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Turning Financial Markets Inside Out: Polanyi, Performativity and Disembeddedness*

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Abstract:

In light of the spread of markets across the globe and deeper into daily life, this article argues for a more robust analysis and application of Karl Polanyi's conception of (dis)embedded markets coupled with the performativity thesis authored mainly by Michel Callon. It suggests that while disembeddedness as a concept is necessary for an analysis of contemporary financial markets that are increasingly self-referential, it is not sufficient. Despite the suggestion of a gulf between Polanyian and Callonian economics, there are important similarities in the two frameworks. These are considered along with the considerable differences all in an attempt to develop a more robust methodological framework for analyzing financial markets. Performativity, it is argued, can help fill the gaps in Polanyi's embeddedness framework, albeit only when that concept's tendency to produce aspatial and apolitical arguments are taken seriously. The article uses an abbreviated case study of the development of U.S. financial derivative markets in the 1970s and 1980s to argue that markets must be considered in light of both their institutional and geographic entanglements as well as their (dis)embeddedness in systems of calculativeness and mathematical modeling. Specifically the article analyzes the tension between the derivative origin story authored by Donald MacKenzie, which focuses on neo-classical pricing models like the Black-Scholes-Merton option pricing formula, and my own empirical research, which suggests the urban-economic geography of Chicago played a key role in the development of these instruments.

Key words: markets, embeddedness, disembeddedness, performativity, financial derivatives, Black-Scholes, Polanyi, Callon, Chicago

1. Introduction—Our Market Mentality

This article addresses one of the growing imperatives for economic geography and the other critically minded social sciences, namely to more rigorously and innovatively theorize the expansion

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of markets across the global landscape (Berndt and Buckler 2009, 2011, Peck 2012). Markets, especially those designed to regulate themselves, were one of Karl Polanyi's main concerns, even though most of his empirical analysis focused on their 19th Century manifestation. He believed the time of the self-regulating "market system" had passed with the World Wars. If Polanyi (1886-1964) 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 30 years would drive Western socio-economies 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) and 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). It seems, however, that despite significant resistance, financial markets only continue to grow in kind and influence, and the overall market "mentality", despite Polanyi's prediction of obsolescence in 1947 (Polanyi 1968), is more deeply engrained in our social institutions than ever. How do we begin to explain this "orientation towards financial markets" (Preda 2009: 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 article that a number of Polanyian concepts such as "disembedded" markets and "market society" provide a stronger theorization of the relationship between financial markets and the socio-economy than has previous been suggested. But I will also suggest that a Polanyian institutional methodology is not sufficient to understand markets that are increasingly creating their own social 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, a methodology that has much more in common with Polanyi's arguments than is often suggested. This theory of market performativity, which has been put to work by Donald MacKenzie and others, focuses on the expanding influence of neo-classical market logics, and has the capacity to conceptualize a process of market construction, from the inside-out, but without some of the most egregious assumptions of neo-classical economics. The performativity framework also has weaknesses and gaps, most importantly its tendency to decontextualize and depoliticize processes of market construction, something a turn to Polanyi remedies. I will not argue that either of these frameworks is analytically right or wrong, but suggest that together, two less than perfect frameworks provide a path forward for theorizing contemporary financial markets.

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 methodological argument. It is to accept on one hand the basic argument that financial markets cannot exist without the broader socio-economy, 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 (Leyshon and Thrift 2007, Bryan and Rafferty 2011). 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 with their internal logic, not least in the ways that logic "overflows" (Callon 1998) and influences the rest of the world.

The article 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 an abbreviated 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 with thoughts on the shape of a potential research program that grapples with real disembeddedness without abandoning uneven geographies or the political realities of assembling alternative markets and economies.

2. Polanyi's frame of reference

Those attempting to identify a theoretical core or the "real" meaning of Karl 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 (Krippner et al. 2004, Gemici 2008). 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, this issue). Nevertheless, Polanyi's reframing of laissez faire politics coupled with free-market economics as a dangerously 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) saw in the 19th Century, especially England, the development of the first true self-regulating "market system" where the 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: 71-80). In the development of fictitious commodities Polanyi saw both the potential for the

“demolition of society” (76), but also the organic reaction of society to protect itself from annihilation, or what Polanyi called the “double movement”¹.

While Polanyi did not invest much energy in analyzing finance, save the 19th Century international gold standard (2001), three components of his socio-economic framework help us re-imagine 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 neo-classical economics and Marxist political economy (Polanyi 1968). 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 essential to the emergence of markets, especially the intensified self-regulatory market². Instead, markets are historically, geographically and institutionally contingent, if not assembled directly by states and commercial interests.

¹ This article 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 only emerges 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 a la Althusser, or whether there a relative autonomy to social agency that pre-dates capitalism all together (see Read 2003).

² 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.

Second is Polanyi's methodological suggestion that investigations of the economy should be "substantive" not formalistic³. 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 50 years, is the concept of embeddedness itself. Polanyi believed economic activity was a "instituted process", meaning that it was not an independent sphere of human life, but instead "embedded" or "submerged in social relationships" (Polanyi 2001: 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 non-economic 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 "livelihood of man from the material angle" (Polanyi, et al. 1957: 241)⁴.

Fred Block has argued that what Polanyi really meant is that the economy is "always embedded" (Block 2003) or that the economy can never be truly disembodied from non-economic

³ 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: 243-4).

⁴ 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: 241-2).

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 rich literature, but embeddedness has in various forms been regularly employed by geographers (see Hess 2004, Peck 2005, Peck this issue) and other social scientists (see Krippner 2001, Krippner, et al. 2004, Dale 2010)⁵. 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 socio-cultural 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, this issue). *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 (Krippner 2001, Krippner et al. 2004; Slater 2002; Gemici 2008). As Krippner suggests, “researchers either study economic processes in 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” (Krippner et al. 2004: 113).

Gareth Dale thinks these critiques have “on the whole missed their target” (Dale 2010: 198).

He reminds us that Polanyi was suggesting that economic activity is not “always” embedded in

⁵ One significant literature I am not directly engaging is the New Economic Sociology (NES), which was in large part engendered by Mark Granovetter’s (1985) re-write 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 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).

society, but instead in institutions. Institutions, in all societies other than those dominated by market economies, are ruled by non-economic 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 non-economic 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: 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” (Polanyi 2001: 60) and a few pages later “a market economy can only exist in a market society” (74). *This is the disembedded market*, or a market that constitutes an “autonomous zone” (Polanyi 1947: 63), separated from political and social motivations and yet substantially able to reproduce itself. While the term *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 would take 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 non-market 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 (Karl Polanyi 1957: 270, emphasis added).

This framing is fruitful when examining a socio-economy 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. Callon: looking out for the market

Over the last 15 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 tenants of Polanyi’s framework (2002), he produces a similar treatment of disembedded, or “disentangled” in Callon’s lexicon (1998, 2002), markets. 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 socio-cultural processes that are weaved through market practices as well as neo-classical 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 pre-social, or as Latour (2005) would say, as “assembling” the social, Callon dismisses the concept of society, at least as it has been used by most social scientists, as biased and counterproductive (Callon 1998). 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 Bruno 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: 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: 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* (ibid: 51). Framing and disentangling, however, are not totalizing, and are never complete (Callon 1998: 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.

Market devices are non-human, 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 neo-classical economist might assume the world operates independent 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 in 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” (Callon: 1998: 2), a position that he rejects. It is from this assumption that Callon sets up his argument that economists off 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” (Callon 1998: 2). While Polanyi criticizes formal (neo-classical) 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 the abstraction becomes the reality (ibid).

The distinction 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.

4.0 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 in trying to understand the origin of contemporary financial derivatives markets. It is not possible here to detail this multifaceted story to the extent necessary to make a thorough intervention in the scholarship on financial markets—that is best left for another volume. I will also 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, they are 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 and innovation (Melamed & Tamarkin 1996), economic necessity (Miller 1997), the performativity of financial economic theory (MacKenzie and Millo 2003, MacKenzie 2006), 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 began tying together other financial markets. This has contributed to the construction of a globally interconnected financial market system that has come closer than any other at producing a self-regulating autonomous zone to which many other parts of the world are now dependent. Third, this case has a distinctly geographical character since the vast majority of financial derivatives were traded in a single city, Chicago, from the time they were established in the early 1970s until the late 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 fuel pricing models and 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 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. 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, it 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 U.S. Treasury Bills. From there these markets expanded rapidly into Eurodollar futures, commercial paper futures, stock index futures, and more (Rodengen 2008, Lambert 2011). 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 (Economist 1-4-1986). 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 90s, the volume of OTC derivatives out paced exchange traded instruments, and continued to expand rapidly reaching approximately U.S. \$700 trillion in notional value in the second half of 2011, approximately 10 times the amount traded on exchanges (Bank of International Settlements 2012).

4.1 Modeling derivatives

Numerous factors contributed to the dramatic innovation of these instruments. Building off of 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 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*" (MacKenzie 2007: 359, emphasis in original).

The most important technical innovation in financial economics was the development of an option pricing model. After about 20 years of academic theorizing and testing by a small group of graduate students and Ph.D. 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 over- or under-valued. 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 academic modeling of their predecessors, BSM were able to apply probability theory to stock volatility and thus predict a 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 they 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 BSM, et al. 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: 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 suggests these assumptions became more realistic as the result of higher trading volumes that fueled decreased commission charges and collateral borrowing costs (2003, 2006). And yet, regardless that the assumptions were never perfectly realized, at least for a few years, the prices converged. MacKenzie 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” (2003).

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 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: 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 BSM and similar theories was intensified by increasingly powerful computers and this encouraged rapid growth in these markets. In essence, the BSM 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 (Nesvetailova 2010, Gorham and Kundu 2012). 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 socio-economic 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 of 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 socio-technical 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 socio-economic 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?

4.2 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 80s (Rodengren 2008, 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 briefly discuss three interrelated components of the development 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 archival readings of U.S. 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. Which you'll see when you go on the floor. 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 that traded the first financial futures, stepping out of their home pits to trade the new currency contracts at the CME (Melamed and Tamarkin 1996) and equity option contracts at the CBoT (Lambert 2011).

Once a trade is executed in a trading pit, another series of work processes begin, as behind the scenes these contracts are quite complicated. 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 non-performance. 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 agro-industrial 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 U.S. 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 and Tamarkin 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 Markham 1991, 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, D.C. (Markham 1987, Griesing and Morse 1991, Melamed and Tamarkin 1996, Millo 2007). Concerned that futures

may have been causing price volatility, there was widespread desire, voiced mainly by Midwestern (farm state) congress people 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 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 (30 year: 1982-2012) president of the main Washington D.C.-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 fifty percent margin applied to everything.” (personal interview 9-24-12)

The industry was able to accomplish this in part because they had significant influence over the CFTC through close ties to the Illinois Congressional delegation, the members of whom regularly found their way onto the agriculture committees (Griesing and Morse 1991, Melamed and Tamarkin 1996). Former CFTC and SEC chair people and commissioners were regularly hired to serve on the Boards of Directors of the two exchanges, and many of the lawyers and Congressional aides that

wrote the CFTC statutes and regulations were later hired by the Chicago exchanges (Griesing and Morse 1991; Melamed and Tamarkin 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 \$2,000 from the exchanges (Melamed and Tamarkin 1996: 272).

Why did Chicago fight so hard for influence in Washington D.C.? The obvious answer is so they 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 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 were fierce because they 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 that would listen that they were their best regulators, and for the most part they were successful in regulating themselves and promoting that success to those that might impose outside restrictions.

The important point is the U.S. 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 momentary disentanglements of actors and actants from long-standing institutional entanglements. But there were also structural trends, long standing 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 and Tamarin 1996: 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 traded *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: 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: 4-5, *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 wanted it that way. Nevertheless, as the U.S. and global political economy transformed in the 1990s and 2000s, futures or “derivatives” became a centerpiece of commercial and investment banking, 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 socio-political 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.

5. 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 an “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 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 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” (Peck 2012, Hall 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 all together.

By over-emphasizing 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 (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, although he is much more open to alternative explanations, similarly suggests that financial economics has created its own worlds (2004). These arguments dissolve society, geography and history into disembodied 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 of 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 should not be analytically over-extended. 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 “counter-performativity”, 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 a-political, Callon responds that the theory actually ought to be politically liberating (2010). His explanation is that *any* economy can be performed, and politically minded people ought to stop

critiquing neo-classical 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?” (MacKenzie 2006: 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, possibly even though 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.

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