Commoditizing Finance:
Chicago's Financial Futures Markets, 1972-1988

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Abstract

This thesis analyzes the geographic context and spatial implications of the invention of financial derivatives, originally known as financial futures, beginning in 1972. The thesis argues that the historical geographic location of these markets in Chicago, Illinois was a key determinant of their structure, and helps to explain the speculative economic spaces that contemporary derivatives produce. The analysis follows the first fifteen years of financial futures trading which culminates in the October, 1987 stock market crash, which was the first significant financial derivative market failure and crisis. It argues that financial derivatives, at least during this formative period, were deeply embedded in the agricultural futures industry of Chicago. In particular, the governance structures that allowed these markets to operate were inherited directly from those that governed the agricultural futures markets. The territorial and relational location of these markets, far from the New York financial center of the U.S., allowed the Chicagoans to construct the first financial derivatives markets according to the rules of agricultural speculation, not those of securities trading, which had been significantly reformed in the 1930s. Hence my crucial argument is that financial futures *are better understood as futures, than as finance*. This distinction helps explain how futures markets engendered a revolution in finance in the 1980s and 1990s—because they were originally constructed outside the boundaries of the financial field. The empirical analysis focuses on the Chicago-based actors and institutions that constructed these markets and their struggles to frame derivatives as economically and politically legitimate. The chapters variously engage theoretical debates over the ability of the state and society to regulate finance, the nature of economic and financial embeddedness, the geographic implications of speculation and market liquidity, and the nature of financial prices, speculation, and knowledge. Ultimately the thesis appeals for a deeper and more theoretically sophisticated engagement with derivatives by human/economic geographers and other critical social scientists.

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Contents

Figures

Abbreviations/Acronyms

- 1933/1934 Acts=Securities Act of 1933 and Securities Exchange Act of 1934
- BSM=Black, Scholes, Merton option pricing formula
- CBOT=Chicago Board of Trade
- CBOE=Chicago Board Options Exchange
- CEA=Commodities Exchange Act, passed 1936, also refers to Commodity Exchange Authority, which was established by the Act
- CFMA=Commodity Futures Modernization Act, passed 2000
- CFTC=Commodity Futures Trading Commission, replaced CEA, est. 1974/1975
- CME=Chicago Mercantile Exchange
- GFA=Grain Futures Act, passed 1922
- GNMA=Government National Mortgage Association or "Ginnie Mae"
- ICE=Intercontinental Exchange
- LIFFE=London International Financial Futures Exchange
- NYSE=New York Stock Exchange
- SEC=Securities Exchange Commission, est. 1934

Chapter 1: Introduction

Finance from the Margins

> A primitive form of futures trading emerged spontaneously in various market centers at least as early as 1850. Only in the grain trade at Chicago, however, was the demand for a means of hedging commercial risks then strong and persistent enough to permit this unconventional form of trade to survive the fluctuations in speculative interest, overcome conservative opposition, and live through the stormy period of experimentation necessary to put it on a firm footing. When that had been accomplished at Chicago, the new form of trading was soon adopted at other market centers and for other commodities than grains (Holbrook Working 1953: 314).

At the founding of the city of Chicago, Illinois in 1837 it was already clear that it would serve as a hub for trading natural commodities. With great assistance from the Native Americans, the earliest European explorers quickly recognized that the location, at the southwestern terminus of North America's Great Lakes, and only ten miles from a tributary of the Mississippi meant it was a convenient location for both a trading outpost and a military garrison (Miller 1996). Furs were the first main product, but very soon after, grains that flourished in the rich, prairie soil of Illinois, Indiana, and Southern Wisconsin were flowing through the new city. By the time Chicago won the battle to become the nation's railroad hub twenty years later (Cronon 1991), the State of Illinois had issued its first charter for Chicago Board of Trade. Here merchants and distributors traded both actual grain and paper receipts to collect grain at Chicago's grain elevators. The physical exchange of grain was an important economic activity for Chicago, but it was the Chicago Board of Trade's (CBOT) success in creating a liquid market for grain futures contracts[1] that became a revolutionary innovation. The prices of these grain futures were transmitted widely, and became a common measurement for the value of grain itself. As a result, the economic geography of both Chicago and vast rural landscapes were transformed (ibid.). More importantly for this dissertation, grain futures

[1] Near the end of this introductory chapter I define commodities, futures, derivatives, and other key terms.

spawned an entire Chicago based futures industry. Over a hundred years later this industry would cause a revolution across a different landscape—that of finance.

In 1972 the Chicago Mercantile Exchange (CME) drew directly on its institutional experience in designing agricultural futures to start a futures contract for foreign currencies. A year later the CBOT began trading similar contracts on corporate stock. Over the next five years the two exchanges would develop futures-like contracts on home mortgages, Treasury bonds, and corporate debt. These, and many more that followed exerted immense pressure on New York financiers to improve the efficiency of their markets, but more importantly, to formalize connections with Chicago's markets. The bridges between Chicago and New York constituted the beginning stages of the development of a deeply *interconnected financial system* that between 1980 and 2000 would shift its focus from investing to speculating.

When I began thinking seriously about Chicago and finance in late 2008, the U.S. and the world was in the midst of the worse financial meltdown since the stock market crash and banking collapse of 1929-1933. The 2008 crisis became influential to the way I constructed my research questions. Given the centrality of financial futures, which by then were generically referred to as financial derivatives, to the 2007-2009 crisis, I began to wonder if the geographic origin of these instruments might have something to do with their role in the crisis. After all, the instruments had only been in existence for about 35 years, during at least half of which they were traded almost exclusively in Chicago. And yet, the undeniable focus of the crisis was New York, or more specifically the arrogance, greed, and corruption of "Wall Street".

The result of my focus on this *geography* of derivatives is that my analysis of finance, has in a way been conducted from what could be considered the periphery of the financial industry. Considered this way, Chicago is not only different, but *derivative* of New York. In fact, one of my central contentions is that financial futures—and derivatives—at least in the way they relate to our contemporary financial system, *are better understood as futures than as finance.* In other words, my

argument is that financial futures did not emerge from a financial geography per se, but instead from an agricultural-industrial geography, and this difference matters for what eventually became the highly interconnected financial system that exerts so much influence on daily life today. On the other hand, I also contend that financial futures and derivatives are mistakenly assumed to be *derivative*. Instead, I argue they are highly *productive*. Most importantly, they are productive of new spaces of economic interdependency, and as such new geographies of accumulation.

Five years after the financial debacle of 2008, one of the crucial questions facing U.S. and global society is how to enact practical, if not radical, limits on the financial system (Engelen et al. 2011). If there is anything that achieves consensus in U.S. politics today, it is that financial markets should not again be allowed to wreck the national or global economy. To date, however, the solutions have done more to rebuild the power and influence of finance than to limit, slow, or shrink the industry. One reason for this is a profound misconception of what finance is and what it does. This dissertation is one contribution in a larger project by critical social scientists to remedy these misconceptions (cf. Hall 2010, 2012, 2013, Knoor-Cetina and Preda 2012).

The project of reimagining finance requires the appreciation of a contradiction. On one hand, it is necessary to recognize the power of financial markets to engender economic and geographic interconnection, and thus produce what appears to be a rational and coherent, albeit highly complex system. On the other hand, we need to conceive of finance as a hybrid, discontinuous, and loosely organized system of mundane economic activities (Thrift 1996, Leyshon and Thrift 2007). This latter point is particularly imperative to those, like myself, interested in contesting the power of finance. To achieve this it is vital to identify sutures or "cracks" in what is assumed to be a coherent system of *finance* capitalism. As John Holloway (2010) has elaborated, these cracks present opportunities to resist and pry apart the hegemony of the most alienating forces of capitalism. This is not only a question for the present conjuncture, but also for the past. In other words, following Foucault (1980, 1994) we must question the historical contingency and

construction of inherited political-economic categories if we are truly to grasp them outside the dominant discourse of our own times (see also Roth 1981, Christophers 2013b). This is particularly important now given the dominant neoliberal, or market friendly, political disposition (Peck 2010).

In this dissertation I am analyzing both sides of this contradiction from a geographic perspective. On one hand, I am arguing that contemporary financial markets have constructed an interconnected and liquid system of speculative markets. This system reproduces economic globalization both by incentivizing interconnection, but also by providing consistent price information that makes it appear as a coherent and logical system to begin with. On the other hand, I am arguing that contemporary finance has only attained its relative autonomy—or its systemic nature—by conglomerating bits and pieces of other social, economic, and political logics gathered together from disparate economic geographies. In this case, those pieces are speculative expertise from Chicago, financial capital from New York, and political legitimacy from Washington, D.C.

The details of the agglomeration economies, or the "stickiness" of Chicago's "industrial district" (Markusen 1996) are not the main concern of this project. While factors like localized the tacit knowledge embedded in institutions (Gertler 2003) or the generational transfer of a particular Chicago-style of commodities trading (Zaloom 2006) are important to this study, I am more concerned with identifying a longer term institutional or regulatory "fix" (Harvey 2006, Peck and Tickell 1994). I begin my analysis with the uncontroversial assumption, gleaned from reams of secondary sources, that speculative agricultural trading was "stuck" in Chicago as for at least the last hundred years 80+ percent of U.S. agricultural futures trading happened in that city (FTC 1920, Hieronymus 1977). What I am attempting to do is understand how the inherited "fixity" (Brenner 1998) of this speculative trading translated into something new when it became interwoven with the financial industry, a sector that was never substantially fixed in Chicago, at least not as compared to a city like New York or London. In this I draw on the radical and critical traditions of human and economic geography (Peet 1998, Blomley 2006, 2007), that while concerned with describing the

world are also concerned with challenging the dominant and hegemonic conceptions of how the world operates, particularly the parts influenced by capitalism. My main goal in this dissertation is to question and present an alternative perspective on the foundations of the financialized space-economy.

The substance of this dissertation is presented in five somewhat stand-alone chapters that are designed to be submitted as academic journal articles. Consequently, while the text as a whole is focused on financial derivatives, the chapters are individually framed, and do diverge in subject matter, theoretical orientation and methodology. The implications of this are twofold. First, the dissertation lacks a clear narrative and chronology throughout. Second, while the chapters attempt to make clear contributions to important debates in geography and proximate fields, it is difficult to pinpoint the contribution of the dissertation as a whole. I will partially remedy both of these in this introduction, although I will not restate the detailed arguments of the chapters other than to introduce them. To be specific, the remainder of this introduction is intended to achieve four things. I first outline the broad theoretical background and engagements of the dissertation and explain why these engagements are important. Second, I explain a few crucial definitions and facts that will ease reading of the rest of the text. Third, I will explain the research methodology and methods I employed in this study. And fourth I will provide a brief overview of the chapters.

1.2 Overview of Engagements and Interventions

The following chapters grapple with three fundamental questions about finance. First, where did financial derivatives come from? Second, what role did financial derivatives play in constructing a "financialized" economy? Third, why have financial futures and thus financial derivatives largely escaped U.S. government regulation? These are big questions that no single text can answer, and I have not attempted to provide comprehensive explanations. Rather these questions served as motivating factors for my research, and now serve as framing devices for the

written results. In addressing each of them below, I will also discuss how other geographers have grappled with these questions and where this dissertation has potential to refine geographic approaches to investigating financial markets. The questions I am asking furthermore reflect how this thesis contributes to some of the key debates happening in the social sciences with regard to markets, finance, globalization, and capitalism.

1.3 Where did contemporary financial derivatives come from?

If you asked an urban geographer in 1970 to predict what Chicago would be known for 30 or 40 years later, you would likely have received many answers: a transportation hub, a leading center of industrial innovation, or the heart of the agricultural risk management industry. Yet, I doubt anyone would have argued that Chicago would rival New York and London as the dominant global city for speculative finance. Certainly no one in the futures industry in 1975 expected this. Nevertheless, I am not aware of any serious arguments today that suggest any other city was more important to the development of financial futures[2]. Some might argue that Chicago's importance was short-lived and has been surpassed by New York or London, but no one disputes Chicago's dominance in the 1970s and 1980s. And yet only a few writers have analyzed this development with respect to the difference between the cities (Weitzman 2011). Particular institutions, especially the two main futures exchanges, as well as particular innovations or events have received serious attention[3], but the importance of the entire Chicago-based network is subdued or completely

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[2] The development of complex securities, a process called "securitization" (see Leyshon and Thrift 2007, Wainwright 2009), is a different story. New York investment banks played the central role in this process beginning in the early 1980s (cf. Tett 2009). The definitions and common usage of securities, futures and derivatives became muddled in the 1970s and 1980s (see below and Chapter 2).

[3] For the Chicago Board of Trade see Sandor 2012, Zaloom 2006, Falloon 1998; Bronstein, A.M. 2008, *My Word Is My Bond*, Hoboken: Wiley. For the Chicago Mercantile Exchange see Tamarkin 1993, Melamed 1996, Melamed 1993, Rodengen 2008. For a discussion of corruption, fraud, and enforcement actions on these two exchanges see Greising & Morse 1991. For a discussion of the importance of financial economists and economics to the development especially of Chicago stock options, but also financial derivatives in general see Millo 2003, MacKenzie and Millo 2003, MacKenzie 2006.

missing from these accounts (except see Sassen 2006). In this regard, the intervention of this dissertation is my focus not on one particular institution or innovation, but instead on a particular time and place: Chicago and the Chicago futures community from 1972 until 1988. Furthermore, instead of focusing directly on innovation, or directly on an institutional analysis of one of the exchanges, I have attempted to trace the influence of this geographically specific economic sector on the finance industry, financialized capitalism, and financial crisis. In this way I draw directly on the work of William Cronon (1991) in his discussion of the symbiotic relationship between the city of Chicago and its economic hinterlands in the 19th Century. Instead of standardizing and centralizing, and ultimately commodifying wheat, lumber and beef, I am interested in the speculative commodification of financial instruments such as stocks, bonds, and mortgages.

Understanding the origins of Chicago's approach to constructing markets required that I look back further in history than the 1970s. I begin my analysis in the early 20th Century looking back to the late 1800s for hints. I discovered two series of historical events taught the CBOT valuable lessons that they leverage to this day. The first happened during the CBOT's legal and rhetorical battles to on one hand, purge and then integrate bucketshop gambling into its institutional structure, and on the other, appease farmers who wanted to shut the exchanges down (see Lurie 1979, Fabian 1999). In both cases, they learned to appeal first and foremost to the *logic of price making* as an explanation of the virtuous nature of their business. Second, in jockeying with Congress over what would eventually become the 1922 Grain Futures Act, they learned to couch the controversial idea of speculation in a rhetoric of risk management, or what they called "hedging". This history has received significant attention from scholars interested in futures (Lurie 1979), gambling (Fabian 1999), and risk (Levy 2006, 2012), but rarely has it been used to better comprehend the late 20th Century finance industry (see Romano 1997 on Congressional politics and regulation).

Once the CBOT emerged from these initial struggles, few significant changes happened to the futures industry between 1922 and when my study begins in the early 1970s (Markham 1987, Stassen 1982). Most notably, the stock market crash of 1929 and the Great Depression had relatively little effect on the futures industry compared to the profound effects it had on banking, finance, and the securities industry. Thus, to understand where contemporary finance came from, I trace a number of trends that began around 1900 through the 1920s and into the 1970s.

Most notably I demonstrate that the Chicago exchanges, assisted by the U.S. government, incrementally institutionalized speculative wagering on grains and agricultural commodities, and then eventually on financial "commodities". They justified this by keenly appealing to the inherently speculative logic of capitalism. They also appealed to the efficiency of market forces as a natural solution to the problem of managing the contingencies of an uncertain future. As a result of their market making and institutionalization of speculation, the Chicagoans temporarily subdued a key contradiction of liquid markets—that despite their speed, agility, and efficiency, they also produce a critical mass of speculative traders who necessarily transform economic geographies and destabilize the accumulation of capital. One key result of all of this, and something that has received almost no attention by social scientists, was the Chicagoan's remarkable success in avoiding the kind of government regulation that similar industries became subject to during the middle of the 20th Century.

New York financiers, who first ignored the Chicagoans forays into finance, and were then frustrated by their inability to replicate Chicago's success, eventually took advantage of the (de)regulatory precedents set in Chicago to construct their own futures-like markets. While my formal analysis does extend into the 2000s, I would contend that the contradiction of liquid markets, which was partially subdued in Chicago, eventually emerged in New York's off-exchange futures markets and contributed to the serious financial "rupture" (Althusser 1979) in 2008.

My argument is that the Chicago futures industry, embedded in the agro-industrial economy, and at best on the periphery of the U.S. financial industry, eventually revolutionized the hegemonic financial industry of New York. In this I am demonstrating how the financial system is constituted by non-financial practices, or in other words how the financial system is a composite of mundane and localized practices (Leyshon and Thrift 2007, Martin 2011). To borrow from the study of politics and identity, I am arguing that contemporary financial derivatives were constructed from the margins, just as sovereignty (Mountz 2004) and identity (Kaiser and Nikiforova 2006) are constructed from border regions. Considered another way, in order to understand financial futures, we need to examine the spaces where finance and futures "intersect" (Valentine 2007), or come together to reconstitute each other as something novel, but nevertheless retain characteristics of their previous assemblages. This begs the question whether there really is a financial system at all, something that geographers (cf. Thrift 1996) have been asking at least as long as Gibson-Graham began asking similar questions about capitalism in 1996. The answer is in no way simple, but as I alluded to above, requires an appreciation of the multi-scalar constitution of all geographies, whether physical, economic, or financial (Martin 2011).

1.4 Financial derivatives and financialization

To understand what role derivatives have played in "financialization" we need to begin with the somewhat flawed word and concept of "derivative". As noted earlier, "derivative" refers to something that is constituted through the existence of, and is subordinate to something else[4]. Most academic definitions of financial derivatives are some variation of "a contract or security whose

[4] The OED (electronic version as of 9-15-13) defines "derivative" in noun form as, "A thing of derived character; a thing flowing, proceeding, or originating from another." In the realm of finance the OED defines "derivative" as "having a value deriving from an underlying variable asset".

value depends on the price of another "underlying" asset…" (MacKenzie 2006: 298)[5]. Following from this definition, the typical critique of derivatives tends to frame them as somehow less real than the things they are derived from—that the representation or the sign is less real than the signified (Maurer 2002). This assumption of the "deontological character" (ibid: 31) of derivatives is understandable given that a derivative contract is little more than a conditional commitment to take action at a later date[6]. This perspective also reflects the paradigm of economic "embeddedness", which even though it has been subject to much criticism of late (see Chapter 3), is still very influential in the critical social sciences. The idea, based largely on the work of Karl Marx and Karl Polanyi, is that markets are epiphenomena, and are always embedded in social relations, society, or the relations of production, which are all assumed to be more essential or real than markets. Similarly, derivatives are assumed to be marginal to the economy—that the economy does not *need* derivatives. Whether or not the economy needs derivatives is a good and interesting question, but it is a question that should be situated in *actually existing economies,* which are increasingly polycentric and simultaneously constituted by relations at the bodily, local, regional and global scales all at once. The argument I will make is that derivatives do the geographic work necessary to allow this sort of economy to exist. Consequently, to question whether an economy needs derivatives is to ask a much deeper question about the derived nature of contemporary economies all together (Lepinay 2011).

Hence while derivatives—and finance more generally—may be mystifying and abstract, I argue they are very real and consequential (Mann 2009). The fact is that when derivatives markets succeed in becoming liquid, they drive economic restructuring. This happens in a number of ways. First, like insurance, they serve as risk management instruments to lock in prices for underlying

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[5] While she explains herself quite thoroughly, the critical legal scholar Lynn Stout simply defines derivatives as "bets" (2011). Her point is that they are a zero sum game, and as such create no wealth.

[6] Maurer (2002) attributes this assumption—one he attempts to debunk—to the dependence of derivatives on mathematical abstractions and probability functions.

commodities. By removing uncertainty in the production process, derivatives contracts are used by commodity producers to convince bankers to issue them credit. Not only does this increase productive capacity, it also integrates production processes into financial circuits. Second, liquid derivatives markets allow "arbitrageurs" or speculators to buy in the futures market and sell in the commodity market, or vice versa, and reap profits from the differences. Over time, this squeezes the profit margins of "middle-men" in the commodity chain, by disincentivizing inefficacies and progressively rationalizing the underlying market. It may, for instance, encourage innovations in storage technology, or changes in the geography of commodity transportation. Third, fluid derivatives markets also produce a steady flow of price information, which become an important reference point for anyone that wishes to speculate on changes in those prices. When the level of this speculation reaches a critical mass of participants, it drives another round of innovation of exotic derivatives to manage the risk of the "vanilla" derivatives underneath (Ayache 2010). Take for instance the Chicago Board Options Exchange, which in 2012 initiated trading in a derivative that is based on the price volatility of a second derivative that is based on the price volatility of a third underlying derivative on an index of stocks on the New York Stock Exchange[7]. In other words, this derivative tracks the price of the expectation of the expectation of instability in the stock market. Regardless how odd and abstract this may be, my point is only that these instruments may be derivative in some ways, but they are also productive—productive of new markets, new risk, and new economic geographies. This is something that geographers have just begun to research and one of my goals in this dissertation is to provide methodological and theoretical tools to facilitate that work going forward.

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[7] The index is called the "VIX of VIX" or "VVIX" contract. See Kiernan, K., "Behold! Fear Squared! CBOE Launches VIX of VIX Index!", *Wall Street Journal* blog post, March 14, 2012, here: http://blogs.wsj.com/marketbeat/2012/03/14/behold-fear-squared-cboe-launches-vix-of-vix-index/,
William Brodsky, the Chairman of the CBOE said this of the new contract: "This is a natural consequence of the evolution of a good idea that continues to evolve over time. ... These are not just theories. These are not just numbers. These are real things that people are looking at.", FIA SmartBrief, March 20, 2012, here: http://www2.smartbrief.com/servlet/ArchiveServlet?issueid=39D0D00C-4B78-4861-97AA-29384B892F6C&lmid=archives

To quote Bill Cronon discussing the 1870s grain markets, "the futures market was a market not in grain but in the *price* of grain" (1991: 125, emphasis in original). This insight begs for more questions such as, if there is a market for prices, who produces them, and what drives the demand for them? In fact, financial derivatives markets have a voracious appetite for prices, and the prices themselves, just like grain, pork bellies, or corporate profit projections need to be standardized, graded, and consistently produced. Any break in the production of prices causes volatility in the derivatives market, which then translate through financial-economic networks to disrupt the production of actual commodities. In the 1988, the realization that stock markets and stock derivatives markets were seemingly symbiotic, caused a government commission to suggest that the two markets were really just one entangled apparatus (Brady Report). The situation is similar for the cost of government debt and interest rate derivatives, exchange rates between currencies and derivatives on those currencies, and the prices of homes and mortgage derivatives. Likewise, as financial engineering has matured into a science, derivatives contracts reference more and different aspects of economic and non-economic activity. Yet, regardless how abstract they may become, if and when they achieve a sufficient volume of trading, they become much more than "bets" (Stout 2011)—they become a necessary component of all the different pieces of that abstract puzzle.

The intervention I make in this regard is to argue that the process of financialization is much more than the increasing influence of "finance" and on the economy (Pike and Pollard 2010). Financialization is about the construction and influence of price making apparatuses and more importantly, what happens when these apparatuses take on lives of their own[8]. , and more about the construction of price making apparatuses of any kind. There is little question that money is a crucial component of all market exchange, but this does not mean that all markets are about money and finance. Instead I am interested how derivatives markets are about the construction of

[8] This is exactly what Foucault and Agamben meant by the term "apparatus" or "dispositif": an economizing and self-perpetuating or replicating machine (see Berndt and Boeckler 2011).

Chicago-style price making apparatuses regardless what is traded. One thing that should become clear to the reader of this dissertation is that the Chicagoans, unlike the New Yorkers, learned how to build markets for a wide array of commodities and assets. As already mentioned, the Chicago futures traders were not interested in what was being traded per se. Rather they were interested in trading prices. On anything.

Before moving on, I will return once again to the geography of financialization. My intervention is to suggest that the term financialization, by being closely associated with particular economic activities such as banking and investing, and with certain places, such as the City of London and Wall Street, is somewhat of a distraction. Geographies of financialization (Lee et al. 2009, Hall 2010, 2012, 2013, French et al. 2011) might better be conceived as, for lack of a better term, geographies of price, or even *derived* geographies[9]. To reiterate, money is a crucial component of markets, but otherwise it may be a coincidence that the most liquid, and thus the most geographically influential markets are those that trade financial instruments. It may instead be that markets and prices, when produced consistently, are one of the crucial components of the kind of highly interconnected global economy that many refer to as "financialized". Put another way, the proposition I putting forward is that "financialization", not unlike globalization, is fundamentally a process of using prices to link bodies, commodities and entities across geographic space. Unlike globalization, however, this geographic space need not exist at the global scale.

1.5 Regulating a market juggernaut

Anyone attempting to limit the reach of markets in contemporary U.S. society faces an uphill battle. Whether it is neoliberal dogma (Peck 2010), or neo-classical economic "fact", the positive benefits of markets and market forces have become ideology. By this I mean that the underlying

[9] I am borrowing this term from Lepinay (2011) who suggests that "deriving" is a key function of the entire capitalist economy, which helps explain the power of derivatives.

assumptions of what capitalism and markets are, and how they operate, are almost never questioned even by those that may otherwise be trying to limit the influence of markets, or more often, pernicious market actors. For Zizek (2009) this is the essence of the ideology of capitalism. Inside of this ideology most everyone assumes that the horrendous economic problems society encounters are not a condition of capitalistic markets, but of the frailty, greed, and corruption of humans. Markets cannot in their essence be to blame, because we would then need to question what markets are, or worse, question how to get rid of markets.

The focus of my contribution in this regard is to investigate the case of the largely failed attempt to prevent U.S. financial futures markets from causing economic chaos. Attempts to limit the negative effects of U.S. futures markets has never been about imposing absolute limits. Instead, it has been constituted by tinkering around the edges, or worse yet, by formalizing and institutionalizing market activity within a set of private rules. In attempting to better understand why this is the case, I trace the historical regulation of U.S. agricultural futures, which I argue became the regulation of financial futures. In a twist of history, the U.S. government began to regulate futures markets in 1922, eleven years before they began regulating investment banking and securities markets in 1933 and 1934. The historical conditions at these two moments are immensely consequential. In the aftermath of the 1929 stock market crash, speculation in both the primary and secondary markets for securities was significantly limited by New Deal legislation.

The initial grain regulations, coming before the Great Depression, were less about limiting those markets than placing institutional boundaries around them, inside of which speculation was encouraged and the promotion of "market integrity" was taken as dogma. Notably, the *market first* essence of the initial 1922 laws has not been fundamentally altered even during significant "reforms" of futures regulation in 1936 and 1974 (Markham 1987, Stassen 1982). As is discussed in Chapter 2, one reason for this is the Chicago exchanges have been keen political lobbyists for much of their history, but particularly since the 1970s. Federal securities regulation is a different story.

The rules for securities, which by no means hobbled those markets, has also largely remained true to its original form, but instead of making market integrity the top priority, they instead prioritized customer protection and limits on speculation. When hybrid derivatives instruments that easily could have been defined as securities emerged in the 1970s, the Chicagoans worked exceedingly hard in Washington D.C. to maintain their definition as futures. These distinctions, which are less about a material difference between the instruments, and more about competition within the financial industry and Congressional jurisdiction, continue to be consequential today.

What is remarkable about futures and derivatives markets, and hence the discourse surrounding regulation of those markets, is that pure speculation is necessary for them to function. Unlike securities and other asset markets where use values are relatively obvious, use value in derivatives markets is very difficult to discern. As a result, the production of prices becomes imperative and speculators are necessary to that process. Unlike other markets where there may be obvious alternatives for the distribution of the underlying commodity, to justify significant limits on futures and derivatives markets requires one to justify limiting the essence of market forces. As discussed above, *the commodity that derivatives markets trade is price, or in other words, other markets.* This is why regulating derivatives is so difficult. Bryan and Rafferty (2006) refer to derivatives as "meta-capital" or "relations about the relations of capital". The implication being that limiting derivatives markets requires limiting capitalism, and this is a conversation that almost no elected politician in the U.S. wants to engage with. Nevertheless, if we want to be serious about limiting the influence of financial derivatives and financial geographies, it is a conversation we need to have. If nothing else, I hope this dissertation can contribute to that conversation.

1.6 Key terms and facts

In this short section I have outlined a number of important terms and basic factual items that will ease the reading of the rest of the text. I could have listed the terms in a glossary, but there

is a logical progression to the increasing complexity of these instruments, so I have presented them in a textual format.

1.7 Types of instruments

The term ***commodity*** almost always refers to bulk agricultural products and raw materials, although in 1974 this definition was technically expanded to include financial and other goods. The simplest form of commodity market—that for immediate exchange of an agricultural product—is called a ***cash*** or ***spot*** market. Spot markets are typically dispersed across the landscape. To this day, many medium sized towns that are well connected to transportation infrastructure have grain elevators or meatpacking plants where large farming operations can sell commodities for cash. Simple ***forward*** contracts have been in existence since antiquity. Forward contracts, which are usually customized for individual needs, establish a price, quantity and future exchange date for a commodity, and once they are established, are rarely traded. Forward contracts are often available at large grain elevators. International banks will enter into forward contracts to trade foreign currencies with international corporations.

Futures contracts are forward contracts where the exchange date, quantity, quality, and delivery locations of the commodity have been standardized by a commodity exchange. Standardization engenders more efficient exchange of commodities because the negotiation of contract details is removed from the process. Crucially, it also provides parties that have no interest in the actual delivery of a commodity to speculate on price changes, as standardization engenders a more liquid market. People who trade futures are almost never interested in actually making the final exchange for commodities. Rather, before the contract expires, they buy or sell an opposite contract which nets their position out to zero. Instead of contracting for wheat, pork bellies or lumber, ***financial futures*** are contracts for the future exchange of a currency, stock, bond or other financial instrument. Since 1982 most financial futures do not have the option of exchanging for

the underlying financial instrument. Instead if they are held to expiration, the parties settle the differences in cash. ***Options*** are very similar to futures, although instead of an obligation to exchange, there is an option. Options are also rarely held to expiration, but sold for a profit or loss. A ***call option*** is a right, but not obligation to buy, and a ***put option*** is a right but not an obligation to sell. A ***swap*** is a contract to exchange the rights, benefits, or obligations of one underlying instrument for that of another. The actual underlying instruments, however, are not exchanged. The most typical swap, is that for interest-bearing debt (bonds), where usually two parties exchange fixed rate interest payments for variable rate payments for a set period of time. Until recently, many swaps were customized, and usually exchanged between banks, or between banks and bank customers. Increasingly in the 2000s they became more standardized and traded on semi-liquid markets, albeit not on centralized exchanges like those in Chicago. The "Dodd-Frank" financial reforms passed by Congress in 2010 have pushed many standardized swaps onto exchanges.

Derivative is a broad category that has become muddled. As mentioned above, the typical definition is an instrument whose value is derived from another underlying instrument. In this definition, derivatives represent all sorts of forwards, futures, options, and swaps, as well as many of the specialized and/or hybrid instruments commonly used today. For many, however, derivatives have also come to include abstract securities, which unlike the instruments mentioned above, are more than contracts to take future action, and do reflect ownership of underlying assets. Many, but not all, of the mortgage backed instruments involved in the 2007-2009 meltdown actually represented ownership of jumbled pieces of mortgages, so are technically securities, but are nevertheless referred to by most people as derivatives. **Security** is another word that has become muddled. Technically a security represents shared ownership usually of some sort of enterprise, like a corporation, and that is how I use it in this text. In the case of debt securities, they represent a claim on the ownership of an enterprise. **Securitization** is the process of building securities out of

assets that likely do not otherwise trade on liquid markets. Home mortgages are probably the best example of an asset that has been widely securitized over the last 40 years.

I am mainly interested in futures in the following chapters, as these, along with options, were the main instruments developed in Chicago. I do also use the term derivatives when referring to the general category, usually in reference to the broader, extra-Chicago, financial industry. Unless otherwise indicated, however, my use of derivatives is limited to those instruments that are specified time contracts, not abstract securities that represent ownership of assets.

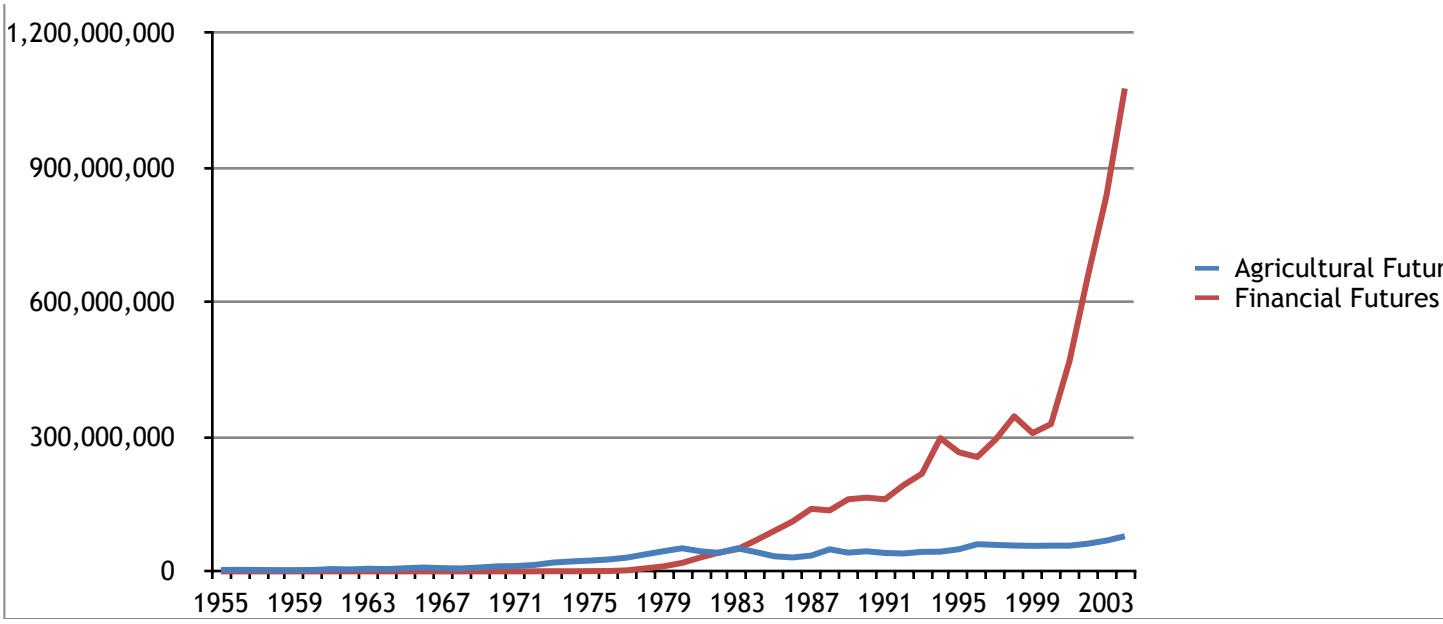
1.8 Facts about the growth of financial futures and derivatives

Since the 1850s Chicago has been the home of the most innovative *agricultural* commodity and futures exchanges in the world. Continuously since that time, Chicago has traded roughly 80% of U.S. agricultural futures. Much later Chicago also became the home of the first successful centralized *financial futures* markets. In 1972 the Chicago Mercantile Exchange (CME) began trading the first financial futures contracts on seven foreign currencies (Powers 1974). From there the Chicago exchanges expanded into corporate stock options and futures, interest rate futures, and various other types of financial derivatives. The growth in volume of futures trading between 1970 and 2000 was remarkable. In 1970 the Chicago exchanges and about ten other commodities exchanges around the U.S. traded approximately 13.6 million contracts all based on agricultural or raw material products. 30 years later is was half a billion contracts. The growth in financial futures alone is even more dramatic.

Annual U.S. Futures Contract Trade Volume[10]

	1970	1980	1990	2000
Chicago Agricultural	11,309,429	51,598,100	44,897,535	57,457,665
Chicago Financial	0	18,938,402	164,562,118	328,948,402
Chicago Total	11,309,429	70,536,502	209,459,653	386,406,067
U.S. Total	13,618,638	92,096,109	276,356,703	503,739,629

Growth in Chicago Futures Trading 1955-2004, Agricultural vs. Financial



1.9 Definitions of Hedging and Speculating

The agricultural futures contracts developed in Chicago were useful for commercial consumers of grain as well as farmers. The contracts allowed users to lock in future prices and thus

[10] Raw data provided by Financial Industry Association, calculations by author. I was only able to attain systematic data for 1955-2004.

carry on their business with an increased level of certainty. These users were called "hedgers" because the contracts enclosed—as a garden hedge—or limited their future risks[11]. Even though they could use the futures contract to take delivery at the expiration of the contract, most hedgers would still buy and sell their commodities in spot markets, and exit out of their futures contracts once they felt their risk had abated. Many of the Chicago-based traders who developed the contracts not only served as brokers, buying and selling contracts for hedgers, but also as "day traders" or "local traders". Attempting to earn a quick profit, "locals" would buy and sell contracts with no intention of ever taking physical delivery, but instead simply watching for favorable price changes. These traders were called "speculators", as they had no inherent interest in the price of grain, but nevertheless created new risks for themselves in the hope of trading it later for a profit[12]. Going back to the 1880s, highly leveraged buying and selling was quite easy in Chicago. Often speculators would buy and sell large positions anticipating only small movements in price. Moving in and out of positions in the same day was common. These definitions, and many of these practices, have not changed significantly since the 19th Century.

1.10 Methodology and Methods

The methods and methodology I employed in this project can best be described as mixed. My engagement with futures markets is firmly grounded in political economy, but I also employ post-structural methods.

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[11] In this context, the *Oxford English Dictionary* (definition 8a) defines "hedge" as "to secure oneself against loss on (a bet or other speculation) by making transactions on the other side so as to compensate more or less for possible loss on the first", which was first used in 1672 by George Villiers in the play *The Rehearsal.*

[12] The definition(s) of "speculation" is complicated and interesting (see Chapter 4), but in this context the *Oxford English Dictionary* (definition 5a) defines "speculate" as "to engage in the buying and selling of commodities or effects in order to profit by a rise or fall in their market value…", which was first used by Thomas Jefferson in 1785.

The 1970s and 1980s are a important period in the transformation of finance. Prior to the maturation of these market systems and institutions in the 1990s and 2000s, the 1970s and 1980s was a period of flux. The Fordist regime of accumulation and the Keynesian systems of macro-economic management were in crisis, and both industry and government looked to financial markets for solutions (Krippner 2005, 2011). During this time the contradictions of financialized capitalism that had been subdued since the 1920s began to reemerge. As a result both public and private institutional precedents were set—or as Foucault says, the "episteme" or the "grid" was cemented. I thus view this period as a window through which to observe a series of debates that were contentious at the time, but were largely settled and subsequently became accepted assumptions. These assumptions now frame contemporary speculative finance, but they have become mostly invisible. The period thus provides a unique "legibility" (Sassen 2006) to observe the construction of financial institutions that may not have been intended to transform the global financial landscape, but nevertheless ended up playing a central role in that process.

The formation of financial institutions was and is an historical and geographic process. As such I also view it as an evolutionary process constituted by the development and resolution of contradictions. However, while these contradictions drove the political economy of finance in the 1970s and 1980s, they did not manifest in a "rupture" (Althusser 1979) like 1929 or 2008, but instead were temporarily subdued by a particular geography, or a "spatial fix" (Harvey 2001). David Harvey argues that a fix happens when capital both produces and attaches itself to geographies in order to promote particular modes of accumulation. Similarly, as Neil Brenner (1998) has explained, capital must remain in motion, it must also touch down in space in order to reproduce itself. In this case Chicago, for a number of reasons, became a hospitable geography for speculative capital in way that New York could not at the time. My study was not, however, bounded by the physical landscape of Chicago. I followed the network of the Chicago exchanges to Washington, D.C. and

New York, interviewing actors who had worked for or with the Chicago exchanges in various capacities at this time.

I designed a strategic mix of qualitative methods to help answer my research questions. Being focused on the past, it would be inaccurate to call this study an "ethnography". However, I was informed by the "Berkeley School" of ethnography (Burawoy 2000) and the related meta-method of "intensive" (Sayer 1992) or "extended case" studies (Burawoy 1991, 1998). This became entangled in my specific methods in three ways. First, I built knowledge by searching not simply for chains of causal events, but deeper socio-economic dynamics and mechanisms that linked chains of events across time and space (see Sayer 1992). Second, I engaged with theory throughout the project. My extensive preliminary research and hypotheses served as a guiding force, but as the empirical investigation progressed I used what I learned to refine my research questions and improve my theoretical arguments. Third, I remained committed to reflexivity, or diligent self-awareness of the identity, assumptions, and analytical categories I brought into interviews and archives. While I strived for objectivity, I also made no naïve assumptions about my ability to purge my preconceptions of the world. Instead I endeavored to remain aware of those preconceptions, even occasionally mentioning them to interviewees when it was appropriate.

1.11 Practical Methodology

Given that much of the data for this project was text based, I utilized discourse analysis, or "critical semiotics" as a method of investigating the use of language and other signs to construct systems of economic meaning (Jessop 2004). I concentrated on the ways these systems of meaning intersected with the grounded, material processes of socio-economic reproduction happening at the time. For instance, because I was interested in speculation on the futures exchanges, I spent time investigating the ways that speculation was represented in newspaper accounts, annual reports of the exchanges, reports written by regulatory agencies, and advertisements the exchanges commissioned

in a trade magazine. I also, however, gathered as many facts as possible about the more mundane, day to day activities of speculative traders on the floor of the exchange, as well as the decisions the exchanges made to improve the prospects of attracting speculators to their contracts.

In fact there are two different traditions of discourse analysis that came together in this project (see Lees 2004). The first tradition has a long history in political economy. Most notably it was used by Antonio Gramsci to critically analyze the construction of ideologies by classes, states or other vested interests to frame the socio-economic landscape in a particular light. Unlike the second, this first version of discourse analysis is not a theory of underlying reality, but instead a theory *of the way reality is represented* by particular groups. I employed this method to critically analyze how specific Chicago exchange officials worked with government regulators to reproduce the notion that financial futures were similar to agricultural futures, and furthermore to negotiate boundaries around and between concepts such as "hedge" and "speculate"; and "commodity" and "security".

The second tradition of discourse analysis is more complicated. It is based on Foucault's conception of "genealogical" research, or the search for past origins of now common conceptions of the socio-economic landscape (Foucault 1980, 1994). In other words, this is the search for foundational systems of knowledge and practice that together frame the entire field of socio-economic reality. But unlike the first tradition which suggests these discursive frames are merely representations of an underlying reality, Foucault instead suggests the discourse *is reality* as repeatedly *performed* through language and action. I reject the "pure social constructivism" of this approach (Jessop 2004: 161) in a similar way that I reject MacKenzie's strong version of performativity (see Chapter 3). Nevertheless, Foucault's approach was useful. It served as a guide to interpret how language, rhetoric, and political lobbying were used to facilitate Chicago's intervention into finance. At times the language used by the exchanges contradicted the material practices of futures trading in Chicago. But just as often, particularly given my attention to the history of futures trading, I observed that the rhetoric of futures trading became the actual reality. The best example

of this is the way the underlying markets for commodities tend to become more economically efficient at the same time that a futures contract on that commodity grows in popularity. I was a bit perplexed by this at first, continually wondering what I was missing. Eventually it made more sense when I realized that futures and derivatives exert much more influence on economies and geographies than I originally expected.

1.12 In-depth interviews and oral history: Interviews helped me to ensure I was explaining financial derivatives from the ground up, or inductively (Schoenberger 1991), meaning without assuming the explanations will fit into pre-given categories. Interviews also allowed me to ask open-ended questions that could not be answered by passive textual sources. This was particularly important because the futures industry and futures trading is both complicated and filled with contradictions. I had a professional background in finance before beginning this project, which helped, but I was still surprised at how different the futures industry was from that of more conventional financial investing. So in addition to gathering facts about the historical geography of futures trading, interviews allowed me to interrogate more abstract ideas about derivatives in general.

I conducted 29 formal in-depth interviews, and had ten other less formal interview-like interactions, or email exchanges. Interviewees included exchange executives, government agency employees and executives, commodities and futures lawyers, academics, and journalists with close knowledge of the development of these instruments at the time. It is important to note that most everyone I interviewed moved between at least two of these professions at one point in their career. The "revolving door" between the exchanges and government regulatory agencies is particularly notable.

There were challenges with the interview method, mainly surrounding the historical nature of my interests. Early on I familiarized myself with methods used for oral history (see Charlton et al. 2007) as a partial remedy. Most importantly, I learned to pay quite close attention to my own

participation in the interview process as in some ways oral history is a collaborative effort between the researcher and the interviewee (Morrissey 1987, Yow 1997). Because so much time passed and memories have changed and/or faded, I was sometimes better able to provide dates, places, events, and chronologies than the interviewees. That said some of my interviewees had amazing memories, rattling off dates, names and events like they happened yesterday. Regardless of how any of the individual interviews turned out, I was very cautious to not rely on any one interview to establish facts. Instead I used them to build a contextual understanding of political-economic trends, exchange strategies, key events, and important personalities. Furthermore, unless otherwise noted, nothing represented in this text is the result of any one interview. I was careful to triangulate facts and specific events, and relied on the written record in almost all cases including the "softer" discussions of, for instance, competitive attitudes between exchanges, or the purported arrogance of the New York Stock Exchange.

Before moving on, I will mention one particular interviewee because he is possibly the most important single person involved in the development of financial futures, and somewhat of a larger than life personality. His name is Leo Melamed and he was variously the Chairman of the Board, President, or the head of important executive committees at the Chicago Mercantile Exchange for much of the last 50 years. He has written or edited at least four books on futures markets, and he takes credit for vigorously promoting, if not singlehandedly cultivating customers for the industry around the world. A former business editor at the *Chicago Tribune* wrote to me in an email that "talking with Leo about LaSalle Street is like talking with Henry Ford about manufacturing". I mention him here because although I treated his two interviews with the same care as the rest, compared with others, I have relied more heavily on his written accounts. This is only a result of the volume of materials he has produced or been directly involved in producing. Given this, I am cognizant that he has actively written himself into the history of the industry. I was aware of this very early on in my research process, and have been careful not to overemphasize his perspective.

All of this said, every indication is that his own recollections, both written and spoken are quite accurate to actual events.

Archives consulted:

- The main trade publication during the period of my study was *Commodities Magazine*, which became *Futures-Magazine* in 1983 (an interesting change on its own). I browsed every page of this magazine from its founding in 1972 through 1988. I read every article that seemed to be relevant to the history of financial futures. I did not count them, but I estimate the number to be 300. Early on in this process I noticed the advertisements in the magazine and paid more attention as the process continued. They turned out to be important representations of the work the Chicago exchanges did to promote their markets. I have included some of them in the chapters that follow.
- I read every annual report of the Chicago Board of Trade from 1970 to 1990. I read only selectively from the Chicago Mercantile Exchange annual reports because they were surprisingly difficult to locate.
- I relied heavily on government reports on the futures industry going back to the Federal Trade Commission Report on the Grain Markets written in six volumes from 1920-1922, and from the 1970s to present, reports by the General Accounting Office, the U.S. Federal Reserve Bank, the Commodity Futures Trading Commission, and the Securities and Exchange Commission
- I used selective newspaper and other periodical accounts of particular events. Most importantly I used *The Chicago Tribune, The Wall Street Journal, The New York Times, The Economist*, and *The Des Moines Register* for a key six part series on failures of futures regulation in 1972
- I read selective transcripts of U.S. Congressional hearings from both the House and Senate Agriculture and Banking Committees, mainly surrounding the 1974 hearings that resulted in the establishment of the Commodity Futures Trading Commission, but also , Congressional and government agency research reports and annual reports

1.13 Outline of Chapters

This introduction is Chapter 1. Chapter 2 serves two purposes. First it provides historical-geographic context, and as such, lays important groundwork for the remainder of the text. It traces the co-evolution of Chicago's futures instruments alongside the laws and regulations that were developed to govern the industry from 1920 until 1980. Second, it traces two trends in futures markets that began around the turn of the 19th/20th Century, and remain crucial to understanding derivatives markets today. The first is the progressive institutionalization of speculative trading from what were at various stages, gambling parlors and fraudulent brokerage houses, into the formalized mechanisms of the Chicago exchanges. It secondly traces the historical development of the legal-

regulatory category of commodity/futures as compared to securities. The chapter concludes that the contemporary regulatory structures governing financial futures markets can reasonably be traced back to regulatory precedents set in 1922, and cemented in 1974.

Chapter 3 is a methodological/theoretical engagement with Karl Polanyi's concept of embeddedness, or more accurately, disembeddedeness. The chapter questions how Polanyi's methodological framework should be employed to understand contemporary financial markets that have seemingly become disembedded from "society" and largely self-referential or autonomous. In order to achieve this, I attempt to put Polanyi in conversation with Michel Callon and his version of economic performativity, even though these two have been set in opposition elsewhere. While I argue against reliance on the strong version of performativity promoted by Callon and Donald MacKenzie, my conclusion is that there is more in common than not between Polanyi's and Callon's frameworks, and that ideally they should be used in tandem. To bolster my argument I use a short case study of the development of Chicago's futures. It draws first on MacKenzie's work on the performativity of financial economics in Chicago's markets, and second on my own geographic-historical perspective. This chapter was recently published in *Environment and Planning A,* and has been reproduced here without permission (yet!) from the journal.

Chapter 4 is a theoretical interrogation of speculation as it relates to the temporal qualities of derivatives markets. Tracing the work of Hayek and some of the more recent financial economists, it attempts to reframe speculation as more than disinterested profit seeking. Instead speculation is considered as a fundamental quality, if not necessity, of market exchange and furthermore as an organizing principal of market society. Drawing on recent metaphysical discussions of derivatives, it asks whether markets have become an institutionalized substitution for economic knowledge. The chapter is limited to a theoretical discussion, and does not engage the Chicago case touched on in the rest of the text. It is, however, an important component of

reconceptualizing finance and financial markets, particularly as it relates to geographic interconnectedness.

Chapter 5 is focused on the concept and phenomenon of market liquidity. I argue that above all else, futures and derivatives markets must achieve a stable level of liquid trading in order to survive and succeed. In this success the futures markets become symbiotic with the market for the underlying commodities. However, drawing on Keynes the chapter argues that there is a contradiction to liquidity. That is, any market with consistently heavy trading inevitably attracts speculators that make the market susceptible to volatile waves of market "sentiment". The Chicagoans, intent to succeed in developing new futures markets, and knowing from experience with agricultural futures that they needed speculative traders to achieve liquidity, worked hard to promote speculation. In doing this, they not only encouraged markets for underlying commodities to disembed from their original geographies, but also re-embed in a geography of speculative trading.

Chapter 6 extends the ideas from Chapter 5 in an empirical examination of the 1987 stock market crash. This was the first system wide crisis involving financial futures, and initially much of the blame was placed on Chicago's markets. There were widespread calls to reduce speculation in futures markets, but the Chicagoans, drawing on the same reasoning they had used for 100 years, defended their markets from any significant regulatory changes. In a paradigmatic case of a market "failing forward" (Peck 2010), the connections between stock markets and futures markets were strengthened in the hopes of averting further crisis. This more robust system of speculative finance set the stage for the growth of a "too big to fail" financial system in the 1990s and 2000s.

In a short conclusion I reconsider the broad themes of the dissertation as a whole and suggest how they might be employed by other geographers interested in financial derivatives or the "derived" economy in general.

Chapter 2
Speculative Institutionalism and the Regulation of U.S. Financial Futures Markets

2.1 Introduction

The critical legal scholar, Lynn Stout, argues that the 2008 financial crisis was "caused, first and foremost, by changes in the law" (2011: 3). She argues that "all significant markets, including financial markets, must be built on some underlying legal infrastructure" (ibid: 37). Like many scholars, Stout is interested in piecing together causes of the 2007-2009 financial crisis. She makes a convincing case that the little known Commodity Futures Modernization Act (CFMA) of 2000 played an important role. The CFMA exempted much financial derivative trading from federal regulation, and at the same time guaranteed the legitimacy of those contracts in the eyes of the federal government.

Foreshadowing the passage of the 2000 CFMA, Larry Summers, along with Robert Rubin and Alan Greenspan battled against the Chairwoman of the Commodity Futures Trading Commission, Brooksley Born, in the late 1990s over the legal and regulatory status of financial derivatives. Born, who is now considered by many to be a hero, (or a martyr for the failed cause of 1990s financial regulation), attempted to rein in what she saw as a growing danger to the financial system. Instead of achieving this, her advice was ignored. On top of this she was upbraided by Clinton's financial thought collective for misunderstanding markets and threatening U.S. financial stability. She subsequently resigned in protest (O'Brien 1998, Corn 2008, Schmitt 2009).

In hindsight it appears the deck was stacked against Born, or in other words the CFMA was overdetermined. Part of the goal of this chapter is to explain why. The 2000 Act precipitated the expansion of derivatives market, but it is my contention that that act was far from an anomaly. Instead it was the culmination of a historical evolution of the laws and regulations that governed speculative finance that began in the 1920s, if not earlier. Hence, the empirical focus of this chapter

is the historical development of a "market first" regulatory system that emerged hand in hand with U.S. financial derivatives markets in the 1970s and 1980s, but has roots in the 1920s. I argue that because of its historical geography in relation to the bread basket of the U.S., a unique Chicago-centered, legal-regulatory structure developed Although originally designed to manage agricultural speculation, over the 20th Century, and especially since 1975, the legal and regulatory infrastructure became a key element in the construction of a highly speculative U.S. financial market system. I trace this history by focusing on the key regulatory changes mandated by Congress and enacted through government agencies and the U.S. derivatives exchanges and markets. My approach is principally chronological, but I do not attempt to convey every meaningful event (for this see Markham 1987, Markham 2002). Instead I focus on important turning-points in relation to three key dynamics. First, I follow speculative trading as it progresses in status from questionable gambling to vital component of institutionalized price producing markets. Second, I focus on the precarious legal-regulatory distinction between commodities/futures markets and securities markets. And third I emphasize how these first two dynamics unfold in relation to two different federal regulatory agencies.

2.2 Pre Neoliberal Markets

There is a growing chorus of economic geographers arguing that markets should become a fulcrum for theoretical and empirical studies of the socio-spatial economy (Barnes 2008, Peck 2012, Berndt and Boeckler 2009). One reason is there is a cumulative hypothesis across the critical social sciences that the market ideology that began to emerge in the 1970s, undeterred by repeated crises (Peck 2010) is approaching hegemony (Zizek 2009), and manifesting in dominant market forms across geographic scales from the urban (Akers forthcoming) to the global (Rankin 2012, Brenner, Theodore, Peck 2010). Financial markets are a key component, of both the material infrastructure

of the market system (Tickell 2000, Leyshon and Thrift 2007, Muellerleile 2013) as well as the ideational infrastructure that justifies continued market based policy interventions (Peck 2010).

In the "regulation theory" (Jessop and Sum 2006) approach to analyzing financial markets their ascendance is often "periodized" (see Huber 2013) during the post-Fordist or neoliberal era of deregulation, globalization, and intensified interconnectivity of the financial system (Dymski 2009). Circumscribed by 1930s New Deal state regulatory interventions, the U.S. financial sector was largely bounded within nation-state borders until the early 1970s. During this time of "embedded liberalism", finance was subordinate to the broader Fordist economy (Blythe 2002). Since the 1970s it is often argued that finance was progressively de-regulated by the state (Dymski 2009), and set free from the constraints of the embedded liberalism only to grow and develop into the master of the broader economy (Harvey 2010). This de-regulation of finance did not happen in a vacuum, but was deeply connected to the historical evolution of Anglo-American, if not global, capitalism. Faced with the crisis of Fordist over-accumulation at the end of the 1960s (Harvey 2010) coupled with the decreasing social surplus of "monopoly capitalism" (Foster and Magdoff 2009) the capitalist state has increasingly turned to financial markets to make decisions about slicing up a smaller pie (Krippner 2011).

It is my contention, however, that too much attention is focused on deregulation, or the "roll-back" of the state, as opposed to the "roll-out" or construction of markets by the state (Peck and Tickell 2002). To cite just one example, which happens to be geographically appropriate, Yuval Millo (2003) provides a lengthy discussion of the importance that federal regulators played in constructing and maintaining the Chicago Board Options Exchange (CBOE), the first U.S. stock options exchange, in the early 1970s[13]. The key point here is that the U.S. state has not been a

[13] Millo makes a convincing case against the "regulatory arbitrage" theory of financial innovation championed by Merton Miller (1997). Miller argues that financial innovation is largely a result of utility optimizing market actors reacting against government regulation. Millo rejects this showing that federal regulators play an important role in a broader socio-technical assemblage that constitutes financial markets.

passive actor in either simply allowing "free markets" to develop. On the other hand, the U.S. government has been deeply implicated in the construction of financial markets.

It is also not enough to focus only on state regulation. We must also consider how markets, market actors, and private market institutions, like financial exchanges, regulate themselves. The assumption I begin with here is there are no free markets—only regulated markets (Harcourt 2011). Consequently, the task at hand is not to imagine the extent to which any given market is free, but how any given market is "regulated" in the broadest sense of the term. One could go as far as arguing that markets, by their very nature, are systems of rules, standards, and norms for the exchange of goods (ibid). In fact, whether it is self-regulation, private regulation, or government regulation, it is the particularities of the regulation that matter (Christopherson 1993, Riles 2011, Stout 2011).

In the case of financial futures we need to take account of the "tangled prehistory" (Peck 2010) of the regulation of financial derivatives, the contemporary form of which began to take shape in the 1920s, if not earlier. For it was in the late 19th and early 20th Centuries that some of the key legal, regulatory, and institutional precedents were established. One particular institutional development that requires an extended historical analysis is the establishment of financial market boundaries (see Preda 2009, Christophers 2013a). I am specifically interested here in the institutionalization over time, and in place, of a boundary between commodities and securities markets—something that is peculiar to the U.S. financial infrastructure. This is particularly apt in the domain of the rules that governed commodities/futures markets because unlike securities markets, the crisis of the 1929 stock market crash and Great Depression as well as the "reaction" to these crises by the state, played only a small role in the development of the regulatory infrastructure. Furthermore, the last major overhaul of the commodities/futures rules, in 1974/5, was also not the result of one particular crisis, but of a conglomeration of events and trends—the result being not dramatic, but incremental change.

The question I am pursuing in this chapter is how to conceive of legal-regulatory boundaries that are both historically-geographically contingent, but also eventually become mobile through time and space. This question is not entirely different from those asked in the policy mobility literature, which is too large to review here (see Peck 2011). However, one important difference is that much of the policy mobility work is focused on the spread of neoliberal market ideology. This particular case begins in the 1920s, which pre-dates neoliberal politics, although it clearly intersects those free market ideas in the 1970s and 1980s. Furthermore, because this case begins prior to the time when futures and finance were considered in the formal sphere of public policy (Lurie 1979), the debates largely took place in the domain of civil legal proceedings. An interesting question that this chapter only briefly engages is whether there is a significant geography to the legal decisions that largely constituted the rules for futures markets at the beginning of the 20th Century.

The broad argument I am making in this chapter is that there has been a progressive institutionalization of speculation in U.S. finance since the beginning of the 1970s, but that the historical-geographic precedents for this were set much earlier. None of this is to say that the nascent neoliberal trends of the late 1960s and early 1970s played no role. On the contrary, the support of Milton Friedman and other University of Chicago free market thinkers as well as the anti-regulation mindset of many Nixon, Ford, and even Carter Administration officials, were important components of the development of these markets and rule regimes. I simply want to suggest that in the case of the development of U.S. financial derivatives markets this was a case of gradual institutional "layering" (Konings 2011), as opposed to a stark shift in political-economic reasoning, as like what happened after the 1929 Crash or the election of Margaret Thatcher and Ronald Reagan.

2.3 Liquid Markets Before Their Time

In the U.S., while never completely disentangled from banking, debt, and flows of money, commodities are defined as standardized agricultural, "natural", or bulk products that are produced to be exchanged. The mode of this exchange has always been partly determined by communication, transportation, and financial infrastructure. So while crop production has always—and still is—dispersed over a vast landscape and unique to local soils and climates, the geography of distribution and exchange has trended towards centralization since the early 1800s. The location of many U.S. cities west of the Appalachians was determined by their convenience as locations for trading grains and livestock commodities, and 19th Century Chicago may be the paradigmatic example of an emergent urban geography determined by agricultural exchange (Cronon 1991).

Meanwhile on the rural landscape of the U.S. grain belt there was an evolution of exchange. Although not necessarily a sequential process, local barter markets became local commodity markets mediated by storekeepers and horse drawn wagons—which became regional markets mediated by railroads, telegraphs, and grain elevators—which became national and global markets mediated by Chicago's futures exchanges (Cronon 1991, Carey 1989). Beginning in the 1850s, the Chicago Board of Trade (CBOT) played an important role in this process. It first codified the procedures for the trading of grain elevator receipts (Cronon 1991), and then began "rationalizing" the market system by standardizing grades, measurements, and delivery locations of grain, as well as the rules by which the traders operated (Lurie 1979). One result of rationalizing the markets, however, was it became easier for speculative traders, who had no inherent interest in the commerce of grain, to buy and sell contracts for quick profits—or losses.

As Chicago developed into the railroad hub for the continent in the 1850s and 1860s, merchants in the city also began to develop a sophisticated, centralized, and standardized market for trading grain "futures" contracts (Cronon 1991)[14]. These contracts were not historically unique to

[14] A futures contract is an agreement to exchange a certain quantity and quality of a commodity at a set price, date and location. See definitions in the introduction.

Chicago, but the volume of grain flowing through Chicago made futures more consequential than ever before. Because of Chicago's connectedness with the rest of the continent, the prices "produced" as a result of CBOT futures trading became a standard reference point for both the dispersed cash exchange of grains as well as other smaller futures markets dispersed across the U.S. and later, the world (Federal Trade Commission (hereafter FTC) 1920, 1921, Carey 1989, Fabian 1999). In effect the Chicago futures markets created a new relational economic geography not only through the material transportation and exchange of grain, but also through the less tangible transmission of grain prices through word of mouth, and newspaper quotes, and electronic telegraph signals.

Not surprisingly, when the grain prices in Chicago dropped, farmers hundreds of miles away became incensed at a price for grain that was produced at a distance, and seemingly took no account of their labor. The supply and demand for grain was increasingly an extra-local phenomenon—detached from face to face transactions. For many farmers the Chicago Board of Trade became an object of resentment along with other "middle men" such as grain elevator and railroad operators (Carey 1989, Fabian 1999). Furthermore, given the enormous volume of grain, CBOT traders realized if they could somehow manipulate futures prices to their advantage, they could quickly reap enormous profits. Manipulating the grain market into a "corner" by controlling the supply or demand became a commercial sport in Chicago in the late 19th Century, and the volatile impacts on price could be catastrophic for those whose livelihood depended on producing, processing, buying, or selling actual grain. Especially after market corners, or "short squeezes", which were common in the 19th Century, patrons of the actual commerce in grain pressured lawmakers to rein in the Chicago speculators, but they had little luck. The CBOT made the case that they were a private club and short of breaking laws, which was difficult to prove, they should be allowed to conduct business as they saw fit (Lurie 1979).

Grain prices were not however only important to farmers, grain processors, and grain traders. As the commerce in grain farming became more deeply integrated with circuits of credit and capital (Henderson 1999), the availability of risk management tools and the constant flow of price information became a necessary prerequisite for cash crop farming. Banks that financed farm production increasingly became dependent upon futures prices to hedge their own credit risks. U.S. capitalism was slowly but surely integrating agricultural production into the general circuits of capital (Henderson 1999), and the farmer's assumption that his labor was best represented by the material crop he produced was being replaced by his integration into a vast system of commerce, of which market prices were a central component (Fabian 1999).

2.4 Interests in the Grain Trade

As the commodity chain was increasingly rationalized, entangled with centralized marketplaces and flows of capital, sudden disruptions to any part of the commodity chain would impact larger geographic scales. As a result, the smooth operation of the price mechanism itself became a measurement of the health of commerce in grains (Lurie 1979), something that would be declared to be in "in the national interest" by the U.S. Congress in 1922[15]. The CBOT took this seriously, working to establish rules and standards both to eliminate monopoly interests (railroads and private grain elevators) that could distort the supply of grain (Cronon 1991), as well as rules to govern the internal operation of the exchange (Lurie 1979). There was, however, always a contradiction for the CBOT between facilitating a free association of merchants conducting their private business, and the best interest of everyone else involved in the commerce of grain (Lurie 1979). It was in the best interest of the CBOT to protect its business model from both unnecessary

[15] U.S. Grain Futures Act as passed by the U.S. Congress in 1922, see United States Code (1925/6), Title 7, Chapter 1 (see also Markham 1987, Fabian 1999).

—or at least unexpected[16]—manipulations in the supply and demand of grain, but also from strict outside regulations that could damage the incentives to hedge against and speculate on grain price changes (FTC 1920).

From the earliest years of the CBOT there were professional traders and trading firms who earned commissions first by arranging trades in grain between third parties, and later on actually making the trades on the floor of the exchange. There were also, going back until at least the 1870s, local speculators who would buy and sell grain often in very short intervals hoping to profit on price changes (Cronon 1991, Lurie 1979). The CBOT speculators served a vital function of providing the liquidity necessary to ensure that hedgers could move in and out of the market without impacting price (see Chapter 4). Beginning in the 1870s the CBOT was quick to point this out as a defense against those that would place limits on their markets.

Speculation, however, was a controversial category of economic activity in the late 19th and early 20th Century. The reasons for this are complicated and historically variable, a detailed discussion of which is out of the scope of this chapter (see Fabian 1999, DeGoede 2005, Stout 1999, Levy 2012), but three reasons are particularly important to futures trading in Chicago. First, both English and U.S. common law through the 18th and 19th Centuries typically outlawed speculation because it was assumed to divert capital away from "productive" enterprise (Stout 1999). Second, excessive speculation was believed to distort prices away from the natural balance between supply and demand. And third, speculation was believed to be morally corrupting to both the speculator and to society more broadly (DeGoede 2005). As a result, the common law has generally

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[16] The particular reasons for any disruption in the supply or demand for grains was irrelevant from the perspective of the Chicago grain trader. As long as there was a reasonably steady flow of information about planting, harvesting, storage, transport, domestic and foreign demand, and even potential market corners, smooth trading could continue (cf. Lurie 1979). Some volatility in prices was good for trading, but sudden disruptions could threaten the financial foundations of the exchange. If a handful of traders or brokers were unable to meet their obligations in a timely fashion, the exchange may have to cease trading in futures, which could cause even more problems since there were many more futures contracts than physical grain to deliver. For this exact reason the CBOT was an early innovator in clearing rules (Hieronymus 1977).

prohibited purely speculative exchanges and markets, or at a minimum, requires potential speculators to incur the costs of transportation and storage of the goods speculated upon (Stout 1999: 712-721). The effect of requiring speculators to incur the costs of inventory incentivizes investment in actual commerce. In U.S. common law, purely speculative contracts were not typically outlawed, but the courts refused to enforce them, meaning they had to be settled by the parties involved according to "private ordering" (Stout 1999). Since the end of the 19th Century, however, there was an exception for trading on organized exchanges, where delivery of the commodity is at a minimum "contemplated" (Levy 2006) and the participants are subject to the rules and regulations of the institution (Stout 1999).[17]

This bias against speculation was particularly problematic for the CBOT. Even though an actual exchange of grain was immanent in every futures contract, the reality was that the vast majority of the CBOT trades never resulted in an exchange because they were offset by opposite contracts prior to their expiration (FTC 1920). For this reason, the CBOT was regularly accused of being little more than a gambling hall. Making matters worse for the CBOT, informal gambling parlors or "bucketshops" where anyone could place a bet on the changing price of grain futures began to pop up all over Chicago as well as across the rural landscape anywhere there was regular access to price quotations from Chicago (Fabian 1999, DeGoede 2005). Although some did, very few bucketshops had connections to CBOT futures, so the trades were truly casino bets. Bucketshops were also notorious for disappearing when too many bets went against the house. For the CBOT, bucketshops were a double threat. First, they lured away speculative dollars that might otherwise be spent on formal grain futures. Second, and more importantly, since bucketshop "trades" were pure wagers with no possibility of a connection to actual commerce, they drew

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[17] One further exception is important. Securities markets such as the New York Stock Exchange do require a speculator to take delivery of the good, but that good is typically little more than a piece of paper such as a stock certificate (or in the 21st Century, an electronic representation). Obviously the costs of holding inventory in securities are low, so securities markets are ripe for speculation. This is exactly why, Stout (1999) argues, securities exchanges have high margin or collateral requirements, and other rules designed to limit speculation (see below.)

undesirable comparisons to CBOT trading where 95% or more of grain futures contracts were offset prior to expiration (Hieronymus 1977). In other words, the bucketshops were a detriment to the CBOT's constant struggle to present itself as a legitimate and legal business enterprise, not to mention its desire to convince the public that it served an economic virtue, not vice (DeGoede 2005).

2.5 "The Dynamics of Self-Regulation" (after Lurie 1979)

Although there were over 200 attempts to enact legislation in the U.S. Congress during the "Long Depression" of agricultural prices from the mid-1870s to the mid-1890s, none of them were successful (Markham 1987). Regardless, the CBOT, being the "pattern and pace maker" for all U.S. futures exchanges (FTC 1920: 30), played an influential role in resisting federal government regulation of futures or the grain trade. As it had been from the very start, this was a time characterized by the futures industry regulating itself and settling its own disputes. The CBOT struggled to manage what at times was a contradiction between maintaining its image as a legitimate and virtuous economic function, but at the same time leave plenty of space for its members to profit from speculation. All the while it also attempted to demonize bucketshop gambling. As both Jonathan Lurie (1979) and Ann Fabian (1999) point out, the CBOT largely accomplished this by formalizing and rationalizing its own operations in order to create both the reality and the image of a formal, ordered, and rational institution. The CBOT formalized its rules and committee structure forcing its members to agree to arbitration in the case of disputes, and allowing for fines and even expulsion from membership for breaking the rules that, at least outwardly, were designed to prevent untoward behavior like outlawed grain options trading or attempts to corner markets. They also established an official clearinghouse to manage the settlement of all trades and even compel their members to deposit collateral to ensure they could live up to their contract obligations (FTC 1920).

Following World War I, during which prices were fixed by the government, grain prices quickly collapsed, and farmers groups put intense pressure on Congress to enact legislation to end futures trading. Farmers blamed the CBOT speculators along with other "middle men" such as railroads and grain elevators, the latter of which were still largely privately owned and operated (Romano 1997). Cooperatively owned elevators were rare prior to World War I, and the CBOT largely banned them from membership forcing them to deal with futures brokers who they believed (often rightly) cheated them.

In 1920/1921 the pressure on Congress was too much for even the powerful CBOT to resist, and in 1922 Congress passed the Grain Futures Act[18]. The farm lobby and their allies in Congress pushed for a total ban on futures trading, referring to speculators as "predatory parasites" (Romano 1997: 279), and to the CBOT as a "gambling hell" (Fabian 1999). Even in the 1920s, most grain farmers did not use futures contracts, which contributed to their view that futures were the tools of urban commerce and the evils of the growing industrial economy, and as such contrary to the virtues of rural work and life (Romano 1997, Fabian 1999). The opponents of regulation, however, also had loud voices, arguing that speculative trading was a crucial component of a successful futures market. Citing the first volumes of a massive report completed by the Federal Trade Commission in 1920 (FTC 1920), they argued that speculation provided a liquid market that was necessary for commercial hedgers as well as a constant flow of price information that improved the efficiency of commerce (Romano 1997). Supreme Court Justice Oliver Wendell Holmes had set the stage for this argument in 1905 when he deemed speculative futures trading a normal part of commerce, or in his words, the "self-adjustment of society to the probable" in 1905.

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[18] The first regulation of commodities trading came in 1914 with the Cotton Futures Act. Its main effect was to create standard categories of cotton that all exchanges were compelled to use. The first Grain Futures Act passed in 1921, but it implemented a tax on speculative trades, something that the Supreme Court would not allow, and the law was struck down. The second Grain Futures Act of 1922 was quite similar to the first, but instead of taxing transactions Congress appealed to interstate commerce in its rule that grain transactions be excluded to licensed exchanges. The CBOT also challenged this law, but the Supreme Court allowed it (see Markham 1987, Romano 1997).

He furthermore argued that the "quotations of prices from the market are of the utmost importance to the business world"[19].

The CBOT itself played a role in helping to draft a compromise bill, and replace a requirement that all futures traders be part of the grain industry, with a requirement that all futures trades happen on an established exchange (Romano 1997: 296-7). The bill passed the U.S. House of Representatives by a margin of 269-69, with strong support from the Southern and Midwestern farm states, and opposition from the manufacturing states of the North and Northeast. It is likely no coincidence, however, that the Illinois House membership bucked the farm state trend voting against the bill 14-7. Even in the 1920s, Illinois legislators knew they wanted to keep an influential friend in the CBOT. In the end, despite the powerful farm lobby, and the anti-gambling sentiment in Congress, the primary effect of the legislation was to ensure the continued operation of the futures markets, now with an implicit blessing from the federal government. Despite strong language in the final law disparaging speculation and its connections with fraud and price manipulation, the law did very little to stop it[20]. Instead the exchanges were compelled to exert more control over their own institutions especially with regard to excess speculation, but the consequences for non-compliance were not serious. The goal of all of this was not a reduction in speculation per se, but rather to control factors that would prevent the market from operating

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[19] Board of Trade of Chicago v. Christie Grain & Stock Co., 198 U.S. 236 (1905). Here is a longer excerpt from Holmes's decision upholding the legality of potentially speculative futures trading: "As has appeared, the plaintiff's chamber of commerce is, in the first place, a great market, where, through its eighteen hundred members, is transacted a large part of the grain and provision business of the world. Of course, in a modern market, contracts are not confined to sales for immediate delivery. People will endeavor to forecast the future, and to make agreements according to their prophecy. Speculation of this kind by competent men is the self-adjustment of society to the probable. Its value in well known as a means of avoiding or mitigating catastrophes, equalizing prices, and providing for periods of want. It is true that the success of the strong induces imitation by the weak, and that incompetent persons bring themselves to ruin by undertaking to speculate in their turn. But legislatures and courts generally have recognized that the natural evolutions of a complex society are to be touched only with a very cautious hand, and that such coarse attempts at a remedy for the waste incident to every social function as a simple prohibition and laws to stop its being are harmful and vain." Accessed here on 10-4-13: http://supreme.vlex.com/vid/trade-chicago-christie-grain-stock-20040045

[20] U.S. Grain Futures Act as passed by the U.S. Congress in 1922, see United States Code (1925/6), Title 7, Chapter 1

efficiently and producing accurate and consistent prices, which were deemed important for inter-state commerce and the "national interest".

Despite the rhetoric of limiting the influence of market forces, particularly speculative price making, the Grain Futures Act had an almost opposite effect. The federal government mandated that grain futures could only be traded on federally licensed "contract exchanges". While this did not completely eliminate bucketshop activities, for the most part it funneled all speculative trading onto the formal exchanges of which the CBOT was "preeminent" (FTC 1920). The added legitimacy of being federally licensed meant that the CBOT, despite being dependent on speculation, became the institutionalized, productive, and rational *other* to informal, unproductive, and irrational gambling (Fabian 1999). Just as important, the federal government began the process of legally defining commodities as those goods that are subject to futures trading on institutionalized exchanges on which speculation was deemed to be a natural and beneficial enterprise.

Between 1922 and 1936, very little changed in federal regulation of grain exchanges, but this cannot be said for the political economic environment. The stock market crash, widespread bank failures, the Great Depression, The Dust Bowl, and the New Deal radically changed the context in which the federal government might intervene in the economy. As I discuss below, this was especially consequential for securities and stock exchange regulation. This political economic environment also helped the "farm bloc" achieve some of its goals[21], but the impact on commodities/futures exchanges was less profound.

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[21] Roberta Romano (1997) makes the case that the underlying goal of the farm bloc was to improve their autonomy and control over grain prices. As was reflected in the 1922 legislation, Chicago speculators and the CBOT took the brunt of the blame their perceived loss of control over the marketing of their grain. Beginning in 1929 with the Agricultural Marketing Act, and continuing through Agricultural Adjustment and National Industrial Recovery Acts in 1933, the federal government became more involved in subsidizing agricultural production. For farmers these not only translated into a material victory by providing some certainty by helping to prop up historically low grain prices, it also represented a reassertion of control over their own production. The futures markets continued to operate and produce prices, but the wild fluctuations in price that had persisted since the turn of the Century would at least be mitigated. Romano suggests that all of this as well as modest changes in the 1936 CEA, such as forcing exchanges to accept co-op elevators as members, broke up the incentives of the farm lobby to continue organizing against the exchanges.

In 1936 the Grain Futures Act was updated with the Commodity Exchange Act, but despite the Keynesian ferment that drove much of the New Deal, commodities exchanges were again not significantly impacted (Markham 1987, Romano 1997). Congress did create a new federal agency, the Commodity Exchange Authority (CEA), to be housed in the Agriculture Department, and take over responsibility for monitoring commodity exchanges. The CEA was given the mandate to install position limits for futures contracts to prevent excessive speculation, meaning that the federal government could legally force speculators to close out positions if the agency thought those positions were large enough to affect the market price. In reality, this almost never happened, regardless of the situation (Markham 1987). Another notable development was the enumeration of 13 specific commodities that were subject to federal licensing for futures trading. Beyond grain, regulated commodities now included butter, eggs, and cotton. But crucially, despite strong arguments otherwise, the commodity exchanges successfully argued as they had for 50 years that speculation was in the economic and public benefit, and as such they were left to control their own collateral requirements[22].

2.6 Securities and Lawyers

During the middle and late 1920s, awash in new wealth from a booming economy and fueled by a speculative bubble in investment "trusts", the U.S. stock market boomed. For a while in 1927/28 during the height of the manic speculative bubble, it seemed that no securities investment could go wrong. When the bubble finally burst in the fall of 1929, Wall Street investment banks and the New York Stock Exchange (NYSE) were widely blamed (Seligman 2003). As a series of investigative hearings in front of the U.S. Senate Banking Committee (The "Pecora Commission") would show,

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[22] It was in the best interest of the exchanges to carefully manage their own collateral requirements. The exchanges were owned by their members, and if parties to trades decided to walk away from their commitments because of drastic price changes, the entire exchange could be at risk. This said, the typical collateral requirement on Chicago futures was between 5 and 10%, meaning that contracts could be leveraged from 90 to 95% of the value of the contract.

Wall Street investment banks engaged in a long series of fraudulent financing in large part by issuing (selling) diluted or just bogus shares of front companies to the public. In typical "Ponzie scheme" fashion, as long as new money kept flowing in, all of the previous investors realized profits[23]. Franklin D. Roosevelt minced no words as he campaigned for U.S. President in 1932 accusing the Hoover administration of "lining up with the stock market"[24], and repeatedly disparaging speculation and "paper profits", and vowing to regulate "to the full extent of Federal Power… Exchanges trading in securities and commodities"[25]. Upon election, his nascent administration using political leverage provided by the Pecora hearings immediately began work on new banking, investment banking, and securities regulations. Drawing on the progressive "legal realism" of scholars such as Louis Brandies and Felix Frankfurter (Seligman 2003), as well as various U.S. state progressive movements to legislate against fraudulent security issuance (Parrish 1970), FDR and a broad coalition in the U.S. Congress began a substantial period of regulatory intervention.

Against the loud protest of Wall Street bankers, two bills were passed to regulate the securities industry in the 1933 Securities Act and the 1934 Securities Exchange Act (hereafter "1933/1934 Acts"). The 1933 Act laid the groundwork for more strict government supervision of security issuance. It created a broad mandate for the federal government to monitor the issuance of corporate securities. The goal of the legislation was not for the government to sanction any particular type of security, but instead to require thorough disclosure of the characteristics of the

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[23] FDR Campaign Address at Columbus, Ohio, August 20, 1932, accessed online here on 9-15-13: http://www.presidency.ucsb.edu/ws/index.php?pid=88407

[25] FDR Radio Address on the National Democratic Platform From Albany, New York, July 30, 1932, accessed online here on 9-15-13: http://www.presidency.ucsb.edu/ws/index.php?pid=88406 After his election, in 1934, FDR sent a message to Congress encouraging them to create a Securities and Exchange Commission. It included this: "It is my belief that exchanges for dealing in securities and commodities are necessary and of definite value to our commercial and agricultural life. Nevertheless, it should be our national policy to restrict, as far as possible, the use of these exchanges for purely speculative operations. I therefore recommend to the Congress the enactment of legislation providing for the regulation by the Federal Government of the operations of exchanges dealing in securities and commodities for the protection of investors, for the safeguarding of values, and so far as it may be possible, for the elimination of unnecessary, unwise and destructive speculation." (quoted in Rainbolt 1977).

security and the enterprise that it represented. In this way it followed Brandeis's "sunshine" dictum: the best prevention against financial fraud is to create a transparent investment environment where any company that wants to issues shares, must provide accurate and regular information to the investing public (Riles 2011: 89-90).

The 1934 Act created a new independent agency, the Securities Exchange Commission (SEC), to supervise implementation and enforce the 1933 Securities Act. The 1934 Act also gave the SEC the power to review and approve the operating rules of securities or stock exchanges. Most importantly, it gave the Federal Reserve the power to control collateral levels on stock exchanges, specifically intending to diminish opportunities to speculate with borrowed money (Seligman 2003, Stout 1999).

Together these two laws along with the 1933 Banking or "Glass-Steagall" Act, created a substantial intervention of the U.S. state into the workings of the financial infrastructure of the nation. There are similarities with the 1922 Grain Futures Act and the 1936 Commodities Exchange Act. For instance, in both industries, federal legislation and regulation was used to delegitimize, if not outlaw, some of the weaker, smaller, or less formal trading operations, which produced monopoly like conditions for the larger and more established exchanges like the New York Stock Exchange and the Chicago Board of Trade (Seligman 2003, Fabian 1999, Stout 1999). Both federal agencies were given the mandate to review and approve exchange rules—although it is notable that neither agency made any substantial changes for decades (Markham 1987, Seligman 2003). Indeed both agencies from the start assumed that ideally these industries would regulate themselves, although as I will describe in more detail below, this was elevated to the level of dogma only in the commodities/futures industry. Furthermore, in both industries, the simple existence of a federal regulatory institution and the maturation of those bureaucracies over time engendered a legitimacy and normalization—even a "depoliticization" (De Goede 2005) of the respective financial industries.

When we look closely at the 1933/34 Acts and more importantly the SEC as a nascent institution, however, there are some unique characteristics that place it in contrast with federal commodity/futures laws and regulatory agency. First, the top priority of the SEC became protecting the public from fraud, or fraudulent securities, not producing efficient price mechanisms. For the most part this was accomplished not by mandating changes in the way securities were traded, but in how securities were issued and marketed to the public. All public companies were compelled to follow standardized accounting procedures (see Ernst 2009) as well as required to produce standardized annual reports including basic financial information about the company. This reflected the guiding principal of the SEC—disclosure and transparency will protect the investing public, and in turn produce efficient markets (Khademian 1992).

Second, the SEC took from the 1933/34 Acts a direct interest in preventing excessive speculation on stock markets (Stout 1999, Thel 1990). There was a New Deal consensus that excessive speculation caused the stock market bubble in 1927-29, the crash in Oct. 1929, and the ensuing financial and economic collapse (Federal Reserve 1984). Unchecked speculation was assumed to lead not just to personal or institutional bankruptcy, but macro-economic trauma. For this reason FDR pushed legislation that installed collateral or "margin" limits high enough to curtail speculation on the stock exchanges (Seligman 2003: 76). In 1984 the Federal Reserve explained the difference between securities and commodities/futures margins:

> The differences in margin ratios appear traceable in part to the disparate history of federal regulation and in part to the nature of the markets. The futures exchanges, free of federal regulation, have established their margin ratios to achieve but one objective: to protect individual brokers and thus assure the integrity of the marketplace. The initial margin ratios in securities and options markets, on the other hand, are in place to achieve the public policy objectives reviewed above, and *protection of market integrity is seen as a beneficial by-product of these other objectives* (Federal Reserve 1984: 16, emphasis added).

Third, although the agency did not infringe much on the day to day operation of the New York Stock Exchange, the SEC was granted wide leeway to establish and maintain the emerging federal securities laws as it related to securities issuance, investment banking, and corporate governance.

From the outset, the agency accomplished this by employing mostly lawyers. This was peculiar for the federal government at the time, but it was presumed from the very beginning that a successful SEC would require a staff of both expert legal minds as well as crack courtroom litigators to begin the process of cleaning up Wall Street. It was expected that the agency would need to both make sense of the insiders game that was corporate finance, as well as go head to head with high powered Wall Street law firms that protected the investment bankers and exchanges, something that neither members of Congress nor the Presidential administration was equipped to do on a long-term basis. As a result the SEC became one of the first federal government agencies to be staffed almost exclusively by professionals, many of who were lawyers. The SEC quickly became a coveted employment opportunity for top graduates of Ivy League law schools, and it was assumed by the older generation of New Deal progressive lawyers at the top of the agency that they were be wholly sworn and devoted to enforce the principals of the 1933/1934 Act. As many have argued (cf. Khademian 1992, Karmel 1982) a prosecutorial culture and combatant attitude toward "the street" emerged at the SEC. This was connected to a deep commitment to the principals of customer protection. To the extent that the SEC was concerned with efficient markets and efficient distribution of capital, which it was, these concerns were translated through the SEC's top priority: ensuring a transparent investment environment for the public.

This latter phenomenon was partially a result of the generally progressive worldview of the New Deal governing class at the time, but it was also specific to changing interpretations and applications of the law. With legal minds such as Brandies, Felix Frankfurter, William Douglas, and James Landis leading the charge, "realist" legal scholars rebelled against the strict formalism of 19th Century law that was concerned with abstract principals and universal rules, and was suspicious of interfering with commerce. In contrast, the progressive, and particularly the New Deal generation saw the law as a practical and technical matter that needed to be adaptable to changing conditions, in particular

economic depression, inequality, poverty, not to mention the realities of market practices (Nourse and Shaffer 2009, Riles 2011: 90-95).

From the establishment of the SEC, it was an agency that the Chicago futures exchanges wanted to keep at arm's length. It was a principal of the commodities/futures business that producing prices was the basis of the enterprise, and this depended on the kind of speculation that the SEC and the common law tradition was fundamentally suspicious of.

2.7 The Limits of the Agricultural Commodity

We have to skip forward 30 to 40 years to find the next key steps in the institutionalization of financial speculation in the U.S. economy. In the early and mid-1970s the Chicago exchanges began to apply their institutional expertise in agricultural futures to financial instruments that were produced not across the vast U.S. rural landscapes, but in the dense urban space of New York. The federal government, not having made any major regulatory innovations with regard to commodities speculation since 1936, played a key role (Millo 2003) in what would become over the next 20 years, a revolution in finance (Miller 1997).

In 1970, the business of futures was still deeply embedded in agricultural exchange. There were no centralized or standardized markets or price mechanisms for any kind futures or options on any financial instruments, and the over-the-counter swap market did not yet exist. In New York there was a small over-the-counter market for options on stock prices (Falloon 1998), and as there had been for decades, and there was a dispersed interbank market for the "forward" exchange of foreign currencies mainly for corporations engaged in international trade (Tamarkin 1993).

In the sphere of government regulation, there was a clear division of labor between what was considered the securities industry and the commodities/futures industry. The SEC was responsible for the securities industry that was largely headquartered in New York. The CEA under the tutelage of the U.S. Agriculture Department monitored the U.S. commodities/futures markets

that were headquartered in Chicago. Unlike the SEC, however, between World War II and 1970 the CEA rarely took meaningful action to change those markets. In extreme cases of alleged market manipulation, they did prosecute individuals and impose speculative limits, but for the most part the agency let the exchanges run the industry, and they never interfered with collateral requirements. On the securities side, the SEC did not for the most part interfere with the day to day operations of the NYSE, but it was heavily involved in monitoring corporate reporting, securities issuance, broker/dealer behavior, and collateral requirements.

By 1973, there were, however, a number of new futures instruments that were not perfect fits for either the SEC or the CEA. The CBOT, in an effort to "open new vistas for commodity marketing, by applying the futures trading concept in new and untried areas", developed option contracts on NYSE traded corporate shares[26]. The CBOT, expecting that any direct involvement with securities would raise the hackles of the SEC, courted their support for the new contracts beginning in the late 1960s (Millo 2003). It was a painstaking experience that lasted many years including many arguments over the dangers of speculation and its status as gambling (Millo 2003, MacKenzie 2006: 158). Eventually, with the help of Nixon Administration appointees, the SEC did relent in 1973. The new options were broadly defined within the realm of securities law and therefore more strictly controlled than commodities/futures. In particular, the securities options had high collateral requirements, and at first were only available as options on upward market movements, not downward movements (Millo 2003) reflecting another longtime SEC bias against short selling, which was associated with speculation (Stout 1999). In other words, even though the SEC allowed an option contract, it remained true to its mission of keeping speculation to a minimum (see Federal Reserve 1984).

The experience of dealing with the SEC reminded the CBOT that the SEC was not an agency friendly to their business, and that they much preferred to deal with the CEA (Falloon 1998:

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[26] 1972 Annual Report of the Chicago Board of Trade, page 5

246). They quickly decided to spin the options exchange off into a separate entity—the Chicago Board Options Exchange (CBOE)—in part to keep the SEC's noses out of the rest of their business (Falloon 1998, Millo 2003).

Complicating regulatory matters further, by the early 1970s, the Chicago Mercantile Exchange (CME), which for all of its 50+ year history was the second exchange in Chicago, had also branched out into new products. Facing an existential crisis in the mid-1960s, it was the first exchange to begin trading meat and livestock futures. In a deliberate effort to diversify their business, they attempted futures contracts on a long list of other commodities like shrimp and turkeys, most of which never achieved the liquidity necessary to succeed (Melamed 1996).

Most importantly, the CME, crawling out of its "agricultural market cradle" (Melamed 1996: 313), used its expertise in contract design and promotion to convince agricultural traders to trade a new contract on foreign currencies beginning in May of 1972. It was not all serendipity that the contract began trading right as the Bretton Woods fixed exchange rate system was breaking apart following U.S President Nixon's decision to end U.S. dollar/gold convertibility in August of 1971. In a fascinating story on its own, the CME, with the assistance of Milton Friedman of the University of Chicago Economics Department, convinced key members of the Nixon Administration and the Federal Reserve, that no new federal regulation was necessary for these contracts (Melamed 1996)[27]. Luckily for the CME, the status quo at the time provided no obvious regulator for currency futures. These contracts were not securities, and they were not enumerated in

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[27] Leo Melamed has recalled the story of Friedman's influence and help many times (see Melamed 1996, Melamed 1988, Rodengen 2008). The most ebullient may be his elegy at Friedman's memorial funeral service in Chicago on January 29, 2007, accessed here on 10-4-13: http://www-news.uchicago.edu/releases/07/070129.friedman-webcast.shtml Friedman was commissioned to write a scholarly paper for the CME defending the idea of currency futures contracts. The CME executives, Melamed in particular, used the paper to convince Nixon Administration officials and others that currency futures had potential to provide economic benefits, and regulation was unnecessary. The connection between the Chicago exchanges (especially the CME) and the University of Chicago economics and business departments was, and still is strong. For one example, see Milton Friedman's Oct. 17, 1974 paper "Free Markets for Free Men" (University of Chicago Graduate School of Business, Selected Papers #45), which he named after the unofficial motto of the CME. Accessed here on 10-4-13: http://www.chicagobooth.edu/~/media/917BA065D1914F8F8DF7536680FD7EE7.pdf

the 1936 CEA, so they were not commodities. To impose outside governance, then, would have required new regulations, something that would not become an attractive idea in Washington D.C. for a couple more years. It is notable as many of my interviewees indicated, that in the case of currency futures, as it was for all of the new contracts at both Chicago exchanges, that exchange executives had to cajole and compel, run marketing campaigns, and create gimmicks to convince existing pit traders and/or new potential traders to speculate on the new contracts. It did not happen without work, and sometimes the contracts would just die off. Other times, as in the case of currency futures, the exchanges would make quick adjustments to the sizes of the contracts to attract more speculators.

On the other side of the Chicago Loop, the CBOT was working hard to develop the first interest rate futures contract on home mortgage securities (GNMA or "Ginnie Mae" securities). It seemed very possible, however, that a GNMA futures contract might be defined not as a commodity/future, but as a security which would have summoned the SEC yet again (Falloon 1998: 238-40).

2.8 The Birth of the CFTC

There is a long list of reasons why the U.S. Congress eventually decided that the regulatory division of labor for commodities/futures was unsustainable. The answers I received from interviewees were diverse and included a wide range of factors. There are, however, common threads through all of their stories, and the periodicals and newspapers accounts at the time help to sort out the story. I focus here on the most obvious explanation, but it is multifaceted and takes into account a number of factors mentioned by interviewees. Most succinctly, in the face of new hybrid instruments that crossed the established boundaries between securities and commodities/futures, the existing system became incoherent and contradictory.

THE MARKETS

Chicago	
Chicago Board of Trade	corn, gold, iced broilers, G.N.M.A. certificates, oats, plywood, silver, soybean meal, soybean oil, soybeans, stud lumber, wheat
Chicago Mercantile Exchange	butter, Canadian dollar, cattle, copper, Deutsch mark, Dutch guilder, eggs, French franc, frozen boneless beef, frozen pork bellies, gold, grain sorghums, hogs, Idaho potatoes, Japanese yen, lumber, Mexican peso, skinned hams, Swiss francs, U.S. silver coins, U.S. Treasury bills, turkeys
MidAmerica Commodity Exchange	corn, gold, hogs, oats, silver, soybeans, U.S. silver coins, wheat
New York	
Commodity Exchange, Inc	copper, gold, silver
New York Cocoa Exchange	cocoa, natural rubber
New York Coffee and Sugar Exchange	coffee, sugar
New York Cotton Exchange & Associates	cotton
Citrus Associates	frozen orange concentrate
Petroleum Associates	crude oil, liquified propane
Wool Associates	wool
New York Mercantile Exchange	Belgian franc, British pound sterling, butter, Canadian dollar, Deutsch mark, Dutch guilder, frozen boneless beef, gold, heating oil, industrial fuel oil, Italian lira, Japanese yen, Maine potatoes, Mexican peso, palladium, platinum, Swiss franc, U.S. silver coins
Minneapolis	
Minneapolis Grain Exchange	barley, corn, flaxseed, frozen pork bellies, oats, rye, soybeans, wheat
Kansas City	
Kansas City Board of Trade	corn, grain sorghums, soybeans, wheat
San Francisco	
Pacific Commodities Exchange	cattle, coconut oil, palm oil, silver

Licensed U.S. commodity/futures exchanges in 1976
(1976 Annual Report of the Commodity Futures Trading Commission, page 30)

First off, by 1973 the commodities/futures business was in an "explosive growth stage"[28]. As *Commodities Magazine* explained in its inaugural issue editorial in February/March of 1972, the public was taking more interest in commodities/futures trading. The Chicago exchanges actively marketed their products to securities investors, running advertisements in newspapers, *Commodities Magazine*, and even Chicago-based *Playboy*[29] (Rodergren 2008: 50). The ads encouraged institutional and individual speculators to play the markets in Chicago instead of New York. In 1971 the dollar value of futures contracts traded exceeded the value of all securities traded on the New York Stock Exchange[30]. The volume of futures contracts traded on U.S. exchanges went from approximately 4 million in 1960, to 14 million in 1970, to 26 million in 1973 (see Introduction).

Yet, the federal agency slated to keep a watchful eye over this growing industry was seen by many to be inept. The CEA was perceived to be lacking expertise, a sufficient staff and budget, and the will to act in the face of commodities fraud or market corners, which were still occasionally happening (*Des Moines Register* 1973). They were accused by many of being "captured" by the commodity exchanges (ibid). This became especially problematic for the CEA as the rate of inflation grew, causing prices for consumer goods to rise and generally become volatile in the early 1970s. Some blamed the futures markets speculation for food price volatility, and were frustrated

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[28] Gold, G. "The New Growth Industry", *Commodities Magazine*, February/March 1972, ppg. 11-12

[29] According to Rodergren (2008), an initial *Playboy* advertisement (date unknown) produced 900 inquiries from people interested in learning more about commodities markets, and consequently encouraged the CME to increase their advertising budget. The obvious question about the gendering of commodities/futures, speculation, and finance more generally is a fascinating one, which has been explored by Marieke De Goede (2005).

[30] Gold, G. "The New Growth Industry", *Commodities Magazine*, February/March 1972, ppg. 11-12. Comparisons of dollar value are deceiving as futures contracts are measured by the value of the underlying commodities that would be traded if the contract expired, but 95% of the time, they are offset before expiration. This explains the reference that is common today of US$600 to 700 trillion in outstanding derivatives contracts, which is ~10x global GDP.

[31] See for instance a discussion with the President of the CBOT concerning the exchange's struggle to justify a drastic spike in the price of soybeans against accusations of excessive speculation in "Commodities talks with Warren Lebeck about 'The Soybean Phenomenon'", *Commodities Magazine*, December 1973, ppg. 8-13

with the CEA for taking no intervening action[31]. The price situation was grim enough that President Nixon imposed price controls on many consumer goods in August of 1971.

What to do till your stocks go up.

You could twiddle your thumbs. Or take up needlepoint. Or perhaps you'd like to try constructing the Eiffel Tower out of toothpicks. It takes a lot of patience to be a traditional kind of investor these days.

On the other hand, for those who are somewhat more adventurous, there's fast-moving, fast growing commodity futures trading on the Chicago Mercantile Exchange. Our kind of trading is not for every investor. You have to have money you can afford to lose (we tell you that out front), guts and a reasonably analytical mind. Given those qualities, you have as good a chance as anyone to be a successful commodity trader. Virtually all the information that affects commodity prices is public knowledge.

If you're interested, ask your broker, or mail us the coupon.

CHICAGO MERCANTILE EXCHANGE
444 West Jackson Blvd., Chicago, Illinois 60606
Dept. 3091
Gentlemen:
Please send me free commodity trader's information.
Name
Address
City State Zip

Courting speculative capital from Wall Street (*Commodities Magazine*, June 1974, pg. 5)

Moreover, some members of the commodities industry[32] favored a new regulatory framework to provide more robust legitimacy and an alternative to the SEC for the nascent financial futures markets[33]. Furthermore, an off-exchange industry for options on commodity futures had developed in the late 1960s and grown tremendously into the early 70s. Trading options on commodities regulated by the CEA was banned. There were, however, unregulated futures markets on some U.S. exchanges, and more importantly there were centralized commodity options markets in London[34]. In what became known as the "London Options" market, U.S. commodity brokerage firms marketed these highly speculative contracts to customers across the U.S. The problem was some of these firms used high pressure "boiler room" sales tactics and misrepresented the risks involved. Some never executed the options trades, hoping the market wouldn't turn against them. When the market did drop, some of the firms went bankrupt basically having embezzled their customers' money (Long 1973).

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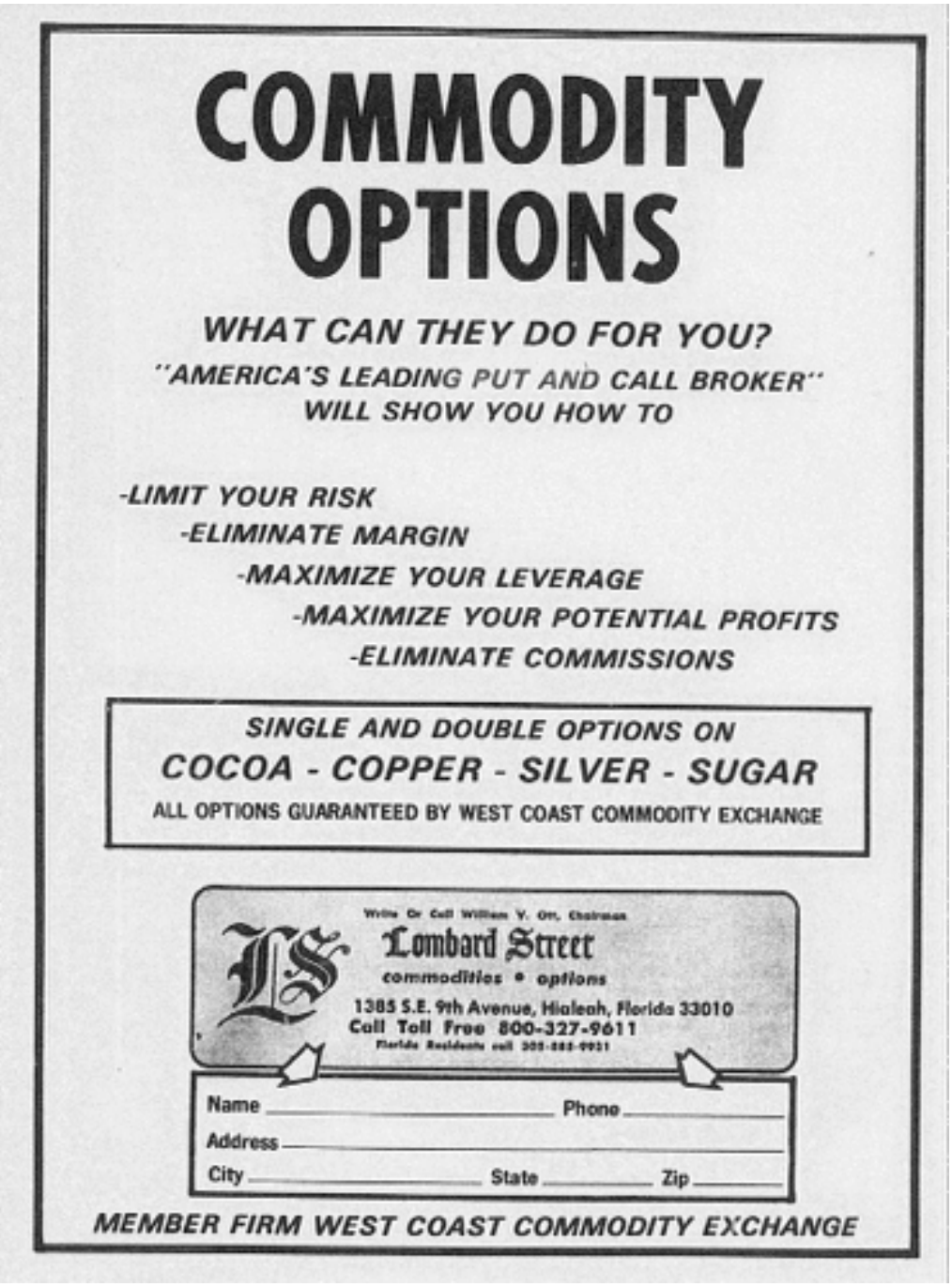
[32] One example of many is Michael Weinberg, Jr., the Chairman of the Board of the CBOT, who said among other things, "While the growth of bureaucracy is often questioned, a deliberately-expanded CEA could provide leadership to augment the policing activities of the various exchanges." See "*Commodities* talks with Michael Weinberg, Jr." *Commodities Magazine*, September 1973, ppg. 8-13. Leo Melamed, one of the most important "evangelists" of financial futures and an outspoken champion of free market, who explained his conundrum over regulatory reform as such: "Every successful industry had a federal counterpart whether it was banking and the Fed, or securities and the SEC. Besides, I had no doubt that our introduction of financial futures would cause substantial growth in the industry, increasing its prominence and notoriety. And a federal agency could act as a buffer between us and the enemies of futures markets, of which there were plenty." (Melamed 1996: 216).

[33] The CBOT had been lobbying for a commodity/futures insurance system similar to the Securities Investor Protection Corporation, which was established in 1970s by the U.S. government to guarantee customer funds in the event of a securities brokerage firm failure. Congress refused to establish a similar infrastructure for commodities in part because prior to 1975, not all commodities were regulated by the federal government (see Johnson 1976). The contradiction of the CBOT's request should not be missed: The CBOT was lobbying for a federal insurance system to guarantee what they market in part as insurance (or "hedging/risk management") contracts.

[34] See "Trading London commodity options", *Commodities Magazine*, June 1972, ppg. 10-15; also Schneider, H. "Commodity Options: Ready for next major step", *Commodities Magazine*, January 1978, ppg.60-61



"Lombard Street" is the London equivalent to Wall Street in New York—but the brokerage firm may never have executed their customers' trades in London[35].
(*Commodities Magazine*, October, 1972)

[35] I have no reason to believe that this particular firm engaged in fraudulent business. I am only using the advertisement to demonstrate how options were marketed to the public.

The similarities with the older bucketshops were stark, and not just because of the conspicuous fraud. Legitimate commodities brokerage firms and the Chicago exchanges wanted the option houses regulated if not shut down because they competed for speculative dollars and gave the entire commodities/futures industry a bad reputation (Johnson 1976: 4)[36].

As a result of all of this, the U.S. Congress began to consider overhauling the commodity/futures laws to create a new independent agency that initially was supposed to emulate the SEC. The bill writing, which was largely initiated from the Assistant Secretary of Agriculture's office and the staff of the House Agriculture Committee, lasted over a year and was complicated by partisan politics, questions of committee jurisdiction, and negotiations between the House and the Senate. Despite the fascinating descriptions of this process conveyed to me by a number of my interviewees, I will not attempt to outline it here (for an excellent overview see Johnson 1976). Instead I will focus on a handful of the key dynamics coupled with the key outcomes of the legislation.

The most important outcome of the legislation, signed into law on October 23, 1974, was that the CEA was replaced by a new agency, independent of the Agriculture Department, called the Commodity Futures Trading Commission (CFTC). In bureaucratic hierarchy, it would be structured like the SEC with five commissioners appointed by the President and confirmed by the Senate. One commissioner would be elevated to Chairman. However, as had happened in 1922 and again in 1936, despite strong rhetoric by many Congresspeople wary of speculation[37] as well as early calls to

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[36] Ironically given the jurisdictional changes in the 1974 legislation the options business temporarily became less regulated as opposed to more because U.S. state's lost jurisdiction to the federal government, and the newly formed CFTC lacked the staff and resources to pick up the slack. In June of 1978 the CFTC outlawed all commodity option trading in the U.S. (see "U.S. Commodity Options Sales Suspended Due to Widespread Fraud, Says Agency", *Wall Street Journal*, April 6, 1978, pg. 2.) Options were eventually legalized by the CFTC in the early 1980s and quickly became a popular and profitable product for the Chicago exchanges.

[37] In a reversal of roles with the exchanges, farmers groups were no longer a vocal critic of commodities exchanges, at least not relative to the late 19th and early 20th Century. Romano (1997) suggests that by the 1970s farmers were much more integrated into the processes of formalized risk management and speculation on commodities exchanges, and so the relationship was less combative.

emulate the SEC, there were no radical changes to the mission of the agency, nor to the rules for day to day oversight of the exchanges or the markets. Commodities options would be allowed, but only if they were traded on the futures exchange. Just as it had in 1922, speculative capital would be funneled into the exchanges, or otherwise outlawed. Furthermore, the promotion of market based risk management and the production and distribution of prices was still considered in the national interest, and the test of whether a new contract was economically beneficial was whether it provided hedging opportunities and/or improved "price discovery". On the other hand, a number of changes made to the jurisdiction of the agency set the stage for a an incursion of futures into the financial field.

These changes were the result of work by the Chicago exchanges heavily influenced the legislative process. Executives of both the CBOT and the CME testified numerous times at hearings in both chambers. More importantly, a number of key lawyers that represented the Chicago and New York commodity/futures exchanges spent considerable time advising the staff of the Agriculture Department and the House Agriculture Committee as the bill was being drafted and edited. The Chicago lawyers were "more instrumental than the Congressional staff's might admit", another lawyer familiar with the process told me (personal interview with Howard Schneider, 2-27-13). In particular, they convinced the legislators to include three key rules that institutionalized speculative trading on a much larger set of instruments.

In a cunning stroke that still reverberates today, the Chicagoans inserted a phrase in the legislation that changed the definition of a "commodity" from the 15 or so products enumerated in the Commodity Exchange Act, to "all other goods and articles…and all services, rights and interests in which contracts for future delivery are presently or in the future dealt"[38]. Immediately upon passage, anything traded in a futures contract on a contract exchange was defined as a commodity.

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[38] The Commodity Exchange Act as amended in 1974, see United States Code (1976), Title 7, Chapter 1, Section 2.

In one fell swoop the definitions of both commodities and futures were transformed, and made largely self-referential to the market itself[39]. Richard Sandor, a key innovator of the first interest rate futures contracts, and today an active champion for derivatives markets for things like carbon (see Sandor 2012), explained the importance of the 1974 change this way:

> The evolution of derivatives has been fast and furious, and it has redefined financial markets. To fully appreciate the extent of change, consider that in the early half of this century, commodities were defined as primary, sortable and bulk goods such as grains or precious metals….When a number of us were working on the act that resulted in the formation of the Commodity Futures Trading Commission, we ultimately persuaded legislators that a commodity ought to be defined as anything tangible or intangible for future delivery. Finally on October 20, 1975, after a great deal of lobbying, the Chicago Board of Trade began trading in interest rates and the word commodity disappeared from the definition! In a short period of 15 years, every single piece of accepted wisdom about exchange-traded markets was obliterated. (Quoted in Falloon (1998), pg. 229)

Despite this sudden incursion of futures into finance, few of the precautions that were convention in the securities business were enacted. Although the CFTC would be separated from the U.S. Agriculture Department, the Congressional oversight of the new agency would remain with the House and Senate Agriculture Committees, while the SEC remained under the Congressional oversight of the Banking Committees.

Making the definitional change even more consequential, the Chicagoans also convinced Congress to grant the CFTC exclusive or "presumptive" jurisdiction (Johnson 1976, Van Wart 1982) over all futures trading. No other Federal agency nor any state government entity or law could

[39] It is tempting to question whether the single stock options that were regulated by the SEC would have ended up under the purview of the new CFTC if they had been developed after 1975. According to the new definition, the case could have been made that they were commodities, not securities.

interfere with the ongoing development of futures markets[40]. Among other things, no other agency could impose collateral limits on the commodities markets. The CFTC only had authority to do this during "market emergencies", and they never used this power.

2.9 Organizing the CFTC Zoo

John Rainbolt was a staff lawyer for the House Agricultural Committee and one of the authors of the 1974 CFTC legislation. When the law passed he was appointed as one of the first commissioners of the agency. When I contacted him and we arranged to meet at a coffee shop in Washington, D.C., he sent me an email and attached his CV and the Philippe Halsman/Salvador Dali photograph, "Dali Atomicus", with a note saying "Iconic photo I associate with early days at the CFTC." When I interviewed him, I asked him what he meant by this. His answer: "It was a zoo." (personal interview, 9-27-12).

Needless to say, the agency had a challenging first few years[41]. The changes mandated by Congress came into effect in April 1975, six months after the law passed, but the commissioners were only confirmed by the Senate six days before the CFTC was to begin operating (Markham 1987). The commissioners needed to hire 136 "high priority professional and non-professional

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[40] The SEC was well aware of the jurisdictional reach of the pending bill in Congress, but they apparently did not put up much of a fight. There are a number of explanations for this, none of which are fully satisfying. No one expected financial futures markets to expand as fast as they did, so it is possible that the SEC never took the Chicago markets very seriously as a threat to the securities industry or to their jurisdiction. It is also possible that the SEC was distracted by their own problems in attempting to restructure the fixed commission structure on Wall Street (Seligman 2003: 596). The Senate inserted language into the law that clarified that even though the CFTC would have exclusive jurisdiction over the expanded definition of commodities/futures, other agencies' jurisdiction would be preserved (Johnson 1976). Apparently at the last minute, however, one other phrase was added: "except as hereinabove provided". What was "hereinabove provided" was the drastically expanded definition of commodities/futures, so in effect this left no room for shared jurisdiction. Finally, the "Treasury Amendment" was inserted in the legislation exempting off-exchange futures-like contracts that were traded between banks or other "sophisticated" investors from CFTC oversight, unless those contracts were traded on a licensed exchange (Johnson 1976). This latter exception would become extremely consequential in the 1990s and 2000s.

[41] Mark Powers, the first Chief Economist of the CFTC, who was recruited from the CME, recalled to me in an interview arriving in Washington to begin work at the CFTC and saying to himself "I decided this was a big mistake." I asked him why? "Because I knew damn well it was a huge mass of people who didn't understand the first thing about futures trading…"

staff"[42] many of whom came from the defunct CEA. A number of former SEC employees were also hired. Office space had to be procured, not only in Washington, D.C., but also in the largest field office in Chicago where the CEA was renting space from the CBOT[43]. The legislation required that the CFTC review and approve all operating rules and re-register the federally licensed exchanges, but this was an impossibly large task, so the agency decided to simply accept all existing rules without review. The new agency was also rife with infighting. The former CEA staff, feeling that newcomers were "outsiders" attempting to impose new policy, fought with the new hires. The newly hired lawyers in the general counsel's office struggled for autonomy from the rest of the agency and commission (Markham 1987, personal interview with Mark Powers 12-12-12). The new Chairman of the CFTC, William Bagley, was a respected and accomplished lawyer and politician, but also a jokester and knew little about commodities/futures, and this combination rubbed some people the wrong way.

All of this translated into a situation where the new agency, already largely predisposed to allowing the industry to set up and maintain its own markets, relied heavily on the status quo operation of the markets and exchanges, and on the industry in general to advise them how to go about implementing the Congressional mandates. Other than preventing fraud in the options markets, there was no immanent crisis to intervene in—and no drastic action necessary. For the most part the markets would continue to operate the way they had since the 1920s, albeit with many more product offerings—all of them now recognized as legitimate by the federal government.

Nevertheless, the new agency was larger than the CEA, and being an independent regulator, became more visible in Washington, D.C. Over the next few years the agency would struggle to

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[42] House Agriculture Committee internal memo, provided to author by John Rainbolt, available from author.

[43] In a personal interview with William Bagley, the first Chairman of the CFTC, he said: "The CEA's office was in the basement of the Board of Trade. You were trying to regulate the big boys upstairs. And it's a hot day, and the air conditioning isn't working, so you have to go upstairs and bug in the Chicago Board of Trade management to please fix the lights downstairs…the regulators I guess rented space…literally in the basement of Board of Trade building."

establish itself, but it did become a formal institution with codified structures, rules, norms, and an organizational culture. Three characteristics of the CFTC help explain its relationship to speculation during these first years.

First, unlike the SEC that closely monitored its reputation as independent from the securities industry as well as elected politicians, the CFTC was from the start seen as a partner with the commodities industry. The revolving door between the CFTC and the Chicago exchanges was extensive, with both senior level and staff level officials moving between the Chicago-based industry and the Washington D.C.-based regulators. The first Chief Economist of the CFTC, Mark Powers,

"Dali Atomicus" by Philippe Halsman (1948) might accurately sum up the bureaucratic challenges faced by the newly established CFTC in 1975.
Available from the Library of Congress: http://www.loc.gov/pictures/item/2005687578/

came from the CME where he had designed many of the first financial futures contracts, a move that Leo Melamed called "an insurance policy to keep the CFTC on track" and "only the beginning of a pipeline that would deliver talent from the futures industry to government" (Melamed 1996: 222). Beverly Splane, who managed the nomination of the first CFTC commissioners for the Ford White House was appointed as the first Executive Director the CFTC, and nine months later hired by the CME as Executive Vice President (Melamed 1996). There are many other examples. This did not mean the exchanges got everything they wanted, but when they called the CFTC, they usually found a friend at the other end of the line. Contrast this with the SEC-securities industry relationship where there was more of a brick wall between the two than a revolving door.

Another aspect of the relationship between the CFTC and the Chicago exchanges has to do with the rhetoric of expertise. The commodities markets were discursively constructed as intensely complicated and nearly impossible to understand for the average layperson, which included virtually all Congresspeople. The commodities/futures markets, as they had been since the 19th Century, were assumed to be for commercial purposes, not for the average investor, although there was no formal barrier to entry to the markets. On the contrary, it was exactly during this period that the Chicago exchanges, particularly the CME, began to court average investors. Nevertheless, the dominant discourse was that commodities/futures markets was one of professional, commercial or sophisticated customers, often using the markets to hedge (or insure) their day to day business involving the underlying commodity. The expertise of the Chicagoans, who largely regulated themselves, was focused on understanding commodity chains, building markets, attracting speculators, and producing consistent prices. The CBOT and the CME spent a lot of time educating the CFTC, the Congress, and the public, how their markets worked, what the benefits of risk management were, and how speculators were crucial to reproducing the market conditions necessary to lubricate the gears of commerce.

The expertise of the SEC was considered differently. From the perspective of the Chicagoans, the staff of the SEC was overburdened by legalistic "red tape", if not tainted by an obsession with protecting the public. Many of my interviewees discussed the differences between the SEC and the CFTC. One common thread was that the SEC was focused on customer protection, while the CFTC was focused on "market integrity". Another was that the SEC was generally focused on laws, while the CFTC was generally focused on economics. Susan Phillips, who with a Ph.D. in economics, worked at the SEC in the mid-1970s and was later both a commissioner and Chairwoman of the CFTC, described the differences between the agencies this way:

In bed with the industry?
William Bagley, the first commissioner of the CFTC kissing Warren Lebeck, the President of the CBOT sometime around 1976. It is not a stretch to assume this is an accurate representation of the relationship between the two institutions at the time
(Photo reproduced from Falloon, 1998, page 248)

> In fact, I was the first economic fellow at the SEC…one of the things I did while I was at the SEC, I spent a lot of time just explaining to the lawyers how competition worked and how markets work. They don't think that way. […] It has to do with customer protection on the securities side. It's integrity of the markets on the commodities side…It's market protection, not customer protection (personal interview 9-19-12).

These differences were more than a matter of bureaucratic culture. They translated into different priorities.

2.10 Jurisdictional Conflicts

It was only months after the establishment of the CFTC when the SEC realized how far the CFTC might encroach on their assumed regulatory jurisdiction as a result of the new definition of commodity/futures. The definitions were, as one prominent derivatives lawyer said to me, "politically arbitrary" (personal interview with Ken Raisler 2-26-13, see also Johnson 1982 as cited in Chapter 3). These arbitrarily constructed boundaries, coupled with the continued innovation of new financial futures in Chicago, translated into a serious concern for the SEC, who saw both an infringement on their regulatory jurisdiction, as well as potential threats to the stability of the securities markets.

The first argument was over futures contracts on securitized mortgage securities issued by GNMA. The SEC made very clear to the CFTC that they thought GNMA certificates were securities, and thus futures on those securities were also potentially securities and ought to be regulated by the SEC. The staffs of the two agencies fought back and forth, but the statute passed by Congress in 1974 was clear—the CFTC had exclusive jurisdiction. The CFTC approved the contract, and it began trading at the CBOT in October of 1975. The staff of the SEC was frustrated[44] (Johnson 1976, Markham 1987), but the CBOT with the help of a new federal agency had constructed the first contract that would allow hedging and speculating on interest rates.

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[44] The SEC, later attempting to regain some of its lost jurisdiction, got revenge by later approving a GNMA option contract on the Chicago Board Options Exchange. The conflict got ugly when the CFTC sued the SEC in federal court. Eventually a federal judge basically told the two agencies to solve their problems out of court.

Two things are remarkable about the GNMA futures contract, which even though it only lasted 12 years, was initially hugely successful—it traded ~20,000 contracts in 1975, ~100,000 in 1978, and 2.3 million in 1981, but went downhill from there (FIA statistics). First, the people that designed the contract for the CBOT, most importantly Richard Sandor, relied heavily on their knowledge of agricultural contracts to figure out how to rate, grade, and categorize, or standardize mortgages. This process (see Chapter 4) was necessary to convince traders they would have a reasonable expectation that the contracts were comparable with each other and consistently reflective of the underlying market for mortgages. Above all else the CBOT would need speculators to trade the contracts if they wanted it to last. Second, it taught the staff of the CBOT, but also the CME how to build an interest rate contract. And build them they did. Over the next few years the CBOT constructed contracts on Treasury Bills and Bonds, commercial paper, and municipal bonds.

The new interest rate contracts had an immediate effect on the U.S. economy. Since 1970 a number of Federal Home Loan Mortgage Corporation ("Freddie Mac") officials had been working to develop a futures market in mortgages because they thought it would fuel the development of a secondary market in mortgages, something they believed would lower the cost of borrowing and thus increase the availability of loans for potential home buyers[45] (Falloon 1998, Sandor 2012). In the mid-1970s the mortgage market was raising as much capital per year as the New York Stock Exchange was for corporations (Falloon 1998). In other words, mortgages, which were still largely constituted by localized credit relations between small banks and borrowers (Gotham 2009), were a potentially enormous capital market waiting to be opened up to investors across the U.S. and the world. Furthermore, the GNMA futures market provided commercial home builders, mortgage banks, and anyone else in or out of the housing industry the opportunity to buy insurance or speculate on changing interest rates.

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[45] See also Sorrells, E. "Home Mortgage Futures Trading Studied as One of Ways to Life Contract Volume", *Wall Street Journal*, February 28, 1972, pg. 20

The 30 year Treasury Bond (T-bond) contract, started in 1977, would become the most heavily traded contract the CBOT would ever construct. The timing of interest rate contracts could not have been better for Chicago. In 1979 the new Federal Reserve Chairman, Paul Volker, set out to end inflation by cutting off the money supply. The sudden increase and volatility in interest rates created an immediate demand for contracts that could hedge against rate changes. It quickly became common for corporate treasurers to buy and sell T-bonds to protect their companies' debt from financial volatility (Falloon 1998). The underlying market for T-bonds also quickly became dependent on the futures market as evidenced by a request of the primary dealer banks to the U.S. Treasury Department in December of 1979 to change the date of bond issuance to ensure the Chicago markets were open when the bonds were released for auction (ibid.).

As the scope and reach of futures markets expanded the jurisdictional battles between the SEC and the CFTC only intensified. The SEC fought quite hard in the early 1980s to regain control over the speculative futures activity that was clearly impacting the securities markets, but Congress, behind the heavy lobbying efforts of the Chicago exchanges as well as the intensifying neoliberal attitude of the Reagan administration, protected what had become the status quo. With only minor exceptions, the CFTC retained its jurisdiction. The Chicagoans continued to develop new markets, promote speculation, and rake in profits, all the while leaving New York financiers scratching their heads wondering how they had missed the futures boat, and what they could do to compete with Chicago (see Chapter 5).

All the while, between 1975 and 1987 the Chicago commodity/futures business was transformed from one almost exclusively focused on creating markets for food and raw material processors and producers, to one mostly focused on financial products and financial markets. By the late 1980s potential financial speculators no longer found any meaningful limits on the leverage they could create in financial markets. While the margin limits in the securities markets remained around 50% of an initial purchase, they remained around 5-10% in the commodities/futures

markets. As a result the volumes of the new financial futures contracts exploded, increasing at an exponential pace.

TABLE III-1
COMMODITY EXCHANGES IN THE UNITED STATES

Name of Exchange	Percent Market Share in FY 1984 a/	Number of Active Contract Markets in FY 1984 b/			Number of Members in 1983	Annual Expenditures in 1983
		Financial Futures	Non-Financial Futures	Options		
Chicago Board of Trade	47.18	5	12	1	2772	$50,835,000
Chicago Mercantile Exchange	26.97	12	7	2	2633	$40,380,000
Commodity Exchange, Inc.	12.92		4	1	772	$14,291,664
New York Mercantile Exchange	3.20		7		816	$7,700,000
Coffee, Sugar & Cocoa Exchange	2.81		4	1	527	$5,143,409
New York Futures Exchange	2.42	1		1	1366	$11,800,000
MidAmerica Commodity Exchange	2.15	7	12		1205	$3,238,523
Kansas City Board of Trade	1.11	2	1		330	$2,321,000
New York Cotton Exchange	1.02		3		448	$3,832,479
Minneapolis Grain Exchange	.22		2		420	$1,555,000
Chicago Rice and Cotton Exchange c/	.01		1		399	$520,000

a/ Based on volume of trading for FY 1984.

b/ Includes all futures and options on futures which had open interest on September 28, 1984 (end of FY 1984).

c/ Formerly the New Orleans Commodity Exchange.

Total trading volumes at U.S. commodity/futures exchanges, 1984
(Federal Reserve 1984)

In effect, when the innovation of financial derivatives exploded in the late 1970s and 1980s, the important regulatory precedents were set. Regardless the extent that the new instruments resembled securities, or impacted mortgage, interest rate, or securities markets—which they did—they were defined as commodities/futures. The innovations in the commodities markets for things such as futures on corporate bonds and futures on stock market indexes meant that capital flowing into or out of any of these markets impacted the others they were connected with. The markets became highly interdependent, both as pricing references for each other, and also because new risk management strategies drew correlations through portfolios of wide-ranging financial investments.

More importantly, and something that requires more research, is the mobility of the categories, rules, and markets, as well as the discursive construction of beneficial speculation that seems to have travelled from the Chicago exchanges to the New York investment banks in the late 1980s and early 1990s. There were repeated warnings from government officials, even from the one rogue chairwoman of the CFTC, Brooksley Born, about the flawed categorization of derivatives as commodities. Leading right up to the 2000 passage of the CFMA, however, the same arguments were successfully mustered against any change in jurisdiction. First and foremost, the market must be allowed to operate.

2.11 Conclusion

The story of the development of speculative financial derivatives markets in the U.S. in the late 20th Century is largely the story of putting the market first. I do not want to rely on hypotheticals, but the amount of resistance and work the Chicago exchanges exerted to keep their customized regulatory system in place, and keep the Securities and Exchange Commission at bay, suggests that their markets would likely not have functioned under that more stringent and principle-minded regime. Instead they "captured" the Commodity Futures Trading Commission, and the

Commodity Exchange Authority before it, by continually working to convince them that centralized agricultural cum financial futures markets were crucial to the economic development of the U.S., and that these markets could only function if collateral levels were kept low.

Certainly the neoliberal market mindset played a role, as did the performance of neo-classical "efficient market" and derivative pricing models (MacKenzie 2006). But in order for these market mechanisms to function, the legal/regulatory system had to set boundaries and frames around these markets, as well as keep competitors for speculative capital at bay, and provide a level of legitimacy that only the federal government could muster. This translated into the construction of a regulatory system that was designed, not to slow down or quell trade volumes, liquidity and speculation, but one designed to enhance all of these, with the assumption going back close to a 100 years, that do to so was to benefit market efficiency and price discovery.

The Chicago exchanges and their lobbyists in Washington, D.C. were extremely effective in their work to ensure the legal-regulatory structures were set in place to create the open space where traders would have the opportunity to make their leaps of faith into the price mechanism—to enact their "free market". And while there is not a direct path to the 2008 credit crisis, without a doubt, the rules that were necessary to allow the Chicago commodity markets to function, set the stage for the 2000 CFMA and the 2008 debacle.

Chapter 3

Turning financial markets inside out: Polanyi, performativity and disembeddedness

3.1 Introduction—our market mentality

This chapter addresses one of the growing imperatives for economic geography and other critically minded social sciences: namely, to more rigorously and innovatively theorize the expansion of markets across the global landscape (Berndt and Boeckler, 2009; 2011; Peck, 2012). Following the theme of this issue, I argue that Karl Polanyi's work on markets, especially those assumed to regulated themselves, is prescient today. Polanyi (1886–1964) believed the time of the self-regulating 'market system' had passed with the World Wars, but if he had lived a few years longer he would have witnessed the birth of a new market system that has expanded rapidly since the 1970s. In particular, he would have seen the emergence of a market-based model of financial management that over the next thirty years would drive Western socioeconomies toward many of Polanyi's worst predictions through the marketization of 'almost everything' (Leyshon and Thrift, 2007).

Since the 1970s financial markets have become integral to most economic geographies (Pike and Pollard, 2010). Financial markets also form the vanguard of processes of commodification of labor (Bryan and Rafferty, 2006; 2011), land (Ashton, 2009; Weber, 2010), and money (Krippner, 2011), the three venerable realms that Polanyi thought society would inevitably rise up to protect in the face of market encroachment (Polanyi 2001 [1944]). Despite significant resistance, however, financial markets only continue to grow in kind and influence (Engelen et al, 2011), and the overall market 'mentality', despite Polanyi's prediction of obsolescence in 1947 (Polanyi, 1968 [1947]), is more deeply engrained in our social institutions than ever. How do we begin to explain this "orientation towards financial markets" (Preda, 2009, page 5), and what kind of methodology should we use to analyze a system where, fictitious or not, financial markets influence many of the political, social,

and even cultural decisions we make?

I will argue in this paper that a number of Polanyian concepts such as 'disembedded' markets and 'market society' provide a stronger explanation of the relationship between financial markets and the socioeconomy than has previously been suggested. But I will also suggest that a Polanyian institutional methodology is not sufficient to understand markets that are increasingly creating their own socioeconomic contexts. I will furthermore argue that economic geographers ought to supplement Polanyi's concept of the disembedded market with Michel Callon's concept of the performed economy. Despite being two of the most insightful theorists of markets outside of neoclassical economics, very little attention has been paid to how their work may be put in conversation, instead of opposition. In fact, Callon's theory of market performativity has much more in common with Polanyi's arguments than is often suggested. Performativity, as it has been put to work to analyze financial markets by Donald MacKenzie and others, focuses on the ways neoclassical economics influences market construction. Thus performativity demonstrates how abstract market logic can be productive of actually existing markets that appear to reproduce that logic across a diversity of social and geographic contexts. It is this latter point, the tendency of performativity to decontextualize markets, that begs for a return to Polanyi's theory of embeddedness. Finding a middle ground between the two theoretical frameworks is the goal of this paper.

In other words, a rigorous analysis of financial markets requires that we analyze both their inside, or their internal operations and logic, *and* their outside, or the broader context within which they reside and from which they depend for their reproduction. To turn financial markets 'inside-out', then, is both an ontological and a methodological argument. It is to accept on one hand the basic argument that financial markets cannot exist without the broader socioeconomy, whether in the form of the production of tangible use values necessary for daily social reproduction, or the production of reliable income streams necessary for securitization (Bryan and Rafferty, 2011;

Leyshon and Thrift, 2007). But it is also to accept that financial markets have expanded in size and influence to the point where the rest of the economy is *subject to them*, forcing us to grasp their internal logic, not least in the ways that logic 'overflows' (Callon, 1998) and influences the rest of the world.

The paper proceeds through four additional sections. First, I discuss Polanyi's analysis of the relationship between markets and the social and economic fields, focusing on the usefulness, but also the challenges of the concepts of embeddedness and disembeddedness. Second, I analyze the work of Callon, considering how his work attempts to overcome one of the key contradictions in Polanyi's framework. Third, in three subsections I use a short case study to show how these two frameworks can be used together to analyze the early growth of financial derivatives markets that were largely isolated in Chicago in the 1970s and 1980s. I conclude by contemplating the shape of a research program that grapples with real disembeddedness without abandoning the concept of uneven geographies or the politics of assembling alternative markets and economies.

3.2 Polanyi's frame of reference

Those attempting to identify a theoretical core or the 'real' meaning of Polanyi's work are engaging in a frustrating business. As brilliant and innovative as his approach is, he seemingly contradicts himself on numerous occasions, not least in conceptualizing the embeddedness of the economy, his most influential idea (Gemici, 2008; Krippner et al, 2004). His empirical work focuses almost exclusively on economic history and the economies of 'primitive' societies, and he spends little time discussing the details of contemporary capitalism (Peck, 2013). Nevertheless, Polanyi's reframing of laissez-faire politics coupled with free-market economics, as a foolish utopian project, was a crucial intervention that reverberates today across the social sciences. As he outlines in his most famous work, the 1944 book *The Great Transformation*, Polanyi (2001 [1944]) saw in the 19th century, especially England, the development of the first truly self-regulating 'market system'. This market

economy was propelled by industrialists and state interests to the point where three key components of social life—land, labor, and money—became mostly commodified and traded on 'price-making' markets. It is in the objectification and marketing of these three 'fictitious commodities' that Polanyi saw the limits of the self-regulating market system (Polanyi, 2001 [1944], pages 71–80). In the development of fictitious commodities Polanyi saw both the potential for the "demolition of society" (page 76), but also the organic reaction of society to protect itself from annihilation, or what Polanyi called the "double movement"[46] (Smith, 2013).

While Polanyi did not invest much energy in analyzing finance, save the 19th Century international gold standard (2001 [1944]), three components of his socioeconomic framework help us reimagine contemporary financial markets. First, despite the paradox of the truly self-regulating market system that I will discuss below, Polanyi rejected the notion of a pure economic sphere. In this Polanyi critiqued both neoclassical economics and Marxist political economy (Polanyi, 1968 [1947]). In both there is an analytical, if not ontological, pureness to economic activity: in the former, market fundamentalism and methodological individualism, in the latter, materialism translated through capital's structural imperative to produce surplus value. Polanyi, in some ways anticipating Gibson-Graham's (2006) argument, saw instead a variegated and hybrid economic system—where, even in 'advanced' industrial economies, components of 'primitive' economic activity still play an important role (Polanyi, 1957). The implication is there is nothing teleological or

[46] This paper does not address the double movement, although this idea certainly deserves more elaboration with regard to contemporary finance and reform movements such as Occupy Wall Street. Along these lines there are deep implications to Polanyi's double movement thesis for questions of the origins of 'society'. Instead of envisioning capitalist social relations and class struggle as constitutive of the economic system as in orthodox Marxism, in suggesting the concept of embeddedness, Polanyi argues that society is relatively autonomous, and while it 'interpenetrates' the market in its participation with and resistance to it, society nevertheless stands for its own non-economic interests (Burawoy, 2003). On the other hand, the double movement suggests society emerges only in reaction, as in dialectically, to the commodification of labor, land, and money. Polanyi indirectly raises the question whether class struggle is a determined and constitutive component of capitalism à la Althusser, or whether there is a relative autonomy to social agency that predates capitalism altogether (see Read, 2003).

essential to the emergence of markets, especially the intensified self-regulatory markets[47].Instead, markets are historically, geographically, and institutionally contingent, if not directly assembled by states and industrial concerns to serve particular interests.

Second is Polanyi's methodological suggestion that investigations of the economy should be 'substantive' not formalistic[48]. In this he means scholars should be focused on grounded investigations of how people meet their material wants and needs to achieve a 'livelihood', as opposed to the reductive and narrow focus on how and where markets operate and how they might be made more efficient (Polanyi, 1957; Stanfield, 1990). Polanyi, in his substantive work as an economic anthropologist, theorized four types of economic organization, only one of which was the market (Polanyi, 1957). Alternatively, formal economic analysis is exclusively interested in markets and, as a result, abandons the study of the *ends*—individual and social development—for the *means*—the efficient distribution of scarce resources (Stanfield, 1990).

Third, and most contentious, but also probably the most useful Polanyian concept over the last fifty years, is the concept of embeddedness itself. Polanyi believed economic activity was an "instituted process", meaning that it was not an independent sphere of human life, but instead "embedded" or "submerged in social relationships" (Polanyi, 2001 [1944], page 48). We might think of embeddedness then, as the inherent entanglement of economic activities in cultural, social, and political institutions. In other words, economic activity of all sorts is facilitated, entangled with, and can only be constituted by noneconomic parts of life. To the extent there is an 'economic' sphere, Polanyi sees it as just another part of social life, albeit the part of life particularly concerned with the

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[47] Burawoy (2003), however, suggests there is a teleology in the double movement thesis, which suggests an imminence to the emergence of 'active' or protective social movements as a reaction to commodification. See footnote (1).

[48] Polanyi says, "The formal meaning implies a set of rules referring to choice between the alternative uses of insufficient means. The substantive meaning implies neither choice nor insufficiency of means; man's livelihood may or may not involve the necessity of choice and, if choice there be, it need not be induced by the limiting effect of a 'scarcity' of the means; indeed, some of the most important physical and social conditions of livelihood such as the availability of air and water or a loving mother's devotion to her infant are not, as a rule, so limiting" (1957, pages 243–244).

"livelihood of man from the material angle" (Polanyi, et al, 1957, page 241)[49].

Fred Block (2003) has argued that what Polanyi really meant is that the economy is "always embedded" or that the economy can never be truly disembedded from noneconomic institutions. To many in economic geography and proximate disciplines, this probably sounds reasonable, if not fundamental. There is no space here to do justice to a broad and rich literature, but embeddedness has in various forms been regularly employed by geographers (see Hess, 2004; Peck, 2005; 2013) and other social scientists (see Dale, 2010; Krippner, 2001; Krippner et al, 2004)[50]. Embeddedness does, however, present an analytical challenge. On one hand if all economic activity is just another part of social life—albeit that part concerned with material livelihood—there is not anything *essentially economic* about the economic part of social life. In other words, if the uniqueness of economic life is subsumed by sociocultural life, there is no economy—as a separate sphere—to be embedded.

While Polanyi never directly addresses this predicament, his substantive methodology logically follows. His methodological conclusion, in the face of imagining nothing essentially 'economic' about life, is to engage in a broad and comparative research program across numerous societies and cultures, focusing on the ways they organize the allocation of materials (Peck, 2013). *And yet,* Polanyi also argues with regard to the *market economy*, that there is something quite unique about economic activity that deserves specific investigation—in other words, he sees something especially *economic* about markets. In the end, Polanyi leaves us with a paradox (Gemici, 2008; Krippner, 2001; Krippner et al, 2004; Slater, 2002). As Krippner et al suggest, "researchers either study economic processes in

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[49] A longer explanation appears later on the same page: "In the whole range of economic disciplines, the point of common interest is set by the process through which material want satisfaction is provided. Locating this process and examining its operation can only be achieved by shifting the emphasis from a type of rational action to the configuration of goods and person movements which actually make up the economy." (Polanyi et al, 1957, pages 241–242).

[50] One significant literature I am not directly engaging with is the new economic sociology (NES), which was in large part engendered by Mark Granovetter's (1985) rewrite of the concept of embeddedness. In part this is because Granovetter, admittedly, made a significant break with Polanyi (cf Krippner et al, 2004), arguing that markets are embedded not in institutions or society, but in network relations. See Peck (2005) for an extensive review of this literature that includes a discussion of the relationship between NES's and Polanyi's arguments (see also Caliskan and Callon, 2009).

social terms, in which case they abandon the sphere of the market [as something unique]; or, they study the market as a theoretical entity in its own right, in which case they purge all social content" (2004, page 113).

Gareth Dale thinks these critiques have "on the whole missed their target" (2010, page 198). He reminds us that Polanyi was suggesting that economic activity is not always embedded in society, but instead in institutions. Institutions, in all societies other than those dominated by market economies, are ruled by noneconomic considerations, norms, and values. But what about societies that are dominated by markets? Polanyi suggests that institutions in a self-regulating market economy actually become 'separated' from politics and society and eventually become dominated by the values of the market. The noneconomic considerations of these institutions become increasingly inconsequential, and to the extent that they are constituted by social relations, those relations are translated through rationalized market logic (see Dale, 2010, pages 188–206). Thus, Polanyi arrives at the suggestion that "it means no less than the running of society as an adjunct to the market. Instead of economy being embedded in social relations, social relations are embedded in the market system" (2001 [1944], page 60), and a few pages later "a market economy can only exist in a market society" (page 74). This is the *disembedded market*, or a market that constitutes an "autonomous zone" (Polanyi, 1968 [1947], page 63), separated from political and social motivations and yet substantially able to reproduce itself. While the concept of *homo economicus* implies a transhistorical absurdity, we must ask the question whether, in the context of a market society, actors have no choice but to behave according to formalistic rationality.

Unfortunately, Polanyi leaves us few clues as to how we might specifically investigate disembedded market economies. On one hand, Polanyi insists on a grounded, substantive investigation of the disembedded market that takes full account of the actors and institutions that engender, surround, and reproduce the autonomous zone. On the other, Polanyi insists on imagining markets from the outside, or from a nonmarket or social context. He explains:

> "Even in regard to the market system itself, the market as the sole frame of reference is somewhat out of date. Yet, as should be more clearly realized than it sometimes has been in the past, the market cannot be superseded as a general frame of reference unless the social sciences succeed in developing a *wider frame of reference* to which the market itself is referable" (Polanyi, 1957, page 270, emphasis added).

This framing is fruitful when examining a socioeconomy where markets play a small or moderate role. However, if a system develops where land, labor, and money are commodified, and markets begin to constitute their own institutions and contexts, one might *imagine* the 'wider frame of reference', but would it be effective in explaining the largely self-referential market and the institutions that surround it? Even though Polanyi promotes the substantive work of investigating the broader context, he never resolves the analytical problem of being *trapped on the outside of the market looking in*.

3.3 Callon: looking out for the market

Over the last fifteen years Michel Callon has developed a variation of actor-network theory for the analysis of market processes. In this he has attempted to overcome the society/ economy binary, and as such the paradox of embeddedness (Slater, 2002), as well as the debate between formalism and substantivism (Caliskan and Callon, 2009). However, while Callon disagrees with some of the basic tenets of Polanyi's framework, his treatment of disembedded, or "disentangled" (Callon, 1998; 2002) markets is similar. Callon is wary of the concept of institutions, but he is deeply interested how commodities and markets are constantly moving through a dynamic process of stabilization or 'entanglement' with institution-like entities, followed by disassociation or 'disentanglement' from those entities. Like Polanyi, Callon promotes grounded empirical work, conceives of markets as contingent and constructed entities, and is interested both in the sociocultural processes that are weaved through market practices as well as in neoclassical economics' role in the creation of market legitimacy. In fact, drawing directly on Polanyi's theory of disembeddedness, Callon titled his first essay on the subject, "The embeddedness of economic markets in economics" (1998).

However, instead of placing markets in a larger social or institutional frame, Callon begins inside the market-analyzing how market practices and technologies expand outward to frame a context that temporarily stabilizes a market. Presenting markets as presocial, or as Bruno Latour (2005) would say, as 'assembling' the social, Callon (1998) dismisses the concept of society, at least as it has been used by most social scientists, as biased and counterproductive. Likewise, Callon abandons the concept of the 'economy'. Instead he focuses on *processes* of 'economizing' and 'marketizing' or how parts of the world become economic or market-like (Caliskan and Callon, 2009; 2010).

These processes of marketization are defined by action, agency, and assemblage. For Callon, an early collaborator with Latour and others in science and technology studies (Mirowski and Nik-Khah, 2007; Preda, 2008), agency is never found in 'the social', and is rarely isolated in humans, but instead results from various combinations of human activity with systems of technology and knowledge. These networks, or agentic combinations, form what Callon refers to as "sociotechnical *agencements*", or "the idea of a combination of heterogeneous elements that have been carefully adjusted to one another" (2007, page 319). Similar to the notion of a "hybrid collective" (Callon and Law, 1995), and with intellectual debts to Deleuze and Guattari, agencements are ephemeral, but all-encompassing configurations of reality. As such, similar to Polanyi's autonomous or disembedded markets, agencements in effect have no consequential 'outside' (Caliskan and Callon, 2010, pages 8–10) as they draft their own contexts. It is the *relations between* market components, particularly framing mechanisms, market devices, and scientific knowledge systems, that constitute both the agency and the context of the agency.

For Callon framing is integral to any process of marketization, as markets are largely a construction of boundaries where certain entities and behaviors become disentangled from other systems and temporarily stabilized as appropriate, rational, or even necessary (Callon, 1998; see also Preda, 2009). Crucially for Callon, market frames allow or even force economic actors to become temporarily 'disentangled' from external concerns and behave 'rationally', or become 'calculative' in

the sense of *homo economicus* (1998, page 51). Framing and disentangling, however, are not totalizing, and are never complete (page 19). Callon thus also theorizes 'overflows' or 'externalities', which are the always existing remnants of an economic agencement, that which is not directly applicable to calculative market exchange (Callon, 1998). Unlike Polanyi's institutional framing, however, they are always emanating outwardly from the assembled logic of the market.

Callon also emphasizes the importance of market devices, which are nonhuman, often technological entities that shape and reproduce market relations [see Callon et al (2007) for an overview]. Coined 'prosthetics' (Caliskan, 2007), these are things such as trading pits, computer screens, published or spoken prices, or financial analysts' reports (Callon et al, 2007). Devices are intimate members of market agencements, part of the basic makeup of market exchange and just as important as humans to the reproduction of market frames. Indeed, self-reproduction and the replication of the market are two of their key effects (Berndt and Boeckler, 2011).

Last, and borrowing directly from Science and Technology Studies, is the crucial contribution of technical or scientific knowledge, in this case economics, to the construction of markets. Unlike methodological realism, where a natural scientist or neoclassical economist might assume the world operates independently of the object of their scientific investigation, Callon argues that conceptions of the economy authored by both academic and practitioner economists *actually make* the worlds of market exchange. There is no line between economic knowledge and the economy for Callon—they are one and the same, constitutive of, and dependent upon each other. To argue otherwise, he says, "amounts to admitting that there does exist a thing—the economy—which a science—economics—has taken as its object of analysis" (1998, page 2), a position that he rejects. It is from this assumption that Callon sets up his argument that economists of all stripes create the economy by performing their economic theories. Callon defines economic "performativity" as the idea that economics "performs, shapes and formats the economy, rather than observing how it functions" (1998, page 2). While Polanyi criticizes formal (neoclassical) economic theorizing as

narrow and misguided, Callon wants to understand how that formalism directly plays out in substantive market constructions, or in other words, how abstract theory becomes grounded reality.

The contrast with Polanyi's methodology is important. Even while Polanyi argued that a truly self-regulating market or disembedded market system could develop, he was always focused on identifying a broader social frame or set of human institutions in which to contextualize that market system. Callon sees it differently. He is mainly interested in identifying the components or 'entities' that in their relations with each other constitute an essential—or calculative—market logic. Theorizing the context outside of that market logic is a secondary concern in Callon's framework. For Polanyi it is fundamental. The challenge is to construct a methodology that takes seriously both the assemblage of market entities emanating outward—and—the broader context, whether geographical, historical, or institutional that lays the groundwork for the market system to begin with.

3.4 The ins and outs of Chicago's derivatives

I turn now to a short case study that demonstrates how these two methodologies might be put into practice analyzing the origin of contemporary financial derivatives markets. This study will not attempt to conclusively advance either the Polanyian or Callonian framework. Instead I will suggest that both are valid and necessary and, at least in this particular case, stronger when used together. There are three reasons I have chosen this case study. First, because it is one of just a few cases of market construction that has been analyzed from a number of different social science perspectives. These include the perspectives of charismatic entrepreneurship (Melamed 1996), innovation driven by economic necessity (Miller, 1997), the performativity of financial economic theory (MacKenzie, 2006; MacKenzie and Millo, 2003), and finally my own research that crosses through all of these, but privileges geographic–institutional analysis. Second, it is a critical case in the sense that from their beginning in the early 1970s, financial derivative markets have woven other markets together. This

has contributed to the construction of a globally interconnected financial market system, and a 'latticework' of financial institutions (Engelen et al, 2011) that has come closer than any other to producing a self-regulating autonomous zone on which many other parts of the world are now dependent. Third, this case has a distinctly geographical character since the majority of financial derivatives were traded in a single city, Chicago, from the time they were established in the early 1970s until the mid-1980s. This geography is far from an accident of history. On the contrary, it is in direct relation to this geography that these markets established juridical stability, political legitimacy, and the trading volumes or market liquidity necessary to expand precipitously in the 1990s and 2000s.

First I will quickly define the various sorts of derivatives, all of which remain in use today. In this context the term *commodity* refers to bulk agricultural products and raw materials. The simplest form of commodity market—that for immediate exchange and delivery—is called a *cash* or *spot* market. Simple *forward* contracts have been in existence since antiquity. Forward contracts, which are usually customized for individual needs, establish a price, quantity, and future exchange date for a commodity. *Futures* contracts are forward contracts where the exchange date, quantity, and quality of the commodity have been standardized, typically by a commodity exchange. Standardization engenders more efficient exchange of commodities since the negotiation of all contract details, other than price, is removed from the process. Crucially, it also allows parties that have no interest in the actual delivery of a commodity to speculate on price changes, as standardization engenders a more liquid market. Instead of contracting for wheat, pork bellies, or lumber, *financial futures* are contracts for the future exchange of a currency, stock, bond, or other financial instrument. *Options* are similar to futures, although, instead of an obligation to exchange, there is an option. *Derivative* is a broad category representing all kinds of forwards, futures, options, as well as many of the specialized and/or hybrid instruments commonly used today.

Since the 1850s Chicago has been the home of the most innovative agricultural commodity and

futures exchanges in the world. Much later Chicago also became the home of the first successful centralized financial futures markets. In 1972 the Chicago Mercantile Exchange (CME) began trading futures contracts on seven foreign currencies (Powers, 1974). About a year later the Chicago Board of Trade (CBOT) began trading option contracts on single equities or stocks (*Commodities* 1974; MacKenzie and Millo, 2003). In 1975 the CBOT began trading the first interest rate contract, and a year later the CME began trading futures on US Treasury Bills. From there these markets expanded rapidly into Eurodollar futures, commercial paper futures, stock index futures, and more. In 1982 with the advent of stock index futures, financial futures traded more in dollar value than agricultural futures, and the Chicago exchanges never looked back (*The Economist* 1986). As the 1980s progressed, innovation and trading volume of exchange traded derivatives grew rapidly, and the markets spread around the globe (see Gorham and Kundu, 2012). In addition, markets for off-exchange or over-the-counter (OTC) derivatives traded directly between banks began to grow quickly. By the mid-1990s the volume of OTC derivatives outpaced exchange traded instruments, and continued to expand rapidly reaching approximately US $700 trillion in notional value in the second half of 2011, approximately ten times the amount traded on exchanges (Bank of International Settlements, 2012).

3.5 Modeling derivatives

Numerous factors contributed to the innovation and dramatic growth of these instruments. Building on Callon's performativity thesis, MacKenzie (2006) places the technical knowledge produced by financial economists at the center of his explanation. His argument, which is more nuanced than can be represented here, is that financial economic theory was performed by a conjunction of actors and technologies to produce a world similar to that outlined in the abstract economic theories. In the culmination of his argument MacKenzie suggests that the performance of financial economic theory actually transformed derivative markets so they more closely resembled

the theories in ways they did not prior to the performance. Explaining the key role that new technical knowledge played in the development of these instruments he says, derivatives "did not simply 'evolve'. They were *invented*" (2007, page 359, emphasis in original).

The most important technical innovation in financial economics was the development of an option pricing model. After about twenty years of academic theorizing and testing by a small group of graduate students and PhD economists, in 1973 Fischer Black and Myron Scholes, and shortly thereafter Robert C Merton (hereafter BSM), published an equation to mathematically estimate the 'correct' price of a stock option. Prior to this, traders of options had no reliable scientific method for deciding whether an option was overvalued or undervalued. They had to rely on the same information as those who bought and sold the underlying stocks. In other words, they had to guess the volatility of the underlying stock price, meaning how the price would change over time, and therefore how much the option was worth. By making a number of assumptions about these markets, assumptions that may not have been realistic in the actual world, but nevertheless fit well with the academic modeling of their predecessors, BSM were able to apply probability theory to stock volatility and thus predict an option price. This mathematically derived price could then be compared with the actual price in the market. If there was a difference, it offered traders a profit opportunity because they assumed the actual price would inevitably move towards the mathematically derived price (MacKenzie, 2006). Financial economics also predicted that these price discrepancies would immediately close because of the 'no arbitrage' assumption in another financial theory that grew to prominence in the 1970s: the efficient market hypothesis. This theory argued that rational market actors always execute trades to take advantage of new information (Fama, 1970).

In 1973, the same year the option formula was published, the CBOT opened an equity options exchange, which became the perfect laboratory for the BSM model. On the new CBOT exchange the prices did indeed move closer to the mathematical prediction (MacKenzie, 2006). In the first few

years after the equation was published there were still significant gaps between the theoretical and market price, but as more traders began using the formula, and hence acted according to the theorized market rationality, this gap closed to the point where for a few years in the late 1970s there was almost no difference between the two prices. This was aided by Fischer Black's new firm that used high-powered computers to produce price sheets which they sold to traders who carried them into the trading pits (MacKenzie, 2006, page 161).

Significantly, the BSM equation depended on unrealistic assumptions about the market: all investors have the same information, all arbitrage opportunities are immediately closed, and transaction costs are zero. MacKenzie (2003; 2006) suggests these assumptions became more realistic as the result of higher trading volumes that fueled decreased commission charges and collateral borrowing costs. And yet, regardless that the assumptions were never perfectly realized, at least for a few years, the prices converged. MacKenzie (2003) concludes that, as bounded as it might have been, and with the help of numerous assemblages of actors and devices, the BSM equation created its own frame or 'world'.

The application of the BSM equation not only affected the equity option market, but it also fundamentally tied the option market to the underlying stock market itself (MacKenzie, 2004, 2006). Of course, they were always related, but the BSM model made them symbiotic. In a kind of reverse engineering, instead of using the equations to derive a theoretical derivative price, the *actual* market price can be plugged into the equation to suggest a theoretical or "implied" volatility for the underlying asset (see Bernstein, 2005, pages 218–219; MacKenzie, 2006). A similar comparison to that between theoretically derived and actual prices in the option market can be made in the market for actual stocks, since all exchangeable asset prices contain an expectation of future price (Keynes, 1964). As a result, the market for the underlying stocks became dependent upon the market price of its option, all of which were dependent upon probability models.

The original work done by financial economists at universities and practitioner economists at the

CBOT was quickly extrapolated and applied to virtually all futures markets. In effect, the same relationships developed between most other futures and options, and their underlying asset markets (Ayache, 2010). The usefulness of the BSM model and similar equations was intensified by increasingly powerful computers and this encouraged rapid growth in these markets. In essence, the BSM model and its cognates changed the functioning of financial markets so they became dependent upon not just mathematics and statistical probability, but the relative validity of the assumptions of the probability models.

However, like many financial instruments, derivative contracts are only as good as the liquidity of the market they trade in (Gorham and Kundu, 2012; Nesvetailova, 2010). Objectively, there is no problem with this, especially in markets for broadly traded instruments such as stocks. As long as everyone is making the same assumptions and guiding their arbitrage decisions according to similar models of the financial markets, the BSM-dominated market, largely disentangled from any notion of socioeconomic institutions, constantly adjusts itself to changing market conditions. It matters little whether the probability models or the assumptions they are built on are objectively correct. The lack of a 'larger frame of reference' is irrelevant as long as market actors can always retreat to the liquid market to find out how other actors are assessing any particular situation in the 'real' world.

However, if, for some reason, the markets stopped trading or even just slowed, how would the models adjust and how would assets be evaluated? In the autumn of 2008 an accelerating drop in the price of homes led to the collapse of prices of numerous collateralized debt instruments that were built upon complex mathematical models that were dependent upon constant price updates (Lewis, 2011). When suddenly Lehman Brothers went bankrupt in September 2008, the credit default swap market, a derivative market derived from the collateralized debt obligation market, almost stopped trading. This was a serious problem on its own for firms like AIG, but the bigger problem was that it meant banks could no longer predict the prices of mortgage-backed securities of any kind, which meant they lost one of the key indicators of the 'correct' price of any monetary

debt, and this in turn meant that banks could no longer predict the future price of money itself. As a result, the trading of credit and debt, along with much of the 'real' economy, virtually stopped. Suddenly the derivative markets, not to mention the housing market itself, that for a short time had been disentangled and largely self-referential, was quickly re-entangled with conditions of actual defaulting homeowners, government agencies, and electoral politics.

By focusing on the ways scientific knowledge is brought into practice or performed in particular sociotechnical agencements, we can see one way a market system as an autonomous zone operates. This is part of a methodology that can be used to analyze actually existing and reproducing markets that have few references points outside of the price mechanism. But what happened to Polanyi's wider frame of reference? At a time of socioeconomic crisis, it seems more important than ever to analyze the dramatic and sometimes devastating impacts derivative markets can have on other economic, social, and cultural fields, especially when the market system collapses. In focusing too much attention on the ephemeral agencement or the agentic performance, there is a risk of missing other important questions. How did financial derivatives achieve political and cultural legitimacy? How are they interconnected with broader social, economic, and political dynamics? How can we change the system of speculative finance so that it is less apt to cause widespread economic upheaval in the future?

3.6 Chicago's derivative geography

A performative analysis of these markets is challenged to answer these questions. In my own empirical work on Chicago's financial futures exchanges, I have used an institutional or political economic analysis, informed by, among other things, Polanyi's theory of embeddedness, albeit one where geographic theory plays a more important role than in Polanyi's original work. My research has focused on how Chicago as an urban space played a role in the development of financial derivatives. Given Chicago's history as a center of agricultural commodities and futures trading

(Cronon, 1991), it may seem intuitive that Chicago became home to the most innovative futures contracts in the 1970s and 1980s (Gorham and Kundu, 2012). Explaining how it became a center of *finance*, however, is more difficult, but in the end helps explain how these markets became relatively self-referential, or disembedded. In the following paragraphs I will discuss three components of Chicago's exchange-traded derivatives that show that, even though financial economics played an important role, these markets were also, at least in the beginning, deeply embedded in the economic geography of Chicago. The arguments I briefly outline here are based on archival readings of US congressional proceedings and industry trade journals, and in-depth interviews with key market participants, regulators, and observers.

To begin with, the specialized knowledge of Chicago-based lawyers, bankers, traders, economists, and politicians was crucial to the development of the first futures contracts. The skills needed to successfully trade in Chicago's pits were learned and passed down through families and close personal relationships. One former chairman of the Chicago Board of Trade described Chicago's unique trading environment and ability to build liquid markets this way:

> We had a way here in Chicago of growing traders like the Swiss grow bankers and the Italians grow tailors. It's not that we trained people, but you learned by mentoring, you learned by watching, you learned by observing, and it was just a great school … . I mean this building, it's amazing what goes on in this building. Even in this little office, it's amazing what goes on. It's like a great reservoir of information … . So we had this great crucible, this great reservoir of talent here. It was like street talent, street smarts, ah, cunning, cleverness, boldness, thinking outside the box, because we had to, to survive. … We have had a great history here going back to the 1800s of people making markets. It's something that we pass on. Like my son. He did the same thing. We go down and we make a bid and we make an offer and it's kind of engrained in the families if you will … we just teach people, it doesn't make any difference if you're buying or selling, it's how you manage the trade (personal interview, 3-6-12).

Others' interviewees made similar comments, and other analysts of Chicago's derivative markets have made similar arguments (cf Zaloom, 2006). Furthermore, it was agricultural traders who traded the first financial futures, stepping out of their home pits to trade the new currency contracts at the CME (Melamed 1996) and equity option contracts at the CBOT.

Once a trade has been executed in a trading pit, another series of work processes begin. The

counterparties to the trade must be identified and matched to the contract, the collateral surveilled on a daily basis, and ultimately when the contract expires, monies and possibly actual assets must be delivered to the appropriate accounts. Before any of this can happen, the contract has to be built by the exchange, which means the underlying assets must be parsed into appropriate units; standardized settlement dates that are attractive to traders and investors must be chosen; and bankers and clearing firms must agree to shoulder the risks of contract nonperformance. The contracts must also be crafted by lawyers specializing in futures law so that the contracts will stand up to congressional and juridical scrutiny. Far from suddenly acquiring the knowledge, trust, and interpersonal relationships necessary to support these new markets at the moment when financial economics reframed them as formally rational, this knowledge was built up over many years of trading agricultural futures. Contrary to MacKenzie's argument that these instruments did not evolve, but were invented, I would suggest that this sort of institutionalized knowledge base did not emerge alongside financial futures, but instead developed in Chicago over a long period of time as the banks, law firms, and exchanges learned to manage enormous quantities of agricultural products and other raw materials that moved through Chicago's agroindustrial economy (see Sassen, 2006). In fact, this specialized knowledge and trust was a prerequisite for their successful development. Furthermore, as many of my interviewees indicated, the knowledge needed to construct and execute futures contracts is significantly different from that needed for a securities or banking market, so it was more difficult to replicate in New York, for instance.

Second, the US regulatory regime that was built to govern financial futures emerged directly out of the previous regime that governed agricultural commodities and futures (Markham, 1987) and had deep connections specifically to Chicago's institutionalized exchanges (Melamed 1996). Beginning in 1922, when commodity exchanges were first subject to federal oversight, the regulations and regulators were weak and, unlike the securities and banking industries, this precedent has never truly been broken. The securities industry, taking much of the blame for the 1929 crash

and the Great Depression, became subject to much stronger oversight as a result of the 1933 and 1934 securities acts which established the independent Securities and Exchange Commission (see Seligman, 2003). The commodities laws were reformed in 1936, and more significantly in 1974, but, even then, little power was vested in the regulatory agencies.

When a regulatory overhaul for futures markets became imminent in the mid-1970s, the Chicago exchanges realized they needed a stronger political presence in Washington, DC (Griesing and Morse, 1991; Markham, 1987; Melamed 1996; Millo, 2007). Concerned that futures may have been causing price volatility, there was widespread desire, voiced mainly by Midwestern (farm state) congresspeople to establish an agency modeled after the Securities and Exchange Commission (SEC) that was responsible for the securities markets (Markham, 1987). Some thought oversight for the futures markets should be merged into the SEC. But, since the 1920s the main oversight of the futures markets fell under the US Agriculture Department, and as such under the agricultural committees in the two houses of Congress, as opposed to the banking committees that had oversight over the SEC. The Chicago exchanges fought hard in the 1974 reforms to establish a new, independent agency with exclusive jurisdiction over the futures markets, and they won that battle in the establishment of the Commodity Futures Trading Commission (CFTC) (Markham, 1987; Millo, 2007). Since then there have been ongoing jurisdictional battles between the two agencies, and numerous attempts to merge the CFTC with the SEC, but Chicago's exchanges and the futures industry at large always fought hard to prevent this. When I asked the long-serving president of the main Washington-based futures industry lobbying organization how important keeping the two agencies separate and keeping sole jurisdiction over derivatives with the CFTC, he said:

> "Let me just say, those are the two things that accounted for the tremendous growth of the industry and the innovation. I don't think it would have happened otherwise."
>
> Follow up question: "When the rubber really hits the road, why is that?"
>
> Answer: "One reason is I think that the SEC would have screwed down on every new product, because they still thought 50% margin applied to everything"
> (personal interview 9-29-12).

The industry was able to accomplish this in part because it had significant influence over the CFTC through close ties to the Illinois congressional delegation, the members of which regularly found their way onto the agriculture committees (Griesing and Morse, 1991; Melamed 1996). Former CFTC and SEC chairpeople and commissioners were regularly hired to serve on the boards of directors of the two exchanges, and many of the lawyers and congressional aides who wrote the CFTC statutes and regulations were later hired by the Chicago exchanges (Griesing and Morse, 1991; Melamed 1996). In the late 1970s the exchanges invited and paid for "no fewer than 85 senators and nearly 200 congressmen" to travel to Chicago to visit and be wined and dined by the exchanges, in addition to receiving an honorarium of $2000 from the exchanges (Melamed 1996, page 272).

Why did Chicago fight so hard for influence in Washington, DC? The obvious answer is so it could create and maintain the most favorable environment for profit making, which included taking advantage of the implicit legitimacy provided by federal oversight. Part of it was also to ensure quick approval of new contracts (Millo, 2007). More important were their ongoing fights against increased margin or collateral requirements, stricter position limits, and transaction taxes, all of which had the potential to scare away speculative traders who were desperately needed to create the market liquidity necessary for their new financial contracts to succeed (Gorham and Kundu, 2012). Chicago, with its long history of speculative 'local' traders, usually won, but competition between exchanges to achieve liquidity first was fierce because it determined which exchange would be able to sustain trading volume in a new contract. Furthermore, as time passed and 'no arbitrage' mathematical models became more important to identifying theoretical prices, liquidity became the lifeblood of any contract because it demonstrated that new information was always being absorbed into market prices. Since the 1930s the Federal Reserve and SEC have controlled the collateral requirements in the securities markets, but to this day the futures exchanges set their own collateral levels, allowing them to more directly promote increased liquidity. As they had since the 19th century, the Chicago

futures markets fought tooth and nail to convince anyone who would listen that they were their own best regulators, and for the most part they were successful in regulating themselves and promoting that success to those who might impose outside restrictions.

The important point is the US federal government, whether through active involvement, implicit approval, or deliberate inaction, played a crucial role in setting the stage for the growth of derivatives markets. Certainly in making the decisions that determined the evolution of these markets, there were disentanglements of actors and actants from longstanding institutional conventions. But there were also consistent, if not structural trends, longstanding institutional differences between government agencies, and the development over time of a government–industry relationship that protected the Chicago exchanges from the "enemies of futures markets, of which there were plenty" (Melamed 1996, page 216).

Third, much of this institutional knowledge and political work was translated through the discourse and practice of commodities and futures law. Financial futures, especially as developed in the 1970s, were legally defined less by their internal qualities, or their relational qualities to finance and money, but rather by their institutional character. By this I simply mean that the early financial futures were not defined as *financial* instruments or investments, but instead as *commodities or futures*, the institutional home of which had a deep and meaningful history in Chicago. One of the foremost experts on commodities and futures law explains:

> "An understanding of commodities regulation must begin with an appreciation of its ambiguity. The most fundamental concepts and features of the regulatory framework are often undefined or ill-defined. The key phrase 'contracts of a sale of a commodity for future delivery'—the basic, futures contract—is nowhere defined in the federal statute, the Commodity Exchange Act" (Johnson, 1982, page xxv).

And a few pages later:

> "A fair reading of the amended and expanded definition of commodity suggests that, as for 'all goods and articles … and all services, rights and interests', their status as statutory commodities *does not emerge until they become the subject of futures trading*. While this method of converting something into a commodity may seem curious, it illustrates an important principal of commodities regulation: its interest is in a form of economic activity rather than

> in the attributes or character of the underlying subject. The economic activity in question is futures trading; *the nature of the commodity does not affect the regulatory result*" (Johnson, 1982, pages 45, emphasis added).

This invites us to embed the earliest financial derivatives, not just in the history and law of futures trading but, even more significantly, in the history of the laws governing agricultural commodities trading, much of the precedent of which is based on the Chicago exchanges' court battles going back to the 1870s (Lurie, 1979; Markham, 1987). Johnson goes on to explain the significant differences between securities law and commodities law, both of which also have significant differences from banking law. But while the New Deal federal banking and securities acts of 1933 and 1934 considered the connections between, and then actively separated securities trading and banking, this never happened between commodities trading and banking, or commodities trading and securities. Commodities and thus futures, which became 'derivatives', were rarely considered in the context of speculative bubbles or systemic risk. They were placed in a different category from finance—and Chicago's exchanges wanted it that way. Nevertheless, as the US and global political economy transformed in the 1990s and 2000s, futures or 'derivatives' became a centerpiece of commercial and investment banking (Engelen et al, 2011), but their regulation remained separate and for the most part outside of the purview of government.

Financial derivatives eventually broke out of Chicago and spread around the globe, and that mobility was facilitated in part by the performance of financial economics. But that growth and mobility could not have happened, at least not in the same form, without decades of work by Chicagoans—work that was less about market calculativeness, and more about sociopolitical legitimacy, the generation of wealth, and competition with other exchanges and cities. It took twenty years of experimentation in New York before that city's financiers began to significantly compete with Chicago, but by then the Chicagoans had set the stage.

3.7 Conclusion: back to Polanyi's paradox

In presenting this abbreviated case study I have attempted to show how a Polanyian approach to markets, or one that is dependent upon a 'wider frame of reference' must be supplemented with an approach that takes seriously the internal logic by which markets function as price mechanisms. This is to say that the wider frame of reference is necessary, but not sufficient to comprehend all markets. As Polanyi alluded, when the wider frame of reference is heavily influenced by market calculation, we may find that the institutions surrounding it are increasingly reframed by the *means* of the market, as opposed to the broader *ends* of a humanized economy. It is worth repeating that Polanyi struggled with the challenge of analyzing markets that have become institutionally separated from social, moral, and political institutions, and developed their own autonomous zone. This is why the performativity thesis should play a more central role in economic geography (see Barnes, 2008; Berndt and Boeckler, 2009; 2011), especially those looking for innovative ways to break apart the black box that is 'the market' (Hall, 2012; Peck, 2012). There are, however, a number of pitfalls along the path to performativity. These ought to be considered carefully, especially by those interested in promoting alternative market forms or alternative economic systems alltogether.

By overemphasizing the mechanics of markets and the science of economics as the key agentic force, performativity can easily distract researchers from other important components of market construction (Engelen et al, 2011; Mirowski and Nik-Khah, 2007), not least the larger institutional and geographic context. Most importantly, however, is the tendency of performativity to ignore power relations and politics in their discussion of markets. Many scholars that have put Callon's theoretical framework to work have produced nuanced discussions that include considerations of history, political influence, and institutional embeddedness (MacKenzie, 2006; Millo, 2007; Preda, 2009). Callon's theorizing, however, tends to deliberately ignore these conditions (see Miller, 2002).

As discussed above, Callon insists that markets necessarily construct their own contexts. MacKenzie (2004), although he is much more open to alternative explanations, similarly suggests

that financial economics has created its own worlds. These arguments dissolve society, geography, and history into disembedded market agencements and, as a result, leave too little room to consider alternative exchange systems, or resistance to market construction. Judith Butler (2010) reminds us that J L Austin in his original conception proposed two types or performativity: illocutionary and perlocutionary. The former are speech acts that actually change the world, such as when a judge utters the words, "I thee wed". Even this utterance is dependent upon acceptance of a certain discourse and set of conditions, but it nevertheless actualizes a certain reality in the utterance itself. The perlocutionary is different. While the speech itself may have causal effects, it is highly dependent upon all sorts of subsequent actions and interactions, and may in fact often fail to bring about any distinct change in reality. Butler's point is that failure, or 'misfire', is a crucial component of performativity and that the perceived agentic 'sovereignty' of an actor or agencement should not be analytically overextended. Attributing too much transformative potential to the agencement surrounding the science and practice of economics, forces Callon and MacKenzie to erase geography, history, and power to make room for the intervention of the performance. This concern remains despite Callon's 'overflows' or MacKenzie's 'counterperformativity', both of which are based on the effects of successful market performances. A successful methodology needs to consider not only the successful markets, but the markets that are not performed, the failed derivative contracts, the collateral requirements never enacted, the liquidity never established, and the social protections that are left behind.

Responding to the criticism that the performativity project is deliberately and dangerously apolitical, Callon (2010) responds that the theory actually ought to be politically liberating. His explanation is that *any* economy can be performed, and politically minded people ought to stop critiquing neoclassical economics and start performing the economies they want. MacKenzie echoes this in the last sentence of his book when he says the most important thing the performativity thesis spurs is the question "what sort of a world do we want to see performed?" (2006, page 275). This is

the exactly the misconception brought about by placing too much focus on the performative act and too little focus on the 'wider frame of reference'. It contributes to a situation where the conditions that determine which performances are successful and which performances fail, are silenced. It is exactly these conditions that a holistic Polanyian approach demands we pay close attention to. I am not suggesting we go too far to the opposite extreme and *underestimate* the agentic sovereignty of actors. Indeed, the world can and should be changed, including through the performance of economic geographies (Barnes, 2008), but this will only happen if the wider social, political, and economic fields and institutions from which markets emerge are also changed. While it is no easy task to tack between the inside and outside of markets, it is nevertheless what is needed in a critique of contemporary finance.

Chapter 4

Derivatives Pricing, Contingency, and Speculative Society*

"The model used by Wall Street to price trillions of dollars' worth of derivatives thought of the financial world as an orderly, continuous process. But the world was not continuous; it changed discontinuously, and often by accident."
—Michael Lewis, *The Big Short*—

4.1 If you can't beat 'em—join 'em

On September 26, 2011, day trader and financial commentator Alessio Rastani bellowed in an interview with the BBC regarding the European debt crisis that "Governments don't rule the world. Goldman Sachs rules the world", and when he goes to bed every night he "dreams of another recession."[51] In a video clip that quickly went "viral" over the internet and in a number of follow up interviews[52], Rastani explained how governments were powerless to solve the Euro crisis in the face of market pressures, and furthermore, that he was prepared to profit handsomely from a collapse by trading financial instruments, something he suggested everyone could and should do.

As the doomsday musings of one charismatic day trader, we shouldn't take this too seriously, but Rastani's basic perspective on financial markets is indistinguishable from the normative assumptions of neoclassical finance theory and neoliberal political theory. That is, there are market

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* This chapter was heavily influenced by numerous extended conversations with Keith Woodward, to whom I am grateful for advice, guidance, and encouragement. An earlier version was presented, with Keith, at the 2011 meetings of the Association of American Geographers in Seattle, Washington under the title "Speculating on Virtual Markets"

[51] More from Rastani: "I'm a trader. I don't really care about that kind of stuff. […] If I see an opportunity to make money, I go with that. So for most traders it's not about, we don't really care that much how they're going to fix the economy, how they're going to fix the whole situation. Our job is to make money from it. And personally I've been dreaming of this moment for three years. I have a confession, which is I got to bed every night and I dream of another recession. […] What I would say to everybody is, get prepared. This is not a time right now to wishful thinking that government is going to sort things out. The governments don't rule the world. Goldman Sachs rules the world. Goldman Sachs does not care about this rescue package. Neither does the big [hedge] funds [sic]." (Interviewed on the BBC on September 26, 2011, available here: http://www.youtube.com/watch?v=aC19fEqR5bA)

[52] See for instance, Rastani's interview with David Frost on Al Jazeera, available here: http://www.youtube.com/watch?v=9sdHTYS9Uic

tools available to protect rational actors from any economic event, if not profit from them, and it is the responsibility of every individual and institution to calculate risks and constantly adjust their financial portfolios accordingly[53]. The crucial assumption that Rastani's perspective hinges upon, which is the main focus of this article, is that the actually existing economic states of the world are contingent to the logic of *speculative trading* in the financial markets, and furthermore, that the only way to protect against that contingency is to *participate* in them.

The implication is that increasingly the material state of life only matters as it is translated through the pricing mechanisms of global financial markets (Marazzi 2011). In other words, individuals, corporations and nation-states—even Wall Street firms—*cannot know the market*, and yet the market is the only institution with the capacity to enhance their future and protect them from disaster. One of the reasons, as it has become increasingly clear in the financial periphery of Europe as well as a growing number of cities and states in the U.S., is that public institutions that once may have protected society against the vicissitudes of financial markets, are now themselves subject to a financial logic that demands "responsibility", austerity, and bankruptcy. Meanwhile, attempts to significantly reduce the influence of financial markets seem mostly futile, not least because they almost always begin with the assumptions that markets in their essence are rational, efficient, necessary, and always in equilibrium (Oetsch 2013, Poovey 2009). As a result, even for those with the best intentions, the discourse of market regulation revolves around eliminating exogenous factors that taint the essential efficiency of markets rather than beginning by questioning what markets are and how they operate.

My goal is to reframe the dominant assumptions about how financial markets operate and reproduce themselves, but this is a large task—too much for a single chapter. Consequently I have narrowed my focus to a conceptual analysis of speculation as both an act of participating in a

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[53] Comaroff and Comaroff (2000) explain it this way: "…above all, it [neoliberal capitalism in its "millennial manifestation"] offers up vast, almost instantaneous riches to those who master its spectral technologies—and, simultaneously, to threaten the very existence of those who do not" (pg. 298).

market, as well as attempting to know the unknowable. Building on the work of geographers, my central contention is that financial derivatives markets in particular are institutionalizing speculation, and as such reorganizing the time-space of the economy at various scales (compare Leyshon and Thrift 1997, Pryke and Allen 2000, Tickell 2000, Harvey 2006). Furthermore, by transforming expectations and commitments of the future financial derivatives are producing the conditions for the ongoing dependence on speculation in those markets, similar to the way that money pulls us toward a capitalistic future (Mann 2008).

I make the case by critically analyzing three frameworks that theorize markets in light of uncertainty. The first is Friedrich Hayek's theory of markets as an organizing principal for society, and the second is the financial economic theory of risk and financial instrument pricing. It is worth mentioning at the outset that my discussion of derivatives pricing is somewhat technical. I have included this analysis because it demonstrates how price and risk become concrete and consequential in the operation of these markets. From there I consider a third more recent and more abstract theorization of derivatives markets that is embedded in a "speculative realist" conception of contingency. In the last substantive section of the paper I synthesize these various perspectives on markets and speculation through an application of the concept of the uneven production of geographic space and time. I conclude by arguing that geographical social theory should be more effectively and frequently deployed to identify the construction of uneven and precarious financial geographies.

4.2 The speculative organization of society

Financial markets are not the only medium and source of uncertainty in contemporary life, but they may be the most profound. They contribute to the abstraction and volatility of value (Goux 1997, Comaroff and Comaroff 2000), deepen and intensify crises of capitalism (Keynes 1964, Minsky 2008, Harvey 2006), and they contribute to the replacement of non-financial

institutions by market risk based institutions (LiPuma and Lee 2004). All of these translate into an increasing necessity to speculate in the dual sense of the word: 1) to attempt to know through conjecture only, 2) to take on risks with the hope of reaping benefits (paraphrased from OED). One might argue that speculating in both of these ways is a universal condition, but speculation is formalized and intensified in capitalism. The widespread use of derivatives in financialized capitalism has further intensified this necessity by pricing hundreds of trillions of dollars-worth of commitments based on expectations of future market mediation. As future events unfold, however, the pricing mechanism occasionally breaks. This leaves financial market participants, but more importantly, the rest of society to deal with the consequences of these commitments, but without the help of the medium through which those commitments were made. When the market fails its almost as if the paper ledger recording all debts is destroyed in a fire. The debts still exist, but the ledger (or in this case, the market) has to be reconstructed before anything can be resolved.

As Marx (1990) demonstrated, the production process as well as commodity exchange in capitalism is an inherently speculative venture. The capitalist can never be sure that the exchange of money for commodities (M-C) in the circuit of production will result in more money (M'). Even if M' is attained, its value is subject to wild fluctuations, particularly during times of crisis. The addition of credit to the system adds another layer of systemic uncertainty (Minsky 2008) as some capital takes on a "fictitious" character, meaning it is only based on an expectation of future production of surplus value, a value that may never actualize (Harvey 2006).

In capitalism in general, but more so in contemporary, financialized, crisis-ridden capitalism since the 1970s, where everything "solid has melted into air" as Marx and Engels said, there are few consistent reference points or handles through which to grasp socio-economic relations. But one phenomenon sticks out—price. Whether wages on the labor "market" or interest rates on the money market, price provides a material referent—a consistent register on which to base decisions. I am cognizant of the dangers of overemphasizing price as this can lead to a rejection of any

intrinsic theory of value (Karatani 2005), or a willful ignorance of the dynamics of capitalism as a system (Harvey 2006). This is something I will avoid. Nevertheless, I find with financial markets in particular, the imperative of *price making itself* is independent of the necessity to exchange use values. Thus, the price making process deserves more attention as maintaining it is a driving motivation not just for the financial industry, but also for the state.

4.3 Knowing History

A focus on price is one of the foundations of neo-classical economics. The marginalist economists of the late 19th Century, reacting against what they saw as the fuzzy category of value and the imprecise explanations of political economy, instead emphasized the importance of prices and market exchange (DeGoede 2005, Caldentey and Vernengo 2010). They were less interested in production and labor per se, than they were with price mechanisms where the supply of, and demand for commodities synthesized. They pushed economics towards more formal scientific methods, employing mathematics and statistics, and began the long term shift of economics toward equilibrium analysis. Thinkers like Jevons, Walras, and Marshall, as well as Baliey long before them (Karatani 2005), saw market price as the key representations of value because it consistently and precisely reflected aggregate desire, or the "utility" of commodities (Warsh 2006: 68-87).

A generation later, Friedrich Hayek, the student of the Austrian economist Mises, began to explore the broader political-economic, even social, implications of markets and prices, all secondary concerns for the marginalists. Hayek was quite critical of equilibrium analysis, as well as the reliance of the marginalists on mathematics. Yet he was transfixed by the mysterious power of price mechanisms to solve one of the great questions of liberalism: how self-interested individuals could together create a system that benefits everyone (Hayek 1945, also see Harcourt 2011: 121-150, Poovey 2009). Today, Hayek is perhaps best known as one of the forebears of neoliberalism, one of the key foundations of which is the assertion that market forces are the best method to order

society (Hayek 1944, 1945). I will not focus on the development of neoliberal ideology (see Peck 2010), but I am instead interested in why exactly Hayek believed markets were so archetypal. There are two components to Hayek's argument for markets—one ethical and one methodological—and both of them relate to speculation.

First, being concerned with questions of how an economy and society ought to be organized, Hayek framed his argument as a choice between central planning and free markets or "competition" (Hayek 1945). He argued that any one person or group of people granted the authority to plan how the resources of a society ought to be distributed quickly led to inefficiency, waste, and ultimately to tyranny. In Hayek's view of central planning, individuals were subject not to their own spontaneous desires, but to "men's fatal striving to control society" (1974: 7), which he famously suggested led down "The Road to Serfdom" (1944). Open markets on the other hand, while not perfect, were at a minimum a medium for individuals to make choices free of coercion from higher powers. In this way, allowing market forces to determine the distribution of resources was the more efficient and more democratic, and thus ethical arrangement for the organization of an economy.

Second, and more important, Hayek believed central planning was inherently flawed as a *method*. In what has been called his "limited knowledge thesis" (Parsons 1997), Hayek describes the challenges, if not the logical impossibility, of "knowing" the social totality (Hayek 1937, 1945, 1974). Following his subjectivism and methodological individualism (Parsons 1997), Hayek believed that social and economic reality was constituted by the perceptions, beliefs and actions of individuals. Futhermore, being heavily influenced by the metaphysical writings of Hume and particularly Kant (Parsons 1997, Fleetwood 1995), Hayek was vexed by the paradox of "correlating" the empirical world with and through the perceptions of human "minds" (Hayek 1945). Given the limits of human reason, coupled with the complexity of economic options, Hayek was skeptical that individuals can "know" even their own desires (Hayek 1937, Mirowski 2002: 238-9, Leppala 2010).

Knowing anyone else's desires was a total impossibility. Consequently, he came to the conclusion that the motivations of individuals are largely beyond the grasp of science. In other words, Hayek was convinced that no economic system beyond the most basic and local organization could be *conceived* by scientific reasoning, let alone *managed* effectively. Even if a plan for economic organization could be devised, he was convinced it would not be adaptable enough to cope with the "day to day changes" in desires and needs of individuals (Hayek 1945).

Hayek's skepticism translated into a profound suspicion of the mathematics of the marginalists, as well as the trends in 1930s and 1940s economics to employ positivistic methods to model national economies (Mirowski 2002: 232-241). In particular he saw only folly in Keynesian style New Deal "planning". Hayek was instead interested in the spontaneous emergence of institutions, the most important of which are markets. For Hayek the organization of an economy was best left to emerge, without design, as an aggregation of the spontaneous (Harcourt 2011: 128-131) and inherently speculative actions of individuals as filtered through the "telecommunications" system that is the market (Hayek 1945, see also Mirowski 2002). The outcome of the operation of that market, or price mechanism, would not only efficiently distribute goods, but also produce prices that would become crucial data for the organization of other social institutions. For Hayek, the state, with no moral standing or reliable method to produce, collect, or distribute knowledge (Davies and McGoey 2012), should be left merely to protect the competitive market environment. In the face of what Hayek sees as a perpetual state of ignorance (Perlman 1997), and the looming threat of an all too real tyranny he observed in 1930s fascism, his solution for the problem of social order was the market price.

I take it as given that Hayek's ideas became influential across the global political economy in the 1980s and 1990s through institutions such as the Chicago School of economics, various think tanks that Hayek enthusiastically supported (Peck 2010), the Thatcher and Reagan governments, and most importantly the financial markets, which were significantly deregulated by those governments.

I am therefore not asking whether markets are capable of creating a social order, but rather, *what sort of society have markets organized in light of Hayek's ideas?*

4.4 The economics of price

If markets in general can serve as an organizing function for society, financial markets intensify this function for the organization of capital. Financial markets are highly centralized, process enormous volumes of transactions, and produce prices at a dizzying speed. These characteristics mean that financial markets, more than any other sort of market, appear to operate in close resemblance to the neoclassical assumptions of perfect competition and the real-time adjustment of supply and demand. For both the marginalists (DeGoede 2005: 95), but also for the financial economists of the middle 20th Century (MacKenzie 2006), these markets were the paragon of efficiently operating price mechanisms, not least in their capacity to specify the illusive category of value (Goux 1997). If for a moment we set aside market failure, crisis, and the associated negative effects on society (we will return to this below), financial markets do appear as a good example of "market efficiency", but mainly because of the uniqueness of the goods they exchange —financial instruments.

Financial instruments are strange commodities. Not unlike the strangest of all commodities, money, their use values are more closely connected to their exchange values than other commodities. This is an historical development, which can be traced in the development of the money commodity (Marx 1990, Harvey 2006, Mann 2008), but also in the development of corporate shares. The emergence of the public corporation is synchronic with the emergence of stock exchanges in 17th Century Amsterdam and London (Ayache 2010). The stock exchange solved the problem of long term commitment, which could now be traded away (Keynes 1964), as well as the problem of the frequent dissolution of jointly owned enterprises, where the assets would otherwise need to be liquidated to pay off a creditor or departing owner. Instead the departing owner could sell her

ownership shares to someone else on the stock exchange and the enterprise could continue to operate. However, this arrangement also meant that an active market in shares became part of the value of a public corporation. The emergence of corporations and stock markets thus represented a "conversion" (Ayache 2010) from debt financing to a new method of equity—or ownership—financing. This transition also represents the conversion in finance from a system focused on closure and the past, to a system focused on the openness of the future. Stated in Ayache's terms, if the identify or "face" of debt is repayment and thus a convergence back to a previous state of parity, the "face" of an equity is the open and unknowable future of the market (Ayache 2010).

In other words, market exchange is immanent to financial instruments (you might even say financial markets are immanent to themselves). While we might imagine the production process of wheat or automobiles as relatively distinct from their circulation and exchange, this distinction is more difficult with a financial instrument[54]. While not true for all, many financial instruments lose all of their value if they are separated from their capacity to be exchanged in a market (see Chapter 4). These characteristics are most apparent in the most complex financial instruments, financial derivatives. Just like fiat money, many derivatives have no use value whatsoever independent of their capacity to be exchanged in the market, because they are "by and large not only equivalent to their financial value, but exhausted by their financial value" (Smith 2007: 20). In other words, *the use value of many financial instruments is their capacity to make a price.*

These characteristics of financial instruments translate into a stiff challenge for those who seek to attribute an objective value to financial instruments. Whether interrogating the nature of financial value on a metaphysical level (see Spivak 1985, Goux 1997, Comaroff & Comaroff 2000, Karatani 2005, Mann 2008, 2009), or experimenting with formulas to predict financial price movements (MacKenzie 2006, Preda 2009: 82-112), thinkers and scientists from various

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[54] Indeed one of the themes of the literature on corporate financialization is the tightening of the relationship between corporations and financial markets, or stated differently, instead of facing product markets, corporations increasingly *face* financial markets (cf. Muellerleile 2009).

backgrounds and disciplines have been asking questions about financial value for more than 150 years. It wasn't until about 50 years ago, however, that academic economists took a sustained interest in how financial markets work and how they determine prices. Prior to that, financial markets were not considered a proper object of study for economics (MacKenzie 2006). This changed during the 1960s and 1970s, and economists developed a series of theoretical frameworks, all based in mathematics, that to this day form the basis of the discipline of financial economics (Caldentey and Vernengo 2010, MacKenzie 2006). These theories include portfolio theory, the Efficient Market Hypothesis (Fama 1970), the Capital Asset Pricing Model (see Mehrling 2012), and the Black-Scholes-Merton option pricing formula (for overviews see Bernstein 2005, MacKenzie 2006, Derman 2011, Poovey 2009, Caldentey and Vernengo 2010, Mehrling 2012). Despite internal debates, by the middle of the 1970s, the field had largely achieved consensus with regard to two things that help us understand the nature of contemporary financial speculation: 1) the relative perfection of market price and 2) a new formalization of risk. I will next discuss each of these and their implications in some detail.

4.5 Financial economics and the price of risk

Because market exchange is immanent to financial instruments, the future exchange value of an instrument is of utmost importance. Contrast this with the exchange of a more basic use value, where presumably the consumer has at least a vague notion of the value of the actual consumption (use) of the object. For instance, in purchasing a car, one might consider the resale value, but presumably the most important value is that it functions as a reliable and safe means of transportation. While some financial instruments produce a flow of income, many do not, leaving the buyer with little to assess value—especially future value. This was a problem for financial economists and they solved it by making four assumptions about price, which build directly on the marginal revolution in economics that began a hundred years earlier.

First, they equated price with value (Derman 2011). This allowed them to imagine price as the one perfect agglomeration and representation of all the characteristics and qualities of any particular asset. Second, they assumed that financial markets were always in equilibrium, which meant that price was a perfect representation of the balance between the supply and demand of that asset in the market. Third, they assumed there was a perfect distribution of information among market participants. Everyone concerned with a particular instrument was assumed to have access to the same information, which is reflected in the price, and only new information would change the price of the instrument. Fourth, all market actors were assumed to be "rational", which meant that their motivations or "utility" was identical. In other words, taken together, this means that markets are "efficient" (Fama 1970, see also Poovey 2009). Furthermore, these assumptions about prices suggested that it was not possible to successfully and consistently *predict* changes in the prices of financial instruments. In other words, *ceteris paribus* price changes were random or "stochastic" (Mehrling 2012). As Hayek argued with regard to markets in general, it may be possible to assess one's own desire or need for a good, and make a buying or selling decision based on little more than its price. He did not, however, believe it is possible to objectively know much of anything about that price or what it reflects about the rest of the world. In Hayek's formulation, however, if price is the optimal representation of a commodity's relationship with that world—as the financial economists argued it was for financial instruments—there is no need to understand the rest of the world.

Arriving at randomness may seem like a dead end for financial economics, but instead it was just the beginning. After all, some investors, traders and firms (e.g. George Soros, Warren Buffett) are more successful than others—so there must be an explanation other than luck. This brings me to the second main intervention of financial economics. That is the formalization of the concept of risk. If you buy a financial instrument, there is not only the possibility the price will go up, but also down. Furthermore the prices of some instruments move more violently than others.

Attempting to identify the patterns in these movements had been a constant preoccupation for financial traders for as long as financial markets have existed, but prior to the 1950s, only an occasional interest for scholars (see Goux 1997, Preda 2009: 82-112). In the 1921 Frank Knight, an economist at the University of Chicago, made a crucial intervention in differentiating between uncertainty and risk. He argued that uncertainty is the sort of randomness that is not subject to probability, and therefore truly unknowable. Risk on the other hand, is subject to probability and thus subject to mathematical calculation. After all, the outcome of any given roll of dice is random, but only within a previously observed set of outcomes, so the mathematics of probability can predict what will happen on average. Creating large data sets of previous outcomes for financial markets was initially quite difficult (MacKenzie 2006), but with the advancement of microprocessors it eventually became relatively easy to study the past performance. These past patterns set the parameters of the probability equations.

In the 1950s and 1960s, financial economists like Harry Markowitz and Fischer Black began to compare the risk of various instruments and groups of instruments and as a result conceived of financial risk as relative (see Mehrling 2012). The risk of cash money or U.S. government bonds losing their value was set at zero, and entire markets for stocks, bonds and other instruments were set as other parameters based on their average risk. Individual instruments or portfolios of investments were then compared to these standards to identify a risk profile. The average *reward* or return for holding cash or a U.S. government bond is quite low, however, so economists began to measure potential *reward* by the amount of *risk* embodied in any instrument. The important intervention for financial economics was developing methods to estimate risk using probability models, and then deriving the average reward for holding any instrument by correlating its riskiness (Derman 2011).

To come full circle, *theorizing the price* of a financial instrument—which in this world is its value—is at the same time theorizing its risk, all of which is based on its past performance relative

to other instruments. Since at least the 1920s risk had been a category indicating the possibility of calculation, but in the 1970s, risk became even more formalized in finance. It became the fundamental category for understanding where financial exchange value, and thus price, came from —the future.

Risk is not, however, a straightforward concept, let alone an object that can be easily quantified. The word "risk" is a neologism, based on a capitalistic version of linear time, and a version of uncertainty that has only emerged in modernity (Luhmann 1996, Giddens 1999, see also Thrift 1996). Consider that if the future was certain, it would require no choices and would instead appear as part of present being (Bay and Backius 1999). Similarly, if decisions about the future involved no compromise or no "danger", there would be no reason to make decisions to begin with (Luhmann 1996: 7). As Hayek explained, "economic problems arise always and only in consequence of change" (1945: 523). The idea of risk is also tied to the assumption that humans possess the agency to change the world, alter the future, and mitigate uncertainty. Consequently the very notion of risk, is inexorably entangled with other complicated categories like time and agency. This is not to say that risk does not exist. If nothing else, financiers have made risk real by constructing discourses and devices that engender the trading of risk as a thing of value (Zaloom 2004, Levy 2012). Along with this, however, they have also constructed a new relationship of finance to time—one where the future is operationalized in the present.

4.6 Derivatives: technology of the future?

The emergence of *financial derivatives* further complicated the concepts of market, price, and risk. One way to understand how this happend is to analyze how financial economists attempted to assess their value. In doing this, this section dives into some of the technicalities of derivatives modeling and pricing. But before I get too far, we should define what a derivative is. First, derivatives are instruments whose value is directly related to another "underlying" asset, whether an

agricultural commodity or financial asset (See Chapter 1/Introduction, see also MacKenzie 2006: 298, LiPuma and Lee 2004: 33-34, Bryan and Rafferty 2006: 10-12, 40-50). Second, derivatives are *contracts for a set amount of time* during which underlying assets are not actually exchanged[55]. Instead, the buyer and seller of the derivative have the right, obligation—or option—to exchange the underlying asset or the benefits of owing that asset at a previously agreed upon date and price[56]. Depending on the instrument, up to the expiration date, some derivatives can be "executed" to obligate an exchange of the underlying asset. In reality, however, *only a tiny fraction of derivatives are ever executed.* Instead they are almost always sold on the market for a cash gain or loss prior to expiration[57].

Because derivatives are little more than time contracts between two parties, they are a "zero sum game". There are no appreciable or depreciable assets involved, so no wealth can be directly created or destroyed in their trading or operation. Unlike underlying asset markets where it is possible for all investors to gain from rising prices (i.e. a bull market in stocks, or rising home

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[55] Some generic definitions of "derivative" do not include a time component (e.g. MacKenzie 2006: 298), allowing inclusion of instruments that when traded actually exchange underlying assets or obligations. We agree with Romano (1996: 70), however, that these instruments, (e.g. pooled mortgage-backed securities) while related to the value of another asset (e.g. real estate) are closer to more generic "securities" than derivatives (see also Stout 2011 for a similar definition). Also see Ayache 2010, pg. 33, on the difference between derivatives and other commodities: "Derivatives settle…therefore, they must have prices in the meantime." Lastly, making definitions even more complicated, investment banks now commonly package together securities and derivatives to create "structured" products.

[56] In the case of "swap" derivatives, the benefits of ownership of the underlying assets (e.g. interest payments on underlying bonds) are temporarily exchanged, but the asset itself is not. A "credit default swap" (CDS) is similar to an insurance instrument, based on another debt instrument, where the insurance policy pays off the face value if the debt instrument defaults or some other significant "event" takes place. The holder of the CDS pays the issuer regular premiums. AIG went bust in 2008 because it had issued billions of dollars of CDSs on exotic mortgage backed securities, and the firm profited handsomely on the premium income never expecting the U.S. sub-prime mortgage market to collapse. When the market did collapse AIG was obligated to pay off the face value of the mortgage securities to firms up and down Wall Street.

[57] It is assumed by many (Hieronymus 1977) that close to 99% of derivatives never get executed. Instead they are "offset" by a contract for the opposite side of the obligation, or "rolled over" into a similar derivative with a later expiration date. In fact, while agricultural futures, the original derivatives, at least designed to facilitate the future exchange of grain, etc…, even they were rarely executed. In the early 1980s the requirement to include an execution provision was removed and many derivatives changed to cash settlement only, meaning that even if the derivative is held to expiration an equivalent value of money to the difference in price of the underlying assets is exchanged instead of the assets themselves (see Millo?).

prices), regardless what happens to the market price of a derivative, one investor's gain is another's loss[58] (Stout 2011). It is a high stakes game where the losers transfer wealth to the winners. In this sense, the analogy to casino wagering is accurate (see Keynes 1964).

Given the similarity to gambling, the finance industry has worked hard to reframe, legitimate, and justify derivatives markets against those who would regulate or altogether prohibit them (DeGoede 2005). The industry justification with the most traction is that derivatives are a positive force in the economy because they allow actors to hedge (or insure) against risk, by redistributing that risk across the economy. In other words, the argument is the instruments allow producers, consumers, governments, and other institutions to hedge against the inherent risks of an uncertain future by trading that risk from those less willing to those more willing to bear it (see example in footnote[59]). In neo-classical, or Hayekian parlance, this redistribution of risk from those less willing to bear it to those more willing makes the product markets, financial markets, and the broader economy more competitive, efficient, and democratic .

The "value" of a derivative is made up of two components, "intrinsic value" and "time value". The intrinsic value of a derivative relates directly to the value of the underlying instrument,

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[58] Some derivative market boosters evoke the zero sum game characteristics of derivatives to argue that they cannot be systemically risky to the macro-economy because regardless what happens, any loss is offset by an equal gain by the counterparty to the contract. This assumes that derivative prices and markets are mere reflections of asset prices and markets, but this is not the case. In other words, it assumes that derivatives are derived, but not productive. This is overly simplistic, if not completely flawed (see Chapter 1/Introduction). As will be discussed below (as well as Chapter 2), at least since the late 1970s, if not as long as they have existed, derivatives also impact the price of the underlying instruments, the volatility of which can have significant macro-economic impacts. In addition to this, derivatives "cause new forms of complex interlinkages between different markets, assets and actors, with a complex variety of possible repercussions and spill-over effects and with very little transparency in regard to the possible risks caused by these interlinkages. Hence, the systemic risk is increased" (Arnoldi 2004: 31, see also Bryan and Rafferty 2006 for a similar, but more thorough analysis). Finally, because derivatives are often used to "hedge" or as a form of insurance on assets or investments, they are often used to strengthen the credit position of borrowers resulting in more credit being issued by banks.

[59] Consider the example of a U.S. based retail corporation that expects to take delivery of widgets manufactured in China three months hence. The retailer can lock in the exchange rate for dollars/yuan now, by purchasing a currency future or option, thus removing the risk of exchange rate fluctuations from their corporate finances. Theoretically this lowers production costs, which has the potential to increase profits and/or reduce costs for consumers. The retailer pays a fee to the seller or "writer" of the future or option contract, who then shoulders the risk of fluctuation in the dollar/yuan exchange rate.

which is determined quite easily by consulting its price in its own market. At the expiration of the contract, calculating the payoff of the derivative will result from a simple comparison of the contract price to the price of the underlying instrument. The difficulty comes in attempting to determine the more nebulous time value of a derivative (cf. Ayache 2010: 32-34). Simply stated, this is the value of the calendar time until the contract expires. The longer a buyer wants to lock in a price for an underlying instrument, or an obligation related to that instrument, the more the buyer will have to pay the seller—or "writer"—of the contract for that guarantee. The key factor in determining time value is the potential, or the risk, for the price of the underlying asset to change during this time, the measurement of which is the *risk of price volatility*. The risk of a contract for a highly volatile asset is higher than the time value for one with little volatility. In 1973 and 1974 three financial economists, Black, Scholes and Merton, used differential calculus and probability theory to produce an equation that would predict this volatility, and thus the risk, and thus the "correct" price of an option derivative[60].

Almost immediately following Black-Scholes' innovation, traders discovered they could reverse the equation to "imply" the volatility of the *underlying instrument* (Ayache 2006, MacKenzie 2006). In other words, rather than solving the Black-Scholes equation for an option price, they could use the existing option price in the market as empirically given, and instead solve the equation for the expected future volatility of the underlying instrument. As new option trades are executed at new prices, the equations can be continually solved to provide new information about price trends, which can then be used to manage risk in both the derivative market and the market for the

[60] The equation is the infamous "Black, Scholes and Merton" option pricing formula, for which they won the Nobel Prize in 1997. The equation was written to provide prices for options on equities or stocks, but it has become the basis for pricing all types of derivative instruments (Stix 1998, Bernstien 2005, Ayache 2010, Derman 2011, Mehrling 2012). To state it simply, Black, Scholes and Merton's equation considers the risk free rate of interest, the price of the underlying stock, the strike price of the option, the amount of time until the expiration of the option, and the estimated future volatility of the underlying stock to then estimate the "correct" price of the option contract. The equation was the culmination [but by no means an end-point] of decades of scholarly and financial industry research that attempted to quantify the risk (and thus, return) of investing in any given asset as compared to the risk profile of the market as a whole. MacKenzie (2006) convincingly refers to Black-Scholes-Merton's work as a "paradigm"—or a Khunian moment—for financial economics, that for the most part still stands (see also Derman 2011).

underlying, not to mention markets for related instruments with similar risk profiles. This means that the prices of derivatives and of the underlying—always inherently related, even before Black-Scholes—changed after the mathematical calculation became widely utilized in trading. In effect the information that is the future expectation of price changes, as represented by the derivative, went from vague "uncertainties" to calculable "risks" (Knight 1921), and as such became a calculated component of the price of the underlying asset. As Arnoldi (2004) says regarding derivatives, "The future (or unpredictability) no longer constitutes a boundary of logic and knowledge" (36). It follows that this would be true for both any derivative, as well as any underlying instrument on which a derivative is based.

4.7 Im-possible Futures—Speculation, Ignorance and Contingency

The probability modeling of Black-Scholes and its cognates activated the expectations of the future of financial instruments in a quantifiable way, opening the door to a new world of financial calculation and engineering. In other words, it instrumentalized the future[61]. Within a few years of Black-Scholes, modeling financial instruments and portfolios based on probability became an industry standard (MacKenzie 2006), and a whole academic discipline for "financial engineers" quickly developed to train mathematicians and physicists—nicknamed "quants"—for work in the financial sector.

The estimations of probability are, however, quite problematic when applied to the contingencies of the socio-economic world (Derman 2011). We need to look no further than October of 2008 to find a seemingly unpredictable (according to stochastic probability) collapse in

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[61] Arnoldi (2004: 24) elaborates: "That is to say that the future becomes an object of knowledge, something that, through computer modeling and advanced forms of probabilistic calculations, comes to inform our present and becomes a basis for action, technologies and, ultimately, in the present case, financial assets." [Arnoldi goes on to suggest there is a difference between "being in practice" and actual existence. This distinction may become consequential to our argument.] Also see Ayache's repeated suggestion that contingent claims are "technology of the future" (Blank Swan).

financial instrument and derivative prices. In Knight's (1924) terms, when the mortgage securities and derivatives markets collapsed in 2008, suddenly risk turned back into uncertainty. But there are no mathematical models to predict the value of uncertainty, particularly when a derivative market is failing to consistently produce prices (see Chapter 3), and especially for instruments that have little use value outside of their capacity to produce a price to begin with. After 2008[62], a number of scholars and commentators have criticized the over-reliance of the finance industry, economics, and the state on probability (Taleb 2010, 2012, Derman 2011).

I am taking a step further and questioning whether trading financial derivatives is fundamentally about any sort of probability or any sort of knowledge at all. Rather we are interested if they are better explained by focusing on the lack of knowledge and the speculative act of trading itself. In other words I want to frame this as a problem of making decisions and taking action in the contingent present. Here I am drawing on the work of Elie Ayache, the financial trader cum "speculative realist" philosopher, who recently penned a monograph (2010) on contingency vis a vis derivatives trading. Ayache, like Taleb, suggests that probability models of all sorts, are inherently backward looking because they are necessarily modeled on what has already occurred. But Ayache goes further to argue that prediction and probability ought to be altogether abandoned. Instead he attempts to provide "an account of how to make money in the market as a *perfect medium of contingency*, not as an imperfect case of probability theory" (xvi, emphasis in original).

Ayache's argument is that the market itself "should be the alternative to prediction in matters relating to the future" (2010: xvii), and he suggests elsewhere that what we need is to analyze "the genetic condition of the reality of the event [of the market] not the condition of the possibility of knowledge" (Ayache 2011: 30). For Ayache market events are not inside or outside normal probability distributions. Rather, the market is a blank slate that takes on both form and color as

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[62] Nassim Taleb should be credited for pointing out the over-reliance of financial modelers on probability prior to 2008 with his books *Fooled By Randomness* (2004) and the first edition of the *Black Swan* (2007), both from Random House in New York.

market participants leap into exchange and thus create difference. He says "to price something is to trade something in order *to earn a difference*. It is to make a difference" (2010: xx, emphasis in original). It is this difference, as represented by a price, that is the (only) answer to the questions the probability modelers continually ask—what will the market do? What is this derivative worth?

His argument helps to clarify the contradictions of price and risk that we are left with in the wake of the neo-classical or financial economic framing of markets. First, by focusing on price, independent of probability, Ayache helps us think about the market "outside of time" (2010: 36). He begins by largely disregarding the hedging or insurance function of derivatives. He sees the function of guaranteeing a future event as much less important than their function of changing the world now[63]. After all, 99% of derivatives are traded prior to expiration—but during this "meantime", how are they priced? In effect the interim between the writing of a derivative and the expiration of that derivative is abolished every time it is traded. The actors in the market must speculate what difference would exist if the derivative expired now, and create a price based on that speculation. In other words, the payoff of the derivative at expiration is replicated every time it is exchanged and "admits" a price. This way, the intervening time becomes meaningless because the derivative replicates the consequences of its future expiration every time it is traded or priced. Emanuel Derman, a physicist and former financial engineer himself, explains this in plainer language. "Financial models don't forecast; they transform one's forecasts of the future into present value" (2011: 192). I would clarify Derman by simply suggesting that it is not models that do the transforming—it is the actual trading.

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[63] Ayache follows the mantra that derivatives are *designed to be traded*, as opposed to being designed to be held or "invested in" for hedging or speculation. The instruments are certainly used for the latter purposes, but Ayache's point is that they must be designed in a way to facilitate, if not encourage, a high volume of exchange of the instruments between market participants. Leo Melamed (1996), one of the key architects of Chicago's first financial derivatives markets explains that any derivative market that does not quickly establish liquidity will precipitously fail, and as such one of the challenges of designing derivative contracts/markets is ensuring their tradability (see Chapter 4).

In suggesting they leave probability behind, Ayache encourages traders and financial engineers to be more adaptable, to escape the bondage of probability models and instead "write" into the market, or push the market into contingency. In other words, this "is what the market is all about: the market as a writing process that is irreducible to a stochastic process; the market as a writing capacity, as a *medium of contingency*, that is irreducible to a writing possibility" (2010: 6, emphasis in original). In other words, he encourages traders to "make" the market, not because certain possibilities are probable, but because by participating in the creation of the pricing event, by speculating into the event of a pricing market, there is money to be made and openness to be reproduced.

4.8 Speculative Market Space

> It is indeed the source of the superiority of the market order, and the reason why, when it is not suppressed by the powers of government, it regularly displaces other types of order…
>
> --F.A. Hayek, "The Pretence of Knowledge", Nobel Memorial Lecture, December 11, 1974

Ayache has made an important contribution to the metaphysical conceptions of markets, and he has also potentially improved the social scientific understanding of how markets work. But when Ayache's arguments are extended into the concrete world of market relations and uneven geographies, they also have seriously flaws. However unwittingly[64], Ayache falls into an idealistic Hayekian trap where human society, regardless of intentions, experience, or context, spontaneously aligns itself with the unconditional openness of speculative markets and price making—what Ayache calls the "market as the last absolute" (175). Short of simply *defining* the market this way, which may be Ayache's intention, it is difficult to integrate his framework with the diversity and complexity of actually existing markets for derivatives and other financial instruments. More

[64] Buried deep in his book (pg. 128-9) Ayache includes one short "interlude" where he suggests that he is not qualified to engage the politics of finance and financial speculation.

important is both Hayek's and Ayache's reliance on the speculative moment where the *necessity* of knowledge is replaced by the *necessity* of price making. Remember for a moment Hayek's feckless state planners relying on flawed scientific methods, inefficiently distributing resources, and dispatching the individual liberty to choose. Instead in Ayache's story (and Taleb's as well) we have the inflated financial modelers. They also rely on flawed scientific methods, and hopelessly drive the markets into imagined probabilities. Modelers thus close off the future from anything but repetition of the past, and generally muck up the otherwise well-oiled machine that is the market.

Yet in both cases the authors, in their compulsion to overcome the limits of human thought, run into another limit—the capacity of any market mechanism to consistently make enough prices to organize society. Here I return to a question asked earlier. That is, what sort of society are the price mechanisms of derivatives markets organizing?

To begin with, financial derivatives provide a regulatory mechanism for international financing and in turn, the global economy (Bryan and Rafferty 2006). It is no coincidence that only nine months after the U.S. Government effectively ended U.S. Dollar convertibility to gold in August of 1971, the Chicago Mercantile Exchange began trading derivatives contracts on foreign currencies (Pryke and Allen 2000). Gold convertibility, regardless of its ultimate arbitrariness as a measure of value, was nevertheless a consistent reference point for the value of the U.S. Dollar, and as such, all other currencies. In its absence, currency derivatives, once they achieved a reasonable level of market liquidity, did two things. One, by trading the actual contracts, actors could materially insure against unexpected moves in currency conversion rates. Two, through the steady production of prices for future conversions, the market created reference information by which actors could inform their decisions about any aspect of international trade, international politics, even the internal macro-economic policies of the nation-states whose currencies were involved or related to the contracts (Bryan and Rafferty 2006).

This reference for the value of money is not only important at the scale of global trade between financial traders and international firms. In a world of fiat money, under which most of the globe has existed since 1971, the prices at which different monies are exchanged are the most tangible register of value. In the contemporary world where social relations have been "compressed" through space and time (Harvey 1990, 1996), this constant valuation translates through every transaction using money as a means of exchange at the local and bodily scales, creating what Pryke and Allen (2000) have called "quick-fire space" where money and the market become entangled in just about every aspect of daily life. Just like the markets for underlying securities, however, the markets for currencies are always already entangled with the markets for their derivatives. So the value of money, which itself is highly entangled with the future (Mann 2008), is doubly abstracted through the trade of currency derivatives that replicate the future every time they make a price. As the necessity of a capitalistic future is exacerbated by the increasing use of money (Mann 2008), so the necessity of financial markets is exacerbated by the increasing use of derivatives. All the while the spaces of the "global" economy are constantly (re)organized by the flows of prices.

Yet, Hayek and Ayache ask too much of the market. Hayek imagines the market as the incomparably adaptable mechanism to distribute both commodities and capital, as well as information about those commodities. Ayache imagines the market as the singular surface of contingency, the pure plane of becoming, which left unencumbered by the flawed backwardation of probability, will constantly and consistently allow traders to adjust to the contingency of being. But, the operation of the derivatives markets in the actually existing world are too heavy a burden for their assumptions. Consider that the social order constructed by the price mechanisms of contemporary financial markets spreads extensively across space and time to capture an unknowable multitude of relations in one moment of price. Take the price of a single currency as represented in a standard underlying (non-derivative) market. At every instance of price, the economic geographies

related to that price necessarily reorganize themselves in a perpetual state of constitutive adaptation to every other entity that is entangled with the market. Now consider the derivative market, which may trade 10 to 20 to 100 times the volume of futures contracts on the same currency. As long as these contracts constantly trade—as long as the interim or the "meantime" between the present and the contract expiration is perpetually contracted in the making of a price—the speculative nature of the transactions is largely inconsequential as the market glides along in synch with the plane of contingency.

But what if suddenly there is a glitch in a trading technology, or a government unexpectedly defaults on a debt payment, or some other unexpected event occurs, and the market suddenly stops trading? What if for any reason, the price making machine breaks? Contingency itself will not hold in place to wait for the market to catch up. Suddenly the commitments of derivative contracts that were virtual are now actual, but there is no longer a reference point to evaluate the global geography of currency relations. In other words, suddenly exchange is no longer immanent to the derivative. To the chagrin of the holder, the derivative becomes little more than a use value, like a dollar bill worth nothing more than the paper it is printed on. If it was the case that only the markets/prices for the *underlying* financial instruments were suddenly thrown out of synch, there may be problems, but at least those problems are largely encapsulated in the present moment. But if there are no prices in the derivatives markets, suddenly the *meantime* is reactivated. Suddenly the uncertainty of the future becomes a violent material reality that is not easily resolved. Suddenly the commitments of derivative contracts are no longer virtual, but real and consequential, removing to some degree the adaptability and mobility of capital that was engendered by the flow of the price mechanism to begin with. Suddenly the speculative space of a global financial geography begs for knowledge, but finds only ignorance of a highly complex and interwoven set of material relations. These webs of

financial-geographical relationships can take years to "unwind", as is happening with mortgage derivatives still owned by the bankrupted Lehman Brothers[65].

4.9 Concluding thoughts

The reality of a financial crisis involving derivatives is it can take years for the *meantime* to be unwound and disentangled from the present. As such, it takes years for the uncertainty of value, which always exists, to return to a level consistent with a "normal" state of economic relations. Meanwhile economic geographies are thrown into chaos as actors struggle to reorganize their lives and institutions to new reference points. These reorganizations, however, are expensive and time consuming, and most importantly, geographically uneven in their impacts. The deleveraging (paying down debt) that has become politically, if not economically, necessary is felt disproportionately by the poor and working classes as they benefit most from state welfare, and suffer the most from austerity. What U.S. politicians refer to as putting the state's fiscal "house in order" is code for reestablishing the conditions in which financial markets will once again put capital in motion across time and space, and thus reestablish its value. This is where Harvey's "state-finance nexus" (Harvey 2010) shows its necessity. Faced with the choice of dismantling parts of the global financial economy, which would very likely have caused a much deeper and longer economic recession or depression, *or* "recapitalizing" the investment banks, the U.S. government chose the latter (see Suskind 2011 for a discussion of this debate within the Obama Administration in 2009). For the past five years, the U.S. Treasury and the Federal Reserve have done everything in their power to inject massive amounts of credit into the economy with the hope that the price making mechanisms become the dominant organizing principal before other, possibly less capitalistic, institutions rise up in their place.

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[65] Farrell, M., "Surprise! Lehman Brothers is still big" 9-16-2013, CNN Money (online) accessed here on 10-8-13: http://money.cnn.com/2013/09/16/investing/lehman-brothers/

The task for geographers is to more concretely theorize and empirically investigate what constitutes the time-space of financial market relations. In this particular case I have presented one promising line of inquiry—one that begs for more empirical research. Derivatives, despite their necessary entanglements with the abstractions of time, do have tangible impacts as they are traded through markets. The challenge is to study uneven financial geographies before they become starkly visible in the aftermath of a crisis. The "legibility" (Sassen 2008) provided by crisis is convenient for researchers. We should take what we can from crisis, but the hard work is identifying and contesting the construction of precarious market time-space before it collapses.

Chapter 5
Speculation, Liquidity, and Derivative Geographies

"The same factors that may have reduced the probability of future systemic events, however, may amplify the damage caused by and complicate the management of very severe financial shocks. The changes that have reduced the vulnerability of the system to smaller shocks may have increased the severity of the large ones."

—Timothy Geithner, former U.S. Secretary of the Treasury—and at the time of this speech (9/15/06) President and CEO of the New York Federal Reserve Bank
http://www.ny.frb.org/newsevents/speeches/2006/gei060914.html

5.1 Introduction—Derivative Infrastructure

On December 20, 2012 the Intercontinental Exchange (ICE), an upstart energy derivatives exchange based in Atlanta, GA announced that it had agreed to purchase the New York Stock Exchange (NYSE) conglomerate for US$8.1 billion[66]. The purchase is notable for a number of reasons. The NYSE is an icon, arguably the most recognizable financial institution in the U.S., if not the world—a symbol of Wall Street and global financial capital, not to mention New York City. For the NYSE to be bought by a 12-year-old financial exchange company from Atlanta is geographically interesting on its own. No doubt it sent shivers down the spines of New York City economic development officials. More important is the reason *why* the ICE made the acquisition. It had less to do with swallowing up the NYSE itself than it did with acquiring its subsidiary, the London International Financial Futures Exchange (LIFFE), derivatives exchange based in London[67].

The reason the LIFFE was such an attraction for ICE lies at the heart of what I am examining in this chapter. That is, the cutting-edge innovation in finance and financial exchange

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[66] See Strasburg,J. and Das, A. "NYSE to Sell Itself in $8.2 Billion Deal; Planned Takeover Highlights Rise of Electronic Trading", *Wall Street Journal* (Online) 12-21-12

[67] See Strasburg and Das at footnote 57, see also *The Economist* (online), "So much for the Buttonwood Tree", 12-20-12, accessed here on 10-6-13: http://www.economist.com/blogs/schumpeter/2012/12/new-york-stock-exchange

increasingly happens in the realm of derivative instruments, not equity exchanges or stock markets[68]. Stock markets are relatively stand-alone, at least in their fundamental operations, and their profits have dropped as new technologies have streamlined their processes and shrunk profits. Derivatives exchanges on the other hand are *necessarily* more dynamic. Derivatives are contracts to exchange assets in other markets, so by their very nature they are dependent on other markets for their existence. Far from being just *derivative of*, or subordinate to primary asset markets, when they become consistently liquid they also become fundamentally interwoven with other markets. For instance, derivatives can isolate segments of a corporate production process, individual aspects of nation-state government debt (Bryan and Rafferty 2006), or even different parts of the human body (Marazzi 2011) by targeting personal information about health or consumption preferences. Derivative instruments provide opportunities to *evaluate* capital, goods and bodies and combinations thereof, that heretofore were financially idle. Put another way, derivatives have the power to financially animate connections between entities that may or may not have previously been considered financial.

To the extent that underlying "markets" trade things such as money, government debt, and corporate stock, derivative markets have become deeply entangled with both macro-economic management as well as the daily life of producers and consumers. But being related to the value of money, derivatives are also quite abstract. Richard Bryan and Michael Rafferty call derivatives "meta-capital" (2006: 13), meaning their markets constitute relations about the relations of capitalism, not unlike the international gold standard of the late 19th and early 20th Century. They argue that derivative instruments "blend" distinct pools of capital together, and in the process they break other assets into smaller parts, which can be valued and revalued in derivative markets. In this process derivatives create and destroy economic geographies. They have become one of the ways that capitalists, if not everyone can *know* the world—and enact economic globalization. All of this

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[68] ibid at footnote 58

translates into great potential for profits for those creative and connected enough to successfully construct new derivative instruments.

This is why ICE wanted the LIFFE, and by extension the NYSE. Because despite the widespread innovation of customized derivatives by investment banks, which can provide both speculative investment opportunities and insurance against the uncertainties of global commerce, centralized exchanges still provide the best chance at constructing a consistently liquid market for a new derivative. It is in this maturation—of liquid trading—that an exchange reaps consistent profits, but more importantly becomes a dependable register for measuring the stability of economic flows. It is in this moment that derivatives become not just financial instruments, but financial infrastructure.

Despite all of this, derivatives remain highly speculative. They are not investments in any conventional sense. They do not represent ownership. They are instead wagers on future events, so even though the finance industry frames it differently, derivatives objectify unknowable futures into material risks (see Chapter 4). The industry, and many financial economists, argue that derivatives are subject to calculation, probability, and thus rational decisions (Miller 1997). And given a consistently liquid market this is arguably true. But this does not change the fact that liquid derivatives markets are built on a foundation of speculation, and regardless how institutionalized that speculation becomes and how stable it appears, it can fall apart in a heartbeat.

This chapter focuses on liquidity both as a theoretical concept and a material component of market making. It does this by analyzing how liquidity is inherently entangled with speculation and spatial connectivity. Liquidity is an inherently geographic concept, reminiscent of both fluvial geomorphology, and financial geography. In fact studies of money and finance are filled with references to liquid. Corporations are dependent on income "streams" and cash "flow". Finance is interested in "pools" of capital, and markets occasionally "freeze" up. Gordon Clark, an economic geographer, has suggested that money flows, not like water, but mercury. In comparing mercury to

global finance he says, "Characteristically, mercury tends to, run together at speed, form in pools, re-form in pools if disturbed, follow the rivulets and channels of any surface however smooth it may appear to be, and is poisonous in small and large doses if poorly managed" (2005: 105). As I will discuss below, other geographers have engaged with the idea of liquidity, but the unique contribution I am making is extending this analysis directly to the operation of *markets*. Specifically I will argue that liquidity is necessary for the survival of derivatives markets. I will furthermore make the case that Chicago exchanges understood this necessity from their long experience trading agricultural futures, and they used this knowledge as a competitive advantage, and marketing tool to attract speculators, who are essential to establishing and maintaining market liquidity.

The chapter consists of two main parts. First is an extended theoretical discussion and literature review focused on liquidity in relation to financialized capitalism, systemic risk, and economic geography. Second, it discusses the recent historical case of Chicago's financial futures exchanges in the 1970s and 1980s. I analyze how those exchanges built liquid markets by depending on speculators and thus set in place a model for expansion of these markets in the 1990s and 2000s.

5.2 Financialized Capitalism

As the finance sector has gained influence in the socio-economy over the last 40 years, social scientists have struggled to explain the dynamics of a new finance capitalism. Over the last 15 years heterodox economists of all stripes, including sociologists, anthropologists, and geographers have developed the concept of "financialization" to help explain what is happening. The term has a number of meanings, at various levels of abstraction, but simply stated the term describes the growing influence of finance on other parts of the economy, politics, and everyday life (Pike and Pollard 2010), or what sociologist Alex Preda has called our overall "orientation towards financial markets" (Preda 2009: 5). Scholars have built an impressive portfolio of empirical studies of the effects of the financial sector on otherwise non-financial corporations (Krippner 2005, Froud, et al.

2006, Muellerleile 2009), monetary and fiscal governance (Krippner 2011), housing (Ashton 2009, Wainwright 2009, Gotham 2009), labor (Bryan and Rafferty 2011), retirement pensions (Clark 2000), the innumerable dynamics of globalization (Arrighi 1994, Sassen 2008, Harvey 1990, Christophers 2012), and of course, economic crisis (Harvey 2010, French, et al. 2009, Foster and Magdoff 2009, Engelen et al. 2011).

I will not analyze that literature here other than to say that financial markets are deeply entangled with most aspects of the "space-economy" (Leyshon and Thrift 1997, Clark 2005, Harvey 2006), or in other words, to the extent that space is produced by economic activity (Massey 1995), financial markets play a key role in the social relations of capitalism and everyday life at various scales (for overviews see Lee et al. 2009, Hall 2010, 2011, 2013, French et al. 2011, Pike and Pollard 2010, Langley 2008). In light of this, as I and others have pointed out elsewhere (see Chapter 3), scholars need to take more seriously the role that financial innovation is playing in commodifying the three venerable realms of human life: labor, land, and money, what Karl Polanyi (2001) called "fictitious commodities". As Nancy Fraser (2012) has pointed out, it is more than a coincidence that we are currently living through extended crises of unemployment, global ecology, and finance—which line up quite well with Polanyi's labor, land, and money.

There is a problem with the concept of financialization, however. That is, despite the extensive analysis of the integration of finance, the concept of financialization still imagines finance as something separate from the rest of the economy. In the extreme, consider the oft-cited proposition of Wall Street versus Main Street, as if Wall Street is a separate realm that can be governed and controlled, or bent to the will of *the rest* of the macro-economy—or that in 2008-2009 Main Street could somehow be bailed out while allowing Wall Street to collapse (Zizek 2009). While today this binary is largely fantastical, it resonates because it has historical precedent. Following the New Deal regulations and the construction of a post-World War II global financial infrastructure, there were relatively few incentives for financial innovation. In particular, speculative finance was

restricted by fixed currency exchange rates, high collateral requirements, and limits on the movement of capital across international borders (Helleiner 1994). It is reasonable to suggest that from 1945 to 1975 finance largely *served* the rest of the economy producing the infrastructure through which capital could remain in motion, providing credit and absorbing surplus value, but largely restricting speculation, and the intense liquidity that comes with it. One of the manifestations of this separation, of keeping finance at bay—of not allowing money itself to become subject to market rule—was that there were relatively few financial crises (Kindleberger 2005). The minor crises that did occur were mainly isolated to individual institutions. Financial markets did not play a role in any *systemic* crises, because finance did not constitute a truly interconnected *system*. This was not the case in the 19th and early 20th Centuries when financial crises routinely wrecked the economies of nation-states, if not the entire planet as in the Great Depression (Polanyi 2001). The point is, there is a historical example of keeping finance under wraps, operating within nation-state borders, and keeping it relatively separate from the rest of the macro-economy.

But today, after 30 years of steady growth in debt (Foster and Magdoff 2009) and financial innovation (Nesvetailova 2010, Engelen et al. 2011), derivatives markets in particular have intensified the relationality of the economy. Derivative markets have built multi-scalar and polyvalent connections between capital and product markets, between economic sectors and state institutions, and across borders and legal boundaries (Sassen 2008: 248-260). Finance has also become a key tool for the state (Krippner 2011), establishing what David Harvey has called the "state-finance nexus" (2010). The point is that while the innovations that constitute new financial derivative instruments and markets are in part reactions to the structural shifts of capitalism, more importantly they are actually creating new connections and driving these structural shifts or to paraphrase Joseph Shumpeter, they *constitute the ground that is shifting below our feet* (1942: 84).

Christian Marazzi (2011) has suggested that we need to reassess the role of finance in both the economy in the abstract as well as its role in everyday life. In fact, his point is exactly this:

increasingly there is no difference between the financial economy and any other sort of economic activity. Another way to think about financialized capitalism is that in at every moment in the circuits of capital, and increasingly in the mundanities of life, most everything is always already evaluated in terms of money. The finance industry has an insatiable appetite for anything that can be translated into a "financialized use value", or in other words can be sufficiently standardized to become subject to its "speculative logic" (Marazzi 2011: 107). Financialized use value creates demand for material use values just as Collateralized Mortgage Obligations did for homes and home mortgages during the 2000s (ibid). With titanic amounts of sortable digital information available about every aspect of life, very little escapes the speculative evaluation of finance. The implication is that increasingly, use values have few evaluative reference points outside of their immediately identifiable potential to be traded through a price mechanism. This is not a new quality of capitalism, but instead an intensification of the influence of market exchange across the circuit of capital. Still, we are left asking, how exactly does this happen? The concept of market liquidity provides some answers.

5.3 Liquefying Commodities

There are numerous interwoven definitions of liquidity in relation to finance and money. Cash money is considered the pinnacle of liquidity because it is the most transferable commodity—the "universal equivalent" (Marx 1990). The conventional macro-economic definition of liquidity is taken from Keynesian economics, and refers to the ability to convert assets into money (Nesvetailova 2010). One of Keynes's (1964) major contributions to economics was the argument that economic actors, particularly in times of uncertainty, have a "liquidity preference". A liquid asset is something like a share of stock of a large corporation. It is easily converted into money through a stock exchange. An illiquid asset is something like an office building, which is difficult to convert into money. Liquidity also implies a general state of an economy, where assets, capital, and

credit are fungible—or able to flow between economic firms and sectors, and across geographic scales. Notwithstanding the considerable contradictions inherent to the acceleration of turnover time in capitalism (Harvey 1990), in neo-classical economics, liquidity is considered to be a sign of economic health (Nesvetailova 2010).

In this chapter I am mainly concerned with *market liquidity*, which is the state of a market where someone can buy or sell goods without causing a significant change in price (see Nesvetailova 2010 for a thorough discussion of the various definitions and states of liquidity). One of the measurements of market liquidity then, is the "spread" between the price *asked*, and the price *bid* for a good. A small spread indicates a relatively efficient market where there is general agreement on the value of a good; a large spread represents inefficiency and disagreement. Carruthers and Stinchcombe (1999) elaborate this point as it relates to the standardization of commodities. For complex commodities, particularly financial commodities, they argue that a liquid market is a sign of "consensus" about both the standardized characteristics of the traded commodity, as well as a sign that the market participants trust that the prices being produced in the market are an accurate representation of value. There is nothing inevitable about the emergence of this consensus, however. Instead these attempts to "qualify" (Millo 2007) or "articulate" (Lepinay 2007) abstract commodities requires the work of many institutional "market makers", corporate bureaucrats, and the state.

Liquidity is never straightforward. Both the concept and the material state of liquidity are constituted by contradictions, which typically reveal themselves in market failure and financial crisis. To begin with, as Paul Langley (2010) has pointed out, market liquidity is always constituted by its other, *illiquidity*. In other words, there is no absolute liquidity, but rather liquidity relative to the idiosyncrasies of any given market and its context. Liquidity is also a contested state, discursively constituted and performed by market actors (Langley 2010), and subject to misfire and failure. MacKenzie (2010), in a friendly critique of Carruthers and Stinchcombe (1999) suggests that the

highly functional or "canonical mechanism" liquid market that they present is often much more "precarious" that it may seem, especially as it is represented by the financial industry.

5.4 Geographies of Systemic Liquidity

Keynes anticipated the effects of these contradictions in the *General Theory* in 1936. He realized that the speculative logic of money and exchange was a powerful force, and that it could become dangerous to the macro-economy when it converged with liquid financial markets. Keynes argued that financial speculation is not *inherently* harmful—but could become so if it became the dominant mode of evaluation in an economy. He explains what it means to have "successfully organized "liquid" markets" (1964: 159):

> Thus investment becomes reasonably "safe" for the individual investor over short periods, and hence over a succession of short periods however many, if he can fairly rely on there being no breakdown in the *convention* [the market] and on his therefore having an opportunity to revise his judgment and change his investment, before there has been time for much to happen. Investments that are "fixed" for the community are thus made "liquid" for the individual" (1964: 153, emphasis added).

Part of the value of any *investment* is the expected likelihood of being able to sell it in the future. Thus Keynes's "convention" is the desired state of a market for the speculative trader, if not any investor. The more speculative an investment, the more important is the expectation of a stable market (see Chapter 4). Indeed as Keynes suggests, to the extent that a market becomes a "convention", the maintenance of the market itself becomes the responsibility of the "community" or more accurately, the state. But there is more to Keynes's story. On the next page, he explains the implications of market speculation:

> In abnormal times in particular, when the hypothesis of an indefinite continuance of the existing state of affairs is less plausible than usual even though there are no express grounds to anticipate a definite change, the market will be subject to waves of optimistic and pessimistic sentiment, which are unreasoning and yet in a sense legitimate where no solid basis exists for a reasonable calculation (1964: 154).

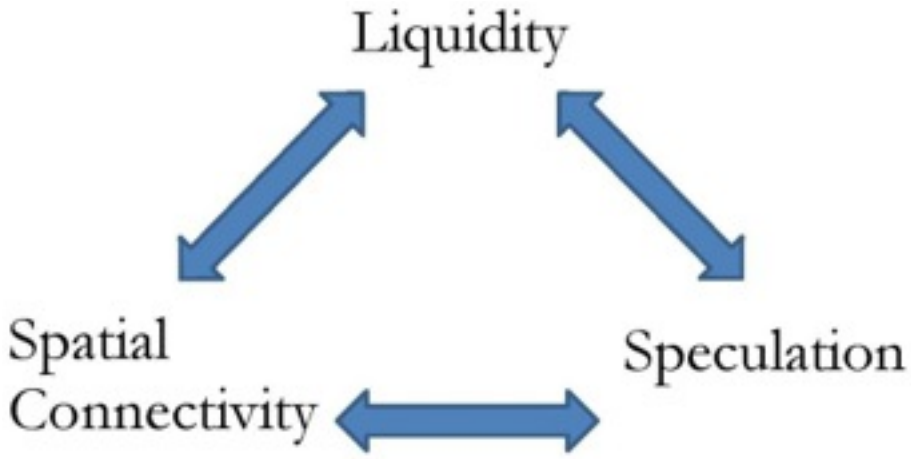
Keynes is suggesting that liquid markets create the possibility for non-committal behavior, or for temporary commitments of capital. He means that it is not necessary to know much of anything about any particular capital if it is always readily evaluated in relation to money. The logical question is how all of these financialzed use values can be evaluated if suddenly the market "convention" ceases to be liquid? It is a good question that I will discuss in more detail below.

Liquidity is also a spatial concept, although surprisingly few geographers have engaged it. This is partly a condition of geographers' general neglect of markets (see Berndt and Boeckler 2009, Peck 2012). Luckily this latter pattern is beginning to change, particularly in the work of financial geographers (see Hall 2010, 2012, 2013 for overviews), and environmental geographers and political ecologists working on the commodification and marketization of nature (cf. McCarthy and Prudham 2004, Robertson 2007).

To the extent that geographers have engaged directly with liquidity, it has mainly been a way to conceptualize the securitization and spatial transformation of the economics of home mortgages. Homes are stubbornly grounded, local, and fixed. For most of U.S. history, local banks and bankers issued mortgages based on localized assessments of property value, and the creditworthiness of a home owner (Gotham 2009). Since the early 1970s, however, a number of developments have allowed homes and mortgages to be standardized and "securitized", and thus traded in centralized markets (see Ashton 2009, Gotham 2009, Wainwright 2009, Carruthers and Stinchcombe 1999, and Leyshon and Thrift 2007 generally on securitization). This process requires mortgages to be "pooled" into groups based on the type of loan, and credit ratings of borrowers. The attributes of the pools are then translated through mathematical models, which not surprisingly, Chicago futures exchanges helped develop (see Chapter 2). Modeling allowed government mortgage agencies to construct standard measurements of risk, which they hoped would be consistently "priced" by investors or speculators. Through this process localized spatial fixity is transformed into mobile

financial value (Gotham 2009), although this transformation is never finished and always tenuous (see Harvey 2006).

The construction of markets for liquefied mortgages produces a number of economic geographies. Local face to face relationships between lenders and borrowers are remade, as are previously localized regimes of land title and property rights (Ketcham 2012). Localized credit and debt are redirected into national or global flows of financial investment (Aalbers 2009) through a new model of mortgage banking called "originate to distribute" (Nesvetailova 2010). Home prices also become relatively disembedded from local geographies and re-embedded in speculative markets that might be centralized in Chicago, New York, or London and include traders and customers with national and global reach (Aalbers 2009, Gotham 2009, Wainwright 2009). With liquid markets for homes, home owners become more mobile as it becomes easier to buy and sell homes, as well as speculate in home ownership (aka "flipping" homes). In the U.S. the state became deeply implicated in the process as government, and quasi-government, for-profit agencies used their government guarantee to back increasingly "sub-prime" mortgages to fuel Wall Street's securitization appetite (Ashton 2009). On top of facilitating the construction of a global speculative financial geography this also drove redevelopment of urban and suburban spaces across the U.S. None of this was possible, however, without creating some sort of consensus about the relative value of these highly abstracted securities.



Author's rough sketch of the geographies of liquidity

These new geographies of economic relations certainly have properties of instability and impermanence, but despite the slowdown caused by the 2007-2009 crisis, they have also increasingly become formalized and institutionalized since the 1970s. The liquification of a broad spectrum of assets and debts has fueled the growth of financial institutions, new laws and regulatory structures, and cultural and political realignments with regard to speculation. Saskia Sassen (2008) refers to the emergence of a massive capital market system in the 1980s as a "distinct institutional order", which is reminiscent of Keynes's market convention albeit on a more intensified global scale. The point being that financial markets, despite their constant fluctuation, and regardless of how "liquid" they are, become relatively stable reference points for economic flows just like any other institution, and as such are constitutive of spatialized economic relations at various scales.

5.5 Chicago: Fixated on Liquidity

To really grasp the development of these new financial geographies of liquidity and speculation we have to step back in time. The upheaval in finance that derivatives caused began in Chicago in 1972, and was largely isolated there for the next 15 years. By the late 1980s, financial derivatives were quickly spreading across the globe, but largely by copying what was invented at the

Chicago Mercantile Exchange and the Chicago Board of Trade. Chicago, being the origin of this upheaval, as opposed to London or New York is not unimportant. In fact, when the Chicago Mercantile Exchange invented the first successful financial futures contract, on seven foreign currencies in May of 1972, New York financiers largely looked down their noses at the upstart financiers in the "Wild West" (Melamed 1996).

New Yorkers thought the Chicagoans were hicks and "crap shooters"[69] who knew plenty about grains, soybeans, and cattle across the vast plains of the Central and Western U.S., but were certainly not sophisticated enough to comprehend international banking, the political economy of interest rate fluctuations, or the patterns of price changes on the stock markets of the great financial capitals of the world (Melamed 1996). Why would anyone expect a small group of Chicago commodity traders to invent what Nobel Prize-winning economist Merton Miller would call a "revolution" in finance (1991: 3). In fact in the beginning, no one expected this. Not even the Chicagoans. Nevertheless, within just a few years, it was clear something big was brewing on LaSalle Street in the Windy City.

Of course the Chicagoans were never as unsophisticated and dim as the New Yorkers thought. The irony, however, is that it was in fact the Chicagoans' relative ignorance of the intricacies of finance, and instead their expertise in trading agricultural and raw material commodities that provided just the sort of knowledge, experience, and institutional capacities they needed to revolutionize the banking, investment, and financial trading industries. They did not try to play the banking or stock market games that were dominated by New York. Instead, as in the theory of financial bricolage (Engelen et al. 2011), they leveraged what they had, and this made all the difference. Observing that the global economy was in a state of transition, they put to work their experience of risk management and contract construction, and a multi-generational talent for producing speculative traders—people who were good at reading trading floor psychology, and

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[69] see "The New Currency Market: Strictly for Crapshooters", *Business Week*, April 22, 1972

above all else interested in the thrill of the speculative gamble (Zaloom 2006). In 1976 *Business Week* explained their innovations this way:

> The New York Stock Exchange is turning over 30 million shares a day one day after another, but the most vital creative corner of the investment world today is not at Broad and Wall in New York. It is at LaSalle and Jackson in Chicago, where the towering Board of Trade stands. In a decade of dazzling growth, the nation's futures markets, led by the Board of Trade, have written a new definition of what constitutes a commodity, changed the investing habits of a sizable number of people, helped some very large companies smooth out earnings, and exhibited skills at marketing and merchandizing that make such giant rivals as the NYSE look old and tired by comparison.[70]

The most remarkable talent the Chicagoans had was constructing liquid markets.

I will make three observations about Chicago's 1970s and 1980s speculative financial geographies. First is the unique importance of liquid markets for futures and derivatives contracts, a point that has yet to have been elaborated outside of financial economics, but is something that Chicago traders and exchange operators realized over 100 years ago. Second, knowing this, the Chicagoans learned early on to depend heavily on speculators to establish and maintain liquidity for new futures contracts. While important for hedgers, Chicago's speculators were less interested in any objective consensus surrounding the standardization of commodities, or the value of any given contract, and more interested that the market just kept producing prices—a constant register for their ongoing wagers. Third, Chicagoans necessarily transformed the economic geographies of every one of the underlying commodities that they traded futures on. For the successful contracts, or those that established a critical mass of speculators and hence, liquidity, the prices of the underlying commodities became an alternative investment opportunity from the commodity itself. As such, the futures prices became an important factor determining value in the commerce of the underlying commodity. In fact, it was exactly this production of a new economic geography that produced the conditions of success for a contract.

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[70] "Commodity Trading: More volume, More customers, More products", *Business Week*, March 15, 1976, pg. 50-7

5.6 Necessitating Liquidity

The unique relationship between futures contracts and liquidity is constituted by four main characteristics. First, is futures' status as a zero sum game. Unlike a cash market for corn, hogs, or corporate stocks, in a futures market, no wealth can be created or destroyed. In a market for an actual commodity, everyone can potentially benefit from an upward trend in prices, thus wealth can be created[71]. In a downward trending market, the opposite can happen—everyone can lose and wealth can be destroyed. Futures on the other hand, do not represent ownership of a commodity, but are instead wagers on the possibility of a change in the price of that commodity. Any gains made from upward trending prices will be offset by the losses of those that bet against those increases. Second, markets in actual assets and commodities are also markets for use values. No matter how abstract, a use value has some sort of value independent of its capacity to be exchanged in a market. This is not the case for futures contracts, which represent almost pure exchange values[72]. As such, a futures contract has almost no value outside of the domain of the market (see Chapter 4).

Third, in futures markets, collateral requirements are kept very low to encourage speculators to trade large positions. While futures positions are "open", however, the exchange owned clearinghouses closely monitor the open positions and daily "mark" them to the changing market prices. As prices change, the clearinghouses immediately collect additional collateral from the losing positions to protect the exchange. In order to monitor risk, therefore, exchange is dependent upon the constant production of prices. Without a consistent flow of prices, the exchange would have to raise collateral levels to protect itself, but in the process it would drive away speculators, which would

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[71] Whether or not *value* can be created in any financial market is a different question, and one that I will not address here.

[72] It could be argued that a futures contract could be held to expiration at which point it represent the right or obligation of the contract holder to execute a potentially profitable exchange of an actual commodity. This is technically true. The reality of futures markets, however, is that at least 95% if not 99% of contracts traded are "offset" prior to expiration because the holder of the contracts have no interest in participating in the commerce of the underlying commodity (Hieronymus 1977).

lower trade volumes even further. Fourth, is simply that futures contracts expire, usually in less than a year. Consequently, unless a contract holder is interested in actually taking delivery of a quantity of a commodity, which less than 5% are (Hieronymus 1977), a second trade to close out the futures position is immanent for 95%+ of open contracts. Furthermore, unlike in the securities markets or the underlying commodities markets where only the buyer is still materially interested in the market, after an initial trade, both the buyer and the seller of a futures contract have an ongoing economic stake in the market. The contract will remain "open" until both parties enter closing trades. This was referred to by one of my interviewees as the "bilateral" nature of futures markets (personal interview with Thomas Russo, 2-26-13).

All four of these aspects of futures markets point to the crucial question that every futures trader or customer asks when they open a contract: Will the market be here when it is time to close out the contract? If there is reason to believe the market will not exist in the future, no one will enter into the contracts to begin with[73]. This is much less of a concern in markets for use values because the potential exists to exchange that use value in a venue outside of the centralized market, or to actually use it if necessary. But in a futures market, market exchangeability itself is the use value. It is for this reason that liquidity in a futures market is crucial. I asked Todd Petzel, a practicing derivatives economist, and someone who helped to build many of the CME contracts in the late 1980s and 1990s, why a futures contract might fail. His answer was revealing:

> It's a little bit definitional. You say, well why are the spreads wide? It's because there's no volume. Well, why is there no volume? It's because the spreads are really wide? It's like a dog chasing its tail. […] …exchanges have come to the point where they get compensated, dedicated market makers to stand and make [a market]. […] And the first thing they ask is if I get a position, can I get out? Can I get out at a reasonable price? That is something that every veteran of any option or futures or even cash markets will tell you. You might think

[73] One might suspect that hedgers, looking to insure against their already existing risks, might be willing to use futures for insurance even if the prospect for a continuing market was questionable. The experience in Chicago, however, is that this is not the case. There are two reasons. First, if there is no consistent flow of prices, the hedger has no way to regularly evaluate the value of the hedge. Second, most hedgers are not interested in dealing with the exchange and delivery of actual assets, which is costly. Instead they expect to exit the market by selling prior to expiration.

> you bought at a great price but if you can't turn around and sell it, it doesn't matter how good you think that first price is. (personal interview 2-27-13)

It is widely accepted that the only way to ensure that traders will be able to sell is to encourage speculators to participate. There must always be disinterested investors or gamblers to take the other side of the wagers that hedgers want to enter. Speculators also represent the relative efficiency of, and indifference to the market price at any given moment. If news of a change in supply or demand suddenly hits the markets and there are not enough participants, or everyone interpreted the news as an immanent price increase, no one would bet against that increase. The spread between the bidding and asking prices would widen, and eventually trading of contracts would cease. The more participants there are, the smaller the price spreads, and the more smoothly the prices move. A liquid market may not be predictable, but at least it reliably functions as a market. In other words, for a zero sum game to function there must be consensus that prices are unpredictable, but also that regardless what happens, there will be prices.

5.7 Testing the model on finance

The Chicagoans knew from their long history of experimenting with agricultural contracts that regardless how brilliant a new contract innovation seems to be, it will only succeed if it achieves a sufficient level of liquidity by attracting disinterested speculators to participate. When new contracts were innovated, the leaders of the exchanges would cajole and compel the speculative floor traders to trade the new contracts in the hopes of achieving a level of liquidity where hedgers would begin to make consistent commitments to the new contract, thus attracting more speculators, and so on. Some of the traders resisted the pressure to participate in the new contracts because they thought it would remove liquidity from their home pits. Les Rosenthal, a veteran CBOT trader and exchange executive explained initial resistance to interest rate futures at the CBOT this way:

> The administrations at the exchange were basically made up of floor traders and floor trader types. So if you are a corn trader and you were on the board of directors of the Board of Trade, and something [a new contract] came along, and it looked to you like uh-oh, that might take away a couple traders from the pit, or some interest from somebody on the outside trading, and it might take away from the volume of the corn futures where you were trading, you were naturally against it, because you didn't want competition on the block (personal interview with Les Rosenthal, 3-14-12).

The CME dealt with the same issues, although they were somewhat more successful at convincing traders to step into the new financial pits to trade even though they knew nothing about finance. Mark Powers, who designed the first currency futures at the CME described walking around the floor with a sign-up sheet for agricultural traders to commit to 15 minutes a day in the currency pits. Leo Melamed, the Chairman of the CME at the time explained it this way: "Every day, 15 minutes! It's all I ask! Get in that pit! 15 minutes! […] And they used to hand in their card to me on the way out everyday. Here's what I did in 15 minutes. And we beat the New York Stock Exchange in that fashion. Our volume just went like that [hand motion up]. And volume was the critical component" (personal interview, 4-9-12).

The exchanges also paid close attention to the design of the contracts so they were both large enough to be efficient for commercial purposes, but small enough that independent "local" traders, aka "scalpers" or speculators, could afford to take on contracts without risking too much of their capital. The Chicagoans had observed the New York Produce Exchange attempt and failure to establish currency futures in 1970, mainly because the contracts were too small (~$10,000) to attract any commercial attention (Tamarkin 1993, Weitzman 2011). The CME started their currency contracts around half a million dollars, but realizing they were too big for local speculators, cut them to $250K, and then to $100K, which seemed to be a happy medium. This reduced size, combined with the cajoling of the exchange executives, convinced agricultural traders who knew almost nothing about banking and currency to give it a try. The day that currency futures began trading in 1972, a CME trader was quoted saying, "I just bought a couple of British Pound contracts even though I didn't know what I was doing. But what the hell—most of us who trade pork bellies have

never been on a farm. We'll learn currencies pretty quickly, too."[74] Similar stories can be found for most every new contract traded on the Chicago exchanges.

The exchanges also worked hard to recruit new speculators, and speculative investors. They ran ads in *The Wall Street Journal*, and the main futures industry trade monthly, *Commodites Magazine* (see images below). As discussed at length in Chapter 2, the Chicagoans also defended the virtue of speculation in the face of criticism from regulators, the U.S. Congress, or occasionally from those with an interest in the production or commerce of the underlying commodities. The skills and rhetoric that the exchanges developed in the 19th Century to ward off this criticism changed very little by the 1970s and 1980s and is still quite similar today. The argument, which is also regularly marshaled by the Commodity Futures Trading Commission, always follows this general logic: 1) all economists agree that hedging risk and price discovery are economically beneficial; 2) hedging and price discovery require liquidity; 3) sufficient liquidity can only be provided by speculators; 4) therefore speculators are doing virtuous work.

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[74] "Mercantile Exchange's Money Market Opens With Active Trading", *Wall Street Journal*, May 17, 1972, pg. 16

The International Monetary Market: a major step toward stability in world trade.

"Nothing else in the world is so powerful as an idea whose time has come."
Victor Hugo

"There is today a major need for a broad, widely based, active and resilient futures market in currency."
Prof. Milton Friedman

You're a multi-national electronics corporation.
You've just made a $10 million sale overseas.
Your profit on the deal is $300,000.
You could wind up losing $150,000.

You're a multi-national oil company.
You've just made a $10 million purchase overseas.
You could wind up paying $10,450,000.

You're a pretty sophisticated speculator.
You keep your eye on the exchange rates.
You think the Deutschemark is undervalued.
Now you can do something about it.

Of course, the speculator *could* lose much of his risk capital. The electronics corporation *could* wind up with a windfall profit of $750,000. The oil company *could* pay as little as $9,550,000 for its purchase.

The difference is this: of the three examples cited, only the speculator *wants* that kind of risk. A major corporation does not. The recent agreement to let currencies vary 2.25% above or below official parity has put many international companies in a business they don't want to be in—currency speculation. Changes in currency values interfere with the conduct of day-to-day business and are even more disruptive of long-range planning and pricing.

Speculators—the shock absorbers of futures transactions—have been unable (though certainly not unwilling) to participate. As Professor Milton Friedman has said: "The market needs speculators who are willing to take open positions as well as hedges. The larger the volume of speculative activity, the better the market and the easier it will be for persons involved in foreign trade and investment to hedge at low costs."

There is little doubt that substantial numbers of speculators will be drawn to currency futures. (If a city-dweller, for example, is willing to take the time to study pig crop reports and various other factors affecting frozen pork belly futures, it seems more than likely that he would find a study of the ultimate commodity—money—at least as familiar and understandable.)

In the interest of bringing greater stability to world commerce; in the interest of providing a major marketplace for those who have the financial ability and the desire to pit their judgment against the future; the Chicago Mercantile Exchange has established the International Monetary Market. As one of the largest and most innovative futures markets in the world, the CME is uniquely qualified to do so. Its brand new trading floor complex together with its world-wide electronic communications facilities make it, technologically, the most modern exchange in the world. Yet this technology is backed by more than fifty years of futures trading experience in the futures trading capital of the world.

The older order changeth. Bretton Woods is dead. The time has come for a new idea. The International Monetary Market is born.

Trading begins in mid-April, 1972 in Canadian dollars, Deutschemarks, Swiss francs, British pounds, Japanese yen, Italian lira and Mexican pesos. Interested parties may secure further information by writing to the address below.

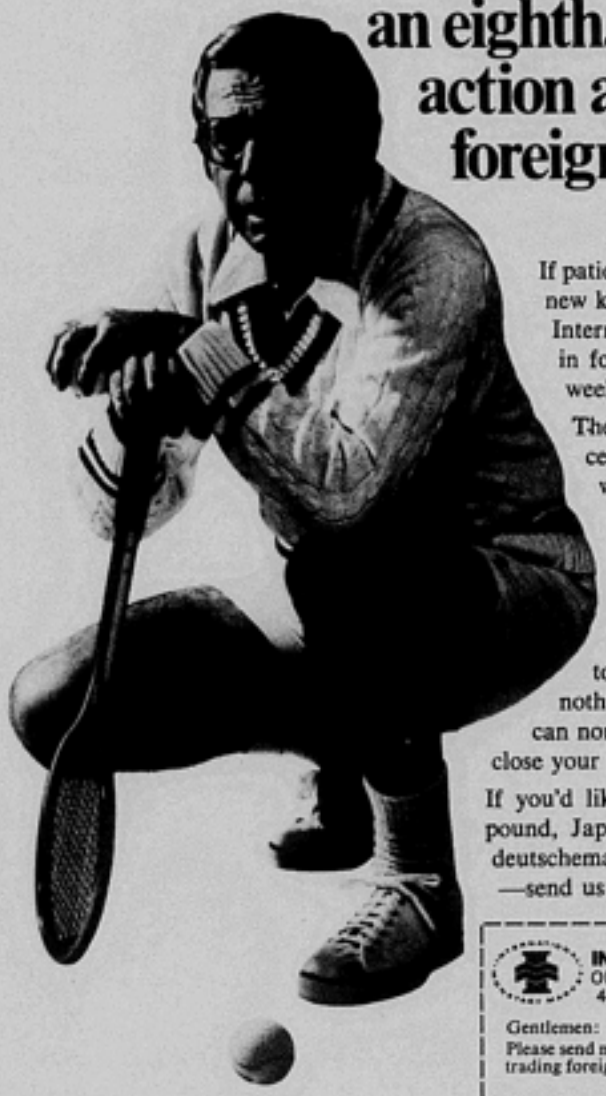
INTERNATIONAL MONETARY MARKET
OF THE CHICAGO MERCANTILE EXCHANGE
110 North Franklin Street, Chicago, Illinois 60606

3

This was not the first time the CME put Milton Friedman to work (see Chapter 2). Note the section "Speculators—the shock absorbers" in the left column (*Commodities Magazine*, April 1972)

I'd go nuts

waiting for utilities to go up an eighth. I can afford more action and I've found it– foreign currency futures.



If patience is not one of your virtues, there's a whole new kind of market coming up fast. It's called the International Monetary Market in which positions in foreign currency futures are held for days or weeks rather than months or years.

The IMM has an almost magnetic attraction for certain kinds of investors — men of judgment who are willing to take greater-than-average risks in the hope of greater-than-average gain.

The reasons for this attraction are not hard to find. There is virtually no inside information. There are only a handful of currencies to keep track of. There are no certificates to get lost. Going short is no problem—there's nothing to borrow, no up-tick necessary. And you can normally get your money out the same day you close your position.

If you'd like to learn more about trading the British pound, Japanese yen, Canadian dollar, West German deutschemark, Swiss franc, Italian lira and Mexican peso —send us the coupon below.

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444 West Jackson Blvd., Chicago, Illinois 60606
Dept. 936

Gentlemen:
Please send me additional information and bibliography on trading foreign currency futures.

Name _____

Address _____

City _____ State _____ Zip _____

(*Commodities Magazine*, July 1973, pg. 5)

Attracting hedgers (left column), and speculators (right column)
(*Commodities Magazine*, January 1976)

In the beginning with the currency contracts, the speculators at the Chicago Mercantile Exchange lost money on a regular basis because the market was imperfect: there was not enough information available to understand the dynamics of supply and demand for particular currencies, and the underlying markets for day trading or customized forward trading of currencies was private information, unavailable to the CME traders. This slowly changed, however, as bankers realized they could potentially use the new contracts as hedging mechanisms against their private, customized forward contracts with large commercial interests. As with any other futures contract, the Chicago traders watched this market activity and realized there were large spreads between what banks were charging their customers for currency transactions and the price they were paying on the currency futures exchange. The traders learned how to make arbitrage trades between the various marketplaces, and eventually the banks had to begin looking at the price of a currency in Chicago before they could set the price for their customers. Initially the New York and London banks ignored the CME, but eventually they had to pay attention. Arbitrage between the various markets began to put pressure on prices and as a result the global currency markets began to become more transparent and in the language of financial economics, "competitively efficient" and trending toward "equilibrium". The same thing happened with U.S. Treasury Bonds and Bills, Eurodollars, and eventually, the vaunted New York Stock Exchange (see Chapters 2 and 6). As the Chicago futures prices for each of these instruments came closer to a "convention", the geography of U.S. and eventually global financial flows were redirected through Chicago. Just as the CBOT transformed the commercial and natural landscapes of the Great West in the 19th Century (Cronon 1991, Carey 1989), so the Chicago exchanges began to transform the financial and monetary geographies of the U.S. and the world in the 1970s.

Something was different, however, between the agricultural markets and the new financial markets that the Chicagoans were beginning to connect with. Agricultural commodities have fairly obvious use values that are distinct from their exchange value, as well as relatively observable and

material limits on supply and demand (things such as weather and seasons, length and cost of storage, shipping costs, and common delivery points—ports, rail hubs, etc…). These barriers serve as regular checks on speculative bubbles. This is not to say monopoly interests, investor sentiment, and speculative euphoria cannot cause bubbles in markets for commodities—they can. This happened most recently with the grain bubble of 2007-2008 (Kaufman 2010), but it is rarer in markets for financial instruments.

The financial markets that were the new object of speculation for Chicagoans were different. The limits and barriers in the commerce for finance and financial instruments are more convoluted and abstract. The costs of production, storage and transport of financial instruments are tiny compared to agriculture, so the limits to supply and demand for financial instruments are determined largely by their price. In other words, currencies, debt, and interest rates have much less obvious use values. Instead their exchange values tend to dominate making them more like money where exchange value is its use value.

5.8 Conclusion: Revisiting Keynes

This invites us to revisit Keynes's warning. Liquid markets attract speculators, who by their very nature are tempted to engage in readings of *market sentiment* as opposed to sustained engagements or investments with farming, resource extraction, capital investment, or any other enterprise, simply searching for trends in the expansion of exchange value. There is nothing inherently perverted about this tendency, rather it is a condition of relations of capitalist accumulation. After all, this is exactly the goal of the productive capitalist, who converts her exchange value into variable and fixed capital in the hopes of producing surplus value embodied in commodities, which can then be converted back to money. The speculator, or the finance capitalist if you will, is simply attempting to eliminate the production component of the circuit of capital. History has shown us, however, that extreme inflations of exchange value usually result in market

collapse and economic crisis (Keynes 1964, Kindleberger 2005, Galbraith 1994). Despite the 2008 financial collapse, which apparently has not engendered a serious reassessment of society's dependence on finance, we are now witnessing an intensification of this dynamic as increasing parts of the economy are subject to speculative sentiment: weather, climate change, carbon credits, and national security (Aitken 2011). Is it possible as Marazzi (2011) alludes that every part of the economy could be subsumed by its exchange value and thus speculative sentiment? This is a question best left for another project.

What is clear is that to the extent that liquid markets become institutionalized "conventions", or what Lepinay (2007) calls an "index of a common world", these financial registers also produce pathways and habits for broader economic relations (Clark 2005). When they suddenly collapse, as recently happened in 2008, we saw not just the bankrupting of firms and trauma inflicted on the financial industry, but a collapse in the pathways of commerce in general. Home construction stopped. Firms stopped hiring employees. People stopped buying automobiles, and the two of the three main U.S. auto manufacturers for all practical purposes went bankrupt. Five years later the economy still has not recovered, and part of the reason is the speculative registers that produce and reproduce the pathways for financial transactions and information flows have not been fully rebuilt. As long as exchange value dominates the economy, the only way they will be rebuilt is to reconstitute liquid markets.

Chapter 6

Failing Forward Through the 1987 Crash

"The national publicity generated by this unprecedented event and the consequential scrutiny our markets received resulted in recognition of our markets as a serious and important component of the world's financial structure."

—Leo Melamed (1993), former Chairman of the CME referring to the 1987 Crash—

6.1 Introduction

I will never forget Monday, October 19, 1987—Black Monday. I was 15 years old, and when I came home from school my normally unflappable mother met me at the door with a dire look on her face. I immediately asked her what was wrong, and she said, "The stock market was down 500 points today". That was all that needed to be said. My father had changed careers two years earlier, deciding to try his hand at investment advising, which at that time was still referred to as "stock brokering". Like any small business, there was little money in it until a new broker built a solid base of clients, which could take years. My father was in the middle of that process, and was for that day and the foreseeable future, dealing with a lot of very worried and upset clients. After all, what could you tell them? "Hold on…I promise this won't be like 1929"?

Anyone you talk to who was in the finance business in 1987 has a story about that day. Even though the crash did not cause a depression or even a recession and the stock markets quickly made up the ground they lost, on that day many people did believe it was 1929 again. In fact the Dow Jones Industrial Average dropped more on Oct. 19 than it did on any one day in 1929. For the Chicago commodity/futures exchanges, this was the day when there was no longer any doubt about how entangled they were in the global financial system. Agricultural futures had been surpassed in volume by financial futures at the CBOT and the CME in 1982[75] and while Wall Street was familiar

[75] Author's calculations based on data provided by the Financial Industry Association

with Chicago financial futures by that time, much of the public and many politicians still thought of the Chicago exchanges as grain and pork belly operations. But on the morning of Tuesday, Oct. 20, the CME came within a whisper of defaulting with its largest creditor (Melamed 1996), and the CBOT was not far behind. With the help of the U.S. Federal Reserve, no exchanges collapsed that day, but by most accounts, the entire financial system was teetering on the brink (Bernanke 1990). The CME did not shutter, but the next year would be one of the most politically challenging periods in the Chicago exchanges' histories. Nevertheless, in the end they would come away stronger than ever, having successfully defended their products from a flurry of attacks from Wall Street and the SEC.

The more important outcome of the crash was the lesson gleaned by most everyone in the financial industry and government. That is, the connections between stock markets and futures markets needed to be strengthened. A few people argued for a ban on stock index futures, but this gained no traction. Others argued for less speculation, and as I will discuss, this became an important debate that the Chicagoans won. After all, the history of futures markets demonstrates that success comes hand in hand with rationalization of underlying markets. In effect, the two markets must become one efficient pricing mechanism.

The main empirical contribution of this chapter then, is to elaborate a case where a futures market contributed to intense volatility of the underlying market, and came very close to collapsing, only to survive and build even deeper connections with the underlying market. Furthermore, this particular case previews the development of a deeply interconnected financial economic system well on its way toward becoming "too big to fail".

Lastly, this case demonstrates what economic geographer Jamie Peck (2010) refers to as neoliberalism's tendency to "fail forward". There are many reasons why more restrictions on speculative finance were not enacted after 1987. One of the most important is a market ideology had developed by that time that would not allow markets in and of themselves to be blamed for

market failure. In neoliberal dogma market failure is always the result of factors exogenous to the market essence. In the case of the 1987 crash, failure was blamed on a lack of robust linkages between the NYSE and the CME. Through the enrollment of numerous political actors and institutions, this diagnosis became accepted fact, and the solution was to build a stronger, faster, and most importantly, more integrated financial system.

6.2 Delivering Stock Indexes

Recalling the story of the institutionalization of speculation in chapter 2, by the early 1980s the Chicagoans had constructed an advantageous regulatory environment largely based on their own rules. The federal government was slightly more involved in the CME and CBOT operations after 1975, but the tradeoff was that even more speculative capital was funneled onto their exchanges. Most importantly, they were managing their own collateral levels, with the goal of attracting speculators to fuel the liquidity necessary to serve hedging functions. They had leveraged their historical knowledge of agricultural commerce and risk management to successfully develop currency and interest rate futures contracts. The Chicago Board Options Exchange (CBOE) also continued to successfully trade options on single stocks, but they were spun off from the CBOT and regulated by the SEC, a story with different dynamics that has been thoroughly covered elsewhere (Falloon 1998, MacKenzie and Millo 2003, Millo 2003, MacKenzie 2006).

Beginning around 1980 the product the futures exchanges most wanted to develop was a futures contract on stock indexes. Indexes, having first been developed by Charles Dow in the 1880s (DeGoede 2005), had become popular measurements of the average movements of the stock market, and were gaining popularity as the basis for "unmanaged" mutual funds. The Chicagoans rightly believed that if they could develop an accurate hedging instrument on the broad trends of the stock market, they would be set up to reap enormous profits from trading. There was one significant problem. With traces back to 19th Century common law, all futures contracts were

required to include a provision for the *exchange and delivery of the underlying commodity* at expiration. Even though 95%+ of futures contracts were traded away prior to expiration (Hieronymus 1977), in order to be enforceable, at least the potential for the "contemplation" of delivery, was required (Stout 1999, Levy 2006). While complicated, the 1970s contracts for GNMA mortgage pools and Treasury Bonds included these provisions. For an index of stocks, however, it was virtually impossible. Because a stock index was an average, pieces of 30 different stocks in the case of the Dow Jones, or 500 stocks in the case of the Standard & Poor's indexes, would need to be delivered. This was a complication that even the expert contract designers in Chicago could not reasonably envision. Furthermore, the possibility of delivery of millions of shares of stocks on the standardized dates when the futures contracts expired could have threatened the stability of the stock markets. In light of this, the SEC strongly objected to a deliverability feature, and in this case, even the CFTC agreed it could be destabilizing (see Millo 2007).

The only solution was to settle index futures in a cash difference, the equivalent of the difference between the futures price of the stocks and the actual price of the stocks in New York (see Architzel and Connolly 1981). The Chicago exchanges pressed the CFTC to allow this change, but some at the CFTC were hesitant given that for 80 years delivery formally separated virtuous speculation from the vice of gambling (Levy 2006, Millo 2007). In the negotiations over the 1982 reauthorization of the CFTC, however, there was general agreement that the contracts had the potential to serve a useful economic purpose of hedging for holders of stocks, particularly portfolios of stocks. Phil Johnson, the Chairman of the CFTC[76], after a long debate over the definition of gambling, convinced the other commissioners, to vote to allow the first stock index contract (see Millo 2007).

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[76]In the early to mid 1970s Johnson was the outside council for the CBOT. Anyone familiar with the 1974/5 Congressional amendments creating the CFTC agrees that he played an influential role in drafting the legislation that precipitated the expansion of financial futures (see Chapter 2)

Yuval Millo (2007) has argued that the elimination of the delivery requirement and replacement of the physical commodity as the basis of a contract with an abstract mathematical formula signals the importance of the growing actor-network required to establish and maintain a derivative contract. This is undoubtedly the case, particularly with regard to the importance of economists, economic modeling, and federal regulatory agencies. The relationship with the commerce of agricultural commodities was relatively straightforward. The relationship between futures and the "commerce" of capital markets was more complex and required political legitimacy, mathematical engineering, powerful computers, and translation of convoluted economic principals into language that pit traders could understand.

A further implication was that with the material connection to the underlying commodity severed, the CME had no fundamental interest in coordinating the underlying market. Unlike grain, or cattle, or even GNMA certificates where the exchanges had actually become part of the commercial flow of these "commodities", other than a flow of prices from the NYSE, the CME had little reason to thoroughly investigate, let alone intervene in the standardization, clearing, or settlement processes for stocks. Also notable was that the Chicagoans were attempting to build a futures contract on an underlying "commodity" that was already trading in a centralized, liquid marketplace. The financial futures they previously developed, on currencies, GNMAs, or Treasury Bonds, were based on financial commodities that traded on dispersed markets that were less standardized relative to stocks (see Miller 1991). In these latter cases, the futures market exerted pressure on the dispersed markets to eliminate inefficiencies and produce consistent and accurate prices. This was less important, at least in the beginning, for the stock market because consistent prices were already flowing.

The replacement of the possibility of delivery with cash settlement had another more important effect. One of the principals of futures markets is that at the time of contract expiration, there must be convergence in the price of the underlying commodity and the price of the futures

contract (Hieronymus 1977). *Ceteris paribus*[77], this is necessarily the case since leading up to the expiration. Otherwise "arbitrage" traders will, for instance, buy the actual commodities, sell the futures, and then deliver the actual commodity to cover the futures contract[78]. Given the opportunity for a riskless profit, the prices' convergence to eliminate said opportunity. The key point is that the physical commodity, as something with a supply and demand as the result of commerce, serves as an anchor for the futures contract. The futures price may deviate, however wildly, over the course of its life, but eventually as it approaches expiration, it is drawn back to the grounded reality of the commerce of the physical commodity. In the case of cash delivery, however, there is never an option to deliver the physical commodity. As discussed above, in the case of corporate stocks, this was actually considered dangerous because as expiration approached there could be sudden spikes in buying and selling of stocks causing instability in the underlying market. The absence of a delivery option does not mean that the prices do not necessarily converge. There is convergence as a result of arbitrage trading between the two markets, but it is filtered through the averaging of 500 stocks into an index.

In ways similar to the debates over grain futures and bucketshops in the 19th Century, this begs the question of the purpose of the futures market. The economic justification both trumpted by the exchanges as well as codified in the mission statement of the CFTC, and the CEA before it were to 1) provide opportunities to hedge existing risks in commerce, and 2), to facilitate price discovery of the commodity (CFTC 1976). As in Chapters 2 and 5, historically whether the real purpose was to produce more accurate prices for the underlying commodities or simply to produce

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[77] Everything else is not equal. Most notably, in the case of physical commodities one must consider the cost of delivery (see Hieronymus 1977).

[78] In financial industry parlance, "arbitrage" is trading for profit without taking any risk. The assumption that utility maximizing traders will always take advantage of arbitrage opportunities is one of the foundations of efficient market theory (see Fama 1970, see also Chapter 4). In reality, true arbitrage is impossible. There is always risk. If nothing else trade execution takes time, during which prices can change. See Miyazaki (2007) for an interrogation of the problematic category of arbitrage.

futures prices for speculation was a legitimate question historically. With the elimination of a necessary connection to the stock market, this question was raised to the level of a contradiction. Exactly what *commerce* was hedged or insured in the futures market? *And was the futures market facilitating the "discovery" of stock prices, or was the stock market facilitating the discovery of futures prices?*

There are no objectively correct answers to these questions. Rather they demonstrate two important points about the evolution of futures markets. First, the arguments for a distinction between first, hedging and speculation, and second, speculation and gambling were increasingly dubious. Second, as the regime of accumulation of U.S. capitalism increasingly shifted from one based on industrial production to one based on financial production, so the risk management and speculative investment tools of the economy followed. To the extent that futures markets were once dependent upon and facilitated the development of the agro-industrial economy, they were now beginning to do the same for the financialized economy.

6.3 One Market

In a deviation of the dominance of Chicago, the Kansas City Board of Trade actually established the first stock index future, the "Value Line Index". Nevertheless, the CME soon followed with an S&P 500 index in April of 1982, which quickly eclipsed the Kansas City contract, becoming the most liquid, and thus most popular index future. The New Yorkers, particularly the NYSE, which may have been the most obvious candidate to develop a futures contract on stocks, took no interest until it was too late. Todd Petzel, who worked as an exchange economist in both New York and Chicago during the 1980s, blamed this on the NYSE's arrogance and short-sightedness. His interpretation of the NYSE's opinion of stock indexes was, "Nobody is going to trade an index. People *buy* and *sell* stocks. […] The NYSE couldn't give it the time of day. They had nothing good to say about derivatives" (personal interview, 2-27-13). This is consistent with what others said about the NYSE in particular and New York finance in general—they looked down their

noses at Chicago and futures. They did not understand the futures business, and they associated it with agriculture and considered it unsophisticated. The New Yorkers never considered that index futures would turn their world upside down. In fact, not even the Chicagoans could have expected how successful the index futures would be. Later in the interview Petzel explained:

> Yeah, they had no idea how big these markets were going to get. They thought they would be pretty good. They thought they'd be a nice addition to the product line. But they had no clue. […]Because like I said, this was the only product line that had pent up demand. The S & P came out of the blocks like a sprinter. They didn't need a big marketing campaign.

The reason there was so much "pent up demand" was that the underlying market was already centralized and quite liquid, but was also unpredictable. It was the perfect contract.

The invention of stock index futures had an almost immediate impact on the stock markets. Since the 1950s, economists had been working on ways to predict and improve the returns on portfolios of stock investments (MacKenzie 2006, Mehrling). The Black-Scholes-Merton (BSM), which provided the basis for estimating the probability of individual stock volatility, was quickly applied to stock index futures to predict the volatility and thus risk/return profile of the entire stock market—at least to the extent it could be averaged. Using the math of BSM, two University of California-Berkeley professors, Mark Rubenstein and Hayne Leland, invented a new product called "portfolio insurance" whereby customers could use index futures to hedge their stock investments (MacKenzie 2006, Bookstaber 2007). The "insurance" came in the form of a daily report sent to investment portfolio managers advising them how to adjust the proportion of stocks versus futures held in their portfolios. Given daily or "dynamic" adjustments, theoretically the managers could maximize gains and minimize losses, or simply maintain a consistent return on their portfolio regardless how the stock market moved. At a macro level, this insurance system incentivized stock market investing because there appeared to be less risk of loss if the market turned bearish (see Miller 1991: 59). Consequently, stock index futures not only produced more business for the Chicago exchanges, but they also funneled more capital into the underlying stock exchanges in New

York, putting upward pressure on prices and contributing to the bull market of 1982-1987 (Koepp 1987, Brady Report 1988).

The capital flowing into the Chicago markets was not only for the purposes of hedging or insurance, however. As had always been the case, the Chicago markets were heavily dependent on speculators to buy and sell the contracts the hedgers wanted to trade. Beyond this, for the short term investor the Chicago markets were becoming an alternative speculative opportunity to the New York stock markets. As before, the Chicagoans promoted their markets with advertisements and educational materials. They produced promotional/informational films, instruction manuals and guidebooks to futures trading, and even offered a free formatted notebook to "trade at home" for practice. In addition to "educating" the public, the Chicago exchanges also invested much time and energy in teaching Washington D.C. politicians about the benefits of hedging and price discovery (see Chapter 3).

In the 19th Century, the grain futures markets drove the rationalization of the underlying market for grain. Over time the relationship between the two markets became symbiotic. The Federal Trade Commission recognized this in 1920. The same happened between Chicago and New York in the 1980s. As McKenzie (2006) demonstrates in a book-length exposition, NYSE stock trading became highly dependent first upon Chicago single stock options, and later stock index futures. The Federal Reserve Bank (The Fed.) recognized this in the mid-1980s.

In two reports published in 1984 and 1985, the bank makes clear that far from *derivative* of the stock exchanges, the Chicago exchanges were deeply entangled with them (Federal Reserve 1984, 1985). Despite different geographic locations and different institutional rules and regulations, The Fed. recognized there was really a single price mechanism operating when futures were traded on an underlying asset. Along with this observation, the Fed. clearly stated that if the intended function of margins was to alleviate excessive speculation and asset bubbles, then the lower margin levels in the financial futures markets would defeat the purpose of the higher margin levels in the stock

markets (Federal Reserve 1984)[79]. Despite this, little was changed and the stock market kept climbing.

6.4 Black Monday

In January 1987 John Kenneth Galbraith, who lived through and wrote extensively about the 1929 Crash and the Great Depression, argued that the stock market was bloated, driven by mindless innovations and speculative mania (he did not mention Chicago's inventions). Over the next eight months, the Dow Jones Industrial Average would rise more than 40% (see Bookstaber 2007). In September the market began to waver. During the week of October 12, the market was volatile, generally in a downward direction. On Friday of that week, the market dropped more than 100 points, the largest daily point drop ever. For Wall Streeters, that weekend was apprehensive. They had time to prepare for Monday, and the consensus was that the market would fall further, so many of them entered sell orders before the market opened. The index futures at the CME immediately opened down, and this intensified the selling pressure on the NYSE. Many of the NYSE specialists for the biggest stocks had so many sell orders at the opening, that they could not establish an orderly market, and instead just stopped taking orders. This all became a downward spiral of panic back and forth between the NYSE and the CME. By the end of the day the DJIA had fallen 508 points, about 22.5%, which was larger than any day in 1929. The S&P 500 futures index at the CME was down 29%. The bursting bubble spread around the world with similar drops in London, Tokyo, and Hong Kong (see Brady Report 1988 for an overview of the events). The following day, Tuesday, October 20, was another wild day, with dramatic drops in the morning and a partial recovery in the afternoon after the Federal Reserve, with its new chairman Alan Greenspan, assured banks that it would inject liquidity into the system in the case of a deepening crisis.

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[79] As Miller (1991) points out, if not exaggerates, the Fed is non-committal in the 1984 study on whether margins are successful at preventing excess speculation. They mince no words however, in observing repeatedly, that this was one of the intended functions of federally regulated margins as implemented in the 1934 Securities Exchange Act.

I will not describe the crash in detail, nor attempt to explain its immediate macro-economic causes, which most analysts agree are opaque largely because other economic indicators at the time were relatively strong (see Brady Report, Bookstaber 2007, MacKenzie 2006). Aside from this, the mechanism of the portfolio insurance system played an important role in the crash, both through automatic and human induced selling. When stocks began to fall precipitously, the prescribed dynamic hedging strategy was to sell a larger portion of stocks in New York and increase the hedge in Chicago by selling futures[80]. Many of the biggest New York brokerage firms had programmed computers to automatically follow these hedging strategies based on inter-day changes in price. When the market began to fall, "programmed trading" kicked in and sent even more sell orders to the floors of the exchanges. Normally this would simply continue to drive prices down until they reached the point when buyers step in and restore some sort of "equilibrium". But on this day there

[80] Selling, or "writing", a futures contract is hoping the market price of the underlying stocks will drop. If prices do drop, the speculator can buy the contracts back at a lower price and realize a profit. Portfolios managers, are overseeing a large inventory of stocks, so if they sell a future and stock prices rise, they lose out on the futures contract, but they gain as much or more because they also own the underlying appreciating stocks. This is why it is called a "hedge"—because the amount of loss can be managed. Selling futures "naked", or without holding any of the underlying stocks, is a pure speculation and extremely risky. If stock prices rise, the speculator has to buy the contracts back at a potentially limitless loss, but has no offsetting profit from appreciating stocks.

Chart from the 1988 “Brady Report” or the Presidential Task Force on Market Mechanisms, page 10

Figure 1

DOW JONES INDUSTRIAL ONE MINUTE CHART

October 14, 1987 to October 20, 1987

Chart from the 1988 "Brady Report" or the Presidential Task Force on Market Mechanisms, page 3

were so few buyers that the markets in many stocks, particularly those managed by "specialists" at the New York Stock Exchange, stopped functioning[81]. The NYSE specialists, who were responsible to ensure every trade was executed even if they had to make the buy or sell from their own accounts were overwhelmed with sells and some of them simply stopped taking orders all together. A

[81] In Chicago the exchanges were until quite recently, run as open outcry auction markets, where no one is compelled to buy or sell at any time. Any member is allowed to trade with any other member as long as the trades happen within the confines of the trading "pit" during trading hours. The New York Stock Exchange was from the beginning of its history until very recently different. On the NYSE, "specialists" are responsible for small groups of stocks at their "post". They become either the buyer or seller of every trade, and it is their responsibility to maintain an orderly market, meaning that they must buy and sell out of their own inventory of stocks when there are not enough outside orders on one side of the market.

number of my interviewees described the situation as total chaos. The lines of communication between the exchanges were not well established, in part because the groups of people that managed the exchanges did not like each other very much, but also because the stock index futures market had grown faster than anyone expected and no one had considered a scenario like the one they were experiencing. One of my interviewees described it this way:

> The 19th was a terrible day. I lived through it. The 20th in the morning was the day where you thought the world was coming to an end. I had an old Quotron machine in my office in New York. The top of it was the Board of Trade, the middle section was a ticker. The middle section was the New York markets. The bottom section was the CME. I could just glance over—you got pretty good at looking for things and just keeping an eye on stuff and I looked at that and I go, what is wrong here? And then I realized after a few seconds there were no S&P prints. We found out later that the Merc [CME] suspended trading because they thought the stock exchange [NYSE] was closed. They weren't even picking up the telephone and talking to each other… The [NYSE] specialists were frozen. They were dead. They were dead in the water…You couldn't sell a thing in New York. (personal interview with Todd Petzel, 2-27-13).

There may indeed have been "one market", but its various components were not functioning very well, nor communicating with each other. In Leo Melamed's words the markets were "linked, but woefully uncoordinated" (1996: 370).

6.5 The Aftermath—Wasting a Good Crisis—Avoiding/Sidestepping Crisis

Black Monday wiped out $1 trillion in virtual wealth in one day (Brady Report 1988), and at the market's close the CME had outstanding margin calls of $2.1 billion (ibid: 52). The settlement and clearing systems backing up both the stock markets and the futures markets, both of which were linked directly into the banking system were stretched beyond their limits. If it were not for the Federal Reserve injecting money into the banking system, the markets may have collapsed even further causing complete financial chaos (Bernanke 1990, see also Melamed 1996: 348-388, Greenspan 2007: 100-110). On the morning of Tuesday, Oct. 20, the CME came very close to not opening because of a $400 million shortfall owed to a Chicago bank. At the last second the bank,

presumably reassured of a liquidity backstop by the Fed., let the CME temporarily off the hook so they could start trading on time (Melamed 1996).

Needless to say, the crash caused an uproar in the press, the public, political and academic circles, and in the financial industry itself[82]. President Reagan quickly announced the appointment of a task force headed by former Wall Street banker and U.S. Senator, Nicholas Brady, to study and quickly report on the crash. The CME, whose index futures were initially blamed by many in New York for the crash, appointed a "blue ribbon" commission of prominent economists to study and issue a report. Among others, the U.S. Congress, NYSE, SEC, and CFTC also commissioned studies.

The Brady Report carried the most weight, and was seemingly the least biased, at least with regard to discrimination between the securities industry and futures industry. Echoing the Fed.'s work four years earlier, the report came to one overriding conclusion: There was no meaningful separation between the stock markets and the futures markets. Given this, the commission recommended that one governmental agency be made responsible for "coordinating the few, but critical, regulatory issues which have an impact across the related market segment and throughout the financial system". The most important of these issues were making margins "consistent across marketplaces", "unifying" clearing systems, and implementing "circuit breakers" to halt computerized trading if/when the next market break happened (Brady Report 1988: 59). The authors argued that failure to coordinate these through one single regulator would "impose pervasive, unavoidable, and possibly destabilizing influences" on the markets (ibid).

The Chicagoans and the CFTC cooperated with the NYSE and the SEC to improve communication and coordination between the two markets, and to limit the capacity of computerized trading in volatile markets. However, no single regulator coordinated these efforts.

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[82] For a newspaper article length retrospective, one week after the event, covering what happened, initial reactions, and the initial reforms being considered, see Rustin, R. and Ricks, T. "Never Again? Stocks' Plunge Bring Calls for Overhaul of Financial Markets", *Wall Street Journal*, Oct. 26, 1987, pg. 1

More importantly, allowing any government regulator to impose margins, especially one other than the friendly CFTC, was out of the question to the Chicagoans. They had been fighting against the outside imposition of margins for at least 65 years (see Chapter 2), and they were ready to fight it again. The Chicago argument against higher margin limits, or any margin limits imposed from the outside has not changed much since the 1920s. Unlike the stock markets, the Chicago exchanges constructed and owned their own clearinghouses beginning in the late 19th Century[83]. Since a futures contract is not an exchange, but a promise to exchange in the future, margin is a "performance bond" to reasonably ensure the traders will be able to meet their obligations when the contract expires. Since the clearinghouses are owned by the clearing members of the exchange, it is in their best interest to set margins high enough to protect the financial integrity of the exchange. On the other hand, the exchange must be careful not to drive away potential speculators, who leverage the low margins to buy and sell many more contracts than they could ever afford to take delivery on at expiration. The Chicagoans argue that because they own the exchange and the clearinghouse, they are responsible for any potential default, and therefore they ought to be able to set margins where they like. Backing up this argument, they point out that the exchanges adjust margins according to the volatility of the prices of futures, demanding larger performance bonds when price movements are more extreme.

In the years following 1987, Chicagoans fought off a number of attempts to impose higher margins. I will not describe the political battles in any detail, but a couple of generalizations are

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[83] While the exact methods have evolved, the basic functions of the clearinghouses have not (for a succinct overview of how they operate, including with regard to the 1987 crash see Bernanke 1990). Regardless who the trade is executed with on the floor the exchange, the counterparty for the purposes of settlement becomes the exchange's clearinghouse. This transfers the uncertainty about the ability of any given floor trader to "perform" the obligations of the contract to the clearinghouse. It also facilitates the 95%+ of trades that are "offset", meaning that they are netted out by entering opposite trades before expiration. At the end of the day the clearinghouses nets all trades, collects cash from losers, and issues cash to winners. The futures instrument, however, is not an actual exchange of assets. Rather, it isa contract agreeing to exchange the underlying commodities at a set price and set date in the future. Technically no money or commodities need be exchanged until the date of the contract. Margin, then, is a "performance bond" (Bernanke 1990), or a small portion (~5%) of the value of the commodities that would be exchanged at expiration. As the price of the contract changes daily as the result of trading, the 5% represents more or less cash, and the contract holders can collect the excess from, or must pay the difference to the clearinghouse.

necessary to convey what happened next. First, the New York financial community, represented by the NYSE, feeling threatened by Chicago's innovations, attempted to develop their own futures contracts and slow the growth of Chicago's by arguing for 50% margins on index futures instead of the 5-15% that was typical[84]. After all, the index business was not small potatoes. In 1990 it was producing $1.5 billion in annual commissions for the Chicago exchanges and futures merchants (Gold 1990). Some New York financiers pushed for a complete ban on stock index futures claiming they were driving customers away from stock markets, and thus raising the price of stock markets' main function: raising capital for productive enterprise[85]. These arguments went nowhere.

The NYSE was largely allied with the SEC whose jurisdictional envy of the CFTC was rekindled after the '87 crash[86]. The SEC pushed both for higher margins, but also for transferring regulation over indexes to their agency. Not all of the SEC's motivations were jurisdictional—they were also concerned about systemic risk, and as they always had been, protection of customers from undue market volatility. In Washington D.C. there were ongoing clashes between the Banking and Agricultural committees in both houses, as they were the respective oversight committees for the SEC and the CFTC.

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[84] *Time Magazine* represented the battle as one between the cities of Chicago and New York in an article "The War of Two Cities" (May 30, 1988). Leo Melamed complained in a letter to the editor of "crass stereotyping" and "blatantly unjust" comparisons of the difference between the NYSE and the CME (Melamed 1996: 376). For a more serious discussion of the regulatory battles at the inter-urban scale see Gold, J., "A Tale of Two Cities", *Financial World*, 10-16-90, pg. 42. In mid-October of 1989 there was another crash and rebound in stock prices, albeit smaller than 1987. This caused another round of debates over Chicago speculation and margins on stock indexes. See McMurray, S. "Higher Margins on Index Trades?", *Wall Street Journal*, Oct. 31, 1989, pg. C1

[85] See Lowenstein, R. and Torres, C. "Curb Futures, Not Programs, Some Declare", *Wall Street Journal*, Oct. 27, 1989, pg. C1

[86] The Nobel Prize winning University of Chicago economist Merton Miller, who was an outspoken proponent of futures markets in general and Chicago in particular had this to say: "This is the SEC's hostile takeover attempt of the CFTC. The SEC is sorry that it so blithely gave up its rights to regulate index futures. They didn't think it would amount to much and now they regret it. Any time there's a downturn in the market, they use it as an excuse to get this franchise back, even though there's no case for them to have it on intellectual grounds." (Gold 1990).

The Chicagoans, however, kicked their public relations and Washington, D.C. lobbying apparatuses into high gear[87]. Just two weeks after the crash, the CME was distributing pamphlets and position papers across the financial community explaining their markets, the crash, and why their margin system was different from that of stock markets (Melamed 1996: 373). Leo Melamed praises Illinois Senator Alan Dixon for carrying water for the Chicago exchanges in the Senate Banking Committee. In the House of Representatives, among others, powerful Chicago Congressman Dan Rostenkowski was always a friend to the CFTC and the Chicago exchanges (see Chapter 3 for a broader discussion of political influence and lobbying). John Damgard, the chief of the main D.C. lobbying group for futures firms, described the battle he fought through the press with the SEC over margins and speculation. In a pithy moment of his interview, he said, "post '87, we won." (personal interview with John Damgard, 9-24-12). Concurring, the preeminent historian of the SEC says calls this episode, "one of the most significant legislative defeats in the SEC's history" (Seligman 2003: 595). David Ruder, the Chairman of the SEC at the time, described in his interview why any effort to mandate increased margins on index futures failed:

> …the reason that there was never any movement on margin was that the big two and the CFTC were against it. You got Greenspan and Treasury [who he earlier described as dominated by free market economists] against something- you don't have any movement at all. So, there was never any margin change (personal interview 10-24-11).

The jurisdictional battles and legislative reform efforts continued into the early 1990s. In 1992 Congress did transfer authority for margins on stock index futures to the Federal Reserve, but the Fed. shortly thereafter delegated this responsibility to the CFTC, and the CFTC delegated it to the futures exchanges (Seligman 2003). Shortly after the crash, the CME raised margins on

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[87] Three of my interviewees independently mentioned that the New York financial community did not organize lobbyists or spend money "educating" politicians in Washington, D.C. the way the Chicagoans did. The futures lobby, headed up by the Chicagoans, were considered exceptionally well connected, skilled, and funded. Clayton Yeutter, who was the President of the CME from 1978-1985, as well as the U.S. Secretary of Agriculture from 1989-1991, said regarding his time lobbying for the CME in Washington, D.C., "We also provided a lot of leadership on the regulatory front; if only Wall Street had done the same!" (email to author, 9-20-12).

speculative index futures to 15%, and 10% for hedging, but to the SEC's chagrin, lowered the hedging margins back to 3% within a year of the '87 crash (Ruder 1988).

6.6 Implications of 1987—Speed Kills?

With no progress on building barriers to speculation, the main attention turned to *developing* instead of dampening the markets. The SEC, NYSE, CFTC, and CME disagreed about many things, but one thing they worked together on was to improve the coordination between the markets and settlement/clearing structures. Most everyone agreed that the futures exchanges were more technologically advanced and more liquid, so it became a major effort to update the NYSE's "market mechanisms" as the Brady Report called them[88]. A year after the crash, the SEC Chairman, David Ruder, commended the stock exchanges for increasing their trading system capacities to be able to handle 600 million shares a day (Ruder 1988). The NYSE's short-term goal was to handle one billion shares a day (Miller 1991), up from an average of 250 million in 1987. The crash had put intense pressure on the NYSE to reform its specialist-based trading system. There was less patience for human intermediaries in the market system, especially humans that might decide that the market ought to slow down or even halt trading during a crisis.

Ruder, who initially after the crash was one of the strongest proponents of increasing margin limits (Presidential Task Force 1988), continued to push for coordination of margins, but also seemed resigned to the fact that futures markets would only grow in influence, and the only viable solution was to prepare the stock markets for increased volume and volatility. Between 1987 and 1992, the stock and futures exchanges set up formal lines of communication, agreeing to share information on large trades and settlement positions, and to coordinate computerized "shock absorbers" to temporarily stop trading in case of another crisis (Ruder 1988, Seligman 2003). These

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[88] Bookstaber (2007: 20) says, "The futures markets was operating in broadband and the NYSE on dial-up."

all seem like very reasonable solutions when the problem is framed as one of finding ways to ensure that the market keep working in any situation.

The bottom line is that instead of taking steps to limit the influence of futures markets on financial markets, the entire regulatory structure took steps to more deeply integrate the two systems. To use the language of the debates over grain, the underlying "commerce" of finance, was moving toward assimilation with the speculative, risk management structures of the futures markets. But, not surprisingly given the growing dominance of free market dogma, largely lost was any discussion of the further institutionalization of speculative trading, or what effects an expansion and strengthening of stock markets might have on corporate governance (Muellerleile 2009) and the broader socio-economy.

Maybe the most accurate representation of the dominant thinking at the time comes from Franklin Edwards, a Columbia University economist[89]. In a symposium at the American Enterprise Institute in February 1988, he argued against new regulations. He used an analogy of automobiles and roads to argue for bigger and faster markets. He suggested that the current stock markets were like roads designed for Model Ts in 1910, but suddenly in futures markets we have a present-day "fast and very safe" Mercedes. Should we "restrict the use of the modern automobile on the grounds that it is dangerous", or instead "build better roads"? His answer:

> The emphasis of these studies [i.e. the Brady Report] is on how to curb this new invention "futures," which we all agree is good but which cannot be handled with our present road system. We should not be thinking that way. We should be thinking about improving the roads so that we can use the modern automobile to its fullest capacity (quoted in Lewis 2009: 73).

To continue with the cars and roads analogy, recent research has shown that building better roads does not necessarily achieve their desired goals (Vanderbilt 2008). Bigger and wider roads incentivize people to drive faster, buy newer cars, burn more petroleum, and behave more wildly on

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[89] Edwards was at the time Director of the Center for the Study of Futures Markets, which is now defunct. For a transcript of a panel discussion of futures markets experts at the symposium, see: http://www.cato.org/sites/cato.org/files/serials/files/regulation/1988/1/reg12n2-cohen.html

the road. In other words, while good roads may seem safer, they may actually result in the opposite: making driving more dangerous, and putting everyone else nearby at risk. As a society we have certainly built a bigger and better infrastructure for finance to operate. This has certainly made the financial industry prosperous and happy, but has it really reduced risks for the rest of society?[90]

6.7 Conclusion

> While the losses on the stock side were tremendous, they were mostly on paper for many investors. Losses—and gains—in futures and options were real money as these markets absorbed some substantial shocks and provided the only true gauge of value at a critical time. […] It is hard to blame the NYSE specialists for getting out of the way of an oncoming train. But the inability of the NYSE to handle Oct. 19 is evidence that, when a jet age futures industry interfaces with the buggy-whip driven stock market system, the potential for problems is very great. Now the NYSE is trying to divert blame for the crash to index futures or program trading. That is an incredible posture. Even more astounding is that the public and politicians believe derivative markets are the problem. (*Futures Magazine*, December 1987, Editorial, "Let the Market Make the Decision on Indexes")

The U.S. Government's General Accounting Office (GAO) wrote an eerily predictive report on the U.S. financial regulatory infrastructure in 2007 describing "regulatory gaps" as government officials struggled to coordinate across the patchwork system of agencies[91]. They suggested the main reason the U.S. system was shaped this way was that reform only happened after crises, and was thus narrowly targeted to deal with each crisis. In a previous report in 2004, the GAO explained the uniqueness of this patchwork system in the world, comparing the U.S. with the more coordinated systems in the U.K. and the Netherlands[92]. These were not revelations, but reassertions of problems that were discovered at least as early as 1984 by the Federal Reserve. Beginning with

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[90] Zizek (2009: 13) sums this up nicely: "It is indeed true that we live in a society of risky choices, but it is one in which only some do the choosing, while others do the risking…."

[91] "Financial Regulation: Industry Trends Continue to Challenge the Federal Regulatory Structure", United States Government Accountability Office, Report to Congressional Committees, October 2007, GAO-08-32

[92] "Financial Regulation: Industry Changes Prompt Need to Reconsider U.S. Regulatory Structure", United States Government Accountability Office, Report to the Chairman, Committee on Banking, Housing, and Urban Affairs, U.S. Senate, GAO-05-61

changes in the 1970s and intensifying in the 1980s, the financial system became integrated across commercial and investment banking, mortgage lending, insurance, and of course, securities investing and futures speculation. The 1987 crash served as a warning, something the Brady Commission, the SEC, and even the GHW Bush Administration recognized between 1987-1990. Unfortunately, the 1987 crash was not serious enough to overcome the growing pro-market and deregulatory dogma of the time, nor was it enough of a shock to break apart the jurisdictional fiefdoms of Congress and the federal bureaucracy. The result was instead to double down on financial market integration.

Going back to at least 1922, the federal government in various capacities had recognized that the Chicago futures exchanges were a vital part of the national economy. In late 1987 this became much more than an abstract recognition of "serving the public interest" and providing economic utility. The realization of "one market" was much more than just interconnected markets, it was a realization that the financial futures markets had become deeply implicated and embedded in the U.S. and global financial infrastructure. Since the Crash of 1929, most economists, politicians, and government regulators appreciated that systemic financial risk included banking as well as stock and bond trading. Futures markets were now becoming an important part of the system.

Conclusion: Producing Financial Space

"The story of CME Group is the story of global commerce.
Innovations in trade, technology, industry and markets advanced the
global economy, and for more than a century CME
Group has played a vital role in this growth."
—CME Group "Stories" webpage[93]—

It is no coincidence that financial derivatives were first innovated in 1972, expanded rapidly through the 1970s, and exploded in popularity in the 1980s. The Fordist economy that provided steady growth in both wages and corporate profits was breaking apart, and the U.S. economy no longer seemed to respond to the Keynesian levers that the government had relied upon to smooth out business cycles and keep unemployment and inflation low. More importantly, the early 1970s showed signs of expanding international trade, labor offshoring, and cross border financial flows. In other words, economic globalization was beginning. Furthermore, economic volatility was intensifying with U.S. government borrowing increasing, and inflation and unemployment both rising precipitously. As David Harvey (1990) explained in *The Condition of Postmodernity*, the feeling that the relative order and stability of modernity was slipping away had much to do with the intensifying connectedness of the socio-economy across space and time.

International finance often plays a role in this story of transformation, particularly since disciplines such as sociology, heterodox economics, and international political economy have begun studying the financialization of the economy. But financial futures and financial derivatives, even financial *markets*, still only played a small role in these discussions until the 2008 crisis. Since then critical scholars have begun to pay more attention to the role derivatives play in economic systems, although the conversation now often revolves around financial crisis. I too have used crisis as a lens through which to understand the contradictions of futures, and derivatives more generally. In this conclusion I want to briefly step away from crisis in order to look at derivatives as something more

[93] Accessed here on 10-5-13: http://www.cmegroup.com/stories/#!1-story-global-commerce

normal and mundane. In other words, I want to imagine derivatives as a part of the everyday life of finance, or more generically, as part of everyday life of the contemporary capitalist economy. First I will restate the three questions I asked in the introduction.

- Where did financial derivatives come from?
- What role did financial derivatives play in constructing a "financialized" economy?
- Why have financial futures and thus financial derivatives largely escaped U.S. government regulation?

I will revisit these questions here, but I will attempt to answer them in a slightly different way, taking account of a non-crisis perspective, as well as reconsidering how the discipline of geography might reconsider derivatives, and financial markets more generally.

The most concrete answer to *where* derivatives came from is Chicago. But one might reasonably ask, could these instruments have been developed somewhere else, in Kansas City, for instance? In fact, the New York Produce Exchange developed a currency futures contract prior to the CME in 1970 (see Chapter 5). The contract never achieved sufficient liquidity and only lasted for a few years. There are at least three reasons for this, which also help explain why Chicago was unique. First, the traders and exchange officials in New York were not adept enough at contract design, not having as much trial and error experience designing agricultural contracts that would attract speculators. Second, even if the contract was attractive to speculators, there simply were not enough "local" traders who were eager to speculate on contracts they knew little about. Third, as Leo Melamed of the CME and others explained to me, the New York exchanges—in fact in Melamed's all of the other U.S. exchanges—lacked charismatic leadership. The leaders of the CME were hungry for new speculative opportunities and they worked exceedingly hard to "market" their new contracts both inside and outside of their exchange.

There is another reason Chicago succeeded where others failed. While New York was clearly connected with the rest of the continent, and the world, a place like Kansas City was not. The Kansas City Board of Trade, which developed the first stock index future in 1982 (see Chapter

6), could not create or maintain connections to the New York security markets the way the CME and the CBOT did. Chicago had a long history as a transportation and communications hub, and its banks, while not as global as New York's, had a global presence even in the early 1970s. Kansas City did not embody this kind of connectedness.

This begs the question of how we might think about the city as a site of a financial innovation in the age of globalization. "Chicago" is more than a grounded city or territory. It is and was also part of a relational network (Ward 2010). In my analysis of futures, I have been mainly interested in the importance of one node in that network—the Chicago Loop-based futures exchanges. Looking back to the 19th Century, with their connections to railroads and telegraphs, the CBOT constituted one of the most highly connected nodes of commerce in the world (Carey 1989)[94]. As the economy began changing in the 1970s, the Chicago exchanges began to rebuild their network, to embed their futures in the emerging service, knowledge, and financial economy. Telecommunications networks continued to be important to the Chicago exchanges in the 1970s, but more important for the construction of financial futures was the exchanges' ability to network with economists, politicians, and central bankers. The Chicago exchange operators needed to leverage their deep experience with agriculture, but at the same time re-embed their contracts and traders in something quite new. The Chicagoans made a concerted effort to hold on to their distinctive product: futures. But at the same time they worked hard to become an integral part of what Sassen has called the "operational field" of global finance, "a broad range of financial and non-financial institutions, different types of jurisdictions, technical infrastructures, and public and private domains" (Sassen 2012: 13). Financial derivatives emerged from the Chicago exchanges' entanglement with this field. All of this helps explain why Kansas City's and even New York's exchanges may have embodied enough entrepreneurial spirit or organization capacity to pursue

[94] Chicago continues to be an important node in the global telecommunications infrastructure, something that is increasingly important in an environment of high frequency trading (Pletz 2012).

financial futures, but they did not have the capacity to translate their historical trajectory into a new field—that of finance, banking, and securities.

We should, however, look beyond the places where derivatives came from. It is also important to question the novel spaces derivatives are producing. Understanding these new spaces begins with an appreciation of economic abstractions.

In the mid-2000s, a group of New York investment banks collaborated to construct the ABX index market (MacKenzie 2012). This was a centralized marketplace to trade derivatives based on the fluctuations in a mathematically derived number, which was reflective of the state of mortgage backed securities, and the many permutations of other securities and derivatives that were based on them. For a few years, despite its convoluted nature, these derivative contracts traded at a steady clip and provided a key metric to understand the health of the increasingly complex and interconnected mortgage market. In 2007-2008, when the housing market crashed, and mortgage derivatives began to collapse, the ABX market was starved of the data necessary to feed the index, and it collapsed. Along with it, the bankers lost an important measurement of the status of the mortgage market. MacKenzie suggests that the ABX was from the beginning a "precarious abstraction", and that academics, financiers, and regulators ought to appreciate the limits of depending too heavily on abstract price making mechanisms (see Knox-Hayes 2013 for a similar conclusion on carbon derivative markets). His point is that "crowd sourced" knowledge that is largely disembedded from otherwise grounded conceptions of value are dangerous for the economy. MacKenzie's point is difficult to disagree with, and as I have pointed out in this dissertation, geographers ought to pay much closer attention to the actual operations of price making mechanisms and how they organize time and space.

At the same time I want to push beyond what I see as the hangover of this kind of analysis, and instead encourage geographers and other critical social scientists to appreciate that the entire capitalist economy is based on precarious abstractions (Mann 2009). It is certainly the case that

mortgage derivatives of all kinds created a tangled and convoluted system of financial instruments, markets, and institutions. But what about the underlying mortgage industry? Over the last 50 years, home mortgages, the housing market, even the material that homes are built of have become more entangled in convoluted circuits of capital right along with the creation of an abstract mortgage finance system. Credit rating agencies instead of local bankers now largely determine borrowers' eligibility according to convoluted financial modeling. The terms and structures of mortgages have become more entangled with government and quasi government agencies, and every aspect of the housing industry is carefully monitored by academic and government economists hoping to predict slight changes in consumer confidence and macro-economic activity.

The sorts of questions I think geographers interested in finance ought to be asking is what role do "abstract" derivatives play in constructing an *economy of abstractions,* or to cast the net more broadly, *worlds of abstractions*? This dissertation has only scratched the surface. There are hundreds, if not thousands, of derivative markets trading everything from weather to carbon to the outcomes of electoral politics. There have even been attempts to create derivative markets for U.S. national security (Aitken 2011). This should not be a surprise. In 1977, one of the most prominent economists of commodities and futures markets (Hieronymus 1977: 22) suggested it may be possible to build futures market for wage labor! It is a frightening thought, but one that ought to be taken seriously. Increasingly, laborers are subject to constant surveillance of body and mind, and presumably digital data aggregators are collecting and storing records of work habits, brain function, and other information that will soon become key measurements for prospective employers (if this seems far-fetched, see Marazzi 2011, Lanier 2013 for trends in that direction). All of this is meant to suggest that geographers need to take better advantage of their disciplinary strengths of interrogating and explaining complex and abstract entities and systems (McCormack 2012), such as derivatives (Christophers 2009). One of the reasons finance and financialization appear to be so complicated is their markets weave together disparate economic geographies at a dizzying pace.

These market systems are indeed abstract, but they are also very real, and embedded in cross scalar or "variegated" economic geographies (Peck and Theodore 2007, Brenner et al. 2010). These geographies include both the cities and regions where the instruments are traded, as well as places where the underlying instruments are traded. But more important than the places where these instruments are "derived" from, are the networks through which derivatives transform the new objects, bodies, and worlds they make connections with. Derivatives are demanding, and at the same time producing these interconnections between entities. These are the new geographies of financialized capitalism that people like Christian Marazzi (2011) have only just begun to analyze, and these spaces are begging for more research. Geographers must play a stronger role in empirically and theoretically engaging these new spaces.

Critical social scientists need to move beyond thinking about derivatives as derived from underlying commodities, as well as thinking about finance as derived from the economy. Derivatives are partly derived, as is finance more generally, but this is only one part of the story and it is reaching the limits of its explanatory power. If we want to understand geographies of derivatives and geographies of finance, we need to focus on the geographies derivatives are making and re-making. Regardless how abstracted they may seem from everyday lived experience, finance and derivatives are increasingly integrated into many aspects of daily life—the mundane activities of production and consumption, not to mention the everyday assemblages of our increasingly technological social life. This is one of the reasons that historical analyses of finance and financial derivatives are necessary (Christophers 2013b). By exhuming the historical record as I have here, it quickly becomes apparent that many of the categories through which we understand finance are highly contingent, adopted from other fields, and potentially revealing of alternative perspectives. If agricultural futures were never simply *reflective* of some assumed underlying geography of agricultural production, but rather constitutive of those geographies, the same is likely true of various other aspects of securities, banking, and international financial markets.

Finally, the same importance of abstractions and history must be applied when analyzing the challenges of regulating finance and derivatives. For a politician or government regulator, to intervene in the derivatives markets is to at the same time intervene in the financial infrastructure that is part and parcel of the everyday lived experience of economic relations. It is to alter the modes and mechanisms through which the macro-economy establishes value (Mann 2009). Although they use different words, this is the argument that Wall Street uses to defend itself against the threat of regulation. If Washington interferes with the work of Wall Street, it interferes with the entire economy. In different circumstances, this argument has been made throughout history. In the wake of the Banking and Securities Acts of 1933 and 1934, Wall Street slowed its issuance of credit in what some called a "capital strike" (Seligman 2003). President Roosevelt recognized the dangers of a stalled economic recovery if the New Deal intervention in finance became too heavy handed. Despite his harsh rhetoric against finance, he eventually outraged many progressives by attempting to appease Wall Street by appointing one of their own, Joseph Kennedy, as the first head of the SEC. As much as he needed to quell the speculative impulses of Wall Street, he also needed capital to flow in liquid channels across the economy. As I have discussed, the SEC and other federal agencies were relatively successful at balancing the role of finance in the economy for the next 40 years.

In the 1970s, institutionalized speculation that had been cultivated in Chicago since the late 19th Century began to creep back into the financial system and thus the broader economy through the invention of financial futures. The contradictions of this speculative financial political economy became apparent in 1987, and repeatedly throughout the 1990s and 2000s, but it took until 2008 for them to cause a significant rupture. Even now, concerns, many of them warranted, about the dangers to economic growth of "over-regulating" finance keep politicians and bureaucrats from placing absolute limits on speculation. I would argue that much of this is a result of inadequate, or

simply missing, historical interrogations of what "finance" is, where it came from, and how it can be analyzed according to alternative categorical assumptions, something that I have attempted here.

Most importantly, the regulation of finance and derivatives must be analyzed in light of their fundamental connections to, and impacts on space and time. Leyshon and Thrift have suggested that the financial system is in large part constituted by the rather mundane search for flows of income that can be securitized and made into investment vehicles. In the process however, they also argue against what they see as a reckless assumption by too many researchers that global finance is a "spectacular system of speculation" (2007: 98). While it may not be spectacular, I think geographers must consider that with the integration of derivatives, finance has indeed become more of a system, and furthermore that speculation has become a crucial component of the everyday mundaneities of constructing and maintaining a system of liquid markets. For those that want to maintain the intensely interconnected global economy, speculation has become a necessity. To regulate financial speculation then, is to regulate the capacity of financial markets to maintain the connectedness of global economic geographies.

I end by reminding the readers of the key contradiction that prospective analysts and researchers of financialzed capitalism must consider. In order to reimagine finance one needs to appreciate that it is on one hand a powerful system that engenders economic and geographic interconnection, and thus produces what appears to be a rational and coherent, albeit highly complex system. On the other hand, it is a hybrid, discontinuous, and loosely organized system of mundane economic activities. The job of geographers, one that I believe they are well equipped for, is to simultaneously analyze both sides of this contradiction in their research. I have attempted here to both dig deeply into the details and complexities of futures markets, but at the same embed them in a sprawling system of interconnected markets. I encourage others to build upon and improve this approach.

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