that derivatives had significantly enhanced systemic liquidity in the corporate bond market[61] – and even went so far

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[59] Sharon Brown-Hruska, "Market and Regulatory Innovation in a Global Environment," Keynote Address at the Futures Industry Association (FIA)/Futures Option Association (FOA) International Derivatives Conference, London, June 29, 2004. For articulation of the same view from the Fed, see: Roger Ferguson, "Financial Regulation: Seeking the Middle Way," Speech to the Fourth Joint Central Bank Research Conference on Risk Management and Systemic Risk (via satellite), Frankfurt, November 8, 2005 and Donald Kohn, "Asset-Pricing Puzzles, Credit Risk, and Credit Derivatives," Speech at the Conference on Credit Risk and Credit Derivatives, Washington, DC, March 22, 2007. In this latter speech, Kohn states: "instead of looking to the bond market to measure default risk, we are increasingly turning to the market for credit default swaps, or CDS. CDS are more standardized than corporate bonds, and, over time, they have also become more liquid. They therefore provide us with new, and in many cases more precise, measures of credit risk. These measures in turn can sharpen our measures of the pricing puzzles. In addition, because the CDS market helps us to strip out the credit-risk component from bond prices, that market also gives us a clearer picture of how important non-credit-risk components of bond prices, such as liquidity, are priced."

[60] Laganá et al., *Implications for Liquidity*, 17.

[61] Ibid., 17-18. "Credit derivatives can strengthen the resilience of the cash bond market to adverse market events. The rapid development of credit derivatives is one of the reasons for the smooth behavior of the corporate bond markets in the aftermath of the GM and Ford credit rating downgrades in May 2005 […] Moreover, investors involved in trading-oriented strategies (such as some hedge funds) have a limited impact on the cash market as they typically trade in credit derivatives markets which offer them greater flexibility and liquidity, as well as facilitate the

as to suggest that the widespread use of derivatives had mitigated the need for transparency requirements in the bond market.[62]

The ECB report cited the Counterparty Risk Management Policy Group II's (CRMPG II) 2005 report on credit derivatives to bolster their analysis of derivatives' contribution to market liquidity. This report, led by Gerald Corrigan (then Managing Director of Goldman Sachs[63]) and written with input from officers at JPMorgan Chase, Citigroup, Bear Stearns, Lehman Brothers, Morgan Stanley, and other major banks and investments firms, developed the argument that credit derivatives provide additional liquidity to the financial system as a whole during times of market distress because credit derivatives traders are typically looking to acquire more risk whereas cash bond traders are typically looking to shed it in deference to risk limits.[64] The CRMPG II report did identify the lack of transparency in OTC derivatives markets as an area of concern, but stopped well short of calling for greater mandated disclosures, recommending instead that this opacity be addressed through voluntary disclosures and through the use of private clearinghouses.[65]

Regulators were clearly aware of the opacity of OTC markets at the time, but their concern for the continued profitability of deep and liquid financial markets – of which OTC derivatives were only a part – frequently outweighed legislative attempts to mandate greater

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dispersion of credit risk. This seems to some extent to have sheltered the cash market from a rise in volatility after the credit event and is believed to enhance systemic liquidity."

[62] They did not, however, conclude there was no need for oversight, just that it was the system as a whole, not particular asset classes that should be rendered more legible: "Our framework tell us that the focus of concern should shift from instruments to investor behavior, in particular gaining a better overview of net exposures and concentrations, common strategies, as well as harmonized valuation and risk management techniques" (Laganá et al., *Implications for Liquidity,* 20).

[63] For more on Corrigan's shift from derivatives critic to champion, see Chapter 2.

[64] Counterparty Risk Management Policy Group II, *Toward Greater Financial Stability: A Private Sector Perspective,* (CRMPG II, July 27, 2005): 107-108.

[65] Ibid., 38-39.

transparency. In 2002, following the Enron scandal, Senator Dianne Feinstein introduced a bill that would have subjected OTC energy derivatives to CFTC oversight.[66] Outside of the International Swaps and Derivatives Association, the derivatives industry's lobbying organization,[67] Sharon Brown-Hruska at the CFTC was one of the strongest voices opposed to imposing greater transparency on OTC markets, saying:

> Increased market transparency is often held out as a quick-fix solution to market problems, even though there are different levels or types of appropriate transparency depending on the kind of market and the instrument being traded. Clearly there must be transparency and integrity in the accounting and financial statements of firms. Publicly-traded companies are required to ensure disclosures accurately reflect the financial condition of the firm, in accordance with accepted accounting principles. […] The extent to which the details of individually negotiated or private transactions should be made public is less clear-cut. Proposed legislation suggests that covered entities, including certain electronic markets, as well as dealer markets, should make information, such as volume, settlement prices, open interest, and opening and closing price ranges, public as appropriate. While I can appreciate the intentions of specific language granting the CFTC discretion in this regard, it appears to force exchange-style transparency onto bilateral and proprietary OTC markets. […] Making transaction data, including price, volume, and open interest, public is operationally problematic in over-the-counter markets since, as I stated before, many contracts are complex, customized, or traded in a variety of venues.[68]

The CFTC was joined in its opposition to making OTC markets more transparent by Fed Chair Ben Bernanke. Although his predecessor Alan Greenspan had expressed significant concerns about the effect of dealer concentration on swap market liquidity a few years earlier,[69] Bernanke

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[66] A bill to provide regulatory oversight over energy trading markets and metals trading markets, and for other purposes, S. 2724, 107th Cong. (2002).

[67] International Swaps and Derivatives Association, "ISDA Concurs with Financial Regulators' Concerns Regarding Expansion of OTC Derivatives Regulation," New Release, September 20, 2002, http://www.isda.org/press/press092002.html.

[68] Sharon Brown-Hruska, "Remarks to the International Swaps and Derivatives Association, Energy and Developing Products Conference," Houston, Texas, March 26, 2003.

[69] "Financial consolidation has reduced the number of firms that, by acting as dealers, provide liquidity to the OTC derivatives markets. Two years ago I expressed particular concern about the implications of dealer concentration for risks in derivatives markets.[…] Concerns about potential disruptions to swaps market liquidity will remain valid until the vast leveraged portfolios of mortgage assets held by Fannie and Freddie are reduced and the associated concentrations of market risk and risk-management responsibilities are correspondingly diminished." (Alan

opposed increased regulation on the basis of asset class. Instead, in refuting the argument that the credit derivatives market should be more transparent, he concluded that, "Rather than addressing specific institutions or instruments in isolation, regulators should begin by identifying their objectives and then address the implications of the broad range of financial innovations for those objectives."[70] In a speech to the same audience the year before Bernanke had also opposed proposals to create a database of hedge fund positions, noting that to avoid problems of moral hazard and to protect proprietary information, disclosures would have to be aggregated to the point where the information was no longer meaningful.[71]

In their 2005 report, the CPRMG II composed of investment bank leaders had called for transparency to be accomplished through voluntary market practices.[72] As early as 1996, Greenspan was already praising private market discipline for its contribution to financial transparency, noting that, "Market and supervisory pressures have led to substantially more, as well as more meaningful, public disclosure of risk positions and risk management procedures."[73] Perhaps it is no surprise, then, that regulators – at the Fed and other agencies – continued to point to private market practices as evidence of sufficient transparency in the derivatives market after the passage of the CFMA in 2000. For example Fed Governor Susan Schmidt Bies raised concerns about the "intended or unintended risk of opaqueness that comes with complexity" and emphasized the need for market participants and regulators to have good quality information

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Greenspan, "Risk Transfer and Financial Stability," Speech to the Federal Reserve Bank of Chicago's Forty-first Annual Conference on Bank Structure [via satellite], Chicago, May 5, 2005.)

[70] Ben Bernanke, "Regulation and Financial Innovation," Speech to the Federal Reserve Bank of Atlanta's 2007 Financial Markets Conference (via satellite), Sea Island, Georgia, May 15, 2007.

[71] Ben Bernanke, "Hedge Fund and Systemic Risk," Speech at the Federal Reserve Bank of Atlanta's 2006 Financial Markets Conference, Sea Island, Georgia, May 16, 2006.

[72] CRMPG II, *Toward Greater Financial Stability.*

[73] Greenspan, "Banking in the Global Marketplace."

about derivatives transactions, but once again underscored the role of "market discipline" in fostering that transparency.[74] The CFTC concurred with this assessment, stating that, "Developing OTC markets in forex and energy are far more transparent and liquid than the brokered markets of the past. Markets like Intercontinental Exchange have made numerous improvements in their rules and platform that raise our confidence in their integrity and have enhanced the quality of information about transactions available to both regulators and to the marketplace."[75] Brown-Hruska concluded that proposals to render derivatives more transparent, "could potentially harm these developing markets, possibly forcing those markets back into the closet and/or offshore."[76]

2. Liquidity as a substitute for transparency-via-disclosure

Empirical evidence about the relationship between transparency and liquidity in financial markets is mixed. Madhavan, Porter, and Weaver note that "regulatory responses to transparency questions are often predicated on the belief that greater transparency will increase the efficiency and fairness of securities markets."[77] A study by Mark Lang and Mark Maffett notes that, at the firm-level, firms with greater transparency experience less liquidity volatility and fewer incidences of extreme illiquidity. Similarly, they find that market liquidity is enhanced with greater transparency because, "to the extent that transparency reduces uncertainty it has the

[74] Susan Schmidt Bies, "Strengthening the Financial System of the 21st Century: An Agenda for Europe and the United States," Speech at the Symposium on Building the Financial System of the 21st Century: An Agenda for Europe and the United States, Rüschlikon, Switzerland, February 28, 2002.
[75] Sharon Brown-Hruska, "Targeted Regulation of Derivatives Markets," Keynote Address at the New York City Bar Center, December 9, 2005.
[76] Ibid.
[77] Ananth Madhavan, David Porter, and Daniel Weaver, "Should securities markets be transparent?," *Journal of Financial Markets* 8 (2005): 266-288.

potential to reduce the tendency to withdraw liquidity during market downturns."[78] This is consistent with Lang, Lins, and Maffett's claim that the limited transparency afforded by accounting standards (when implemented well) can enhance liquidity.[79]

On the other hand, Madhavan, Porter, and Weaver leverage the imposition of public disclosure requirements on the Toronto Stock Exchange to find that increased transparency actually reduced liquidity in the stock market. [80] Pre-trade transparency, in this case, was associated with an increase in trade execution costs and market volatility. Laganá et al. develop a model of post-trade disclosure that leads them to conclude that, "in a world characterized by constraints (of foresight, liquidity and capital), the real-time observation of high turnover and falling prices in a bond that seldom trades is more likely to motivate a seller than a buyer … Against this background, real-time post-trade transparency is unlikely to improve systemic liquidity."[81] While Laganá et al. concede that (contra Madhavan, Porter, and Weaver) pre-trade transparency might marginally increase search liquidity, they contend that increased transparency has the potential to reduce search liquidity if those disclosures prompt the market to front run a firm's sale of an asset whose value is falling and risk rising.[82] The ambiguous relationship between increased transparency and market liquidity was reflected in debates over enhanced transparency in the securities market in 2005: Although the SEC, the UK Office of Fair Trading, and IOSCO supported increased transparency, the Securities Investment Board opposed

[78] Mark Lang and Mark Maffett, "Transparency and liquidity uncertainty in crisis periods," *Journal of Accounting and Economics* 52 (2011): 102.
[79] Mark Lang, Karl V. Lins, and Mark Maffett, "Transparency, Liquidity, and Valuation: International Evidence on When Transparency Matters Most," *Journal of Accounting Research* 50:3 (2009): 734.
[80] Madhavan, Porter, and Weaver, "Should securities markets be transparent?" 266-288.
[81] Laganá et al., *Implications for Liquidity*, 21.
[82] Ibid.

it out of fear that if market makers were to publicly disclose information relating to their positions, liquidity would be reduced. [83]

In the case of derivatives markets, however, regulators saw opaque derivatives markets as an acceptable price to pay for enhanced liquidity in the financial system more generally. In the view of regulators in the lead-up to the crisis, imposing greater transparency on OTC markets risked their profitability and jeopardized the important role they played in stabilizing the financial system. The European Central Bank (and others) distinguish between "search liquidity," which refers to the ability of sellers of particular assets to find willing buyers quickly and at a common price, and "systemic liquidity," which refers to the ability to find willing buyers and sellers in the financial system as a whole.[84] In the lead-up to the financial crisis, regulators prioritized systemic liquidity, and made the case that it could exist in spite of – and even because of – opaque derivatives markets.

To make sense of this perspective, it is important to understand the constitutive role liquidity plays in modern financial markets. Markets are liquid if there is a seller for every buyer and vice versa, so that sales and purchases can be made immediately, and when the forced liquidation of assets by one seller does not affect the overall price level in the market. [85] In liquid markets, prices are determined by supply and demand and reflect the average valuation of assets across all traders in the market. The standardized valuation practices discussed in Chapter 3, in conjunction with the practices of counterparty confidence analyzed in Chapter 5, are prerequisites of market liquidity. As Fed Governor Kevin Warsh put it, "Liquidity exists when

[83] Madhavan, Porter, and Weaver, "Should securities markets be transparent?" 267.
[84] Laganá et al, *Implications for Liquidity*, 4.
[85] Ibid., 9.

investors are confident and willing to assume risks. And liquidity persists when risks are quantifiable and investors are creditworthy."[86] Liquidity has taken on particular significance in the contemporary era of decentralized financial networks, where many transactions take place outside of regulated exchanges and are not recorded on banks' balance sheets, as liquid markets – rather than banks – now play a key role in determining asset prices.[87]

The importance of liquidity to market participants is reflected in the existence of a "liquidity premium" attached to assets for which the market is comparatively illiquid; this premium is the additional cost a borrower or purchaser of a derivative must pay because the asset in question cannot easily be turned into cash.[88] The importance of liquidity to regulators is evidenced through central banks' role as lenders of last resort: providers of emergency liquidity in times of crisis.[89] Liquidity is valued by market regulators because liquid markets are, at least in the short term, predictable and ordered markets. In this sense, liquidity functions as something of a substitute for full transparency via disclosure; as long as the market is liquid, regulators can justify their lack of centralized control, since the price mechanism serves to govern the workings of the market. Liquid markets are legible to their participants, if not to outside spectators, and regulators were quick to equate transparency with liquidity.[90]

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[86] Kevin Warsh, "Financial Market Developments," Speech to the State University of New York's Albany School of Business, Albany, New York, September 21, 2007.
[87] Donald Kohn, "The Evolving Nature of the Financial System: Financial Crises and the Role of the Central Bank," Speech at the Conference on New Directions for Understanding Systemic Risk, New York, May 18, 2006.
[88] Laganá et al., *Implications for Liquidity*, 6.
[89] In my core body of derivatives-related documents from the Bank of England and the Federal Reserve, references to "liquidity" refer to central banks' liquidity provision far more often than to the liquidity of markets for particular financial assets or to the liquidity of the financial system as a whole.
[90] E.g., "The more transparent a marketplace, the more liquid it is, the more competitive it is and the lower the costs for corporations that use derivatives to hedge their risks." (Gary Gensler, "OTC Derivatives Reform," Remarks at Women in Housing and Finance, no location given, March 2, 2010.)

This equation (or perhaps conflation) of liquidity and transparency provided the backdrop for their confidence that "market discipline" would ensure a measure of transparency: the success of derivatives markets in terms of their volume and growth constituted evidence for the market's evident liquidity, and regulators assumed that this could not have happened in the absence of some measure of transparency within the market. To the extent that transparency is a means, not an end of governance, in the case of OTC derivatives, regulators were largely content to accept decentralized control through the price mechanism as an alternative means to the end of liquid financial markets. As Greenspan starkly put it back in 1997: "In the case of the institutional off-exchange derivatives markets, it seems abundantly clear that private market regulation is quite effectively and efficiently achieving what have been identified as the public policy objectives of government regulation. I am aware of no evidence that the prices of OTC contracts have been manipulated. Participants in these markets have been savvy enough to limit their activity to contracts that are very difficult to manipulate."[91]

IV. Authoritative Practices of (Limited) Market Transparency

As noted above, regulators from multiple agencies espoused confidence in the ability of voluntary practices and market discipline to provide them with a limited window into the risks, size, and composition of the OTC market. This confidence was not wholly unsubstantiated: Regulators referenced a series of market practices – most of them developed by the market itself – as providing evidence of the market's ability to autonomously generate a measure of transparency. Like risk and pricing models, these practices both enabled the growth and development of the market and reassured regulators of the derivatives industry's ability to

[91] Alan Greenspan, "Government regulation and derivative contracts," Speech at the Financial Markets Conference of the Federal Reserve Bank of Atlanta, Coral Gables, Florida, February 21, 1997.

regulate itself through voluntary practices and market discipline. Voluntary central clearing, electronic settlement, disclosure of risks under the Basel Accord, and standardized methods of accounting were all cited as contributing to OTC market legibility. This section will discuss the first three of these practices briefly, before turning to the standardized accounting method that would prove to be the weakest reed during the 2007-2009 financial crisis by regulators' own admission during and after the crisis.

A. Electronic trading systems

Following the collapse of LTCM, the President's Work Group identified the absence of electronic settlement for OTC swaps as an impediment to smoothly functioning swaps markets in their 1999 report to Congress.[92] Laurence Meyer at the Fed concurred, noted that, "Currently, settling derivatives transactions requires lots of paper and manual labor. […] Even electronically generated confirmations often must be manually verified by counterparties. Many confirmations are faxed between counterparties. […] Not surprisingly, the result has been significant backlogs. Active dealers report hundreds of unconfirmed trades. A small but significant share may be outstanding ninety days or more."[93] In the late 1990s, participants in the swaps markets typically communicated via telephone and fax, and the use of electronic confirmation was very limited, since it was rare for both counterparties to use the limited available systems. Occurring with no electronic record, these contracts were often wholly invisible to regulators and those not party to the contract. Moreover, the resulting backlog hindered the liquidity of the swaps market. However, voluntary use of electronic confirmation and settlement systems grew significantly in

[92] The President's Working Group on Financial Markets, *Over-the-Counter Derivatives Markets and the Commodity Exchange Act,* November 1999, 13-14.
[93] Laurence H. Meyer, "Strengthening Risk Management for Derivatives," Speech before the Derivatives Risk Management Symposium at Fordham University School of Law's Institute on Law and Financial Services, New York, February 25, 2000.

the 2000s, and regulators cited these systems approvingly as enhancing market liquidity[94] and allowing bank supervisors to "monitor the [OTC] industry's progress."[95] An electronic record of trades, while falling well short of mandatory disclosures of trades, nonetheless made the market more tractable – and at least potentially legible – than it had been before.

B. Voluntary central clearing

Beginning in the late 1990s, derivatives industry participants had begun using central clearinghouses to reduce counterparty risk associated with some more common forms of derivatives, such as interest rate swaps. This development is discussed in greater detail in Chapter 5 and therefore is not dealt with in any detail in the present chapter, but the voluntary use of central clearing was a second industry practice that regulators referenced as enhancing derivatives market transparency. [96]

C. Disclosure of risk positions and strategies

In addition to specifying VaR-style strategies for measuring market risk, Pillar III of the Basel II Capital Accord (2001) recommended (subject to national enforcement) that banks publicly disclose both their capital ratios and more extensive information about their risk measurement and management practices. While noting that more information is not always better – especially with banks allowed to use internal risk models to calculate their risk exposure – Fed Vice Chair Richard Ferguson nonetheless described these limited disclosure requirements as

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[94] Bernanke, "Regulation and Financial Innovation."
[95] Donald Kohn, "Financial Stability: Preventing and Managing Crises," Speech at the Exchequer Club Luncheon, Washington, DC, February 21, 2007.
[96] Born, "Remarks at Fordham University." See also: Randall Kroszner, "Central Counterparty Clearing: History, Innovation, and Regulation," Speech at the European Central Bank and Federal Reserve Bank of Chicago Joint Conference on Issues Related to Central Counterparty Clearing, Frankfurt, April 3, 2006.

making an important contribution to the Fed's oversight ability.[97] Six years later, Bernanke agreed, stating that Pillar III disclosures "make banks more transparent to financial markets and thereby improve market discipline"[98] and Susan Schmidt Bies identified them as "a key component of improving market transparency."[99]

D. Accounting standards and mark-to-market pricing

Accounting standards – as dry and technical as they may seem – represented the most significant authoritative practice in the area of transparency and liquidity. Tim Büthe and Walter Mattli have effectively dispelled the notion that the dry and technical is not also politically salient in their detailed analysis of private authority, in which international accounting organizations play a starring role. As Büthe and Mattli observe, "Seemingly technical, these standards create incentives for firms to engage in some activities and to avoid others, as well as to choose particular means in pursuit of a given goal; they thus shape the behavior of firms and consequently important aspects of a country's political economy."[100] In this chapter, the focus is on still another facet of accounting standards' political nature: how they served to reassure regulators of market liquidity – and later compounded the financial crisis.

The derivatives-related crises of the 1990s[101] attuned lawmakers and regulators to the opacity of derivatives markets and the inadequacies of a lack of standardized accounting

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[97] Roger Ferguson, "Convergence of Regulatory Standards: A Work in Progress," Speech at the Institute of International Bankers, Washington, DC, March 6, 2006; see also: Laurence Meyer, "The New Basel Capital Proposal," Speech at the Annual Washington Conference of the Institute for International Bankers, Washington, DC, March 5, 2001; Susan Schmidt Bies, "Effective Market Discipline: The Role of Auditors, Companies, and Analysts," Speech at the Conference on Market Discipline, Federal Reserve Bank of Chicago, Chicago, October 31, 2003.

[98] Ben Bernanke, "Modern Risk Management and Banking Supervision," Speech at the Stonier Graduate School of Banking, Washington, DC, June 12, 2006. See also: Kroszner, "Innovation, Information, and Regulation."

[99] Bies, "Strengthening the Financial System."

[100] Tim Büthe and Walter Mattli, *The New Global Rulers: The Privatization of Regulation in the World Economy,* (Princeton: Princeton University Press, 2011): 227-228.

[101] See Chapter 2, Section VI for more detail about these crises and how regulators responded to them.

practices. As SEC Chair Arthur Levitt testified before Congress in 1999, "In the context of derivatives, users of financial statements have complained that the current accounting, to the contrary, is incomprehensible and opaque […] Current accounting conventions for derivatives and hedging fail these three tests [credible, useful, serve investors]: they have not kept pace with the developments of the markets and with the extraordinary growth in the use of derivatives and market risk management techniques."[102] The proliferation of new types of derivative transactions made possible by advances in risk and pricing models –as well as the exemption of OTC markets from regulatory oversight – resulted in a great deal of inconsistency in how (and whether) these transactions were included on banks' and end-users' balance sheets.

In response to these concerns by both industry participants and regulators, the Financial Accounting Standards Board (FASB), a private US standard-setting organization, began developing a new set of accounting practices for derivatives. Members of the FASB are generally Certified Public Accountants and other relevant experts, and they work closely with financial market participants in their development of accounting standards for various assets and institutions, which are then incorporated into official regulation by the SEC.[103] The FASB's standard-setting process was regarded as authoritative by both financial market participants, for whom accounting standards were an important constitutive market practice, and by regulators. For example, a comment letter submitted by General Motors Corporation to the FASB stated, "[We] believe that the proposed standard, in its current state, represents a significant improvement to the accounting model for derivatives and hedging activities and we support its

[102] Arthur Levitt, "House testimony concerning FASB's proposed accounting rules for derivative financial contracts," Testimony before the Subcommittee on Capital Markets, Securities, and Government Sponsored Enterprises, US House of Representatives, October 1, 1997.
[103] Mattli and Büthe, "Global Private Governance," 239.

issuance […]"[104] The SEC, too, endorsed the development of new accounting standards for derivatives, noting that, "Establishing accounting standards that provide relevant and reliable financial information to investors should make the markets and the allocation of capital among entities more efficient."[105] The Fed was somewhat more hesitant about the FASB proposal, noting that it "takes a first step toward enhancing fair value disclosures related to the reliability of fair value estimates," but that additional disclosures should also be considered by the SEC.[106]

In September 2006, the FASB finally released SFAS 157 "Fair Value Measurements" which provided guidance to companies about how to measure and report derivatives transactions, and in February of 2007, they supplemented this with SFAS 159 "The Fair Value Option for Financial Assets and Liabilities," which elaborated on what kinds of assets could be valued using this method.[107] These recommendations standardized what had developed as a common market practice for accounting for derivatives: fair value accounting. Fair value accounting involves valuing assets relative to their market prices rather than basing estimates on historical data. These market prices could either be observed directly or modeled based on relevant parameters, depending on the liquidity and transparency of the market in question.[108] The use of fair value

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[104] Peter Bible, "Letter from Peter R. Bible, Chief Accounting Officer, General Motors Corporation, to Mr. Timothy S. Lucas, Director of FASB Research and Technical Activities, August 1, 1997. Qtd. in Levitt 1997.
[105] Levitt, "House testimony concerning FASB's proposed accounting rules."
[106] Susan Schmidt Bies, "Fair Value Accounting," Remarks to the International Association of Credit Portfolio Managers General Meeting, New York, November 18, 2004. See also: Bies, "Strengthening the Financial System."
[107] David Easley and Maureen O'Hara, "Liquidity and valuation in an uncertain world," *Journal of Financial Economics* 97 (2010): 3.
[108] More specifically: "Fair value hierarchy prioritises the inputs to valuation techniques used to measure fair value. According to US GAAP, level 1 valuation requires observable prices for the same instrument in liquid markets. When observable prices are unavailable for the valuation date, level 2 valuation allows the use of prices on nearby dates, or the use of arbitrage-type valuation models that use the observable prices of other financial instruments or available indices. For instruments for which levels 1 and 2 valuations inputs are not available, level 3 valuation allows the use of theoretical valuation models that use as inputs various relevant fundamental parameters ("mark-to-model" approach). As valuation moves from market prices to mark-to-model valuation, fair value accounting becomes less transparent and increasingly dependent on judgment, model assumptions and parameters, posing reliability challenges to which markets, particularly under distress, are sensitive." (Jaime Caruana and Ceyla

gained significance as derivatives became widespread since alternative accounting practices based in historical price data (e.g., accounting at cost) had been inadequate, given the short length of time many derivative products had been on the market.

Fair value accounting was also adopted by the International Accounting Standards Board (IASB) as the recommended approach for derivatives in International Accounting Standard 39 (IAS 39). The IASB had been founded following the Asian financial crisis to enhance the transparency of global markets, and in both form and recommendations, was closely modeled after the FASB. As Büthe and Mattli note in reference to fair value standards, "In several recent projects […] the IASB has adopted US standards as international standards virtually without change, even in the face of European opposition."[109] Fair value accounting was not without its critics, both in the US and Europe, because marking to market causes asset valuations to be highly vulnerable to market volatility compared to the relatively stable practice of valuing assets based on historical data.[110] IAS 39 was opposed by many European banks and insurance companies out of a concern that its required use would increase the volatility of their balance sheets, compared to the more stable historic cost accounting practices they preferred.[111] Nonetheless, the IASB had a very close relationship with both the FASB and the SEC in the United States and, prior to the crisis, was deferential to their preferences.[112] Moreover, governors and deputy governors of European central banks credited fair value accounting as enhancing the

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Pazarbasioglu, "Revisiting valuation practices throughout the business cycle: some symmetry is needed," in *Valuation and Financial Stability,* Banque de France Financial Stability Review 12, October 2008, 18-19.)

[109] Büthe and Mattli, *The New Global Rulers*, 99.

[110] Andreas Nölke, "The politics of accounting regulation: responses to the subprime crisis," in *Global Finance in Crisis: The Politics of International Regulatory Change,* eds. Eric Helleiner, Stefano Pagliari, and Hubert Zimmerman (New York: Routledge, 2010), 37.

[111] Mattli and Büthe, "Global Private Governance," 258.

[112] Nölke, "The politics of accounting regulation," 38. See also Mattli and Büthe, "Global Private Governance," 250.

transparency of OTC derivatives markets, after these standards were adopted by the EU and other jurisdictions in 2005.[113] The favorable analysis by Christian Noyer, governor of the Banque de France, is illustrative of this perspective:

> [T]he move to mark-to-market accounting financial reporting has fostered transparency and a more timely recognition of risk exposures, and has contributed to sharpening market discipline. The logic underpinning this change is basically that accurate and meaningful financial statements need to reflect the value at which balance sheet items could be bought or sold in current transactions between willing parties. This, in turn, enables market participants, investors and supervisors to gain a better insight into the actual risk profiles of financial institutions.[114]

Despite the limitations of fair value accounting for derivatives, the regulatory consensus was summed up José Viñals, deputy governor of the Banco de España, who stated that it was "the only method capable of offering a transparent, relevant and reliable valuation."[115]

V. The Failure of Both Liquidity and Transparency Practices During the Financial Crisis

A. Markets become both opaque and illiquid

Regulators spoke approvingly of derivatives' contribution to financial market liquidity, inferring a measure of liquidity in the OTC market that they could see only dimly through the transparency-related practices discussed in the preceding section. In reality, liquidity does not guarantee market stability. Although the ECB referenced the "almost uninhibited liquidity" of credit derivatives in 2006, they also noted that, "Almost all major financial crises, such as the Tequila crisis (1994-95), the Asian financial crisis (1997-98) and the LTCM debacle (1998), started off life as a trading liquidity crisis in markets or sectors that were considered reasonably

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[113] Avinash Persaud, "Regulation, valuation and systemic liquidity," in *Valuation and Financial Stability,* Banque de France Financial Stability Review 12, October 2008: 75.
[114] Christian Noyer, "Valuation challenges in a changing environment," in *Valuation and Financial Stability,* Banque de France Financial Stability Review 12, October 2008: 3.
[115] José Viñals, "Improving fair value accounting," in *Valuation and Financial Stability,* Banque de France Financial Stability Review 12, October 2008: 123.

liquid."[116] While the sudden seizing up of trading activity in a formerly liquid market was not inconceivable, few regulators anticipated the depth or severity of the liquidity freeze that began in 2007 as a wave of defaults – correlated in ways wholly unanticipated by risk and asset pricing models – swept through the US housing market, prompting fire sales of derivatives contracts written on bundles of these mortgages. Risk limits were quickly breached, counterparty defaults were common and insufficiently collateralized, and financial markets ceased to function normally.

The causes and drivers of the financial crisis are many and the goal of this chapter – and this dissertation more broadly – is not to add to the cottage industry of crisis explainers, but rather to focus on how particular sets of practices helped constitute a crisis-prone market, and in so doing, limited regulators' post-crisis options. While debates persist over whether key large financial institutions were rendered insolvent or merely temporarily illiquid (a debate with potentially important implications for the Fed's purchase of distressed assets), regulators' speeches and Congressional testimony make clear that, at a minimum, OTC derivatives were badly illiquid. Fed Governor Randall Kroszner observed in late 2007:

> In some financial markets, however, the price discovery process appears to have actually broken down. In particular, I am referring to markets for structured credit products (for example, collateralized loan obligations and collateralized debt obligations) that are often complex and opaque, as well as instruments that are linked to these structured products, such as asset-backed commercial paper.[117]

Kroszner attributed the breakdown in price discovery to a lack of transparency in both credit derivatives themselves as well as in the market more generally.[118] He was not alone in his

[116] Laganá et al., *Implications for Liquidity*, 7.
[117] Kroszner, "Recent Events."
[118] "A second, related factor contributing to the breakdown in price discovery is the recognition by investors of complexity and lack of transparency, both in the instruments themselves and in the markets more broadly. The complex structures of the innovative instruments, and the lack of transparency with regard to the underlying assets

belated realization of the extent to which opaque derivatives markets fueled market illiquidity. The International Monetary Fund and the Financial Stability Forum also blamed the crisis, at least in part, in insufficient transparency in large issues of asset-backed securities, such as collateralized debt obligations, in their 2008 analyses of the crisis.[119] As the once-uninhibited liquidity of derivatives markets that regulators and lawmakers had accepted in lieu of mandating greater transparency abruptly dried up, the opacity of derivatives transactions – to both counterparties and regulators – was starkly revealed.

B. Marking to market when there is no market

And what of the practices that regulators had cited as evidence that they had at least some knowledge of OTC markets pre-crisis? Like Value-at-Risk, fair value accounting practices worked reasonably well during normal times. Although derivative dealers continued to post bid and offer prices for contracts, there was very little trading at these prices: the basic market requirement of liquidity had vanished. Easley and O'Hara attribute this illiquidity to pervasive uncertainty in the market, observing that:

> Such a scenario is hard to reconcile with our standard models of asset price formation in which supply and demand inevitably find an equilibrium price, or even with microstructure models that allow for bid and ask prices to evolve separately […] Such an outcome is inconsistent with the typical view in financial markets that at a given price 'if you are not a buyer then you are a seller,' and instead reflects a reality in which traders will apparently neither buy nor sell even

backing these instruments, made them more difficult and costly to value than many investors originally thought. At the same time, many investors realized that it was difficult to identify where the risks were lodged. This uncertainty, of course, is one of the trade-offs of a more market-intermediated finance system in which risks are more widely dispersed rather than concentrated in the banking system. As problems in the subprime mortgage market became more apparent, investors became unwilling to purchase products that could have any exposure not only to subprime mortgages, but to housing-related assets and other structured products more generally. Put simply, investors suddenly realized that they were much less informed than they originally thought. In these circumstances, it is not necessarily surprising that investors pulled back from purchasing certain instruments at any price." (Ibid.)

[119] Pagano and Volpin, "Securitization, Transparency, and Liquidity," 2417.

> at drastically different prices […] In the presence of uncertainty, the investor neither buys nor sells, and the market falters.[120]

Under these market conditions, fair value accounting – which requires that assets be valued relative to their market prices – fails to reflect what it is intended to in liberal economics' model of liquid, self-regulating markets. Prices are no longer the average of function of decentralized market forces but rather reflect individual beliefs about best- and worst-case possible outcomes under conditions of uncertainty.[121]

Nonetheless, as Viñals observed in 2008, there were few alternative methods for valuing derivatives other than fair value accounting standards. As a result financial institutions continued to rely on them and when market prices for derivatives contracts plunged (reflecting sellers' worst-case scenario beliefs), they were forced to sell these assets at lower prices to keep their portfolios balanced. This, in turn, further depressed the prices of financial assets, resulting in a vicious, pro-cyclical circle of devaluations. As a result, fair value accounting practices not only failed to keep markets transparent and liquid; their widespread use actively contributed to the market illiquidity that came to define the financial crisis. In an illiquid market, fair values

[120] Easley and O'Hara, "Liquidity and valuation," 1; 13. They go on to develop a model in which market actors are unable to rank their preferences over asset portfolios containing credit derivatives due to their uncertainty about the market for these products and use this to show that under such conditions, trading would cease – even if bid and offer prices are posted and visible to market participants.
[121] Ibid., 3.

became increasingly difficult to impute at all.[122] Central bankers,[123] market participants,[124] and political economists[125] were explicit in identifying IAS 39 (the international standard requiring fair value accounting of derivatives) and mark-to-market accounting practices more generally as an important driver of the financial crisis.

The consensus between international and US accounting standards began to break down in April 2009 when the FASB issued a new set of recommendations reaffirming that assets should continue to be marked to market, even in inactive markets, as long as transactions were "orderly" (i.e., not forced liquidation sales or distressed sales).[126] In contrast, the IASB opted not to follow this guidance, given the difficulty of implementing it during the crisis.[127] The new FASB guidance hinged in being able to distinguish "inactive" markets from "distressed" markets and, as Noyer observed, "financial firms could make substantially different interpretations of

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[122] Ibid., 8

[123] "The sharp falls in asset prices, in particular structured and securitized products, combined with the solvency regulations and internal risk management at regulated financial institutions gave rise to endogenous market price dynamics that sustained or amplified the initial shocks. Indeed, given accounting standards, as a result of the growth in securitization and the rise in the volume of marked-to-market instruments, falling market values showed up more directly and prominently in balance sheets, putting pressure on profit and loss and/or on equity. These dynamics together with involuntary balance sheet expansion (e.g. as credit lines to structured investment vehicles – SIVs or conduits – were activated and as risk exposures initially planned to be sold had to be warehoused) meant that regulated financial institutions had to raise capital and/or sell assets, thus further depressing market value." (Noyer, "Valuation challenges," iv.)

[124] Avinash Persaud of Intelligence Capital Limited, a wealth management company, states: "It is a commonly held view that International Financial Reporting Standards (IFRSs), adopted by the European Union in 2005 and by other jurisdictions, compounded the recent financial crisis." He does, however, note that accountants are not solely to blame, attributing the crisis to "a mode of thinking about financial risk that the accountants, bankers and regulators have all followed … a Faustian bargain: greater liquidity, lower risk premia and the appearance of sophisticated risk management in quiet times, at the expense of systemic liquidity when markets were under stress." (Persaud, "Regulation, valuation and systemic liquidity," 76-77.)

[125] "Arguably, FVA standards thus have contributed to the depth of the crisis, by forcing companies to sell assets on already depressed markets" (Nölke, "The politics of accounting regulation," 37).

[126] FASB, *Proposed FASB Staff Position on Statement 157 (FSP FAS 157-e): Guidance on Determining Whether a Market is Active and a Transaction Is Not Distressed*, 2009. The guidance distinguished between inactive markets (those with few transactions, quoted prices that do not reflect current information, abnormally high liquidity premia, little public information, and/or unusually high bid-ask spreads) and distressed sales of assets (no time to allow for marketing the asset and a single bidder), holding that fair value standards should hold in inactive markets, though not in distressed ones (3-4).

[127] Easley and O'Hara, "Liquidity and valuation," 3.

what accounting standard meant by 'active market' and 'distress sale.' When the market functioning is impaired, market participants have to make subjective judgements. This could lead to wide dispersion of estimate values for fairly similar instruments, which only adds to uncertainty."[128]

The failure of accounting standards was magnified by the practice of risk disclosures that regulators had viewed so positively prior to the crisis. As Noyer observed:

> [T]he crisis also revealed that unclear, uneven or inadequate disclosure of risk exposures compounded uncertainty, fueled market illiquidity and contributed to depressing asset values. This was most obvious for off-balance sheet vehicles, which were used by regulated entities to off load risk, thereby creating an undue sense of reduced exposure. Problems associated with insufficient disclosure were also patent with respect to valuation practices themselves. The uneven, barely comparable disclosures made by financial firms about how they were valuing complex products and the margins of error surrounding these point estimates, especially as markets became illiquid, magnified uncertainty about the location of risks in the system and contributed to bringing some markets to a halt and spreading risk aversion across otherwise well-functioning funding markets. [129]

In a story familiar from Chapter 3, the very practices that regulators had identified as markers of the derivatives industry's capacity for self-governance and internal (if not external) transparency ended up not only fostering liquidity but actively hindered it.

VI. Shining a Light on OTC Markets Post-Crisis

A. Calls for greater transparency

In the midst and immediate aftermath of the financial crisis, regulators across multiple agencies and central banks in the US and Europe were unanimous in their call for greater transparency in OTC markets. The SEC, which had never been as solidly convinced of the

[128] Noyer, "Valuation challenges," iii.
[129] Ibid.

unambiguous benefits of OTC markets as the CFTC, was unambiguous in asking Congress to permit greater disclosure requirements:

> The current regulatory framework has permitted certain opaque securities-related OTC derivatives markets to develop outside of investor protection provisions of the securities laws. […] The SEC's enforcement efforts have been seriously complicated by the lack of a mechanism for promptly obtaining critical information — who traded, how much, and when — that is complete and accurate. In addition, the SEC believes that it is important in the OTC derivatives market, as in the market for securities generally, that parties to transactions have access to financial information and other disclosures so they can evaluate the risks relating to a particular investment to make more informed investment decisions and can value and evaluate their OTC derivatives and their counterparty exposures.[130]

The Federal Reserve, too, testified before the Senate about the importance of enhanced OTC transparency to both regulators and market participants, "Throughout the debates about reform of the OTC derivatives market, a persistent theme has been concern that the market is opaque. Discussions of market transparency generally recognize the multiple audiences that seek information about a market – market participants, the public, and authorities – and the multiple dimensions of transparency itself – prices, volumes, and positions […]The Board believes that policymakers should pursue the goal of prompt dissemination of prices and other trade information for standardized contracts, regardless of the trading venue."[131] Earlier that spring,

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[130] Schapiro "Senate Testimony Concerning Regulation of Over-the-Counter Derivatives."

[131] Patricia White, "Over-the-counter derivatives," Testimony before the Subcommittee on Securities, Insurance, and Investment, Committee on Banking, Housing, and Urban Affairs, US Senate, June 22, 2009. See also Randall Krozsner's speech at a risk conference in Geneva in 2008: "for quality assurance to be effective, some of the products traded in financial markets have to become simpler and more transparent. Product complexity and a lack of transparency are at the root of many of the problems that have emerged, especially in the markets for securitizations and structured credit products […] a recovery in the market for mortgage-backed securities (MBSs) will require greater transparency and less complexity, and importantly, comprehensive and standardized loan-level data that will allow more independent credit analysis. For example, the structures of cash flows from mortgage payments in the pool to the various tranches of MBSs should be much less complex than some of those created in recent years, and securitization contracts will need to be made more homogeneous so as to allow greater comparability of risk profiles across deals and perhaps promote more robust liquidity." (Randall Kroszner, "Assessing the Potential for Instability in Financial Markets," Speech at the Risk Minds Conference, International Center for Business Information, Geneva, December 8, 2008.)

Ben Bernanke had acknowledged that although the Federal Reserve Bank of New York had been leading a "major joint initiative […] to improve arrangements for clearing and settling credit default swaps and other over-the-counter derivatives," that "the infrastructure for managing these derivatives is still not as efficient or transparent as that for more mature instruments."[132] The Fed was especially concerned with being able to monitor firms' liquidity positions.[133]

With Gary Gensler at the helm of the CFTC as of May 26, 2009, the commission took a much stronger position on transparency in OTC markets than they had in the lead-up to the financial crisis Gensler at the helm means much more talk of transparency in OTC markets. Gensler echoed this call for greater OTC market transparency, calling for it to apply not just to the credit default swaps and CDOs that received the bulk of the attention during the crisis, but also to interest rate, currency, and commodity swaps which he identified as equally opaque, concluding: "We should shine the same light and lower risk on all OTC derivatives."[134] In a later speech, he referenced Brandeis's preferred disinfectant, asserting that, "regulatory reform must

[132] Ben Bernanke, "Financial Reform to Address Systemic Risk," Speech at the Council on Foreign Relations, Washington, DC, March 10, 2009. Bernanke elaborated on this theme in a speech at the post-crisis Squam Lake Conference in 2010, underscoring again the need for greater transparency in OTC markets: "The Federal Reserve has long supported efforts to improve the infrastructure for the clearing and settlement of derivatives. For example, the Federal Reserve Bank of New York was a leader in improving the documentation, settlement, and transparency of credit default swaps. The Federal Reserve has also encouraged the development of industry warehouse utilities for the collection of trade information on derivatives. Although individually customized derivatives still have an important place in the financial marketplace, we believe that systemic risk can be reduced in derivative markets by increasing the standardization of contracts and by requiring standardized derivatives to be cleared through well-regulated central counterparties. In addition, it is also critical that relevant financial regulators have access to detailed information on the derivatives markets–including both standardized and customized transactions–so that they can assess the extent to which derivatives trades might concentrate risk or transmit localized or regional shocks throughout the financial system." (Ben Bernanke, "Remarks on 'The Squam Lake Report: Fixing the Financial System,'" Speech at the Squam Lake Conference, New York, June 16, 2010.)

[133] Ben Bernanke, "Lessons of the Financial Crisis for Banking Supervision," Speech given at the Federal Reserve Bank of Chicago Conference on Bank Structure and Competition, Chicago, May 7, 2009.

[134] Gary Gensler, "OTC Derivatives Regulation," Speech before the European Commission, Sept. 25, 2009.

bring sunshine to as many derivatives transactions as possible by moving them into regulated, transparent trading venues."[135]

B. Practices of post-crisis market transparency

While there was widespread regulatory consensus on the need for greater transparency, the post-crisis implementation and enforcement of practices to make OTC markets more legible has been uneven. In the aftermath of the crisis, both public and private regulators issued proposals for improved derivatives regulation.[136] However, these proposals are dependent on national level enforcement and different jurisdictions have proceeded on different timelines, with the US moving much more quickly than the EU in implementing regulation. Nonetheless, even in the US, the rule-making process necessary for the enforcement of many of these practices has been very slow.

1. Trade reporting

One relatively straightforward change in market practices has been the increased use of trade depository and the publication of data based on depositories' records. The Depository Trust Clearing Corporation's (DTCC) Trade Information Warehouse serves as a repository for contracts and increasing numbers of credit default swaps are contained in their electronic record, which contains information about the underlying securities or risks associated with derivatives, the maturities, and whether they are index or single-name contracts.[137] Recording OTC transactions with the DTCC is voluntary, but following calls by the Federal Reserve and the

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[135] Gary Gensler, "OTC Derivatives Reform," Speech at the Exchequer Club of Washington, Washington, DC, November 18, 2009. See also: Jill Sommers, "The U.S. Regulatory Landscape: The View from Washington," Speech at the FIA/FOA International Derivatives Expo, London, June 9, 2009.

[136] See Chapter 5 for a more detailed discussion of the regulatory proposals to come out of the G20 Pittsburgh Summit, for example.

[137] Patrick Parkinson, "Credit derivatives," Testimony before the Committee on Agriculture, U.S. House of Representatives, November 20, 2008.

President's Working Group for more comprehensive use of trade reporting and the public reporting of CDS contract information,[138] major dealers committed to bank supervisors that they would begin recording all their CDS trades with the DTCC.[139] Both the Federal Reserve and the ECB viewed this change as having the potential to make OTC markets significantly more transparent, especially if trade repositories are created for other kinds of OTC assets besides credit derivatives. The ECB, for example, stated, "Trade repositories, by acting as authoritative registries of key information regarding open over-the-counter (OTC) derivatives trades, provide an effective tool for mitigating the inherent opacity of OTC derivatives markets."[140]

While the ECB went on to state their preference that increased use of trade reporting be "predominantly market-led,"[141] the CFTC, acting under their new authority to regulate swaps under the Dodd-Frank Act, established mandatory swap reporting data requirements for swap counterparties (including central counterparties and swap execution facilities). According to CFTC Commissioner Scott O'Malia, the goal of this new requirement was two-fold: to make data available to market participants to improve transparency and price discovery and to make the market more legible to regulatory authorities in the US[142] By 2015, the FSB found that the

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[138] See, for example, Peter Parkinson's testimony before the House of Representatives in November 2008: "Many market observers have expressed concern about the opaqueness of OTC derivatives markets generally. The Depository Trust Clearing Corporation's (DTCC) Trade Information Warehouse, a contract repository, contains an electronic record of a large and growing share of CDS trades. DTCC recently began publishing aggregate market data based upon these records each week. Information is provided, for example, on index, versus single-name, contracts; reference entities on which the contracts are written; and maturities of contracts. However, these data currently are not comprehensive. The PWG has called for a record of all CDS that are not cleared through a CCP to be retained in the DTCC warehouse or a similar repository and for regulators to have access to the data on CDS housed at CCPs and repositories. Furthermore, the PWG has called for public reporting of prices, trading volumes, and aggregate open interest." (Parkinson, "Credit derivatives.")

[139] White, "Over-the-counter derivatives."

[140] European Central Bank, "Consultation of the Committee of European Securities Regulators on Trade Repositories in the European Union: ECB Contribution," ECB, November 2009: 1.

[141] Ibid.

[142] "The Commission's rulemaking under the Dodd-Frank Act will establish swap data reporting requirements for swap counterparties and regulated entities, including SEFs, designated contract markets ("DCMs"), CCPs, swap data repositories ("SDRs"), SDs, MSPs, and counterparties who are neither SDs nor MSPs. The reporting requirements

majority of its member jurisdictions had implemented some form of OTC reporting requirements.[143]

However, despite regulators' initial optimism, the new reporting requirements have only had a limited effect on OTC transparency. The 2015 FSB report on OTC Derivatives Trade Reporting found a series of limitations to trade reporting practices from a regulatory perspective, including issues with cross-border legal recognition of foreign trade repositories; very limited direct access to trade data for regulators; incommensurable and un-standardized data; and the lack of universal or harmonized trade, product, and institutional identifiers.[144] Vice-Chair of the Fed Stanley Fischer cited and concurred with this report, noting that "inadequate data standards and limitations on authorities' access to trade repository data have prevented the benefits of derivatives trade data reporting from being fully realized."[145]As we will see with post-crisis clearing requirements in the next chapter, national-level enforcement has resulted in market fragmentation, even in areas where this is broad international consensus.

2. Mandated central clearing and swap execution facilities

One of the most significant regulatory changes to come out the 2009 Pittsburgh G20 summit was mandatory central clearing for standardized OTC derivatives. The aim of this

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will provide transaction information to market participants in real-time and comprehensive information to the Commission, the Securities and Exchange Commission ("SEC"), and America's prudential regulators. The fundamental goal of mandatory trade reporting is twofold. First, important swap transaction-level data will be made available to market participants to improve transparency, price discovery, and market integrity. Second, regulatory reporting will ensure that complete data concerning all swaps subject to the Commission's jurisdiction is maintained in SDRs, where it would be available to the Commission and other financial regulators to fulfill their regulatory mandates, including systemic risk mitigation, market monitoring, and market abuse prevention." (Scott O'Malia, Keynote Address at the 7th Annual FIA Asia Derivatives Conference, Singapore, November 30, 2011.)

[143] Financial Stability Board, *Thematic Review on OTC Derivatives Trade Reporting: Peer Review Report,* FSB, November 4, 2015.

[144] Ibid., 7.

[145] Stanley Fischer, "Financial stability and shadow banks – what we don't know could hurt us," Speech at the Financial Stability: Policy Analysis and Data Needs 2015 Financial Stability Conference, Washington DC, December 3, 2015.

recommendation was two-fold: to reduce systemic risk and, per Ben Bernanke, "to improve the transparency of the OTC derivatives markets."[146] Title VII of Dodd-Frank – and cognate legislation in the EU – requires that many of the most common forms of non-exchange-traded derivatives be "cleared" through a clearinghouse that acts as a counterparty to both the buyer and the seller. These clearinghouses are known as central counterparties (CCPs) and because they are required to keep a record of transaction details, including the notional amount of the contract and counterparty information.[147] This information complements that gathered per another requirement of Dodd-Frank: that OTC derivatives be traded through platforms with reporting and settlement functions, known as swap execution facilities (SEFs). The required use of these trading platforms falls short of post-crisis proposals to list credit derivatives on exchanges (a proposal endorsed by James Overdahl at the SEC[148]), but because of the reporting requirements attached to SEFs, it did make the market more legible to regulators. While mandatory clearing has been widely adopted outside of the US, the required use of trading platforms analogous to Dodd-Frank's SEFs is much more limited. Nonetheless, in conjunction with data from clearinghouses, and because of the concentration of the OTC market in the US or with US counterparties, SEF data also contributes to transparency.[149]

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[146] Ben Bernanke, "Clearinghouses, Financial Stability, and Financial Reform," Speech at the 2011 Financial Markets Conference, Stone Mountain, Georgia, April 4, 2011. The risk-management potential and pitfalls of mandatory central clearing are dealt with in detail in Chapter 5, but because central counterparties

[147] Konczal, Milani, and Hwang, *Doomed to Repeat,* 49.

[148] "Exchange trading of credit derivatives would add both pre- and post-trade transparency to the market which could add credibility to the pricing of credit derivatives. Exchange trading could also reduce liquidity risk by providing a centralized market, which would allow participants to better initiate and close out positions efficiently and at the best available prices." (James Overdahl, "Senate Testimony Regarding Reducing Risks and Improving Oversight in the OTC Credit Derivatives Market," Testimony before the Subcommittee on Securities, Insurance, and Investment, Committee on Banking, Housing, and Urban Affairs, United States Senate, July 9, 2008.)

[149] "While payment, clearing, and settlement arrangements can create significant efficiencies and promote transparency in the financial markets, they also may concentrate substantial credit, liquidity, and operational risks." (Ben Bernanke, "Regulatory restructuring," Testimony before the Committee on Financial Services, US House of

In justifying these regulatory changes, US regulators in particular emphasized the necessity of transparency not just from a regulatory perspective but also to industry participants. For example, in his keynote address to the US Chamber of Commerce, Gary Gensler responded to industry concern about the higher amounts of collateral required by CCPs as follows: "Derivatives dealers, however, already charge counterparties for credit extensions when they do not clear their transactions. How can you know that these costs charged by the dealers – embedded and opaque – are less than the margin associated with clearinghouses? At least margin requirements imposed by clearinghouses are transparent to all market participants and subject to review by the appropriate regulator."[150] Gensler elaborated on this market-friendly justification for enhanced transparency requirements at the American Bar Association, stating, "The more transparent a marketplace is, the more liquid it is. The more transparent a marketplace is, the more competitive it is. And the more transparent a marketplace is, the lower the costs for hedgers, borrowers and, ultimately, their customers. The best way to bring transparency is through regulated trading facilities and exchanges. Such centralized trading venues not only bring greater transparency, but increase competition in the markets by encouraging market-making and the provision of liquidity by a greater number of participants." [151]

Whereas prior to the crisis regulators had accepted opaque derivatives markets in exchange for more liquid financial markets (albeit with varying degrees of enthusiasm), after the crisis, they were much more willing to impose transparency on the market – this time in the

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Representatives, Washington, DC, July 24, 2009.) The concentration of risk in CCPs is dealt with in the following chapter.

[150] Gensler, "OTC Derivatives Reform," US Chamber of Commerce.

[151] Gary Gensler, "OTC Derivatives Reform," Speech at the American Bar Association, Committee on Derivatives and Futures Law, January 29, 2010. Gensler went on to acknowledge that transparency requirements were very unpopular with Wall Street, as they shift the advantage away from the small group of dealer banks who previously were able to concentrate information asymmetrically – and therefore inefficiently – in the market.

name of liquidity.[152] While these new regulatory requirements did require some concessions to industry participants,[153] they nonetheless represented a significant shift in market legibility from the pre-crisis status quo.

3. Whither marking to market?

Conspicuously absent from post-crisis regulatory discourse on transparency are the fair value accounting standards which they had cited as a significant factor in compounding the crisis. The 2008 Financial Stability Report adopted by the G7 did include recommendations related to improving accounting standards for off-balance-sheet vehicles (through which many OTC transactions were conducted) and to improving international convergence, recalling the IASB's failure to adopt the FASB's guidance on "distressed" vs. "inactive markets." This was accomplished in 2011 (at least according to IASB Chair David Tweedie) in 2011 when the IASB collaborated with the FASB in the US to produce IFRS 13 ("Fair Value Measurement"), which harmonizes guidance about how to apply fair-value accounting principles.[154] The new standard does not, however, specify which assets should be measured using this standard, but it does

[152] SEC Chair Mary Shapiro, for example, was unequivocal on the imperative of transparency: "In addition, central clearing for credit default swaps and other OTC derivatives would bring to this market much-needed transparency. Such transparency will enable regulators to better monitor transactions that are effected through the use of a central counterparty. Importantly, central clearing would also mitigate the systemic risks created by OTC derivatives." (Schapiro, "Statement at Treasury.")

[153] Scott O'Malia recounts: "In the end, while not perfect, we negotiated a proposed rule that offers far more flexibility to traders, allowing them to transact in illiquid markets and in large volume without fear of telling the whole market their strategy. This compromise solution does not mandate a limit order book, but will instead allow participants to use a variety of trading systems and platforms, including order books, request for quote systems, and voice-based systems. But, it does require that SEFs maintain an electronic screen that displays all firm and indicative quotes to market participants and so in that way satisfies pre-trade transparency requirements" (Scott O'Malia, "Derivatives Reform: Preparing for Change," Keynote address at the TabbForum, New York, January 25, 2011.)

[154] David Tweedie, "Bringing transparency to financial reporting: towards an improved accounting framework in the aftermath of the credit crisis," in *Valuation and Financial Stability,* Banque de France Financial Stability Review 12, October 2008: 117.

clarify that the "fair value" is the price that would be received to sell that asset on the measurement date, provided there is an orderly market for that asset.

Aside from harmonizing international standards, there was very little contestation of the application of mark-to-market accounting methods to over-the-counter transactions following the financial crisis. As Andreas Nölke concludes, "neither the basic character of accounting standard-setting as a mode of private governance, nor the dominance of the FVA [fair value accounting] paradigm have been challenged in fundamental ways. Instead, changes have been restricted to […] minor caveats in fair value accounting for certain financial instruments."[155] Nölke attributes this continuity to the insulation of the IASB from political pressures and to the dominance of the Anglo-American approach to financial regulation with its deference to investor interests.[156] This explanation is consistent with the broader thesis of this dissertation that regulators have been highly deferential to practices private actors have developed to ensure the market's existence and functioning.

From the perspective of this chapter, this absence of contestation and change of accounting standards is evidence of how thin regulators' confidence in standardized accounting practices was prior to the crisis. Fair value accounting was a relatively recent development in financial markets prior to the crisis, and while regulators cited it approvingly, it is telling that when they committed whole-heartedly to making the OTC market more transparent, mandatory trade reporting, central clearing, and swap execution facilities were much higher priorities than addressing accounting standards. Moreover, it is not clear what, if any, alternative accounting method would derivatives markets more transparent. Like VaR, marking to market works

[155] Nölke, "The politics of accounting regulation," 37.
[156] Ibid., 38.

reasonably well and may even stabilize markets during normal times. As discussed above, the existing alternatives rely on historical data, which, as we know from the previous chapter, is also a faulty basis for valuing derivatives, due to their relatively newness and lack of standardization, as well as endogenous uncertainty which renders history a poor guide for the present, as well as the future. Some scholars and market participants have suggested supplementing fair value accounting with model-based and historic cost valuations,[157] while Sylvie Matherat of the Banque de France advocated for a greater role for central banks and less reliance on private market accounting practices,[158] but there has been very little by way of fundamental challenge to fair value accounting.

VII. Conclusion: the outer darkness

The limited pre-crisis regulation of the OTC derivatives market in the lead-up to the financial crisis was the result of both regulators' tolerance of opacity in exchange for enhanced liquidity and of their acceptance of a set of market practices that provided them with a limited glimpse into the workings of the derivatives market. When these practices exacerbated the crisis, they chose not to push for major changes to those practices. Doing so – at least in the absence of other reforms – would have reflected a continued privileging of the decentralized control of liquidity over transparency-via-disclosure. Instead, regulators leveraged the international consensus that the opacity of the OTC market was a major contributor to the crisis to enact mandatory disclosure requirements, prioritizing transparency and describing it as a means to the end of more liquid markets.

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[157] Franklin Allen and Elena Carletti, "Should financial institutions mark-to-market?" in *Valuation and Financial Stability,* Banque de France Financial Stability Review 12, October 2008: 1.
[158] Sylvie Matherat, "Fair value accounting and financial stability: challenges and dynamics," in *Valuation and Financial Stability,* Banque de France Financial Stability Review 12, October 2008: 53.

Compared with valuation practices, regulators have attempted to enact much more significant changes in the area of transparency and liquidity. While these reforms have certainly made the OTC derivatives market more visible to regulators (and perhaps to market participants) than it was prior to the crisis, the OTC market is still far more opaque than exchange-traded derivatives, let alone bonds or stocks. Having been prohibited from enacting these reforms earlier by the Commodity Futures Modernization Act, the market developed in such a way that the enforcement of these practices now has only had a limited effect. While there is more information available, much of that information is partial, incommensurable with that collected by other facilities and regulatory agencies, and difficult to interpret. The market is more transparent now, but it is far from obvious that it is fully legible to regulatory authorities. The enduring opacity of the OTC market raises the possibility that, in the case of a market that has been allowed to grow complex and entangled in darkness for so long, the belated imposition of transparency-via-disclosure may be too little, too late. Many regulators seem optimistic that with more and better data – if the Dodd-Frank requirements on trade reporting, clearing, and SEFs are enforced more consistently and widely – the market will become more and more legible to them. But the inherent uncertainty of the market, in addition to its complexity and constant innovation, gives cause for doubt. As Scott reminds us, innovative social and human behavior resists attempts at control-through-imposed-transparency.

There is a second reason, too, to be measured in our confidence about regulators' newfound (or at least newly recommitted) zeal for OTC market transparency: the discomfiting possibility that opacity is not just a feature of derivatives, but – at least for some of them – a constitutive property. The starting point of this chapter is the governance puzzle of regulating that which arguably depends on its opacity to remain profitable. If the coarse information

conveyed by a bundle of assets is required for a liquid market in credit derivatives, then mandating greater transparency risks pushing investors further outside the spotlight (however dim) of regulatory scrutiny to ensure the continued profitability of their trading strategies. The continued profitability of the OTC derivatives market even in the face of these regulatory changes suggests this is not universally the case.[159] However, this is insufficient to guarantee that derivatives markets will remain both transparent and profitable. There has been significant variation across national jurisdiction in the timing and precise requirements for trade reporting and for moving particular classes of OTC derivatives to these central clearinghouses, leading to a geographical fragmentation in a market that previously crossed national borders fluidly and limiting US regulators' view of the market as a whole. As CFTC Commissioner J. Christopher Giancarlo noted in late 2014:

> [T]he world's response to the CFTC's newly implemented regulation of the US swaps markets has been swift and stark. The world is voting with its trading book to transact in other markets. According to several studies, global swaps trading has fragmented into US person markets and non-US person markets. Non-US person market participants are curtailing transactions with US counterparties to avoid getting caught up in the CFTC's ill-designed swaps trading rules.[160]

Furthermore, regulators are keenly aware of the aptly named "dark pools" of capital and the possibility that tightening regulations of over-the-counter markets may well drive investors to make use of these unregulated sources of capital and liquidity, undermining their attempts at imposing greater transparency.[161] Moreover, the experience with implementing the disclosure

[159] It is also possible that they have been so limited in their scope as to have had little effect on the industry.
[160] J. Christopher Giancarlo, "Statement from Commissioner J. Christopher Giancarlo: Reconsidering the CFTC's Swaps Trading Rules for Greater Effectiveness in the Global Economy," US Commodity Futures Trading Commission, 2014, http://www.cftc.gov/PressRoom/SpeechesTestimony/giancarlostatement111214.
[161] Elisse Walter, "International Harmonization of Wall Street Reform: Orderly Liquidation, Derivatives, and the Volcker Rule," Testimony before the Committee on Banking, Housing, and Urban Affairs, United States Senate, March 22, 2012. For more on the relationship between derivatives, financial regulation, and dark pools of capital,

and reporting requirements associated with SEFs suggests that this remains a possibility. As Scott O'Malia recounts:

> It was clear that SEFs are prepared to move quickly to meet the new mandates, and they are doing so in a manner that will raise the bar in terms of transparency and competition. It was, however, a process for many SEFs. The product on the screen often represented version 2.0, 3.0 and so on. What came out of the process, we were reminded by participants, is that while the CFTC is dictating the outcome, the rules need to provide flexibility. I believe this is code for: don't apply a futures exchange model and expect it to be equally successful in the swaps market. The swaps market is a less liquid and more customized market. SEF's will provide greater price transparency, but we must protect the market's ability to transact sufficient size without penalty. At the end of the day, we can't claim success if we create a market structure that fractures liquidity and creates an incentive to utilize dark pools. Based on all the negative responses to the Commission's proposed block trading rule, I think we should consider introducing more flexibility into the block trading rules to allow the SEF's to set the block size or allow them to be phased in.[162]

The result was a compromise with the industry that limited transparency to less than what regulators envisioned, but more than the near total pre-crisis opacity, suggesting real – if not inevitable – limits to the governance potential of enhanced transparency.

see: Zsuzsánna Biedermann, "Off-exchange Trading, Dark Pools and their Regulatory Dilemmas," *Public Finance Quarterly* 1 (2015): 79-94.

[162] Scott O'Malia, Speech given at FIA Clearing 2011: A Derivatives Forum, no location given, April 13, 2011.

Chapter 5:
In Collateral We Trust: Measuring & Managing Counterparty Risk in a Complex System

"Looking forward, the most important potential change in the infrastructure for credit derivatives is the creation of one or more central counterparties (CCPs) for CDS. The Federal Reserve supports CCP clearing of CDS because, if properly designed and managed, CCPs can reduce risks to market participants and to the financial system."
- Patrick Parkinson, Deputy Director, Division of Research and Statistics, United States Federal Reserve, 2008[1]

"[W]hat if the clearinghouse itself topples? The Dodd-Frank Act authorizes regulators to designate a clearinghouse as systemically important, and provides a source of emergency funding. But the law doesn't say what happens if the clearinghouse fails. This may be the single greatest weakness of the new financial architecture […] Failure of a major clearinghouse could paralyze large swaths of the financial markets."
- David Skeel, S. Samuel Arsht Professor of Corporate Law, University of Pennsylvania Law School[2]

I. Counterparty Trust as a Hard Case for Post-Crisis Regulatory Continuity

An opaque global market for highly complex, securitized derivatives, the concentration of risk in a small handful of enormously powerful private actors, financial institutions deemed "too big to fail" and backstopped by public authorities, and questions about the adequacy of risk models and capital holdings – all of these phenomena have been criticized as contributing to the 2008 global financial crisis. The regulatory proposals that came out of the G-20 meetings during the crisis and its immediate aftermath targeted many of these aspects of global financial markets, recognizing the salience of systemic risk and the need to regulate financial markets at the level of networks, rather than institutions. As briefly noted in Chapter 4, a key element of these regulatory proposals was a call for non-exchange-traded derivatives to be "cleared" through intermediaries that would act as a single counterparty to both the buy-side and the sell-side,

[1] Patrick Parkinson, "Credit derivatives," Testimony before the Committee on Agriculture, US House of Representatives, November 20, 2008.
[2] David Skeel, "What if a clearinghouse fails?" *Brookings Center on Regulation and Markets,* June 6, 2017, https://www.brookings.edu/research/what-if-a-clearinghouse-fails/.

reducing counterparty risk and, in combination with new disclosure requirements, rendering the over-the-counter (OTC) derivatives market and its complex dynamics of risk more legible, tractable, and, ideally, manageable. Six years after the G-20's call for central clearing, the proposal has been implemented in the majority of the main financial centers.[3] By 2016, 62% of all OTC contracts were conducted through central counterparties (CCPs), and the Bank for International Settlements estimated that the rate of clearing for interest rate derivatives had more than doubled (and perhaps even tripled) between 2008 and 2016 as a result of the clearing mandate.[4]

Central clearing is one of the most significant post-crisis regulatory changes to a market that was, prior to the global financial crisis, notable for its nearly complete lack of public regulation and oversight. It represents a major departure from the pre-crisis regulatory landscape in which counterparty trust was ensured primarily through bilateral contracts, which included provisions for assigning and holding collateral; through credit ratings of counterparties and of underlying debt associated with financial derivatives; through risk management policies based around risk models and capital buffers; and through social relationships between "sophisticated market participants."[5] The clearing requirement has been touted by regulators, industry participants, and scholars of IPE as having the potential to significantly transform OTC markets. According to regulators, its potential extended well beyond simply making the existing market

[3] As of June 2016, the central clearing mandate had been implemented for at least some categories of derivatives in Australia, China, the European Union, Hong Kong, India, Indonesia, Japan, Korea, Mexico, and the United States (Financial Stability Board, *OTC Derivatives Market Reforms: Eleventh Progress Report on Implementation* [Basel: FSB, 2016], 22).
[4] Bank for International Settlements, *Quarterly Review: International Banking and Financial Market Developments*, (Basel: BIS, 2016).
[5] The salience of this concept to the regulatory discourse is discussed in greater detail in Chapter 2 as part of what constitutes a competent performance of authoritative practices.

more transparent; they viewed this regulatory reform as fundamentally restructuring the over-the-counter market in a way that would significantly reduce both counterparty and systemic risk. Accordingly, the central clearing mandate represents a hard case for the argument that post-crisis financial governance has been characterized by continuity rather than change.

However, the clearing requirement has been met with a series of unintended consequences and has reproduced many of the same characteristics of financial markets that were identified as exacerbating and magnifying the 2008 financial crisis. A perusal of the financial news and discussion surrounding the central clearing mandate in 2014-2015 turns up a set of uncertainties and anxieties that could almost as easily come from discussions of investment banks and hedge funds in 2009: concerns about the concentration of trading and risk in a limited number of financial actors, the moral hazard and potential real economic costs of institutions deemed "too big to fail," and questions about the limitations of risk models as a centerpiece of risk management strategies.

What accounts for the recalcitrance of the OTC derivatives market to this regulatory change? Why has a key regulatory mandate, specifically intended to counteract the risk associated with waves of defaults in a highly complex network, ended up reproducing some of the same dynamics? I argue that focusing on the technologies and practices used to govern derivatives markets helps explain the absence of more radical regulatory policy shifts in derivatives regulation. Specifically, I contend that although there has been a significant shift in who regulates OTC markets, much less has changed at the level of the specific practices that govern these markets.[6] CCPs are much more important players in the OTC market now than they

[6] The issues associated with central clearing go beyond the continued reliance on pre-crisis risk management practices. For example, some commentators have pointed to possible conflicts of interest between CCPs and their

were prior to the crisis and they have changed the structure of trading in significant ways. Nonetheless, the tools they use to manage the risk of counterparty default are quite similar to those cited by key regulatory authorities prior to the crisis as guaranteeing the markets' capacity to govern itself. While these tools may be reasonably well-suited to organize and manage markets during ordinary times, their inadequacy during times of crisis, when complexity and uncertainty dominate over the regularities on which most risk management tools are premised, has already been demonstrated.

This chapter proceeds in eight parts. In Section II, I justify my focus on counterparty trust as a third (after valuation and liquidity) necessary condition for the existence and legibility of the OTC market, itself a prerequisite for its perceived legitimacy as a self-regulating market. In Section III, I position my analysis in contrast to public and scholarly claims that the central clearing mandate should be understood primarily as a major shift in the regulatory landscape and a promising solution to the problem of counterparty and systemic risk, arguing that such a perspective overlooks important continuities in financial market governance. Section IV provides the context for the post-crisis clearing requirement, paying particular attention to a set of practices (netting, collateralization, and risk modeling/management) that structured the market for OTC derivatives prior to the crisis – and that were taken by regulators as evidence of the market's capacity to regulate itself. In Section V, I briefly describe how the OTC market was implicated in the financial crisis and how central clearing emerged as a hallmark policy proposal.

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members, whereby CCPs may relax collateral requirements to attract more end users, undermining their capacity to manage systemic risk by containing losses associated with counterparty default (Bora Yagiz, "Clearinghouses' default 'waterfall' offers no panacea against their potential failure," *The Knowledge Effect*, last modified April 8, 2014, http://blog.thomsonreuters.com/index.php/clearinghouses-default-waterfall-offers-no-panacea-against-their-potential-failure/). However, I focus primarily on the former issue in this chapter to focus on my central thesis about the ways in which authoritative practices continue to constitute the derivatives market as a self-regulated and crisis-prone sphere.

Section VI identifies some of the unintended consequences of central clearing, focusing on those that reproduce pre-crisis dynamics. Section VII analyzes these changes, emphasizing the continuities in the market for OTC derivatives that have persisted despite a significant regulatory change. The chapter concludes with a reflection on how this analysis helps answer the two central questions of this dissertation: How did the OTC derivatives market grow to such an unmanageable size in such a crisis-prone way with so little regulation? And, why, given the severity of the crisis, have regulatory responses been relatively constrained?

II. Counterparty Trust as a Constitutive Market Practice

A. Trust in markets

Trust matters greatly in financial markets. Members of the public need to trust that their money is being invested responsibly, investors need to trust that financial innovations represent profitable (or at least potentially profitable) investment opportunities, and, at the most general level, the public needs to trust that markets are legitimate and an appropriate mechanism for allocating resources. The focus in this chapter is narrower, examining the trust among and between market participants in their mutual ability and willingness to fulfill the terms of a financial contract. The term of art for the persistent possibility that one's counterparty might not be able to uphold their end of a contract in the future is referred to as "counterparty risk" and it has been a central preoccupation among both private and public regulators, as well as market participants in the OTC market. Derivatives contracts are, by definition, oriented toward an uncertain future. In a complex network of banks, each with multiple highly leveraged exposures to other banks in the network, the possibility that, at some future date, your counterparty might not have the capital reserves to pay what they owe you is a real one. In response, market

participants have developed practices both to improve counterparties' perceptions of their own creditworthiness and to assess others'.[7]

These practices to contribute to what I term "counterparty trust." This phrase may appear counterintuitive to the extent that we tend to think of trust in a primarily affective or emotional register, whereas quantification, standardization, and modeling – all aspiring to objectivity – play starring roles in contemporary finance.[8] Indeed, the history of risk over the past 300 years can be broadly narrated as moving away from subjective judgements about the future towards quantitative, probabilistic modeling.[9] As established in Chapter 3, quantification and modeling have been essential to the development of the OTC financial derivatives market. Nonetheless, limiting the tools used to respond to counterparty risk to modeling and rating obscures the judgment, discretion, and experiential knowledge that remain an irreducible part of financial

[7] Jens Beckert emphasizes the importance of considering the performances of both "trust-givers" and "trust-takers" in markets, contending that too much emphasis has been placed on the decision-making processes of trust-givers and not enough on what trust-takers (those who seek to be regarded as trustworthy) do to earn counterparties' trust. This chapter contributes to this effort to address the interaction of those earning and granting trust in the area of derivatives markets. However, it should be noted that I am using "trust" in a slightly different sense than Beckert; he defines trust as "the expectation of the trust-giver that his one-sided advance concession in the exchange relationship is no exploited by the trust-taker, even though the latter could achieve a higher utility by choosing to defect" (6). His conceptualization of trust applies primarily to an actor's expectations about their counterparty's *willingness* to fulfill the terms of a contract, whereas I am interested in expectations about both their willingness and, somewhat more straightforwardly, their *ability* to do so. Willingness and ability are difficult to analytically separate when it comes to counterparty defaults, since there is typically a hierarchy of obligations that defaulting counterparties must prioritize. For Beckert and for those working in a game theoretic framework, trust is what allows actors to make agreements in exchange despite incentives to defect; I am also interested in cases where defection is not just a rational choice in response to incentives but rather the only choice, given their economic position and (in)solvency. (Jens Beckert, "Trust and the Performative Construction of Markets," MPIfG Discussion Paper 05/8 Max-Planck-Institut für Gesellschaftsforschung Köln [2015].)

[8] To be sure, reputation, subjective judgment, and relationships still play important roles in counterparty trust – and some scholars have identified an increasingly important role for judgment rooted in personal experience in contemporary risk management practices. But such judgement is typically a complement to, rather than a substitute for, quantitative and predictive risk modeling.

[9] Peter L. Bernstein, *Against the Gods: The Remarkable Story of Risk,* (New York: John Wiley & Sons, 1998), 6.

practice.[10] Given the volatility of financial markets, the abstract quality of financial assets,[11] and the inability to distinguish skill from luck in financial trading, Tuckett writes that it is "far from rational to value financial assets (and financial performance) only calculating risk and probabilistic returns in the way economics and finance textbooks suggest."[12] In addition to calculation, Tuckett's research shows that financial actors depend on their narratives of past events, their hopes for the future, rumors, and confidence in the superiority of their own abilities in order to make decisions. Far from being a dying remnant of a less quantitative era in finance, experiential judgment is integral to realms where uncertainty cannot be fully eliminated or absorbed.[13]

My use of the term "trust" is intended to encompass both of these strategies – ostensibly objective predictive modeling *and* subjective judgment – as methods to respond to both the calculable risk and incalculable uncertainty that inheres in derivatives contracts. Although many of the practices discussed in this chapter treat this underlying uncertainty as risk – as something calculable and manageable – they cannot eliminate it entirely. They do, however, enable actors to engage in future-oriented transactions.

B. Trust between market participants

Counterparty trust is central to the OTC market in two respects: internally (that is, between market participants) and externally (between market participants and regulators). First,

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[10] Amar Bhidé, for example, argues for a much greater role for expert judgment in contemporary finance, observing that case-by-case evaluations are much better suited to a decentralized market where different individuals may have very different interpretations of market dynamics. (Amar Bhidé, *A Call for Judgment: Sensible Finance for a Dynamic Economy* [New York: Oxford University Press, 2010])

[11] By this Tuckett means that the present value of financial products like derivatives is dependent on their fundamentally uncertain future value, itself dependent on the reflexive expectations of traders.

[12] David Tuckett, *Minding the Markets: An Emotional Finance View of Financial Instability* (New York: Palgrave, 2011), xvii.

[13] Beckert, "Trust," 14.

trust between counterparties to an exchange is a necessary condition for the existence of the market. As Susan Phillips, a Federal Reserve Board Governor, observed: "derivatives also permit the construction of positions for which risk can be more difficult to assess than simpler, more traditional activities. That is, *quantification* of risk becomes more complex as the instrument becomes more complex […] The financial product innovations to which I have been referring could not have taken place had there not been a parallel set of innovations in the technology of risk measurement. Indeed, risk *measurement* innovations can be said to have spawned financial *product* innovations."[14] Without assurance that one's counterparty will pay up in the relevant credit event (or whatever financial outcome triggers the execution of the contract), there could be not market for derivatives as the assets would cease to have a discernible and predictable value.

This counterfactual is not a purely theoretical conceit; empirically, the dissolution of counterparty trust in derivatives markets has produced market instability and crisis. For example, when Long-Term Capital Management (LTCM), a highly leveraged hedge fund that made derivatives a central piece of its investment strategy, collapsed in 1998, investors quickly loss confidence in the ability of LTCM and its many counterparties to fulfill any risky contract and rushed to unload these assets at any price, regardless of the counterparty and "objective" measures of risk. This "fire sale" disrupted the meaningfulness of price signals, undermining the very existence of a capitalist market. In his testimony before the House Committee on Banking and Financial Services in 1998, Federal Reserve Chair Alan Greenspan explicitly described this dynamic as antithetical to a functioning market:

> Financial markets operate efficiently only when participants can commit to transactions with reasonable confidence that the risk of nonpayment can be

[14] Susan M. Phillips, "Risk Management for Banks and Banking Regulators in the 21st Century," Speech given at the Atlanta Society of Financial Analysis, Atlanta, February 14, 1997.

> rationally judged and compensated for. Effective and seasoned markets pass this test *almost* all of the time. On rare occasions, they do not. Fear, whether irrational or otherwise, grips participants and they unthinkingly disengage from risky assets in favor of those providing safety and liquidity. The subtle distinctions that investors make, so critical to the effective operation of financial markets, are abandoned. Assets, good and bad, are dumped indiscriminately in circumstances of high uncertainty and fear that are not conducive to planning and investment. Such circumstances, were they generalized and persistent, would be wholly inconsistent with the functioning of sophisticated economies supported by long-term capital investment […] [A] fire sale may be sufficiently intense and widespread that it seriously distorts markets and elevates uncertainty enough to impair the overall functioning of the economy. Sophisticated economic systems cannot thrive in such an atmosphere.[15]

As fear replaced trust, the potential for systemic crisis was judged to be acute enough to justify federal intervention in the form of a negotiated private bailout of LTCM, orchestrated by the Federal Reserve Bank of New York. Ten years before the 2008 crisis, the impossibility of a financial market functioning in the absence of counterparty trust was apparent. So central was the role of trust to derivatives markets that Greenspan cited it in 2007 as both constitutive of the existence and growth of the market and as a justification for not regulating the market:

> Trust still plays a crucial role in one of the most rapidly growing segments of our financial system–the over-the-counter (OTC) derivatives market […]do not say that the success of the OTC derivatives market in creating greater financial flexibility is due solely to the prevalence of private reputation rather than public regulation. Still, the success to date clearly could not have been achieved were it not for counterparties' substantial freedom from regulatory constraints on the terms of OTC contracts.[16]

C. Counterparty trust and self-regulatory authority

Counterparty trust does not only matter for market participants; as the above quotations from regulators suggest, the existence of practices of counterparty trust is also relevant for

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[15] Alan Greenspan, "Private-sector refinancing of the large hedge fund, Long-Term Capital Management," Testimony before the Committee on Banking and Financial Services, US House of Representatives, October 1, 1998.

[16] Alan Greenspan, "Corporate Governance," Speech at the 2003 Conference on Bank structure and Competition (via satellite), Chicago, May 8, 2003.

supervisory and regulatory authorities. If counterparties cannot be confident in their mutual ability to fulfill the contract, regulators cannot be confident in the stability of the system as a whole. As the LTCM case and the main subject of this chapter – the 2008 financial crisis – illustrate, if trust in counterparties is violated on a widespread scale and derivatives contracts are not executed, the massive liquidity crisis that results can be interpreted as necessitating federal intervention. During normal times, in contrast, the perception that market actors are competently managing counterparty risk reassures public regulators that there is no need for greater intervention. In this way, practices of counterparty trust undergirds the authority of financial market actors.

The centrality of practices of counterparty trust to perceptions of financial actors' self-regulatory competence can be seen in regulatory statements during the growth of the financial derivatives market. For example, in a 1998 speech Greenspan noted that, "In this rapidly expanding international financial system, the primary protection from adverse financial disturbances is effective counterparty surveillance and, hence, government regulation and supervision should seek to produce an environment in which counterparties can most effectively oversee the credit risks of potential transactions."[17] Regulators like Greenspan regarded counterparty trust to be an industry responsibility and public regulators deferred to industry practices in shaping their own minimal supervisory standards.[18]

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[17] Alan Greenspan, "Understanding today's international financial system," Speech given at the 34th Annual Conference on Bank Structure and Competition of the Federal Reserve Bank of Chicago, May 7, 1998.

[18] "So while I complain that the new products have complicated our job of supervising banks, I do not mean to imply that the increased complexity has rendered our supervision of banks any less effective. Rather it has been a case of the supervisor using ever more sophisticated tools to assess risk and to determine the limits of risk-taking. In this regard, supervisors have learned a lot from the technological innovations in risk measurement that have taken place within the banks themselves. In particular, we have sharpened our determination of capital adequacy, along with the adequacy of risk management procedures, by critically examining certain internal risk modeling processes within the largest banking organizations. These risk models have been developed to measure *market* risk and *credit*

Internally and externally credible practices of trust are significant building blocks in the establishment of financial authority, enabling the growth of a nearly $600 trillion market,[19] legitimating its self-regulation, and delimiting the possibility of radical regulatory change even in the aftermath of a global financial crisis that was fueled precisely by the failure of these practices. The remainder of this chapter argues that rather than contradicting this analysis, publically mandated central clearing in fact illustrates the enduring power practices have to shape market governance.

III. Tempering Central Clearing Optimism

The rapid and widely shared consensus among international and national policymakers that most OTC derivatives should be centrally cleared represents, in some ways, a significant departure from the pre-crisis regulatory environment. The mandate been reasonably successful at altering derivatives market participants' behavior: According to the FSB, 70% of interest rate derivatives and 79% of credit derivatives are being centrally cleared in the United States, though CCP usage varies widely across national jurisdictions and asset classes, with many jurisdictions reporting much lower levels of clearing, even for products for which an appropriate CCP exists (see Figure 1).[20] At a global level, the percentage of contracts cleared through CCPs has increased steadily from less than 10% in 2010 to 26% at end-2013 and 31% at end-June 2015,

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risk, which, taken together, are two of the most important types of risk faced by financial institutions." (Phillips 1997)

[19] By the end of 2007, the global market for derivatives was valued at $596 trillion (Bank for International Settlements, "OTC derivatives market activity in the second half of 2007," BIS, 2008, accessed November 25, 2015, http://www.bis.org/publ/otc_hy0805.htm).

[20] Financial Stability Board, *OTC Derivatives Market Reforms: Tenth Progress Report on Implementation* (Basel: FSB, 2015), 9; Financial Stability Board, *OTC Derivatives Market Reforms: Ninth Progress Report on Implementation* (Basel: FSB, 2015), 12-13.

and 64% at end-June 2016 suggesting a widespread, if slow, change in the structure of the derivative industry.[21]

More generally, the clearing mandate marks out an important ideational shift from a regulatory environment in which market self-regulation was held up as the ideal to one in which OTC derivatives were seen as the appropriate object of public regulation and governance. Prior to the crisis, regulatory authorities in the United States and the United Kingdom, in particular, insisted on the virtues of self-regulation for derivatives markets.[22] Just five years later, following the passage of Dodd-Frank mandating central clearing in the United States, Federal Reserve Governor Daniel Tarullo called for even further public regulation of CCPs, noting that "it is essential that the Committee on Payment and Settlement Systems (CPSS) and the International Organization of Securities Commissions (IOSCO) complete their important work on strengthening the oversight of central counterparties as soon as possible."[23] Patricia White, the Fed's Associate Director in the Division of Research and Statistics testified before Congress that mandatory clearing "would have significant benefits" and that it represented an important tool for managing counterparty credit risk, reducing risk to market participants and ultimately to the financial system as a whole.[24] Peter Parkinson went even further calling mandatory clearing "the most important potential change in the infrastructure for credit derivatives."[25] Regulators at the

[21] Bank for International Settlements, "Quarterly Review."
[22] See Chapter 2.
[23] Daniel Tarullo, "The International Agenda for Financial Regulation," Speech at the American Bar Association Banking Law Committee Meeting, Washington, DC, November 4, 2011.
[24] Patricia White, "Over-the-counter derivatives," Testimony before the Subcommittee on Securities, Insurance, and Investment, Committee on Banking, Housing, and Urban Affairs, US Senate, June 22, 2009. See also Patrick Parkinson's testimony the previous year. (Patrick Parkinson, "Over-the-counter derivatives," Testimony before the Subcommittee on Securities, Insurance, and Investment, Committee on Banking, Housing, and Urban Affairs, US Senate, July 9, 2008.)
[25] Patrick Parkinson, "Credit derivatives," Testimony before the Committee on Agriculture, US House of Representatives, November 20, 2008.

SEC concurred, identifying CCPs as an "important aspect of a new regulatory framework" that "address concerns about counterparty risk by substituting the creditworthiness and liquidity of the CCP for the creditworthiness and liquidity of counterparties" and asserting that their use would "contribute generally to the goal of market stability."[26]

For these reasons, policymakers were (and are) eager to hold up the central clearing requirement as, if not a panacea, at least a compelling solution to the problem of systemic risk. The Bank for International Settlements refers to central clearing as "a key element in global regulators' agenda for reforming OTC derivatives markets to reduce systemic risks."[27] This rhetoric, which has its origins in the G20's statements after the 2009 Pittsburgh Summit, is echoed by other transnational and national regulatory actors, with European Central Bank Executive Board member Gertrude Tumpel-Gugerell referring to central clearing as "an essential part of the regulatory reform to make this market sufficiently transparent and to allow supervisors and overseers to effectively monitor the build-up of systemic risk."[28] The IMF has been somewhat more circumspect in its assessment of this regulatory change, but nonetheless describes central clearing as reducing both counterparty and systemic risk.[29] Market participants,

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[26] Mary Schapiro, "Senate Testimony Concerning Regulation of Over-the-Counter Derivatives," Testimony before the Subcommittee on Securities, Insurance, and Investment, Committee on Banking, Housing, and Urban Affairs, US Senate, June 22, 2009.
[27] Bank for International Settlements, *Statistical Release: OTC Derivatives Statistics at end-December 2015* (Basel: BIS, 2016), 2.
[28] Gertrude Tumpel-Gugerell, "Why OTC derivatives must be cleared," *Financial Times,* June 22, 2010, http://www.ft.com/cms/s/0/35243fba-7e0c-11df-8478-00144feabdc0.html#axzz3uJlnKAx1.
[29] International Monetary Fund, "Making Over-the-Counter Derivatives Safer: The Role of Central Counterparties," in *Global Financial Stability Report: Meeting New Challenges to Stability and Building a Safer System* (IMF, April 2010).

too, referred to the central clearing mandate as a "significant change,"[30] demanding "profound operational changes."[31]

This optimism about the capacity of central clearing to reduce counterparty and systemic risk is shared by scholars of political economy, as well, particularly in the immediate aftermath of the crisis and the regulatory changes it sparked. For example, writing in 2010, Eric Helleiner and Stefano Pagliari used central clearing as a key piece of evidence supporting their claim that the financial crisis instigated a significant shift in financial market governance, heralding the end of the era of self-regulation "in the sense that public authorities have accepted formal responsibility over the regulation of derivatives markets."[32] Some economists were equally optimistic about the potential for central clearing to ensure greater transparency and ultimately mitigate counterparty risk. As Viral Acharya et al. write in the prologue to their 2010 volume on the Dodd-Frank Act, "Centralized clearing of derivatives … should enable markets to deal better with counterparty risk, in terms of pricing it into bilateral contracts …" and they go on to describe the mandate as "welcome" and "admirable."[33]

But while the clearing mandate marks an important shift in who is seen as the appropriate regulator of derivatives markets, we should be careful not to overstate the degree of regulatory change; focusing exclusively on which actors are charged with governing global finance can

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[30] See, for example: Deloitte, "OTC Derivatives: The new cost of trading," EMEA Centre for Regulatory Strategy, 2014.
[31] KPMG, "OTC derivatives regulatory reform: Buy-side central clearing under the Dodd-Frank Act," (KPMG, 2012).
[32] Eric Helleiner and Stefano Pagliari, "The end of self-regulation? Hedge funds and derivatives in global financial governance," in *Global Finance in Crisis: The Politics of International Regulatory Change,* eds. Eric Helleiner, Stefano Pagliari, and Hubert Zimmerman (New York: Routledge, 2010), 90. See also: Eric Helleiner, "Reining in the Market: Global governance and the regulation of OTC derivatives," in *Governing the Global Economy: Politics, Institutions, and Economic Development,* eds. Dag Harald Claes and Carl Henrik Knutsen (New York: Routledge, 2011), 149.
[33] Viral Acharya, Thomas Cooley, Matthew Richardson, and Ingo Walter, eds., *Regulating Wall Street: The Dodd-Frank Act and the New Architecture of Global Finance* (New York: Wiley, 2010), 8; 31.

obscure continuities in the technologies and practices used to regulate derivatives markets, as well as the persistent influence of the transnational policy community. There are three reasons to temper optimism about central clearing. First, while *mandated* central clearing is a policy innovation, voluntary central clearing of OTC derivatives pre-dates the crisis by many years and was originally interpreted by regulators in explicitly market-friendly terms as evidence of derivatives markets' capacity to self-regulate. In 2006, for example, Federal Reserve Governor Randall Kroszner observed that, "I have often cited CCPs for exchange-traded derivatives as a prime example of how market forces can privately regulate financial risk very effectively."[34] In this sense, central clearing does not represent a dramatic break with the pre-crisis regulatory deference to the private sector and its claims to responsible risk management. Indeed, the fact that CCPs are private, for-profit actors initially attracted criticism from the Bank of England, which in its 2010 Financial Stability Report wrote that, "CCP treasury units should act not as profit centres, but invest in safe and liquid assets. User-ownership and not-for-profit governance arrangements provide the strongest incentives for effective risk management, aligning CCPs' interests with suppliers of capital."[35] Although the mandate for central clearing comes from national-level regulators, CCPs remain private, and some prominent commentators have continued to question their current for-profit status, even while acknowledging the multiple difficulties associated with nationalizing clearinghouses that serve global markets.[36]

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[34] Randall Kroszner, "Central Counterparty Clearing: History, Innovation, and Regulation," Speech at the European Central Bank and Federal Reserve Bank of Chicago Joint Conference on Issues Related to Central Counterparty Clearing, Frankfurt, April 3, 2006.

[35] Bank of England, *Financial Stability Report,* No. 28 (Bank of England, 2010): 10.

[36] See for example, Tucker who writes in the voice of an imaginary advocate for socializing CCPs: "Quit pretending that clearing houses are something different from what they really are. They're designed to insure the system against one variant of financial market tail risk. They need to be completely safe, with no doubts. They're also in the business of managing externalities, and of leaning against the wind. If central banks should be part of the State, so

A second reason to interpret the central clearing mandate in terms of continuity rather than change is that, aside from the admittedly significant elevation of the position of CCPs in global financial networks, it has done little to fundamentally re-order the centers and relations of power in the global financial system. As the pre-crisis evaluation of central clearing as market-friendly suggests, the clearing requirement did not meet with the strong opposition from the financial industry that more disruptive proposals (such as banning all credit default swaps[37] or so-called "naked" or unattached derivatives[38]) encountered. As Tett and van Duyn wrote in 2009, "Most senior financiers are willing to move some activity on to a clearing platform. Indeed, this shift was under way before last week's announcement – ventures offering clearing functions for credit derivatives started operating this year."[39] While the clearing requirement increases costs for derivatives dealers,[40] it is relatively popular among end-users,[41] derivatives dealers, anxious about their counterparty exposure,[42] and, not surprisingly, private exchanges with clearing capabilities. The clearing mandate reflects the enduring influence of the financial industry, but also of the transnational policy community who acted quickly to shape the post-crisis regulatory

should CCPs." (Paul Tucker, "Are Clearing Houses the New Central Banks?," Speech at the Over-the-Counter Derivatives Symposium, Chicago, April 8, 2014.)

[37] The Credit Default Swap Prohibition Act of 2009 (H.R. 3145, 111th Congress) would have allowed the SEC to ban credit default swaps.

[38] Two bills were introduced in the United States Congress in 2009 that would have banned trading of at least some forms of "unattached" derivatives, but neither passed. (The Prevent Unfair Manipulation of Prices Act of 2009, H.R. 2448, 111th Cong. [2009]; The American Clean Energy and Security Act of 2009, H.R. 2454, 111th Cong. [2009])

[39] Gillian Tett and Aline van Duyn, "Let battle commence," *Financial Times*, May 19, 2009, http://www.ft.com/intl/cms/s/0/d4a7adfc-44a5-11de-82d6-00144feabdc0.html#axzz3uUrjQqQ3.

[40] Deloitte calculates an additional €13.60 in transactions costs (margin requirements, capital requirements, compliance costs) per €1 million (notional value) of OTC contracts traded (Deloitte, "OTC Derivatives," 5.)

[41] International Swaps and Derivatives Association, *ISDA Insight: A survey of issues and trends for the derivatives end-user community* (ISDA, 2015), 6. The ISDA survey reports that of five post-crisis regulatory reforms (clearing, trade execution, trade reporting, increased margin for non-cleared swaps, and cross-border harmonization), clearing has the highest positive and lowest negative ratings among end-users.

[42] Helleiner and Pagliari, for example, point to a "widespread backlash against the lack of regulation in derivatives markets" ("The end of self-regulation?," 82-83).

agenda.[43] Although International Swaps and Derivatives Association (ISDA) officials have raised concerns about some of the consequences of central clearing, the clearing mandate enjoys the support of the primary private regulator of the derivatives industry, as ISDA CEO Scott O'Malia recently testified before the House Agriculture Committee in the United States.[44] Moreover, as Helleiner and Pagliari suggest, the United States, the UK, and the EU were key national actors in pushing for mandated clearing, reinscribing their primacy in the global financial landscape.[45]

Finally, as I document in the rest of this chapter, we should avoid overstating the impact or benefits of the clearing mandate insofar as CCPs rely on many of the same risk management practices that preceded – and failed to anticipate – the 2008 financial crisis. The unintended consequences of the shift to central clearing and the uneven way in which it has been implemented globally have pushed back against the immediate post-crisis optimism about CCPs' capacity to address systemic risk. In the remainder of this paper, I contend that, despite the shift from private to public regulation, the consequences of central clearing are better understood as reflecting continuity at the level of practice. In structuring the OTC market, these practices also delimit thinking about the techniques of market governance.

IV. Pre-Crisis Practices of Self-Regulation

Against the backdrop of the end of the Bretton Woods system, the liberalization of capital controls, the development of deep, liquid, and minimally regulated global capital markets, a

[43] Eleni Tsingou, "Regulatory reactions to the global credit crisis: analyzing a policy community under stress," in Helleiner, Pagliari, and Zimmerman, *Global Finance in Crisis*.
[44] "I would like to stress that ISDA supports the intent of Dodd-Frank to strengthen financial markets and reduce systemic risk. That includes the reporting of all derivatives trades and clearing of standardized derivatives products where appropriate." (Scott O'Malia, "Testimony of Scott O'Malia, Chief Executive Officer, International Swaps and Derivatives Association Before the US House of Representatives Committee on Agriculture," July 29, 2015.)
[45] Helleiner and Pagliari, "The end of self-regulation?" 74.

global market in non-exchange-traded derivatives based on interest rates, exchange rates, and credit risk began to develop in the 1980s.[46] Over-the-counter derivatives have historically been bilaterally traded, orchestrated through standardized, nationally enforceable contracts with each party to the contract potentially vulnerable to the risk of default by her counterparty (known as credit risk). Market participants took a series of measures to limit their exposures to counterparty default, most notably through netting arrangements, collateralization, and risk modeling. Prior to the financial crisis, these practices were cited by regulatory authorities as evidence of the market's capacity to regulate itself.

A. Legitimizing self-regulation

Public regulators, especially in the United States under the leadership of Alan Greenspan, took an intentionally hands-off approach to regulating the market for these products in the first decade after they were developed and became widespread. Regulatory intervention was thought to likely distort the efficient allocation of risk, and regulators argued that market actors had sufficient incentives to manage credit risk on their own. Alan Greenspan's 2003 address at the Conference on Bank Structure and Competition is illustrative of this regulatory attitude toward derivatives markets: "[T]he success [of the OTC derivatives market] to date clearly could not have been achieved were it not for counterparties' substantial freedom from regulatory constraints on the terms of their OTC contracts."[47] Greenspan recognized that the limited number of market participants in the OTC derivatives market and the concentration of certain types of contracts within "a handful of dealers" risked creating concentrations of counter-party risks,

[46] Some commodity derivatives are also traded over-the-counter, but the bulk of the OTC market is made up of interest rate, foreign exchange, and credit derivatives.
[47]Greenspan, "Corporate Governance."

"rais[ing] the specter of the failure of one dealer imposing debilitating losses on its counterparties, including other deals, yielding a chain of defaults."[48] Nonetheless, he asserted that "derivatives market participants seem keenly aware of the counterparty credit risks associated with derivatives and take various measures to mitigate those risks," noting that, "market participants usually have strong incentives to monitor and control the risk they assume in choosing to deal with particular counterparties. In essence, prudential regulation is supplied by the market through counterparty evaluation and monitoring rather than by [public] authorities." [49]

While perhaps most vocally championed in the United States, this anti-regulatory attitude was shared by the Basel Committee for Banking Supervision, the main international public actor to take up the issue of transnational market regulation, whose recommendations for national regulations emphasized "promoting a better foundation for self-regulation."[50] The Bank of England similarly resisted proposals from the European Union calling for greater regulation of the financial sector.[51]

The self-regulation of OTC markets prior to the crisis, in general, did not occur over public regulators' objections but was rather endorsed and enabled by a shared worldview that held that efficiency and liquidity in the market were both normatively desirable and best ensured through minimal state intervention. The close relationship between the financial industry and state economies, especially in terms of extending credit to individuals and the use of finance as a growth strategy, meant that the financial industry's interests and public economic authorities'

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[48] Ibid., 3-4.
[49] Ibid., 5.
[50] Eleni Tsingou, "The Governance of OTC Derivatives Markets," in *The Political Economy of Financial Market Regulation: The Dynamics of Inclusion and Exclusion,* eds. Peter Mooslechner, Helene Schubert, and Beat Weber (Cheltenham, UK: Edward Elgar, 2006), 177.
[51] Hubert Zimmerman, "Varieties of global financial governance? British and German approaches to financial market regulation," in Helleiner, Pagliari, and Zimmerman, *Global Finance in Crisis,* 121-136.

interests were often interpreted and represented as converging. As Kwak notes, "it is difficult to prove that the deregulatory policies pursued by these agencies were clearly not in the public interest as knowable at the time."[52]

Prior to the crisis, the risk of counterparty default was addressed through a series of conventional industry practices, rooted in private authority, most notably the International Swaps and Derivatives Association, an industry coordinating and lobbying group. ISDA provided parties to derivatives deals with a standardized contract known as the Master Agreement that could be modified to fit the specifics of individual derivative dealings. Although the Master Agreement did not provide all the same functions as a formal, publically regulated derivatives exchange, which limits counterparty credit risk through the use of daily margin calls, the widespread use of the Master Agreement nonetheless fostered standardization and comparability of contracts, facilitating market liquidity. [53]

B. Netting

The Master Agreement also played a critical role in legitimizing self-regulation, mitigating regulators' concerns about the concentration of counterparty risk in a handful of derivative dealer banks by outlining provisions for terminating contracts in the event of counterparty default, most notably permitting parties to "net out" all of their open transactions with each other, rather than undertaking a series of payments back and forth that the defaulting

[52] James Kwak, "Cultural Capture and the Financial Crisis," in *Preventing Regulatory Capture: Special Interest Influence and How to Limit It*, eds. Daniel Carpenter and Davis Moss (Cambridge: Cambridge University Press, 2013), 73.

[53] ISDA estimated that by 2003, there were more than 54,000 signed bilateral derivatives contracts using the Master Agreement form (Annelise Riles, *Collateral Knowledge: Legal Reasoning in the Global Financial Markets* [Chicago: University of Chicago Press, 2011], 75).

party might not be able to complete.[54] The practice of netting thus reduces one firm's exposure to its counterparty. The use of these closeout netting agreements was endorsed by the Basel Supervisory Committee in 1994, which noted that "netting arrangements for […] forward-value contractual commitments such as foreign exchange contracts and swaps have the potential to improve both the efficiency and the stability of interbank settlements, by not only reducing costs but also credit and liquidity risks"[55] and amended the 1988 Capital Accord to permit bilateral netting.[56]

Netting provisions were also lauded by national regulators as an example of market-based initiatives to reduce counter-party risk. As Darryll Hendricks of the Federal Reserve Bank of New York concluded in 1994, "netting agreements unequivocally lead to reductions in current credit exposures, which make up the bulk of total credit exposures [and] under certain circumstances, netting agreements reduce fluctuations in the volatility of the credit exposures of dealer institutions, thereby lowering the volatility of the institutions' credit exposures on average […] the second major components of total credit exposures to OTC derivatives."[57] Hendricks's remarks are illustrative of the frequent references to bilateral netting arrangements in regulatory speeches explaining and justifying the minimal public regulation of derivatives markets with reference to existing industry practices. The narrative that netting arrangements facilitated

[54] Rodrigo Zepeda, *The ISDA Master Agreement: The Derivatives Risk Management Tool of the 21st Century?* (Amazon Digital Services, 2014).
[55] Basel Committee on Banking Supervision, *Prudential Supervision of Banks' Derivatives Activities* (Basel: Basel Committee on Banking Supervision, 1994), 7.
[56] The 1988 Capital Accord had previously only permitted netting by novation, which replaced existing contracts between two counterparties for delivery of a specified amount of currency on a specified date by a single contract that took into account all of the original contracts.
[57] Darryll Hendricks, "Netting Agreements and the Credit Exposures of OTC Derivatives Portfolios," *Federal Reserve Bank of New York Quarterly Review,* Spring (1994): 17.

counterparty trust was remarkably consistent across the Federal Reserve, [58] the Securities Exchange Commission,[59] and the Commodities Futures Trading Commission,[60] with little variation in the association of netting with the effective management of counterparty risk by the industry itself.

C. Collateralization

A second practice facilitated by the Master Agreement was the assignment of collateral to derivatives contracts, intended to reduce the risk of large losses in the event of counterparty default. As ISDA writes, "In the case of a privately negotiated derivatives transaction, the essential mechanism by which collateralization works is to provide an asset of value that is to the side of the primary transaction; in the event of default on the primary transaction, the collateral receiver has recourse to the collateral asset and can thus indirectly make good any loss suffered."[61] The Master Agreement's Credit Support Annex was widely used to govern collateral

[58] See, for example: Greenspan "Government regulation"; Alan Greenspan, "Measuring Financial Risk in the Twenty-first Century," Speech before a conference sponsored by the Office of the Comptroller of the Currency, Washington, DC, 1999; Laurence Meyer, "Why Risk Management Is Important for Global financial Institutions," Speech before the Derivatives Risk Management Symposium, Institute on Law and Financial Services, Fordham University School of Law, New York, February 25, 2000; Alan Greenspan, "World Finance and Risk Management," Speech at the Lancaster House, London, September 25, 2002; Susan Schmidt Bies, "Qualitative Aspects of Effective Risk Management," Speech at the Global Association of Risk Professionals Fifth Annual Convention, New York, February 25, 2004; Alan Greenspan, "Risk Transfer and Financial Stability," Speech to the Federal Reserve Bank of Chicago's Forty-first Conference on Bank Structure (via satellite), Chicago, May 5, 2005; and Kroszner, "Central Counterparty Clearing."

[59] Richard Lindsey, "Testimony Concerning Regulation of the OTC Market and Hybrid Instruments," Testimony before the House Committee on Banking and Financial Services, US House of Representatives, July 24, 1998, fn. 1; Annette Nazareth, "Testimony concerning netting of financial contracts, hedge fund disclosure, and OTC derivatives transactions," Testimony before the House Committee on Banking and Financial Services, April 11, 2000.

[60] William Rainer, "Remarks at 22nd Annual Chicago-Kent College of Law Derivatives and Commodities Law Institute," Chicago, October 28, 1999; James Newsome, "Address before the International Swaps and Derivatives Organization at the Energy and Developing Products Conference, Houston, March 26, 2003; Sharon Brown-Hruska, "Market and Regulatory Innovation in a Global Environment," Speech at the Futures Industry Association/Future Options Association International Derivatives Conference, London, June 29, 2004; Reuben Jeffery, "Market Integrity: A Shared Mission," Speech given to the International Swaps and Derivatives Association, New York, December 6, 2005.

[61] International Swaps and Derivatives Association, *ISDA Collateral Guidelines* (New York: ISDA, 2005), 7.

agreements between counterparties, specifying the asset (most often cash or treasury bonds) that would be used to secure the counterparty's obligation as well as the conditions under which the collateral-receiving counterparty can use it to satisfy the obligation.[62] Annelise Riles notes that the Master Agreement and its Credit Support Annex governing collateralization aims "to serve as a basis for global self-regulation."[63] Indeed, US Federal Reserve Chair Alan Greenspan specifically referenced industry collateralization practices, alongside netting and risk modeling and limits, as evidence of the OTC market's capacity for self-regulation: "Participants in the OTC derivatives markets typically manage their counterparty credit risks to dealers by transacting only with counterparties that are perceived to be highly creditworthy, by entering into legal agreements that provide for closeout netting of gains and losses, and with the exception of most exposures to the few Aaa-rated dealers, by agreeing to collateralize net exposures above a threshold amount. […] The widespread use of collateral, in particular, usually is a powerful means of limiting counterparty credit losses."[64] The use of collateralization to limit losses in the event of counterparty default was similarly encouraged by the Bank for International Settlements, which incentivized the practice by crediting counterparties for collateralization

[62] Riles, *Collateral Knowledge,* 34-35
[63] Ibid., 32
[64] Greenspan, "Risk Transfer." It should be noted, however, that Greenspan conceded that collateralization is less effective when counterparties hold very large positions in highly illiquid markets (e.g., Long Term Capital Management in 1998), when closing out contracts may move markets, amplifying losses beyond the posted amount of collateral. For further references to the significance of collateral to self-regulation see: John Behof, "Reducing credit risk in over-the-counter derivatives," *Economic Perspectives* 17 (1993): 21-31 and Greenspan, "Government regulation:" "Institutional participants in the off-exchange markets also have demonstrated their ability to manage credit risks quite effectively through careful evaluation of counterparties, the setting of internal credit limits, and the judicious use of netting agreements and collateral … Thus, there appears to be no need for government regulation of off-exchange derivative transactions between institutional counterparties."

when calculating capital requirements.[65] Like netting, collateralization practices were routinely cited by regulators as evidence of the market's ability to manage counterparty risk effectively.[66]

D. Risk measures, models, and management

As referenced by Greenspan above, in addition to the ISDA Master Agreement and its termination and netting provisions, derivatives dealers relied heavily on credit assessments from credit rating agencies, private American corporations (Standard & Poor's, Moody's, and Fitch are the big three), to calculate counterparties' creditworthiness. Credit rating played a particularly important role in the market for credit derivatives, contracts used to insure (or hedge) against the risk of default (the credit risk) attached to an underlying portfolio of assets.[67]

In addition to external measures of risk, derivatives market participants relied on internal (though broadly standardized) risk models, taking the risk of default into account. Perhaps more so than any other practice of counterparty trust, the existence of the market for credit derivatives, in particular, cannot be separated from the development of risk models. As Fed Vice Chair Roger Ferguson observed in a 2001 speech to the Bond Market Association, "Better risk measurement and the consequent more-efficient risk-sharing improve the markets' ability to allocate resources to the most productive uses. One example close to the hearts of this audience is the improvement

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[65] Riles, *Collateral Knowledge,* 44.

[66] See also: Greenspan 1997 "The Evolution of Banking"; Laurence Meyer, "Increasing Global Financial Integrity: The Role of Markets Discipline, Regulation, and Supervision," Speech at the 16th Annual Monetary Conference, Money in the New Millennium: The Global Financial Architecture, Cato Institute, Washington, DC, October 22, 1998; Greenspan, "Measuring Financial Risk"; Roger Ferguson, "Financial Market Lessons for Bankers and Bank Supervisors," Speech before the Bond Market Association, New York, October 28, 1999; Greenspan, "World Finance"; Sharon Brown-Hruska, "Risk Assets or WMD: The Case for Derivatives," Keynote Address, New York, December 7, 2005; and Donald Kohn, "The Evolving Nature of the Financial System: Financial Crises and the Role of the Central Bank, Speech given at the Conference on New Directions for Understanding Systemic Risk," New York, May 18, 2006.

[67] Frank Partnoy, "How and Why Credit Rating Agencies Are Not Like Other Gatekeepers," in *Financial Gatekeepers: Can They Protect Investors?,* eds. Yasuyuki Fuchita and Robert Litan (Washington, DC: Brooking Institution Press, 2006), 73-80.

in credit risk modeling that has led to the development of new markets for credit risk transfer, such as credit derivatives and collateralized debt obligations (CDOs)."[68] The close relationship between credit risk models and derivatives led regulators to defer to banks' internal risk models, contending that banks were better able to determine their risk exposure than an outside regulator.[69]

Banks' internal risk models were in turn tied to internal risk limits and capital requirements, as recommended by the Basel Committee on Banking Supervision in the 1988 Capital Accord, which focused on credit risk, and its 1996 Amendment covering market risk. Banks were required to keep specified amounts of capital to guard against unexpected losses, with the precise amount determined through a combination of risk-weighted assets and models of market risk exposure. These models played an instrumental role in empowering derivatives traders as authoritative, responsible managers of the financial future.[70]

Like netting, collateralization, and credit rating, risk modeling – in conjunction with risk limits and capital requirements – was widely interpreted to be a sound private-sector method of governing the future.[71] In conjunction with risk limits and stress testing, risk model-based capital requirements reassured regulators that the OTC markets should have the authority to govern

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[68] Roger Ferguson, "Credit Risk Management: Models and Judgment," Speech at the Bond Market Association's 1st Annual Credit and Risk Management Conference, New York, October 16, 2001.

[69] "The role of public policy is to encourage sound risk management. In this regard, policymakers are encouraging firms to enhance their risk-management systems, including appropriate management oversight, adequate risk-management policies and procedures, effective risk-measurement and monitoring systems, comprehensive internal controls and independent external audit. Policymakers simply cannot dictate the details of risk management based upon assumed market developments. Markets currently are in tremendous flux, and policymakers cannot foresee the needs in future years. Thus, the soundest course is to create a clear legal and regulatory environment within which market participants can develop risk management tools as needed." (Meyer, "Strengthening Risk Management")

[70] The authoritative practice of risk modelling is discussed in greater detail in Chapter 3.

[71] Tony Porter, "Risk models and transnational governance in the global financial crisis: The cases of Basel II and credit rating agencies," in Helleiner, Pagliari, and Zimmerman, *Global Finance in Crisis*, 62-64.

themselves.[72] Susan Phillips, for example, was explicit on this score, noting that "despite the increased complexity of bank risk-taking activities, the chances of a repeat of the banking crisis of the late 1980s have been reduced. The banks' higher capital levels and the improvements in their risk measurement and management processes contribute to the safety and soundness of the system."[73]

E. Expert judgment and social relationships

Netting, collateralization, and risk models formed a triad of practices that largely reassured regulators that market participants could trust each other and that the derivatives market would not succumb to the liquidity-destroying fear that threatened the financial world following LTCM's collapse. Nonetheless, and consistent with Beckert's insight that practices of quantification and calculation cannot eliminate uncertainty, regulators also recognized the expert judgment of market participants as an important source of their authority and as a crucial check on overreliance on models. As Greenspan observed in 1999, "boards of directors, senior managers, and supervisory authorities need to balance emphasis on risk models […] with emphasis on the skills, experience, and judgment of the people who have to apply those models. Being able to judge which structural model best describes the forces driving asset pricing in any

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[72] Basel Committee on Banking Supervision, *Overview of the Amendment to the Capital Accord to Incorporate Market Risk* (Basel: BCBS, 1996), 1; Greenspan, "Financial derivatives": "Some may now argue that the periodic emergence of financial panics implies a need to abandon models-based approaches to regulatory capital and to return to traditional approaches based on regulatory risk measurement schemes. In my view, however, this would be a major mistake. Regulatory risk measurement schemes are simpler and much less accurate than banks' risk measurement models."

[73] Phillips, "Risk Management"; see also: Alice Rivlin, "Supervision of bank risk-taking," Speech at the Brookings Institution National Issues Forum, Washington, DC, December 19, 1996; Alan Greenspan, "Technological Change and the Design of Bank Supervisory Policies," Speech given at the Conference on Bank Structure and Competition of the Federal Reserve Bank of Chicago, May 1, 1997 ("in the face of continual market-driven innovations in banks' risk measurement and management systems, regulatory approaches based on rigid, one-size-fits-all rules are likely to become quickly outdated, ineffectual, and, worse, potentially counterproductive."); Ferguson, "Credit Risk Management"; Ben Bernanke, "Modern Risk Management and Banking Supervision," Speech at the Stonier Graduate School of Banking, Washington, DC, June 12, 2006.

particular period is itself priceless. To paraphrase my former colleague Jerry Corrigan, the advent of sophisticated risk models has not made people with grey hair, or none, wholly obsolete."[74] The trope of "grey hair" (referring to the accumulated experience of those with a long career in finance, predating the rise of "quants) was repeated by Susan Bies in a 2004 speech on risk management, in which she noted that, "As many banking organizations have grown into much larger and far more complex institutions, that personal feel often gets lost. Their managements need the more sophisticated and systematic processes that risk modeling can provide, but they also need to ensure that an incorrect or weak model does not bring down the house. I would offer that success in this area often requires grey hair and keen intuition as well as highly developed analytical skills."[75] Regulators were aware of the some of the limitations of credit risk models and associated practices of counterparty trust, but they regarded intuition, judgment, and experience as adequate complements.[76]

More specifically, the social relationships and reputations that long-time market participants had developed were cited as important correctives to an overreliance on standardized models. In a 2000 speech, Fed Governor Laurence Meyer referenced the fact that most OTC transactions were carried out verbally, between participants with an existing relationship and knowledge of each other.[77] Similarly, Greenspan cited the importance of a dealer's social

[74] Greenspan, "Measuring Financial Risk."
[75] Bies, "Qualitative Aspects."
[76] See, for example, Ferguson, "Credit Risk Management": 'Practitioners need to keep in mind that rare events implicit in the tails of distributions will occasionally occur. The critics don't seem to mention perhaps the biggest risk of the increasing importance of models: the lulling of the users into a false sense of well-being that loses sight of these potential tail events. I find, on balance, recent advances in the formalization of risk measurement and management to be beneficial. I urge financial institutions and market participants to continue to improve these models, and to use empirically based quantitative risk-management models as one of many techniques used to choose and manage risk. These models should not replace, but rather supplement, judgment and experience. Judgment and experience informed by empirical support should, over the long-run, be superior to judgment uninformed by modern technology." See also: Meyer, "Strengthening Risk Management."
[77] Meyer, "Strengthening Risk Management."

reputation in maintaining counterparty trust, contending that, in conjunction with netting agreements and collateral, firms' social relations and concern for their reputation provided market discipline more effectively than the government could.[78]

The pre-crisis OTC derivatives market was governed primarily through private industry practices that served to convince and reassure regulators that market actors had the necessary capability to govern themselves and to limit the potential crisis. Statements from the Fed chair and governors, the Securities and Exchange Commission, the Commodity Futures Trading Commission, the Bank of England, and the Basel Committee on Banking Supervision suggest that key regulators saw an unregulated OTC market as serving the public good, further forestalling the potential for more intrusive regulatory policies.[79]

V. Financial Crisis and the Origins of the Clearing Requirement

Despite private- and public-sector confidence in private forms of risk management, their inadequacy was starkly revealed during the 2008 financial crisis, when waves of defaults by insufficiently collateralized counterparties spread through the derivatives market, hastened by reports of Bear Stearns's and Lehman Brothers' impending insolvency.[80] The system of bilateral private contracts was recognized as overly complex and severely lacking in transparency, as contracts were unwound rapidly and without sufficient liquidity in the system to ensure full repayment or to accurately price the contracts counterparties had on their books. As losses dramatically exceeded those anticipated by risk models, capital cushions were quickly exhausted

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[78] Greenspan, "Government Regulation."
[79] Market efficiency, wealth creation, and distribution of risk are all variously cited as public ends served by derivatives.
[80] See, for example: Kate Kelly, "Fears, rumors touched off fatal run on Bear Stearns," *Wall Street Journal,* May 28, 2008, http://www.wsj.com/articles/SB121193290927324603; Bryan Borroughs, "Bringing Down Bear Stearns," *Vanity Fair,* August 2008, http://www.vanityfair.com/news/2008/08/bear_stearns200808-2.

and bilateral netting and collateralization arrangements were insufficient to confine losses associated with counterparty default to the immediate parties to the contract. As Andrew Haldane of the Bank of England observed in early 2009, "The financial system is […] a network, with nodes defined by the financial institutions and links defined by the financial interconnections between these institutions. Evaluating risk within these networks is a complex science; indeed, it is the science of complexity. When assessing nodal risk, it is not enough to know your counterparty; you need to know your counterparty's counterparty too. In other words, there are network externalities. In financial networks, these externalities are often referred to as contagion or spillovers. There have been many examples of such spillover during this crisis, with Lehman Brothers' failure a particularly painful one."[81]

OTC derivatives played a significant role in magnifying the effects of the US subprime meltdown, as recounted in greater detail in the previous chapter. In turn, the crisis laid bare the correlations, complexity, interconnectedness, and uncertainty that had structured financial markets all along, even as standardized practices provided temporary stability.[82] Risk management practices based on probabilistic estimates of credit risk, especially ones that had been based on a necessarily (given the relatively newness of derivatives markets) limited set of historical data from non-crisis times, proved to be ill-suited to the massively correlated defaults and unprecedented drying up of liquidity that swept the OTC markets in 2008-2009. Accordingly, collateral and netting arrangements were quickly overwhelmed by the magnitude of losses.

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[81] Andrew Haldane, "Why banks failed the stress test," Speech at the Marcus-Evans Conference on Stress-Testing, London, February 9, 2009, 5.

[82] Stephen Nelson and Peter Katzenstein, "Uncertainty, Risk, and the Financial Crisis of 2008," *International Organization* 68:2 (2014): 361-392.

In response to this financial contagion and to systemic risk more broadly, the G-20 and the Financial Stability Board called for a series of substantial reforms of OTC derivative market, including that, "All standardized OTC derivative contracts should be traded on exchanges or electronic trading platforms, where appropriate, and cleared through central counterparties by end-2012 at the latest."[83] Central counterparties were represented as a means of reducing systemic risk by decreasing complexity, since the clearinghouse would serve as a counterparty to both buy-side and sell-side market participants. In the event of counterparty default, the CCP guarantees the obligation through its own resources, including a default fund composed of the collateral (or "margin") demanded of other banks, confining (in theory) the consequences of member default solely to the transactions involving that member and forestalling the contagion that spread through Haldane's complex networks. Additionally, CCPs were thought to provide a much more efficient system of netting than when this is done primarily on a bilateral basis, because each firm's exposure to multiple other firms can be netted out multilaterally, rather than as a series of one-on-one transactions. This proposal was widely taken up for consideration by national regulatory agencies in global financial centers (e.g., the de Larosière report commissioned by the European Commission and the Turner Review in the UK[84]) and endorsed by key international organizations.[85]

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[83] G20, *Leaders' Statement, The Pittsburgh Summit,* September 24-25, 2009, http://g20.org/English/Documents/PastPresidency/201511/t20151127_1617.html; See also Financial Stability Board, *Implementing OTC Derivatives Market Reforms,* October 25, 2010: "The proportion of the market that is standardised should be substantially increased in order to further the G-20's goals of increased central clearing and trading on organised platforms, and hence mitigate systemic risk and improve market transparency."

[84] The High-Level Group on Financial Supervision in the EU, *Report* (Brussels, 2009), 25; Financial Services Authority, *The Turner Review: A Regulatory Response to the Global Banking Crisis* (London: FSA, 2009), 82-83.

[85] See for example: International Monetary Fund, "Making Over-the-Counter Derivatives Safer." The IMF does note, however, that, "movement of contracts to a CCP is not a panacea, since it also concentrates the counterparty and operational risk associated with the CCP itself" (91).

The United States took the lead in implementing mandatory clearing of OTC swaps, with the passage of the Dodd-Frank Wall Street Reform and Consumer Protection Act.[86] But even before this, central clearing was quickly seized on as a desirable policy. As early as December 2008, the Securities and Exchange Commission granted CCPs temporary exemptions from federal registration requirements to allow them to get up and running quickly and begin clearing derivatives.[87] Rather than taking advantage of the United States' unilateral increase in regulation, the European Union, with the crucial cooperation of British policymakers (given the centrality of London financial markets), also began the process of implementing mandatory clearing relatively quickly, culminating in 2012 with the passage of the Regulation on OTC Derivatives, Central Counterparties, and Trade Repositories (known as European Market Infrastructure Regulation, or EMIR). While implementation of clearing across different classes of OTC contracts has been much slower in the EU than in the US (and, as I contend below, has contributed to market fragmentation), both actors' commitment to central clearing underscores the extent to which it was seen as a means to manage the counterparty and systemic risk that lay at the heart of the crisis.

As of June 2016, public regulators in Australia, China, the European Union, Hong Kong, India, Indonesia, Japan, Korea, Mexico, and the United States have mandated central clearing for at least some OTC derivatives.[88] Although only relatively recently implemented, central clearing requirements have already had a significant effect on the OTC market. As of June 2016, an estimated 64% of all OTC derivatives were cleared through CCPs, with higher rates for interest

[86] Dodd-Frank Wall Street Reform and Consumer Protection Act, §723 (2010), 300-307.
[87] Securities and Exchange Commission, "SEC Approves Exemptions to Allow Central Counterparties for Credit Default Swaps," *SEC News Digest* 2008-247, December 23, 2008, https://www.sec.gov/news/digest/2008/dig122308.htm.
[88] Financial Stability Board, *Eleventh Progress Report*, 22

rate swaps.[89] The clearing requirement has increased the percentage of cleared OTC contracts, but it has been less successful at restructuring financial markets to make them less crisis-prone.

VI. The Unintended (But Familiar) Consequences of Central Clearing

A. Regulatory and market fragmentation

While ostensibly a move by public regulators to reclaim a measure of control over financial markets, the central clearing requirements have struggled to do just that. Rather than centralizing a market formerly seen as overly complex and decentralized, central clearing requirements have produced regulatory fragmentation, as different jurisdictions have imposed different clearing requirements on different timelines, raising questions about liquidity and the concentration of risk in the global market for derivatives.[90] While nearly two-thirds of the total volume of OTC derivatives contracts is cleared, the clearing rate is much lower for credit derivatives (37%) and foreign exchange and equity derivatives (>2%).[91] There is also considerable variation in clearing rate across national lines. Figure 6, reproduced from a 2016 Financial Stability Board report, depicts the unevenness of clearing volumes for OTC interest rate derivatives alone. Despite the international consensus around the desirability of central clearing in the immediate aftermath of the crisis, enforceable mandates must be implemented through national legislation and there has been significant variation across jurisdictions in the regulatory requirements for both OTC derivatives and CCPs themselves, causing the global market to fragment along jurisdictional lines.[92] While both the United States and the European

[89] Bank for International Settlements, "Statistical Release," 4.
[90] See, for example, International Swaps and Derivatives Association, "Cross-Border Fragmentation of Global OTC Derivatives: An Empirical Analysis," *ISDA Research Note*, January 2014, 1-2.
[91] Bank for International Settlements, "Statistical Release," 4.
[92] ISDA found that this fragmentation was particularly acute in the case of euro interest rate swaps, with 88.6% of total euro IRS swaps transacted exclusively between European dealers, up from about 74% is 2013, before the

Union's regulatory regimes allow for the recognition of non-domestic CCPs, in practice cross-border recognition has been slow, especially on the part of the EU, due to discrepancies in minimum margin requirements for CCPs.[93]

	Of all new transactions, estimated percent that can be centrally cleared (given current clearing offerings in jurisdiction)					Of all new transactions that can be centrally cleared (given current clearing offerings in jurisdiction), estimated percent that has been centrally cleared				
	0–20	20–40	40–60	60–80	80–100	0–20	20–40	40–60	60–80	80–100
AR										
AU	-	-	-	●	-	-	-	-	-	●
BR	-	-	-	-	●	●	-	-	-	-
CA	-	-	-	●	-	-	-	-	-	●
CN	-	-	-	-	●	-	-	-	-	●
EU	-	-	-	●	-	-	-	-	●	-
HK	-	-	●	-	-	-	-	●	-	-
IN	-	-	●	-	-	●	-	-	-	-
ID										
JP	-	-	-	●	-	-	-	●	-	-
KR	●	-	-	-	-	-	●	-	-	-
MX	-	●	-	-	-	●	-	-	-	-
RU	-	-	-	-	●	●	-	-	-	-
SA										
SG	-	-	●	-	-	-	●	-	-	-
ZA										
CH										
TR										
US	-	-	-	-	●	-	-	-	-	●
	0–20	20–40	40–60	60–80	80–100	0–20	20–40	40–60	60–80	80–100

(a) Estimates provided by FSB member jurisdictions, using information available as at March 2016.

no CCPs authorised to operate in jurisdiction to clear OTC derivatives transactions in this asset class.

CCPs operating, but data not able to be provided (typically because trade reporting requirements are not yet in force in this asset class, or due to data aggregation challenges).

For jurisdiction codes see Table A on page 3.

Source: FSB member jurisdictions.

Figure 6: Estimated scope of central clearing of OTC interest rate derivatives (March 2016)[94]

Under conditions of regulatory fragmentation, derivative buyers and sellers are less readily able to find each other and make a market. As ISDA chair Eric Litvack observed earlier

implementation of clearing requirements and mandated trading through swap execution facilities in the United States (ISDA, "Cross-Border Fragmentation").

[93] Gary DeWaal, "Non-recognition of US CCPs as subject to equivalent regulation may require European-based funds to restrict trading in US centrally cleared derivatives," *Lexology*, May 31, 2015, http://www.lexology.com/library/detail.aspx?g=d4233378-54cb-4fe8-8daa-38cd96e683cf.

[94] Financial Stability Board, *Eleventh Progress Report*, 27.

this year, "There is clear evidence that global derivatives markets are fragmenting. The derivatives market has always been global … But regulations are implemented at the local level. Conflicting, confusing or overlapping rules can encourage derivatives users to stay local and lose the benefits of competitive pricing and service."[95] ISDA CEO Scott O'Malia concurred, warning that fragmented markets results in lower liquidity and higher costs.[96] These dynamics are concerning from the perspective of financial system stability, as fragmented markets may lead to less transparency in the system as a whole, as well as a concentration of risk – dynamics that the clearing mandate was specifically intended to mitigate.

B. Too-big-to-fail, scaled up

Market fragmentation is not the only potential cause of a re-concentration of risk in the global financial system. Pulling in the opposite direction are the economies of scale associated with central clearing. For example, the benefits associated with multilateralized netting are greatest when a single CCP clears a particular class of derivative.[97] Accordingly, and especially given the high levels of capital CCPs are required to hold, only a small number of large CCPs are likely to be profitable. As a result, risk is becoming increasingly concentrated in a handful of prominent clearing houses (LCH.Clearnet, CME, Eurex, Intercontinental Exchange[98]), a dynamic that Federal Reserve Board Governor Jerome Powell acknowledged as concerning in 2014.[99]

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[95] Qtd. in Helen Bartholomew, "Swap rule harmonization tops the debate," *International Financing Review*, April 21, 2015, http://www.ifre.com/isda-agm-swap-rule-harmonisation-tops-the-debate/21195209.article.
[96] Ibid.
[97] Craig Pirrong, "The Economics of Central Clearing: Theory and Practice," *ISDA Discussion Paper Series* 1 (New York: ISDA, 2011), 14.
[98] LCH.Clearnet clears 95% (nearly $33 trillion in notional amount) of the derivatives that are cleared, while Intercontinental Exchange (ICE) controls more than 98% ($88.7 trillion notional) of the credit default swap clearing market (Skeel, "What if a clearinghouse fails?").
[99] Jerome Powell, "A Financial System Perspective on Central Clearing of Derivatives," Speech at the 17th Annual International Banking Conference, Chicago, November 6, 2014.

Although multilateral netting and collateralization are intended to offset the concentration of risk in CCPs, the possibility of CCPs having inadequate capital reserves is not farfetched. Analysts and market observers have raised questions about the ability of CCPs to effectively mitigate systemic risk. For example, ISDA's chair Stephen O'Connor recently remarked that the two major clearinghouses, LCH.Clearnet and CME "probably" have enough capital on hand in case of widespread default of their members, which many observers found less than reassuring.[100] The head of global clearing at JPMorgan was similarly concerned about the ability of CCPs to limit losses and forestall crises, locating the responsibility for doing so squarely within the financial industry: "The CCP default fund contribution is woefully inadequate. The CCPs only pay 2% towards that fund at the moment, and that contribution needs to increase, because we have to rule out the taxpayer picking up the cost. The industry needs to be able to shoulder this burden, and the ring-fencing of losses is vitally important."[101] JPMorgan echoed these concerns in June 2017, stating that current capital holdings at CCPs are insufficient to cover losses from defaulting counterparties and other risks.[102]

Regardless of the position one takes on the question of who bears the responsibility the ensure market liquidity in the event of mass defaults, the possibility that CCPs have reproduced the "too big to fail" dynamic that characterized the 2008 financial crisis looms large. Moreover, given the central position CCPs have been assigned in the post-crisis financial landscape, the

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[100] Joe Rennison, "LCH and CME have enough capital, says ISDA's O'Connor," *Risk Magazine,* September 24, 2014, http://www.risk.net/risk-magazine/news/2371886/lch-and-cme-have-enough-capital-says-isdas-oconnor.
[101] Qtd. in Elliot Holley, "'Woefully inadequate' CCPs could pose major systemic risk," *Banking Technology,* November 24, 2014, http://www.bankingtech.com/264912/woefully-inadequate-ccps-could-pose-major-systemic-risk/.
[102] Joe Parsons, "More changes needed to safeguard CCPs, says JPMorgan," *The Trade,* June 7, 2017, http://www.thetradenews.com/Post-trade/More-changes-needed-to-safeguard-CCPs,-says-JP-Morgan/. Accessed June 19, 2017.

failure of a CCP has implications that extend well beyond its immediate clearing members, exposing the system as a whole to the same unexpected losses and liquidity shortages that exacerbated the 2008 financial crisis.[103]

Accordingly, one of the major areas of the post-crisis G-20 agenda has related to the regulation of clearinghouses and in particular the question of "recovery and resolution regimes" – that is, what will happen in the event of a CCP default. In 2014, two prominent transnational financial actors, the Bank for International Settlement's Committee on Payment and Market Infrastructures (CPMI) and the International Organization of Securities Commissions (IOSCO) jointly issued a set of detailed principles for the recovery of systemically important financial institutions. While these principles are, on the one hand, evidence of a general agreement about the need to address the possibility of CCP failure, they ultimately require national-level implementation and enforcement, and the report notes that "some jurisdictions may not allow [financial institutions] to use all the tools listed in this report."[104] Moreover, the recommendations are intended for market participants and are explicitly agnostic on the question of state or central bank support for CCPs.[105]

Despite this international consensus around the need for CCP recovery and resolution regimes, there has been considerable fragmentation along national lines.[106] In the United States, for example, policymakers have been very reluctant to guarantee access to central bank

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[103] Froukelien Wendt, "Central Counterparties: Addressing their Too Important To Fail Nature," *IMF Working Paper* (Washington, DC: IMF, 2015), 2.
[104] Committee on Payment and Market Infrastructures & Board of the International Organization of Securities Commissions, *Recovery of financial market infrastructure* (Basel: BIS & IOSCO, 2014): 1.
[105] Ibid., 6.
[106] An outcome foreshadowed by the note appended to the CPMI-IOSCO report recording the United States Securities and Exchange Commission's objection to its publication and the SEC's position that "this report does not bind or otherwise reflect a judgment by the SEC with regard to its proposed or final versions of its rules or standards" (CPMI-IOSCO, *Recovery*).

lending.[107] In contrast, the European Central Bank and the Bank of England announced in 2015 their willingness to backstop CCPs under a limited set of circumstances, raising concerns that some of the same problems of moral hazard and excessive risk-taking on the part of investment banks that were cited as conditions of possibility for the financial crisis have merely been transferred to a new set of private financial actors.[108] As Benoît Cœuré, a member of the European Central Bank Executive Board contends, in the now-foreseeable event of a crisis as bad as or worse than the 2008 financial crisis, even CCPs with clear plans for allocating resources to cover losses (so-called "default waterfalls") are unlikely to have sufficient capital to limit losses to members, and given the mandatory nature of central clearing, public authorities will have no choice but to intervene.[109] The area of CCP governance, especially as it relates to recovery and resolution, is illustrative of both continuity at the level of financial system dynamics, as well as regulatory fragmentation where international cooperation was have once seemed possible.

C. Still-unregulated markets

Finally, some commentators have observed that large volumes of trading do not even qualify for central clearing. Not all OTC derivatives have large enough trading volumes to ensure the liquidity necessary for centralized clearing and are exempted from the clearing requirements of Dodd-Frank and EMIR, although under post-crisis regulation, many OTC derivatives that are not subject to the clearing requirement are subject to higher margin requirements than before. Regulators have justified the exclusion of certain nonstandard OTC

[107] Yagiz, "Clearinghouses' default 'waterfall.'"
[108] Huw Jones, "Regulators see slow progress on who pays for failed clearinghouses," *Reuters,* June 10, 2015, http://www.reuters.com/article/2015/06/10/us-eu-markets-regulations-idUSKBN0OQ1FI20150610.
[109] Benoît Cœuré, "Central counterparty recovery and resolution," Keynote Speech at Exchange of Ideas #2 Central Clearing – guarantee of stability or new moral hazard? London, November 24, 2014.

derivatives from the clearing requirements on the basis of the difficult of assigning standardized margin and default procedures to these products – a justification reminiscent of regulators' hesitance to impose greater standardization on niche exotic derivatives prior to the crisis, as discussed in Chapter 3.[110] Perhaps more significantly, so-called dark pools of capital and much of the shadow banking sector continue to be unregulated at the public level at all.[111]

VII. Making Sense of the Unintended Consequences

A. A reversal of regulatory fortune or crisis-prone continuity?

The shift in regulatory thinking from viewing derivatives as an area in which states' regulatory power should accommodate the power of global capital to a view shared by influential regulators in the EU and US that the market for derivatives is an appropriate object of at least some measure of state control is a significant one. Nonetheless, state actors have struggled to assert control over a sphere of social interaction that is constituted by innovation, uncertainty, and adaptability. Having legitimized these forms of un-publically governed social activity in the 1990s and early 2000s, recent attempts to put the genie back in the bottle have touched off new dynamics of complex interconnectedness and uncertainty.

What accounts for these consequences and the return of concerns about risk modeling, too-big-to-fail, liquidity, and uncertainty? I contend that while the central clearing requirement undoubtedly marks a shift in thinking about which actors have the authority to regulate OTC markets, it is also characterized by considerable continuity at the level of practices and that adhering to these practices limits policymakers' ability to envision more radical regulatory

[110] Patricia White, "Over-the-counter derivatives," Testimony before the Subcommittee on Securities, Insurance, and Investment, Committee on Banking, Housing, and Urban Affairs, US Senate, Washington DC, June 22, 2009.
[111] See, for example: Zsuzsánna Biedermann, "Off-exchange Trading, Dark Pools and their Regulatory Dilemmas," *Public Finance Quarterly* 1 (2015): 79-94.

reforms that might have the potential to more radically restructure global financial markets. Although large volumes of OTC contracts are now cleared through CCPs, the practices used to manage risk are remarkably similar to the ones that were used prior to 2008 and that both industry and regulatory actors alike recognized as inadequate. Central clearing has reshaped the market, but it has done little to fundamentally alter its unpredictable dynamics. On this point, Fed Governor Jerome Powell is worth quoting at some length:

> It has also been frequently observed that central clearing simplifies and makes the financial system more transparent. That, too, has an element of truth to it, but let's take a closer look. Charts similar to the ones shown in Figure [7] are frequently offered to illustrate the point that, as a CCP becomes a buyer to every seller and a seller to every buyer, it causes risks to be netted and simplifies the network of counterparties. The dizzying and opaque constellation of exposures that exists in a purely bilateral market, illustrated in the chart on the left, is replaced by a neat hub-and-spoke network that is both known and more comprehensible, illustrated in the chart on the right […] Figure [8] shows that, at the same time, in the real world CCPs bring with them their own complexities. As the figure shows, we do not live in a simple world with only one CCP. We do not even live in a world with one CCP per product class, since some products are cleared by multiple, large CCPs. Also, significant clearing members are often members of multiple CCPs in different jurisdictions. The disruption of a single member can have far-reaching effects. Accordingly, while CCPs simplify some aspects of the financial system, in reality, the overall system supporting the OTC derivatives markets remains quite complex.[112]

Powell's analysis suggests that CCPs operate in a world that is, in some ways, just as complex, uncertain, and crisis-prone as the pre-crisis world, not because CCPs have left relationships between financial institutions untouched but because they have replicated some of them at a different scale. Moreover, as clearinghouses rely on many of the same risk management practices that failed in the financial crisis, we should question the extent to which they have successfully mitigated systemic risk.

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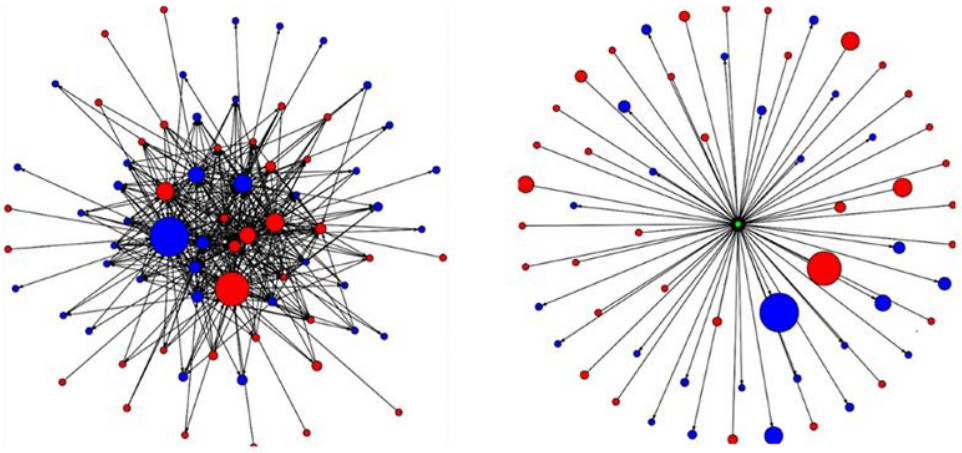
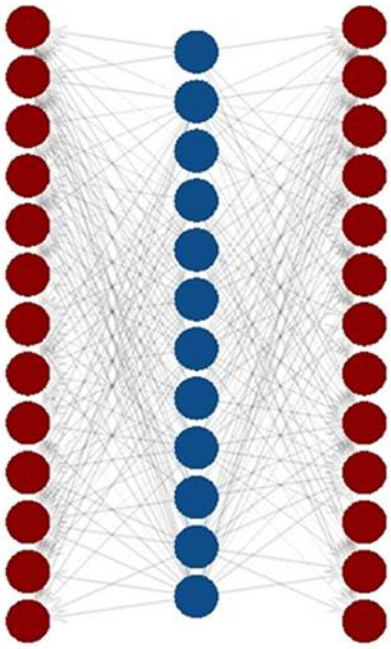
[112] Jerome Powell, "A Financial System Perspective on Central Clearing of Derivatives," Speech at the 17th Annual International Banking Conference, Chicago, November 16, 2014.



Note: The figure on the left shows a bilateral network in the credit default swap (CDS) market for a single and highly traded CDS contract. The figure on the right shows the hypothetical network that would exist if the contract were cleared through a single central counterparty. In each figure, a red circle denotes a protection seller and a blue one denotes a protection buyer. The size of the circle represents the amount of protection bought or sold.

Source: Depository Trust & Clearing Corporation.

Figure 7: Bilaterally and central cleared networks[113]



Note: The figure illustrates the network between banks in the portfolio of the Large Institution Supervision Coordinating Committee (LISCC), represented by blue circles, and central counterparties (CCPs), represented by red circles. Each connection indicates the relationship between a member bank and the CCP.

Source: Federal Reserve Board.

Figure 8: Links between banks and global central counterparties[114]

Three practices, in particular, are commonly cited in regulatory documents as contributing to CCPs' superior capacity to manage credit and systemic risk in OTC markets: netting, collateralization, and risk management systems. Ironically, these are the same practices that public regulators prior to the crisis referenced in their defenses of market self-regulation prior to the crisis. (See Figure 9 for a graph of references to each of these three practices by regulatory agency pre- and post-crisis.) The IMF's description of the merits of central clearing is illustrative of many public sector actors' endorsement of this regulatory change: "the primary advantage of a CCP is its ability to reduce systemic risk through multilateral netting of exposures, the enforcement of robust risk management standards, and mutualization of losses resulting from clearing member failures."[115] Even Powell, despite his critical evaluation of CCPs, cites this constellation of practices as evidence of their superior risk management potential.[116] Taking these technologies one at a time reveals important similarities with the pre-crisis era, despite shifts in the actors who are performing these practices.

[113] Powell, "A Financial System Perspective."
[114] Ibid.
[115] IMF, "Making Over-the-Counter Derivatives Safer," 91.
[116] Powell, "A Financial System Perspective": "the intent is not simply to concentrate risk, but also to reduce it–through netting of positions, greater transparency, better and more uniform risk-management practices, and more comprehensive regulation."

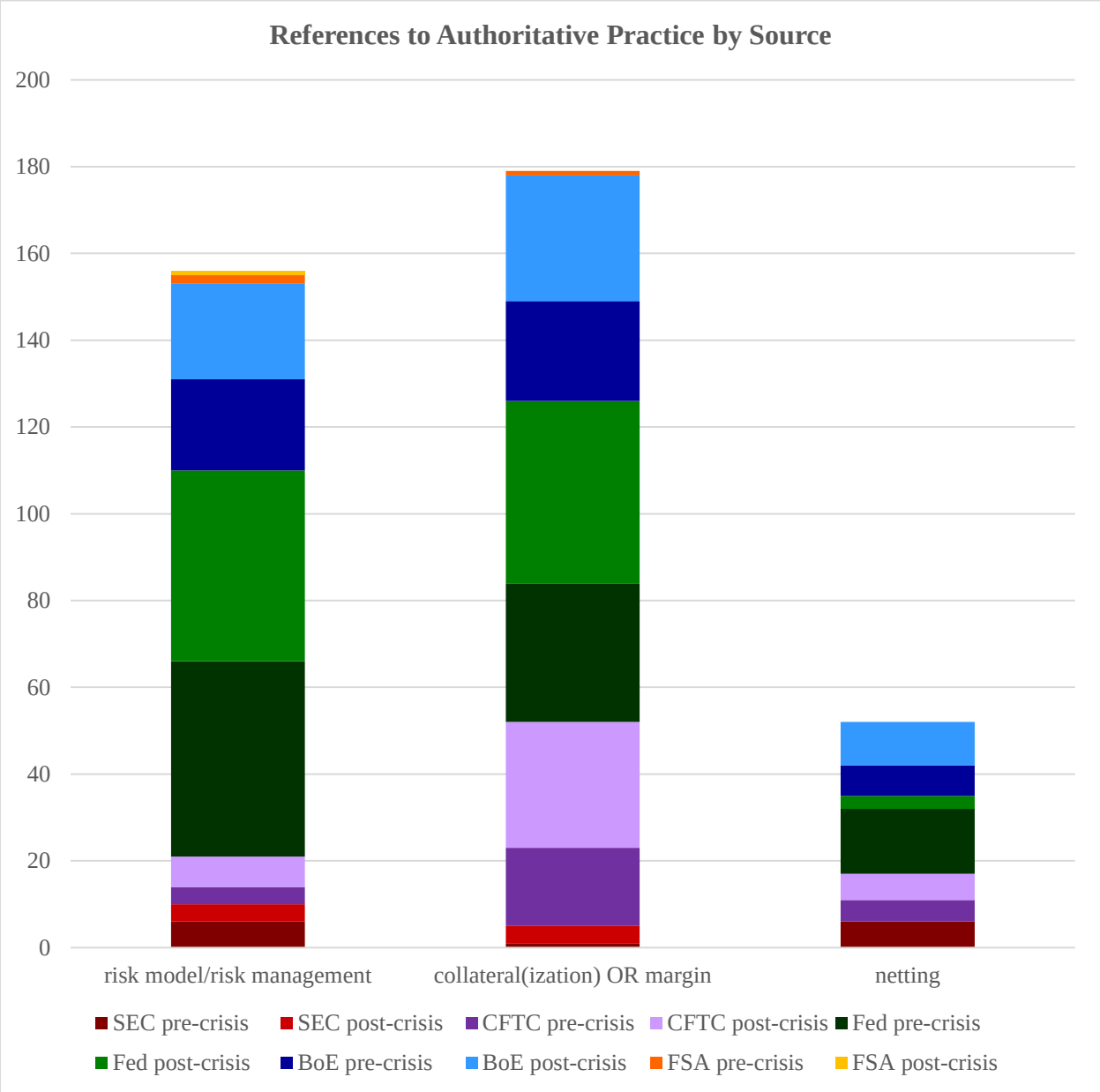


Figure 9: References to authoritative counterparty risk management practices by source

A. Netting, in a world of central clearing

CCPs' capacity for multilateral netting is frequently touted as one of the main advantages of central clearing. Rather than the pre-crisis norm of bilateral netting, which did not account for the interconnectedness of derivative dealers and users, as central nodes in financial networks,

CCPs are, in theory, better able to "net out" transactions that implicate multiple counterparties. The Bank of England's explanation is representative of how this advantage is explained: "CCPs can reduce counterparty credit risk by netting exposures across their members: that is, offsetting an amount due from a member on one transaction against an amount owed to that member on another, to reach a single, smaller net exposure […] The netting of payment obligations can also reduce the liquidity needs of members arising from those contractual obligations."[117]

Multilateral netting is thus taken as evidence of the superior ability of CCPs to limit credit risk, but there is good reason to be cautious of the extent to which multilateralized netting actually makes financial markets more stable. For example, Darrell Duffie and Haoxiang Zhu find that, "for plausible cases, adding a new CCP for a class of derivatives such as credit default swaps (CDS) reduces netting efficiency, increases collateral demands, and leads to a higher average exposure to counterparty default."[118] Using both modeling and illustrative evidence from the OTC positions of US banks, Duffie and Zhu show that while a single CCP can reduce credit risk, as CCPs fragment along jurisdictional lines, central clearing rapidly loses its advantages in terms of limiting exposure to credit risk.[119] Craig Pirrong is similarly skeptical of CCPs' capacity to limit risk in practice, regardless of their numbers, noting that, "the primary effect of netting is to redistribute risk to elsewhere in the financial system […] Specifically, netting redistributes risk away from derivatives counterparties and towards other creditors of bankrupt firms. Since these other creditors (e.g., money market funds) (a) may be systematically important, and /or (b) may have incentives to "run" from financially troubled financial institutions with derivatives

[117] Amandeep Rehlon and Dan Nixon, "Central counterparties: what are they, what do they matter and how does the Bank supervise them?" *Bank of England Quarterly Bulletin* Q2 (2013): 2-4.
[118] Darrell Duffie and Haoxiang Zhu, "Does a Central Counterparty Reduce Counterparty Risk?" *Review of Asset Pricing Studies* 1 (2011): 75
[119] Ibid., 76.

positions, this redistribution can be systematically destabilizing."[120] Moreover, as Jon Gregory observes, determining the optimal number of clearinghouses for purposes of mitigating risk poses something of a paradox: a smaller number of CCPs better reduce credit risk but raise – as noted in the previous section – serious concerns about moral hazard and public backing of private financial institutions.[121]

B. Collateralization, in a world of central clearing

Critics of central clearing have raised similar objections to CCPs' ostensible advantages in multilateralizing collateral (referred to as margin, in the context of central clearing). Like netting, the "mutualization of losses" is frequently held up as evidence of CCPs' capacity to confine the effects of counterparty default. Much as bilateral OTC contracts are usually backed by collateral, CCPs demand an initial margin from both parties to all transactions, which can then be used, in conjunction with a default fund to which all members contribute, to cover any losses. Should those sources be exhausted, the CCP may have to draw on its own capital, followed by contributions to the default fund by non-defaulting clearing members. The "default waterfall" is intended to deal with counterparty default in an orderly, and ultimately, confined, manner. As Amandeep Rehlon and Dan Nixon of the Bank of England observe, "Perhaps the most important benefit […] is the role that a CCP plays in the event of one of its members defaulting: CCPs have a number of rules and resources in place to manage such a default in an orderly way […] CCPs typically have access to financial resources provided by the defaulting party, the CCP itself and the other, non-defaulting members of the CCP."[122] Although the

[120] Craig Pirrong, "A bill of goods: CCPs and systemic risk," Working Paper, Bauer College of Business, University of Houston (2013), http://web.law.columbia.edu/sites/default/files/microsites/law-economics-studies/Pirrong_Paper.pdf.
[121] Jon Gregory, "The Clearing Mandate," *Rocket: The Magazine from OTC Space,* 3 (2015): 18.
[122] Rehlon and Nixon, "Central counterparties," 2.

authors go on to assert that, "CCPs set margin policies and requirements such that the probability of sums owed by a defaulting member to the CCP on its cleared positions exceeding the amount of margin held is very small,"[123] Powell of the US Federal Reserve contends that it is precisely the possibility of such low-probability events that lead to questions about whether CCPs will actually be able to tamp down the contagion through which the 2008 crisis was spread:

> During the global financial crisis, governments around the world took extraordinary actions to shore up many of the large financial institutions that are also large clearing members. While it is not possible to say with confidence what would have happened if these measures had not been taken, it is surely the case that whatever pressures CCPs faced would have been many times greater, and the potential consequences much greater as well. Moreover, as CCPs grow into their enhanced role in the financial system, they will represent an ever larger locus for systemic risk. It is therefore important not to be lulled into a false sense of security that past performance is a guarantee of future CCP success.[124]

Given the dramatic deviations from rating agencies' evaluations of default risk[125] and risk models' predictions of losses[126] during the financial crisis, we should be cautious of whether CCPs' margin calculations can account for unpredictable swings in asset prices, market liquidity, and counterparty default in a way that fundamentally alters the vulnerability of the financial system to such events.[127] Although there may now be more capital available to draw on, in the event of a counterparty default, the technologies for assigning that capital – and more fundamentally, the mitigation of risk through capital reserves (whether in the form of collateral, capital requirements, or default funds) – remains the same, as discussed in more detail below.

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[123] Ibid., 5.
[124] Powell, "A Financial System Perspective."
[125] See, for example: Bruce Carruthers, "From uncertainty toward risk: the case of credit ratings," *Socioeconomic Review* 11:3 (2010): 525-551.
[126] Nelson and Katzenstein, "Uncertainty, Risk."
[127] Higher margins requirements are often held up as a means of better ensuring CCP solvency in the event of crisis, but here too there is a trade-off as higher margin requirements may deter market participants from clearing their transactions, reducing the number of transactions/liquidity required for central clearinghouses to have enough capital to absorb losses.

D. Risk management, in a world of central clearing

In addition to multilateral netting and collateralization, much of the positive rhetoric surrounding central clearing emphasizes "the enforcement of robust risk management standards."[128] As described in the preceding paragraph, these risk management techniques are closely linked to the assignment of margin to member banks. A 2015 analysis found that the four biggest CCPs (CME, Eurex, LCH.Clearnet, and ICE) all use some variation of the Value-at-Risk model to calculate margin on OTC transactions.[129] The limitations of VaR as a method for calculating market risk are well-documented.[130] Although CCPs have attempted to modify their VaR models to account for these limitations,[131] the underlying methodology remains the same.

Given the widely recognized failure of the Value-at-Risk model during the financial crisis, some CCPs use instead the Expected Shortfall model to calculate the magnitude of losses against which they must hold capital.[132] But while Expected Shortfall is often presented as a dramatic improvement on VaR,[133] this method still fundamentally depends on having a knowable distribution of outcomes and probabilistic reasoning, and therefore does not represent a radical departure from the predictive logic of VaR. As Gregory writes of initial margin calculations by CCPs:

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[128] IMF, "Making Over-the-Counter Derivatives Safer."
[129] Peter Walsh, "So Many Margin Models," *Rocket: The Magazine from OTC Space,* 3 (2015): 38.
[130] See Chapter 3.
[131] E.g., by weighting volatilities, embedding stress testing, and using multiday "holding periods," rather than single trading days as observations – measures designed to better account for extreme tail events, though not without considerable criticism (e.g., Jon Danielsson, "The new market-risk regulation," *VoxEU,* November 28, 2013, http://www.voxeu.org/article/new-market-risk-regulations.)
[132] Gregory, "The Clearing Mandate," 19.
[133] J. Hull, "VaR vs. Expected Shortfall," *Risk Magazine* (2007), http://www.risk.net/risk-magazine/technical-paper/1506669/var-versus-expected-shortfall; Basel Committee on Banking Supervision, "Fundamental review of the trading book: a revised market risk framework," Consultative Document (Basel: BCBS, 2013), 18: "ES accounts for the tail risk in a more comprehensive manner [than VaR], considering both the size and likelihood of losses above a certain threshold."

> [A] typical calculation might require that initial margin is sufficient to cover the average of the worst 6 losses in the last two and a half thousand days (10 years). […] However, the problem with the thousands of days of market data changes that are analysed in order to define the initial margins is that on virtually none of them have any CCP members (i.e. banks) actually defaulted. Predicting the market volatility in the aftermath of a default event using data when defaults don't happen is dangerous. The worst six days in the above example are actually pretty much the only days of interests, given that at least some of these represent the last significant OTC default scenario (Lehman Brothers). However, taking the average is less than 'robust' and would imply significant probability of losses exceeding initial margin and spilling over into default fund.[134]

Gregory's criticism of CCPs' reliance on historical data in calculating initial margin was borne out in 2016 when the Brexit vote caused GBP swap rates to move by more than the initial margin required by both LCH and CME, the two major clearinghouses for currency swaps.[135] LCH and CME calibrated their risk models for setting margin requirements based on ten-year and eight-year-long historical periods, respectively, and neither period included a price movement on the scale of that produced by Brexit. Despite the use of tail loss scenarios, a measure meant to correct for both VaR's and Expected Shortfall's exclusion of very uncommon, very large possible losses, both CCPs' models failed to anticipate the amount of collateral that would be necessary to guard against the change in swap rate caused by an unexpected political event.[136] A reliance on historical data is not the only problem of CCPs' risk models; Jon Danielsson is similarly skeptical that Expected Shortfall allows financial institutions to better guard against otherwise unforeseen losses than VaR did, due, in part to its inability to capture risk that is

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[134] Gregory, "The Clearing Mandate," 19.

[135] Amir Khwaja, "Brexit – the impact on swap margin," *Clarus Financial Technology,* June 28, 2016, https://www.clarusft.com/brexit-the-impact-on-swap-margin/. The author thanks Jon Gregory (personal correspondence) for directing her to this example.

[136] Moreover, although Brexit has now been factored into the initial margin calculations for GBP swaps, it is not clear whether the possibility of a rate movement of that magnitude has affected the initial margin requirements of other currency swaps, raising further questions about the generalizability and limitations of the historical data used to calibrate these risk models.

endogenous to the financial system, including "the vicious feedback loops that are at the core of financial crises."[137]

Centrally cleared OTC derivative markets depend on the same core set of risk management practices that failed to limit counterparty, and ultimately systemic, risk during the global financial crisis. These practices were insufficient to control markets when it mattered most, and there is good reason to doubt whether their transfer to central clearinghouses has done enough to prevent another crisis in the future. In failing to recognize the inability of netting, collateralization, and risk modelling to fully account for market complexity and uncertainty, we also overlook the contribution of these practices to that instability, whether through engendering a false sense of security, counterperformativity, or the creation of highly correlated linkages among large financial institutions. We should not, therefore, be surprised that the central clearing requirement has reproduced many of the very dynamics it was intended to forestall. Although the shift from market self-regulation to a governmentally mandated clearing requirement can be interpreted as a fundamental shift in market governance, a closer look at the practices that structure central clearing reveals continuity, rather than change.

It is possible to interpret this outcome as a failure of imagination, in which more radical structural reforms were passed over in favor of modifying existing technologies. A full consideration of why regulatory thinking was so constrained is beyond the scope of this paper. Nonetheless, the continued acceptance of OTC derivatives markets as legitimate forms of economic exchange surely plays an important role. As long as these markets exist, netting, collateralization, and risk models are likely to play important roles, given the ways in which

[137] Danielsson, "The new market-risk regulations."

these practices structure the daily operations of the market. Far from being regulations imposed on the market by public regulators worried about risk, these practices were first developed by the industry itself, then cited by public regulators as evidence of the capacity for self-regulation. Implementing regulation that departed dramatically from these technologies would likely mean a restructuring of the OTC market that would likely leave it unrecognizable or perhaps even non-existent. Having legitimized these practices in the era of self-regulation, policymakers enabled the creation of a hundred-trillion dollar market that was, in part, constituted by them. In not (successfully) disputing the OTC market's right to exist following the crisis, policymakers were limited to regulatory tools that would allow the market to remain profitable. We should not be surprised, then, that central clearing has reproduced so many of the dynamics associated with the OTC market prior to 2008.

VIII. Conclusion

Given the relative newness of the central clearing requirement, this analysis is necessarily preliminary. But while this novelty represents a potential disadvantage in terms of data collection, it also provides scholars of global political economy with valuable "real time" insight into how markets are constituted and reconstituted – a perspective that is often missing in our analyses of the lead-up to the financial crisis, many of which are retrospective. Accordingly, this chapter is more empirical than theoretical in bent, and my arguments about the limitations of central clearing and the sources of those limitations in pre-crisis narratives and assumptions about how markets can and should be governed are, of necessity, provisional ones.

Nonetheless, this analysis helps me answer the two central questions that motivate this dissertation: How did the OTC derivatives market grow to such an unmanageable size in such a crisis-prone way with so little regulation? And, why, given the severity of the crisis, have

regulatory responses been relatively constrained? In answer to the first question, we can see that regulators who, as we know from Chapter 2 were in a position to alter the trajectory of derivatives markets, repeatedly referenced industry practices of counterparty trust in their justifications for self-regulation. Netting, collateralization, and risk modeling – supplemented by the judgment of "sophisticated investors" – were cited as evidence of the market's capacity to limit financial losses, prevent contagion, and govern itself.

In answer to the second question, the crisis did not put an end to the longstanding regulatory tradition of deferring to market practices. Private clearinghouses were already a part of the financial landscape, albeit a much smaller one, and mandated clearing was tolerated – and in some cases even endorsed – by actors within the financial industry following the crisis. The transnational policy community of national and international regulators, market participants, and industry organizations that encouraged self-regulation in the derivatives industry prior to the crisis were quick to push for central clearing to be included on the influential G-20 agenda in 2009. The handful of more radical reforms that were floated during the height of the crisis – especially those, such as banning unattached CDS and requiring exchange trading of all OTC derivatives, that would have rendered the OTC market unrecognizable, if not ended it entirely – were quickly abandoned in favor of a more market-friendly regulatory regime that relied on a familiar set of risk management practices. This continuity speaks to the influence of the financial industry, but it also reflects the limits of possible regulatory change once public authorities have determined that a particular market should (continue to) exist.

While continuity at the level of practices is explained, at least partially, by transnational dynamics, many of the unexpected, potentially destabilizing consequences of mandated central clearing are evidence of the salience of national regulatory actors post-crisis. While we have seen

international consensus around broad regulatory changes, accompanied by more detailed regulatory principles published by transnational actors like IOSCO and CPMI, public regulation must ultimately be implemented and enforced at the national (or supranational, in the case of the EU) level. Cross-border disputes over recognition and regulatory harmonization have produced regulatory, and in turn, market fragmentation, undermining CCPs' capacity to most effectively mitigate systemic risk. Moreover, as market pressures reduce the number of clearinghouses in each jurisdiction, the debate over the appropriate relationship between public finances and private firms that are "too big to fail" has been re-opened. Despite initial optimism about the ability of publically mandated central clearing to transform the global financial landscape, thus far, the topology appears worryingly familiar.

Conclusion

I. Empirical Contribution of this Project

The main contribution of this dissertation is to provide a detailed, micro-level empirical analysis of the development and regulation of the biggest market in the world, but one that is nonetheless understudied in International Political Economy. This dissertation help us understand the pre-crisis construction of derivatives markets and financial authority, the politics and dynamics of the financial crisis itself, and the limited post-crisis regulatory changes.

Despite episodes of public contestation and heightened regulatory scrutiny that threatened to quash the unfettered proliferation of over-the-counter derivatives since they were first developed, by the turn of the 21st century, public regulators had come to interpret the OTC market as legitimate, citing its contribution to efficient, deep, and liquid global financial markets. The preceding chapters recount how financial market actors had constructed a recognizable market for over-the-counter derivatives through practices for valuing assets, ensuring market liquid, and measuring and guarding against counterparty risk. Public regulators referenced a core set of these practices in their public justifications for not doing more to govern the market, citing them as evidence that autonomous market forces had ensured that risks were being managed, the price mechanisms was operating freely, and banks and other financial institutions were protecting themselves adequately against the risk of counterparty default. Practices like pricing and risk models, electronic settlement, mark-to-market accounting, collateral standards, and netting provisions in contracts signaled to regulators that derivatives dealers and users were sophisticated, competent actors in control of the market they had created.

Beyond their constitutive properties in making the market for derivatives possible, recognizable, and largely immune from regulatory intervention, the specific details of how these

practices are performed matters for understanding the politics of the financial crisis. First, these practices made regulators and the public overly confident in the stability of an unregulated market, leaving them unprepared for a global crisis. These authoritative practices' widespread use and incorporation into official market recommendations caused investors and regulators to neglect uncertainty, convinced regulators that opaque derivatives markets were an acceptable price to pay for liquid financial markets, and undergirded the regulatory perspective that systemic crisis could be successfully avoided through counterparty risk management.

Second, these authoritative practices, while well-suited to the smooth functioning of the market are often inadequate during times of crisis. Models of counterparty risk dramatically underestimated the risk of counterparty default, which meant that collateral and netting arrangements were inadequate bulwarks against financial contagion. VaR dramatically underestimated the maximum possible loss on portfolios of derivatives, which meant that capital holdings, too, failed to limit systemic effects.

Third, while intended to manage and control the uncertainty, opacity, and complexity of the derivatives market – and often viewed as doing so by public regulators – these practices often compounded the market's crisis-prone dynamics. The same practices that structure the market for derivatives in the short run can also contribute to its uncertainty and instability in the long run. Practices of valuing complex assets can produce unintended consequences when they rely on inadequate historical data and produce convergence in investor behavior, heightening the market's vulnerability to ever-present generators of unpredictability. Marking assets to an illiquid and panicked market exacerbates illiquidity and the continued use of this accounting method throughout the crisis fueled the run on already distressed assets.

Finally, an analysis of these authoritative practices helps us make sense of continuity in the size and structure of the OTC derivatives market and of the absence of more sweeping regulatory change. Given the depth of the crisis and regulators' explicit identification of both OTC derivatives market and of particular constitutive market practices as drivers of the crisis, this continuity is initially puzzling. This analysis shows that even when the actors who regulate derivatives have shifted from private international institutions to states, the market continues to be structured by many of the same practices it was pre-crisis, with the same potential for crisis-prone dynamics. Because these practices are constitutive of the market, fundamentally altering them would jeopardize the existence of a market that regulators still perceive as providing a valuable social function by distributing risk.

Many of these practices continue to enable financial market actors' authority. For example, while mandatory central clearing signals that private financial authority is not as sweeping as it was before the crisis, collateralization and close-out netting, carried out by private, for-profit actors are still routinely cited by public regulators as evidence of effective counterparty risk management (albeit now in a multilateralized setting). These practices are cited as justifications for not running CCPs as not-for-profit public utilities, serving – once more – to buttress private financial authority.

Other practices are now less frequently referenced by regulators as hallmarks of market discipline and self-regulatory ability, but nonetheless continue to structure the market. Variations on VaR, Black-Scholes, and the Gaussian copula are still used by both banks and counterparties to price derivatives and portfolios containing them, because few alternatives exist given the specific characteristics of financial derivatives. Regulators now advocate supplementing these with experiential judgment, stress tests, and enhanced leverage ratios and capital requirements,

but have taken little action to alter the basic methodologies that underlie these valuation practices.

Even practices that were nearly universally condemned by regulators at the height of the financial crisis have endured. Mark-to-market accounting practices continue to be the norm for financial assets like derivatives in the absence of a better alternative, although regulators are now more circumspect about the conditions under which these methods are appropriate. However, unlike the area of valuation in which public regulators have done relatively little to augment basic models, regulators have taken additional actions to enhance the transparency of OTC markets, through mandated use of central counterparties and swap execution facilities, both of which have reporting and disclosure requirements attached to them. But these reforms have been limited in effect by the inherent opacity of many derivatives contracts and exit to less transparent jurisdictions and pools of capital.

II. Theoretical and Methodological Contributions of this Project

This project also makes theoretical and methodological contributions to the study of IPE and IR more generally. My findings challenge two conventional assumptions in the field of IPE: that regulatory outcomes are primarily the result of competing public and private interests and that financial power and markets can be understood in purely material terms.

Scholarship in IPE often analyzes markets and politics according to a public/private dichotomy, in which markets are, ideally – or even ideal-typically – autonomous, apolitical spheres of law-governed rational interaction and politics is the domain of state actors (or of private actors' attempts to influence state actors). From this perspective regulation and rule-making are an intervention into "normal" market activity that compromise the efficient allocation of scarce resources in the service of a public goal. Instead, I show that regulatory changes are

often rooted in shifting interpretations of derivatives – including that their unregulated use *is* in the public interest; that there is no unified private interest, with different derivatives counterparties holding different beliefs about what constitutes acceptable public regulation; and that regulators – even within the same agency – often held different views about the relationship between derivatives and the public good.

In contrast to a materialist theory of financial power, I argue that that it should also be understood in terms of authority. Finance very often does not have to lobby or persuade to be powerful and this mode of power is surprisingly resilient in the face of crisis. Materialist understandings of financial power often tend to regard global capital markets as a relatively undifferentiated force in global politics. This project makes the case for disaggregating financial markets, recognizing that different markets have different dynamics and different relations of authority. These differences matter for understanding the vulnerabilities and instabilities of a given market, for evaluating the conditions of possibility for effective regulation, and for analyzing its distributional consequences. The importance of understanding specific details of the different interactions, relations, and exchanges that constitute the global financial system was underscored by Federal Reserve Board Governor Susan Phillips in 1997, who stated:

> Perhaps the most basic lesson we have learned from our experience in supervising trading and derivatives activities is that the underlying risk of a financial instrument is more important than what an instrument is called. Although two instruments that differ in name only may have entirely different treatment under existing (and outmoded) legal and regulatory frameworks, the market, credit, liquidity, operational, and reputational risks embodied in them can be identical. […] Indeed, placing financial instruments in pigeonholes without regard to their true risks and economic functions can create disincentives for prudent risk management – often with unfortunate results.[1]

[1] Susan Phillips, "Derivatives and risk management," Speech at the Derivatives & Risk Management Symposium of the Fordham University School of Law, New York, September 19, 1997.

While financial regulators apparently did not learn this lesson well enough to avoid "unfortunate results" ten years later, scholars of the global political economy would do well to pay attention to the micro-level processes that constitute global finance.

The theoretical innovation of authoritative practices and the methodological strategy for identifying and tracing them is another contribution of this dissertation with relevance outside the study of derivatives markets. While I argue that the concept of authoritative practice is particularly well-suited to a study of OTC markets, in which governing power was historically neither publically justified nor coercively imposed, this empirical area of inquiry does not exhaust the usefulness of this concept. By drawing analytical attention to practices that, when competently performed, constitute certain actors as having the right to make politically consequential decisions, the concept of authoritative practices can help us make sense of other instances in which power is neither contested nor exercised through force: cases in which various forms of expert knowledge are constitutive of the right to rule; cases in which the boundary between public and private action is blurred or misleading; and cases in which power endures beyond a crisis of legitimacy. Given the centrality of questions of expertise, private authority, and democratic deficits in the scholarship on global governance, I anticipate that authoritative practices might productively be used in a wide variety of scholarly inquiries in this area.

III. Normative Contribution of this Project

Focusing on practices allows us to resist the tendency to take financial authority for granted, even as its taken-for-grantedness is part of what makes it authoritative. This project is critical of approaches that attribute financial power to the sheer material size of global financial markets and take as axiomatic that material capability is what determines outcomes in the global political economy. I show that financial authority was not granted automatically or achieved

without effort, and examining the effort that has gone into consolidating that authority makes visible the contingency of this defining development of contemporary global politics. Had derivatives been interpreted differently at key moments or had different interpretations won out, the trajectory of how the market developed might have looked very different: There was nothing inevitable about the development of an unregulated and crisis-prone $600 trillion sector of the global economy. The critical perspective advanced in this project pushes us to reject a deterministic view of financialization in contemporary global politics and to regard authority as a political project that must be constructed and maintained over time, that can be contested, and that could be allocated differently. That things could have been different in the past suggests that they can be made different going forward.

At the same time, for those looking to this project for resources to resist and rein in global capital markets, this project also reveals some significant challenges. While I show that the market could have followed alternative trajectories and financial authority could have been constructed differently, it matters a great deal that the market and financial authority developed the way they did. Markets are not autonomous forces and political actions and decisions can alter their trajectory, but that also means that the decisions that were made in the past have real consequences for today. Requiring that OTC derivatives be traded on regulated exchanges today is a very different question than early 1990s when it was first proposed and even than in the immediate aftermath of the crisis, when the space for radical regulatory reform was arguably much greater. Compared with the early 1990s, derivatives markets today are much more closely enmeshed in firms' investment and risk-management strategies and the market is much larger, more complex, and arguably more opaque (post-crisis disclosure requirements notwithstanding)

precisely because of the regulatory decisions and non-decisions that were made over the past twenty years.

The mutually reinforcing growth of financial markets and financial authority has resulted in a global financial system that is surprisingly durable and resilient, even in the aftermath of a crisis caused by its very structure. The problem is not just that the market was endowed with authority that is difficult to withdraw now; the legitimacy of global finance and of OTC derivatives has indeed been questioned and critiqued. The problem is that granting authority to derivatives market participants in the first place made possible the construction of the market in ways that are now difficult to reverse, even if the legitimacy of the market has been undermined. Financial authority is not just a political overlay on apolitical practices; financial practice and financial authority are co-constitutive of the political economy of global finance.

Understanding the simultaneous contingency and weight of the political origins of modern finance has implications outside of derivatives regulation as well. For example, during the 2016 presidential election campaign, both Republican and Democratic presidential candidates campaigned on "breaking up the banks" and reinstating some version of the Glass-Steagall provisions in the US Banking Act of 1933 law that separated commercial and investment banking and that were repealed in 1999 by the Gramm-Leach-Bliley Act.[2] While there is considerable public support for breaking up financial institutions deemed too big to fail (at least in the abstract),[3] this project suggests that the particular structures and practices of the financial system matter as much as questions of legitimacy for understanding the conditions of

[2] See Chapter 2.
[3] Peter Schroeder, "Poll: Bipartisan backing for breaking up big banks," *The Hill,* January 20, 2015, http://thehill.com/policy/finance/230058-poll-bipartisan-backing-for-breaking-up-big-banks.

possibility for financial reform. In the case of breaking up the banks, this analysis pushes us to consider the ways that both commercial and investment banking have been transformed in the eighty years since Glass-Steagall was implemented and to identify the practices that are constitutive of contemporary banking and that would be altered or perpetuated by this reform. While this certainly does not mean that the proposal is a bad one, it does suggest that the possibilities and limitations of financial regulation in 2017 are fundamentally different than they were in 1933, precisely because of the regulatory decisions that have been made in that time.

The 2008 global financial crisis revealed the limitations of some of the key assumptions underlying self-regulation: the ability of market actors to accurately assess the risk associated with complex financial assets; the assurance of a market and sufficient liquidity for highly rated debt; the reliability of the price mechanism to ensure a liquid market for debt and risk; the accuracy of determinations of creditworthiness that underlie banks' investment decisions; and the assumption of a division between private market activities and the public welfare. But while these assumptions have been undermined, this dissertation suggests that financial practices and authority are considerably more resilient.

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