

Toward a Supply-Side Theory of Financial Innovation

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ABSTRACT

Innovation. The word is evocative of ideas, products and processes which have somehow made the world a better place. Prior to the global financial crisis, many viewed *financial* innovation as unequivocally falling into this category. Underpinning this view was a pervasive belief in the self-correcting nature of markets and their consequent optimality as mechanisms for allocating society's resources. This belief exerted a profound influence on how we regulated financial markets and institutions.

This paper examines the influence of this market fundamentalist thinking on the regulation of OTC derivatives markets in the U.S. during the pivotal period between the enactment of the *Commodity Futures Trading Commission Act* (1974) and the *Dodd-Frank Wall Street Reform and Consumer Protection Act* (2010). More specifically, it traces how the conventional 'demand-side' view of financial innovation played an important role in blinding policymakers to a host of pressing regulatory challenges. The objective of this paper is to start us down the path toward a more complete theoretical account of the nature, sources and potential private and social welfare implications of financial innovation. It also aspires to move us incrementally toward a more constructive equilibrium between the important insights of financial *theory* and how we conceptualize and pursue the objectives of financial *regulation*.

TABLE OF CONTENTS

I.	Introduction	1
II.	Financial Innovation: The Conventional Demand-Side View	4
III.	The Conventional Demand-Side View as a Driver of Public Policy: The Regulation of OTC Derivatives Markets in the U.S. (1974-2010)	8
IV.	Toward A Supply-Side Theory of Financial Innovation	23
V.	From Theory to Practice: Three Case Studies in Financial Innovation	32
VI.	Lessons Learned? The <i>Dodd-Frank Act</i> , OTC Derivatives and the Supply-Side Theory of Financial Innovation	40
VII.	Conclusion	49

I. Introduction

Innovation. The word is evocative of ideas, products and processes – the printing press, the light bulb or penicillin, for example – which have somehow made the world a better place. Prior to the global financial crisis (GFC), many viewed *financial* innovation as unequivocally falling into this category. Underpinning this view was a pervasive belief in the self-correcting nature of markets and their consequent optimality as mechanisms for allocating society’s resources (Johnson and Kwak, 2010). Perhaps nowhere was this market fundamentalism more clearly reflected than in connection with the emergence, precipitous growth and regulation of over-the-counter (OTC) derivatives markets: swaps, structured finance, and structured investment products. Prevailing dogma prior to the GFC viewed the insatiable demand for many species of OTC derivatives as a rational response to market imperfections. Supply, in turn, was a rational response to this demand. That supply met demand within the marketplace was then generally interpreted as being dispositive of these instruments’ private and social utility. This view was deeply rooted in the neo-classical framework underpinning the canonical theories of financial economics.

Conventional financial theory has exerted a profound influence on how we regulate modern financial markets. In the case of OTC derivatives, for example, it provided the historical rationale for why public regulatory intervention was not necessary to ensure the safe and efficient operation of these burgeoning markets. This rationale was grounded in the conviction that rational and fully informed market participants – utilizing sophisticated quantitative methods and the innovative financial instruments these methods made possible – had both eliminated uncertainty and

effectively mastered risk.¹ This view was seemingly bolstered by the emergence of private actors such as the International Swaps and Derivatives Association (ISDA), along with various execution, settlement and clearing platforms, to provide the legal and operational infrastructure vital to the development and growth of these new markets. Public regulatory intervention, by implication, was largely relegated to a supporting role: namely, the provision of private property rights and efficient contract enforcement necessary to support private risk-taking (Frydman and Goldberg, 2011). Markets, after all, supposedly knew best.

The GFC has revealed the folly of this market fundamentalism as a driver of public policy. It has also exposed the intellectual framework underpinning conventional financial theory as incomplete. More specifically, the conventional ‘demand-side’ view of financial innovation played a role in blinding policymakers to a host of pressing regulatory challenges ranging from uninformed contracting; to fraud and other opportunistic behavior, to the build-up of systemic risk. The objective of this paper is thus to start us down the path toward a more complete theoretical account of the nature, sources and potential welfare implications of financial innovation. In the process, it also aspires to move us incrementally toward a more constructive equilibrium between the important insights of financial *theory* and how we conceptualize and pursue the objectives of financial *regulation*.

This paper yields two related critiques of the prevailing equilibrium. The first is an *institutional* critique stemming from the failure of the conventional demand-side view of financial innovation to incorporate the important role played by financial intermediaries as suppliers of financial innovation. The second is an *informational*

¹ Employing the terms in the Knightian sense, whereas risk is susceptible to measurement (e.g. using stochastic methods), uncertainty on the other hand is fundamentally not; Knight (1921).

critique stemming from the broader failure of conventional financial theory to reflect structural limits on the availability of information within various markets; the existence of asymmetric endowments of information amongst market participants, and the presence of Knightian uncertainty. As we shall see, both critiques hold important insights for public policy and, more broadly, for how we might go about re-conceptualizing the relationship between law and finance in the wake of the GFC.

Importantly, the analysis and case studies presented in this paper also run counter to the dominant view which understands the *law* as fundamentally exogenous to *finance* (La Porta et. al., 1998). More specifically, and in line with the emerging legal theory of finance (Pistor, 2013), this paper explores how the law – in the form of both public regulation and private contractual arrangements – is in fact an important catalyst for financial innovation: shaping the way financial markets emerge and evolve. In the process, it highlights the extent to which markets are legally constructed and, as a consequence, the reality that the law is very much endogenous to finance.

This paper proceeds as follows. Part II describes the conventional demand-side view of financial innovation. Part III then explores its influence on public policy through the lens of a single case study: the regulation of OTC derivatives markets in the U.S. between 1974 and 2010. Building on the lessons from this pivotal period, Part IV tentatively advances a more complete theoretical account of financial innovation which seeks to re-conceptualize it as a process of change influenced by, amongst other factors, the supply-side incentives of financial intermediaries. Moving from theory to practice, Part V examines three case studies illustrating the importance of these supply-side incentives as drivers of financial innovation. Part VI then

examines what insights this framework might hold in terms of the potential benefits and shortcomings of the embryonic post-crisis regulatory regime governing OTC derivatives markets under the *Dodd-Frank Wall Street Reform and Consumer Protection Act*.² It also canvasses a number of (more radical) options for further regulatory reform. Part VII concludes.

Ultimately, this paper does not seek to indict conventional financial theory for its role in the GFC or dismiss all financial innovation as socially undesirable. Indeed, conventional financial theory has done much to enhance our understanding of the economic world. Simultaneously, however, it is merely a lens and – like all lenses – magnifies some features of the landscape and obscures others. By examining the contours of this lens, along with the resulting blind spots, this paper aspires to provide the foundations for a more thoughtful debate about financial innovation and the role of law within financial markets.

II. Financial Innovation: The Conventional Demand-Side View

Economists employ the term ‘innovation’ in a strictly technical sense to describe unanticipated shocks to an economy (Tufano, 2003). Beneath this veneer of objectivity, however, there survives a tendency within the relevant literature to conceptualize these unanticipated shocks as “unforecastable *improvements*” (Miller, 1986, p. 460). Perhaps nowhere is this more clearly reflected than in the conventional economic view of *financial* innovation. Scott Frame and Lawrence White, for example, define financial innovation as “something new that reduces costs, reduces risks, or provides an improved product/service/instrument that better satisfies financial system participants’ demands.” (Frame and White, 2009, p. 4. *See also* Gennaioli, Shleifer and Vishny, 2010, p. 4). Robert Merton (1995), meanwhile, rather

² Pub. Law No. 111-203 (2010) [the “*Dodd-Frank Act*”].

boldly characterizes financial innovation as the driving force behind the global financial system's march toward greater economic efficiency.

While it is difficult to ascertain with any certainty, this view appears likely to have been influenced by Joseph Schumpeter's conception of innovation as the catalyst of growth within capitalist systems (Schumpeter, 1942). As Schumpeter explains (p. 83):

“The fundamental impulse that sets and keeps the capitalist engine in motion comes from the new consumers, goods, the new methods of production or transportation, the new markets, the new forms of industrial organization that capitalist enterprise creates.”

Continuing (p. 84):

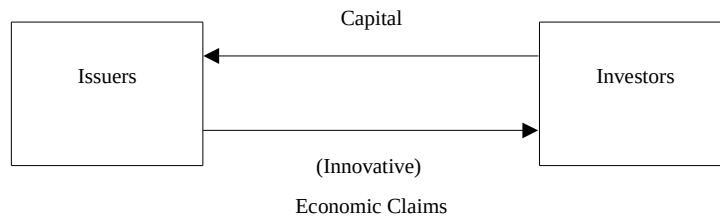
“The opening up of new markets, foreign and domestic, and the organizational development from the craft shop and factory to such concerns as U.S. Steel illustrate the same process of industrial mutation – if I may use the biological term – that incessantly revolutionizes the economic structure *from within*, incessantly destroying the old one, incessantly creating a new one. This process of Creative Destruction is the essential fact about capitalism.”

While Schumpeter himself may not have espoused this view, it is not difficult to see how one might interpret his analysis as equating *innovation* – in the form of new goods, methods of production or forms of industrial organization – with what we might colloquially call *progress*. Indeed, Schumpeter's utilization of biological terminology is suggestive of a Darwinian survival of the fittest. In reality, however, the private and social welfare implications of financial innovation are not nearly so straightforward (Litan, 2010; Tufano, 2003; Van Horne, 1985). This indeterminacy points to the desirability of a more cautious, less value-laden, understanding of financial innovation as an ongoing process of experimentation whereby new institutions, instruments, techniques and markets are (or are perceived to be) created (Tufano, 2003). As we shall see, reframing our understanding of financial innovation

as simply a process of (perceived) *change* – but not necessarily one of *improvement* – has far reaching implications in terms of how we look at modern financial markets.

Ultimately, any attempt to reframe our understanding must necessarily begin with an examination of the prevailing framework. The standard economic account of what drives financial innovation is grounded in Proposition I of the Modigliani and Miller capital structure irrelevancy principle (M&M, 1958). Proposition I posits that the value of a firm is independent of its capital structure. More specifically, Proposition I predicts that the manner in which cash flow, governance and other rights are allocated as between a firm’s suppliers of capital will have no impact on the value of the firm as a whole. Crucially, this prediction rests on a number of strict assumptions about the absence of market imperfections. These imperfections include asymmetries of information and the resulting adverse selection and agency problems (Myers and Majluf, 1984); incomplete markets (Duffie and Rahi, 1985; Tufano, 2003; Van Horne, 1985); regulation and taxes (M&M, 1963), and other frictions which constrain the ability of market participants to maximize their utility (Tufano, 2003; Allen and Gale, 1994; Harris and Raviv, 1989). Following this view, where these imperfections exist, they generate demand for innovations which promise greater choice; lower costs; enhanced liquidity; signaling benefits, and/or more effective risk management (Tufano, 2003). Conversely, where the central assumptions of the M&M capital structure irrelevancy principle hold true, Proposition I predicts that we should observe no demand whatsoever for innovation (at least in terms of the design of new financial instruments). Figure 1.1 depicts the relationship between issuers and investors in this M&M world.

Figure 1.1: Innovation in the M&M World



Deeply embedded within the M&M world – and thus the conventional demand-side view of financial innovation – is the intellectual framework (and central assumptions) of neo-classical economics. At its core, this framework envisions market participants as autonomous actors making rational and fully informed decisions with a view to maximizing their utility. Markets, then, reflect the aggregate preferences of these rational, fully informed and utility maximizing actors. Viewed from this perspective, for example, the extreme interest rate volatility of the 1970s and early 1980s can be seen as having spurred demand for innovations such as adjustable rate mortgages, variable-rate certificates of deposit, financial futures and interest rate swaps (Blair, 2010; Hu, 1992-1993; Van Horne, 1985); U.S. regulatory constraints surrounding the remuneration arrangements, eligible investors and trading strategies of registered investment companies and advisers as having prompted the development of hedge funds; and the thirst for yield on fixed income assets in the low interest rate environment of the 2000s as having stimulated demand for new forms of asset-backed securities (ABS), collateralized debt obligations (CDOs), synthetic CDOs and other structured finance vehicles (Turner, 2009). In each case, the conventional demand-side view sees innovation as a rational response to market imperfections. Supply, in turn, is viewed as a rational response to this demand.

However, while this demand-side story may be important, it paints a fundamentally incomplete picture. First, it is firmly rooted in the market

fundamentalist paradigm in which the intersection of supply and demand are viewed as being dispositive of an innovation's private and social utility. Second, it fails to adequately account for the incentives of the institutions at the center of the market for financial innovation: it ignores the role of financial intermediaries. The implications of acknowledging both (1) the shortcomings of conventional financial theory as a description of real world actors and markets and (2) the supply-side incentives of financial intermediaries are examined in greater detail in Part IV. First, however, we turn our attention to a case study demonstrating the influence of the conventional demand-side view as a driver of public policy.

III. The Conventional Demand-Side View as a Driver of Public Policy: The Regulation of OTC Derivatives Markets in the U.S. (1974-2010)

There exists no shortage of case studies illustrating the nature and pace of innovation within modern financial markets. *So why OTC derivatives?* This choice is motivated by three observations. First, OTC derivatives markets are hotbeds of innovation (Duffie, Li and Lubke, 2010; Stulz, 2009; Duffie and Hu, 2008). The basic building blocks of OTC derivatives can be combined in an infinite number of ways and with reference to an infinite number of underlying assets. It is this flexibility which makes possible the diversity and complexity observed within OTC derivatives markets today. From plain vanilla currency, interest rate and equity-linked swaps, to more sophisticated credit derivatives and structured investment products, the economic substance – and thus the potential uses – of OTC derivatives are theoretically as boundless as the imaginations of the Wall Street and Canary Wharf ‘financial engineers’ who create them. Equally spectacular, has been the pace of innovation with OTC derivatives markets. Whereas an authoritative desk reference in 1985 might have identified a universe of perhaps a dozen or so relatively basic

instruments, today there are hundreds of different species of OTC options, forwards, swaps, structured finance vehicles and structured investment products.³ This derivatives universe, like our own, is constantly expanding.

Second, OTC derivatives played a prominent role in the thick of the GFC. Structured finance vehicles – and specifically mortgage-backed securities (MBS) and the more complex CDOs into which they were repackaged – underpinned the ‘originate-and-distribute’ lending model at the heart of the U.S. sub-prime mortgage crisis and facilitated its spread throughout the global financial system (FCIC, 2011; Gorton, 2010). The sub-prime crisis unleashed a wave of broader uncertainty and, ultimately, illiquidity within ABS, CDO and related markets. This illiquidity undermined the stability of many of the financial institutions which traded in these instruments (or utilized them as collateral in their wholesale funding operations), precipitating the flight of assets, haircuts and collateral calls which triggered the near collapse of Bear Stearns (SEC, 2008); the bankruptcy of Lehman Bros. (Valukas, 2010), and the bailout of AIG (Squire, 2010; Sjostrom, 2009) between March and September 2008 (FCIC, 2011; Gorton, 2010; Gorton and Metrick, 2009). Indeed, the bailout of AIG was itself necessitated by the insurance firm’s enormous one-way bet on credit default swaps (CDS) linked to MBS and related CDOs. Accordingly, while OTC derivatives were arguably not a proximate cause of the crisis, the GFC nevertheless provides us with an illuminating window into their potential risks.

Finally, and most importantly for the present purposes, the approach adopted toward the regulation of OTC derivatives markets in the U.S. prior to the GFC was heavily influenced by the conventional demand-side view of financial innovation. Reflective of the market fundamentalist thinking which underpinned it, this approach

³ For a more comprehensive overview of the taxonomy of OTC derivatives, see Flavell (2009).

can perhaps best be characterized as ‘non-interventionist’ (Awrey, 2010 and 2012). Swaps markets effectively (if not at all times legally) fell outside the perimeter of federal securities and commodity futures regulation (Partnoy, 2001; Gibson, 1999; Romano, 1997). ABS, CDOs, other structured finance vehicles and structured products, meanwhile, were typically sold under exemptions from prospectus, registration and other regulatory requirements.⁴ Somewhat paradoxically, this non-interventionist approach was imposed through a series of strategic interventions by the U.S. Treasury Department, Federal Reserve Board and other federal banking regulators. As we shall see, each of these interventions had the effect of undercutting attempts to enhance public regulatory oversight of these rapidly expanding markets. As we shall also see, this ‘non-interventionist’ interventionism was motivated by the view – grounded in conventional financial theory – that private market participants were invariably best positioned to identify and respond to the risks arising in connection with OTC derivatives.

Basic derivatives have been woven into the fabric of commercial life for centuries. Derivatives inflated what is often held out as the first speculative asset bubble: the Dutch ‘tulip mania’ of the 1630s (Shiller, 2005). They also played a role in the South Sea Bubble of 1720 (Shea, 2007). These early derivatives – primarily forwards and futures – typically contemplated the future delivery of physical commodities such as grain, textiles, livestock or precious metals. While a number of early derivatives markets such as the Chicago Board of Trade (CBOT), London Metal Exchange and Liverpool Cotton Exchange eventually achieved a relatively high

⁴ For example, exemptions could be obtained under sections 3(a)(2) and 4(2) of the *Securities Act of 1933*, codified at 15 U.S.C. § 77a (1933) [the “*Securities Act*”] and sections 3(c)(1) and 3(c)(7) of the *Investment Company Act of 1940*, 15. U.S.C. §80a (1940) [the “*ICA*”]. The SEC subsequently expanded the available exemptions through Rule 144A under the *Securities Act* (adopted in 1990) and Rule 3a-7 under the *ICA* (adopted in 1992).

degree of formal organisation and sophistication, the basic structure of early derivatives and the nature of their underlying remained essentially unchanged until well into the 20th century.

Regulation of these early derivatives markets was, similarly, a relatively static affair. The *Commodity Exchange Act of 1936 (CEA)*⁵ is often viewed as the first comprehensive attempt to regulate U.S. derivatives markets.⁶ The *CEA* granted the U.S. Secretary of Agriculture the authority to designate authorized boards of trade (or ‘contract markets’) and license brokers trading futures contracts in commodities such as grain, butter, cotton, rice, potatoes and eggs. The *CEA* imposed requirements on designated contract markets respecting, amongst other matters, transaction recordkeeping and the admission of members. It also introduced penalties for fraud and market manipulation; set speculative position limits, and imposed conduct of business requirements on market participants. Administration of the *CEA*, meanwhile, fell to a new agency – the Commodity Exchange Commission – created as a division of the Department of Agriculture. The regime established under the *CEA* would remain in place, more or less unchanged, for almost four decades.

The status of derivatives markets as a small, parochial and largely agrarian financial backwater began to change in the early 1970s. Looking to capitalize on the exchange rate volatility precipitated by the collapse of the Bretton Woods fixed exchange rate regime, the Chicago Mercantile Exchange (CME) began trading futures contracts on foreign currencies in 1972 (Petzel, 1995). Later that same year, the Chicago Board Options Exchange (CBOE), an offshoot of the CBOT, was created to facilitate trading in options and futures on individual securities (Petzel, 1995). On its

⁵ 49 Stat. 1491, codified at 7 U.S.C. § 1-15 (1936).

⁶ See Romano (1997) for a more complete history of U.S. derivatives regulation during this period.

first day of operation, a total of 911 contracts were executed on the CBOE in 16 underlying securities.⁷ The first seeds of the derivatives revolution had been planted.

Spurred in large part by these developments, Congress enacted the *Commodity Futures Trading Commission Act of 1974 (CFTCA)*.⁸ The *CFTCA* created the Commodity Futures Trading Commission (CFTC) as an independent agency – analogous to the Securities and Exchange Commission (SEC) – for the purpose of regulating futures and commodity options markets. It conferred upon the CFTC exclusive jurisdiction over the regulation of all transactions involving contracts for the sale of a commodity for future delivery (and all options thereon), subject to a savings clause designed to preserve the jurisdiction of the SEC (*CEA*, s. 2(a)1(A)). Simultaneously, the *CFTCA* expanded the scope of the *CEA* to include previously unregulated commodities, along with “all other goods and articles, and all services, rights, and interests in which contracts for future delivery are presently or in future dealt in.” (*CEA*, s. 2(a)1(A)).

It is in response to the proposed expansion of the *CEA* that the influence of the intellectual framework underpinning conventional financial theory on U.S. derivatives regulation can first be observed. On its face, the CFTC’s exclusive jurisdiction clause granted it wide-ranging purview over trading in both futures and options – not just on any designated contract market but, importantly, on “any other board of trade, exchange or market” (*CEA*, s. 2(a)(1)(A)). Concerned that the CFTC’s jurisdiction might thus extend to wholesale markets in foreign currencies, government securities and certain other financial instruments, the Treasury Department petitioned vigorously

⁷ See www.cboe.com/AboutCBOE/History.aspx.

⁸ Pub. Law No. 93-463, 88 Stat. 1389 (1974).

to curtail the scope of the clause, stating in a letter (Ritger, 1974) to the Chairman of the Senate Committee responsible for overseeing the CFTC:

“The Department feels strongly that foreign currency futures trading, other than on organized exchanges, should not be regulated by [the CFTC]. Virtually all futures trading in foreign currencies in the United States is carried out through an informal network of banks and dealers. This dealer market, which consists primarily of large banks, has proved highly efficient in serving the needs of international business in hedging risks that stem from foreign exchange rate movements. The participants in this market are sophisticated and informed institutions...”

Continuing:

“... in this context, new regulatory limitations and restrictions could have an adverse impact on the usefulness and efficiency of foreign exchange markets...”

Persuaded by this line of reasoning, Congress inserted what has come to be known as the ‘Treasury Amendment’ to the *CFTCA* (*CEA*, s. 2(c)(1) and (2)). The Treasury Amendment carved out from the CFTC’s jurisdiction transactions in foreign currencies; security warrants; security rights; resales of installment loan contracts; repurchase options; government securities; mortgages, and mortgage purchase commitments, provided that such transactions did not involve the sale of any of these instruments for future delivery on a CFTC-designated contract market. In effect, the Treasury Amendment ensured that markets in these instruments would remain under the oversight of federal banking regulators and, specifically, the Federal Reserve Board and Office of the Comptroller of the Currency (OCC).

The importance of the Treasury Amendment in terms of the development of U.S. derivatives markets and their regulation cannot be overstated (Harvey, 2013; Carruthers, 2013). First, by carving out the fledgling wholesale markets for foreign currencies, government securities and other financial instruments from CFTC oversight, the Treasury Amendment created the regulatory space within which swaps,

structured finance and other OTC derivatives markets would eventually emerge and blossom. Second, the central assumption underpinning the Treasury Amendment – that “sophisticated and full informed” (Ritger, 1974) market participants possessed both the capacity and incentives to minimize the attendant risks – would, in time, provide the principal justification for the non-interventionist approach adopted toward the regulation of OTC derivatives markets. Indeed, this assumption would continue to inform public policy for the better part of the next four decades. As we shall see, it would do so notwithstanding three subsequent developments: (1) the exponential growth and proliferation of OTC derivatives markets; (2) the entrance of less sophisticated counterparties, and (3) a series of manifest failures on the part of ostensibly sophisticated counterparties to understand and/or effectively manage various risks.

The decades following the enactment of the *CFTCA* were characterized by revolutionary change and dramatic growth within U.S. (and global) derivatives markets. In September 1975, the CBOT received approval to trade the first futures contract on a financial instrument.⁹ This exchange-traded market would continue to grow and evolve under the oversight of the CFTC (Romano, 1997). It was within the emerging OTC market, however, that the vast majority of innovation would take place. The first widely reported swap transaction – a currency swap between IBM and the World Bank – was entered into in 1981 (Flavell, 2009). The emergence of markets for interest rate (c. 1981), commodity (c. 1986) and equity-linked (c. 1989) swaps would follow over the course of the next decade (Castignino, 2009). The forerunners of modern CDS, meanwhile, came to the market in the early 1990s (Castignino, 2009). By 1997, ISDA estimated the outstanding notional amount of all

⁹ See www.cftc.gov/aboutthecftc/historyofthecftc/history_1970s.html.

OTC interest rate and currency derivatives at USD\$37.39 trillion: up from a mere USD\$1.14 trillion in 1987 (ISDA, 2010).

The 1980s and 1990s would also witness the emergence and precipitous growth of ABS, CDO and other structured finance (or securitization) markets. The first ABS was issued by the U.S. Government National Mortgage Association (Ginnie Mae) in 1970 (Heffernan, 2005). This nascent ABS market initially revolved around the issuance of residential MBS by U.S. government sponsored enterprises (GSEs) such as Ginnie Mae, the Federal National Mortgage Association and the Federal Home Loan Mortgage Corporation (Heffernan, 2005). Observing the success of this ‘agency’ ABS market, private sector financial institutions – primarily larger commercial and investment banks – began structuring and distributing ‘private label’ ABS in the mid-1980s (Heffernan, 2005). These financial institutions adapted the structures developed by the GSEs in connection with residential mortgages to securitize cash flows derived from a far broader range of underlying assets including commercial mortgages; home equity and student loans; automobile, aircraft and equipment leases; credit card receivables; corporate debt; swaps, and even other structured finance vehicles. Between 1985 and 1997, the outstanding volume of non-mortgage-related private label ABS (including CDOs) grew from an estimated USD\$1.2 billion to over USD\$500 billion (SIFMA, 2012).

Observing these developments – along with a series of high profile derivatives-related scandals involving market participants such as Orange County, Proctor & Gamble, Gibson Greetings, Metallgesellschaft and Barings plc – the CFTC issued a Concept Release in May 1998 announcing its intention to fundamentally re-examine its approach toward the regulation of OTC derivatives markets and,

specifically, swaps (CFTC, 1998). The Concept Release was framed as part of a comprehensive reform effort designed to update the CFTC's oversight of both exchange-traded and OTC derivatives markets (Carruthers, 2013). To this end, it sought comment on a number of specific areas of potential reform including: eligible transactions; eligible market participants; clearing; transaction execution facilities; registration; capital; internal controls; sales practices; recordkeeping, and reporting.

The Concept Release was roundly criticized by the U.S. financial services industry (Stout, 1999). It also provoked a chorus of objections from other federal regulators including the Treasury Department, Federal Reserve Board and SEC (Johnson and Kwak, 2010). It is in the content of these objections that the influence of the conventional demand-side view of financial innovation on the pre-crisis regulation of OTC derivatives markets is perhaps most clearly reflected. Indeed, the ideological predisposition of at least one key player had become apparent some time prior to the issuance of the Concept Release. Speaking at the Federal Reserve Bank of Chicago in May 1997, Alan Greenspan (1997a) stated:

“The unbundling of financial products is now extensive throughout our financial system. Perhaps the most obvious example is the ever expanding array of financial derivatives available to help firms manage interest rate risk, other market risks, and increasingly, credit risks... Another far reaching innovation is the technology of securitization – a form of derivative – which has encouraged unbundling of the production processes for many credit services... These and other developments facilitating the unbundling of financial products have surely improved the efficiency of our financial markets.”

In remarks at the Federal Reserve Bank of Atlanta in February 1997, meanwhile, Chairman Greenspan (1997b) had also expressed his views regarding the desirability of public regulatory intervention into OTC derivatives markets:

“[T]he need for U.S. government regulation of derivatives instruments and markets should be carefully re-examined. The application of the Commodity Exchange Act to off-exchange transactions between institutions seems wholly unnecessary – private

market regulation appears to be achieving public policy objectives quite effectively and efficiently.”

Greenspan (1999) would subsequently argue that the efficiency of OTC derivatives markets provided a compelling case for relaxing regulatory requirements in connection with exchange-traded derivatives.

Standing with Greenspan in opposition to the Concept Release was Treasury Secretary Robert Rubin, then Deputy Treasury Secretary Larry Summers and SEC Chairman Arthur Levitt (Treasury Department, 1998; Summers, 1998; Coutts and Bernstein, 2008; Johnson and Kwak, 2010). The primary thrust of their argument was that (1) private market participants possessed both the expertise and incentives to effectively manage the market, counterparty credit and other risks associated with OTC derivatives; (2) regulatory intervention would reduce market efficiency, and (3) reduced market efficiency would ultimately translate into a reduction in living standards. As Greenspan (1998a) would testify before Congress:

“... professional counterparties to privately negotiated contracts also have demonstrated their ability to protect themselves from losses, from fraud, and counterparty insolvencies... Aside from the safety and soundness regulation of derivatives dealers under the banking and securities laws, regulation of derivatives transactions that are privately negotiated by professionals is unnecessary. Regulation that serves no useful purpose hinders the efficiency of markets to enlarge standards of living.”

The intellectual shadow of the conventional demand-side view of financial innovation is not difficult to discern from these statements. Despite an apparent dearth of credible empirical support, senior federal regulators clearly viewed financial innovations such as swaps and structured finance as unambiguously positive from the perspective of both *private* and – as Greenspan’s reference to enlarged standards of living suggests – *social* welfare. This view was grounded in the assumption that this innovation was the product of rational and fully informed market participants

responding to the existence of market imperfections and, moreover, that these market participants internalized the full costs of their activities. It was a song straight out of the market fundamentalist hymnbook.

Congress responded by enacting the *Commodity Futures Modernization Act of 2000 (CFMA)*.¹⁰ The enactment of the *CFMA* followed on from the issuance of a report by The President’s Working Group (PWG) on Financial Markets – the authors of which included Greenspan, Summers and Levitt – which warned that “a cloud of legal uncertainty” was undermining the U.S.’s leadership in financial services (PWG, 1999, p. 1). On this basis, the PWG Report recommended additional deregulation and exemptions for OTC derivatives markets with a view to, *inter alia*: (1) promoting innovation and reducing risk by enhancing legal certainty and (2) strengthening the competitive position of the U.S. within global derivatives markets. In effect, however, the *CFMA* prohibited the SEC, CFTC and state securities and banking regulators from introducing any new regulation which might impede the development and growth of these increasingly important markets.¹¹ The *CFMA* was thus the legislative embodiment of the notion, reflected in the conventional demand-side view of financial innovation, that the role of public law and regulation is merely to *facilitate* markets – not to *shape* them.

Perhaps not surprisingly, the enactment of the *CFMA* was followed by a period of regulatory stasis.¹² Indeed, what little momentum U.S. regulators could muster was primarily utilized to further relax remaining regulatory constraints. In November 2001, for example, the Federal Reserve Board, OCC, Federal Deposit

10 Pub. Law No. 106-554, 114 Stat. 2763 (2000).

11 More specifically, it exempted swaps and hybrids between “eligible contract participants” from the application of federal securities laws and the *CEA*; see Henderson (2010).

12 Although more significant regulatory activity could be observed during this period in connection with exchange-traded derivatives and publicly issued ABS; see for example SEC (2005).

Insurance Corporation (FDIC) and Office of Thrift Supervision (OTS) introduced new capital requirements for ABS and other structured finance vehicles which effectively devolved risk determinations to private credit rating agencies and, in some cases, the financial institutions structuring and distributing these securities (Johnson and Kwak, 2010; Kling, 2009). Then, in June 2004, the SEC introduced the Consolidated Supervised Entities (CSE) Program (SEC, 2004). The CSE Program established a voluntary, alternative method for computing regulatory capital requirements for certain broker-dealers registered under the *Exchange Act of 1934*.¹³ The CSE Program permitted these broker-dealers to use their own internal mathematical models to calculate net capital requirements in connection with, *inter alia*, market and derivatives-related credit risk. In exchange, broker-dealers agreed to subject themselves, their parent holding companies and affiliates to consolidated supervision by the SEC. They also agreed to (1) comply with enhanced net capital; early warning; recordkeeping; reporting, and other requirements and (2) implement internal risk management systems.

As Simon Johnson and Charles Kwak (2010) observe, the CSE Program was designed to reduce the regulatory burden on major U.S. investment banks. Indeed, the program was introduced in response to a request made by Goldman Sachs, Morgan Stanley, Merrill Lynch, Lehman Bros. and Bear Stearns (Johnson and Kwak, 2010). The CSE Program also represented something of a coup de grâce for non-interventionism: having convinced Congress that regulation of OTC derivatives markets was unnecessary “aside from the safety and soundness regulation of derivatives dealers” (Greenspan, 1998a), federal regulators had turned around and devolved the cornerstone of this regulation to these very institutions. Underpinning

13 15 U.S.C. §78a (1934) [the “*Exchange Act*”].

this decision, once again, was the assumption that private market participants, utilizing sophisticated quantitative tools and acting in their own self-interest, had eliminated uncertainty and effectively mastered risk.

This regulatory torpor stands in stark contrast with the growth of OTC derivatives markets during this period. Between December 2000 and June 2007, the aggregate notional amount outstanding of all bilateral OTC derivatives (i.e. swaps, forwards and options) grew from approximately USD\$95.2 trillion to USD\$516 trillion – an increase of 542% (BIS, 2001 and 2007). Over the same period, the outstanding amount of ABS and CDOs in the U.S. and Europe grew from USD\$341.1 billion to over USD\$3 trillion (SIFMA, 2012). In retrospect, this period would prove the calm before the storm.

It is worthwhile observing at this juncture that a handful of observers have argued that, despite appearances, the Federal Reserve Board and other federal banking regulators actually played a more interventionist oversight role in respect of OTC derivatives markets in the decades leading up to the GFC (Henderson, 2010; Lynch, 2007). Indeed, these claims are not wholly without merit. The *CFMA*, for example, was in part designed to facilitate the development of clearing and alternative execution platforms for swaps markets, ultimately with the objective of reducing systemic risk (PWG, 1999). Along a similar vein, Banking Circular 277, issued by the OCC in October 1993 (and supplemented in 1999), articulated a framework for U.S. banks to evaluate the adequacy of their derivatives-related risk management practices (OCC, 1993 and 1999). Banking Circular 277 identified nine areas of potential risk: strategic; reputation; price; foreign exchange; liquidity; interest rate; credit; transaction, and compliance. Tellingly, *systemic* risk failed to make the list.

Observers also point to a series of interventions by the Federal Reserve Bank of New York as evidence of its proactive approach toward the regulation of OTC derivatives markets. These interventions include the Fed's 1994 settlement agreement with Bankers Trust New York Corporation in connection with leveraged derivatives transactions involving Gibson Greetings¹⁴, along with its 2003 settlement agreements with Citigroup and JPMorgan Chase stemming from their Enron-related financing activities.¹⁵ They also include the Fed's decision in August 2005 to convene a meeting of major OTC derivatives dealers with a view to facilitating the resolution of operational issues which had arisen in connection with a backlog of unconfirmed trades.¹⁶

Ultimately, however, the argument that these sporadic initiatives amounted to meaningful regulatory intervention does not stand up to closer scrutiny. Banking Circular 277 did little more than codify existing industry practices (Henderson, 2010). The settlements with Bankers Trust, Citigroup and JP Morgan Chase, meanwhile, were concluded within politically charged environments in which, as we have seen, other federal regulators had also taken aggressive action. Similarly, the New York Fed's 2005 intervention came only after the U.K. Financial Services Authority (FSA, 2005); a Joint Forum under the auspices of the Basel Committee on Banking Supervision (BCBS, 2005), and the private sector Counterparty Risk Management Policy Group II (CRMPII, 2005) had already called attention to the risks arising from unconfirmed trades. Indeed, the CRMPII had actually proposed an industry-

14 See Docket No. 94-082-WA/RB-HC (December 5, 1994).

15 See SEC (2003) and Henderson (2010).

16 See in particular, Lynch (2007). See also Atlas (2005) and Sender, MacKenzie and Mikdashi (2005). For an assessment of the effectiveness of this initiative, see GAO (2007). For an opposing view, see Listokin (2009).

wide roundtable specifically to address the issue (CRMPG II, 2005). Most importantly, however, these limited interventions – which, other than the three enforcement actions, were effectively designed to nudge private actors into taking action – reflected a broader and more deeply entrenched approach to regulation which tacitly assumed that market participants were invariably best positioned to address the risks arising in connection with OTC derivatives.

Ultimately, of course, we must exercise caution when advancing the existence of a causal relationship between the intellectual frameworks underpinning conventional financial theory and the non-interventionist approach adopted by U.S. regulators. This is especially true given that the only ‘tangible’ evidence of this relationship consists of a relatively small number of (often cryptic) public statements made by senior government officials. While it is difficult to argue that Alan Greenspan was not the most influential financial regulator in the world during the pivotal period between 1987-2006, he was still just one man, working in a large, complex government agency which itself was only one of many agencies with oversight of the U.S. financial services industry. Moreover, the preceding examination has canvassed only select episodes in the often tumultuous history of U.S. derivatives regulation. These important caveats notwithstanding, however, it is difficult to deny the fact that the conventional demand-side view of financial innovation resonates within the statements of Greenspan and others. More importantly, this view was reflected in the regulatory regime – embodied by measures like the Treasury Amendment, *CFMA* and CSE Program – which these regulators played an integral role in establishing. It would take a crisis of truly global proportions to shake the foundations of this relationship between conventional financial theory and how we regulate modern financial markets.

IV. Toward A ‘Supply Side’ Theory of Financial Innovation

So what risks might the conventional demand-side view of financial innovation have caused regulators to discount or simply overlook? First – and despite the foreshadowing provided by several high profile derivatives-related calamities – regulators discounted the risks arising in connection with the opaque, dealer-intermediated microstructure which characterized the markets for swaps and many structured investment products. As market makers, derivatives dealers have historically enjoyed an informational advantage vis-à-vis the remainder of the marketplace in terms of, *inter alia*, prevailing market conditions (i.e. pricing and deal flow); the identity of market participants, and their outstanding positions. As the financial engineers designing these instruments, they are also intimately familiar with their (often complex) mechanics. Together, these advantages have yielded a market microstructure which looks less like the atomized (i.e. flat) markets of conventional financial theory and more like an informational hierarchy with a relatively small, close-knit group of derivatives dealers residing at the apex. This raises the prospect of uninformed contracting by those lower down in the hierarchy and, simultaneously, opens the door to opportunism on the part of those at or near the top. Thus, while regulators may have been content to assume that these markets were populated by sophisticated counterparties with similar endowments of market power, information and expertise, it seems reasonable to suggest that the reality was, and is, somewhat more complicated.

Second, the complexity of OTC derivatives markets – and of derivatives dealers – generated an acute adverse selection problem. More specifically, high information costs stemming from the growing size, technological sophistication,

opacity and interconnectedness of these markets and institutions rendered it increasingly difficult for market participants to ascertain the nature and extent of the relevant market, counterparty credit, operational and other risks (Awrey, 2012). These information costs were compounded by fundamental uncertainty (Frydman and Goldberg, 2011). Especially during periods of market turmoil, we would expect high information costs and uncertainty to be reflected in a ‘lemons discount’ as market participants struggled to differentiate between assets and counterparties of variable quality (Akerlof, 1970). In extreme circumstances, the resulting ‘flight to quality’ (or liquidity hoarding) may even precipitate complete market breakdown (Cabellero and Simsek, 2009). Indeed, this is precisely what we observed within wholesale funding markets during the darkest days of the GFC (Gorton, 2010; Gorton and Metrick, 2009). Viewed from this perspective, the complex structure of these instruments, the markets in which they trade, and the institutions which trade them can be seen as leading, almost inevitably, to crisis. Once again, however, regulators seemingly discounted these latent problems and, with them, the attendant (systemic) risks.

As we have already seen, one of the reasons why regulators discounted these risks was that they believed that market participants possessed both the capacity and incentives to address them. This belief was founded on at least two (often implicit) assumptions. The first was that quantitative methodologies such as ‘value-at-risk’ (or VaR) could accurately measure risk – even during periods of market turmoil. This assumption was reflected in regulatory initiatives such as the CSE Program and the Internal Ratings Based Approach (or IRB) introduced under Basel II (BCBS, 2006), both of which permitted banks to use their own internal models to calculate credit risk for the purposes of regulatory capital requirements. The second assumption was that individual counterparties would in all states of the world be incentivized to utilize

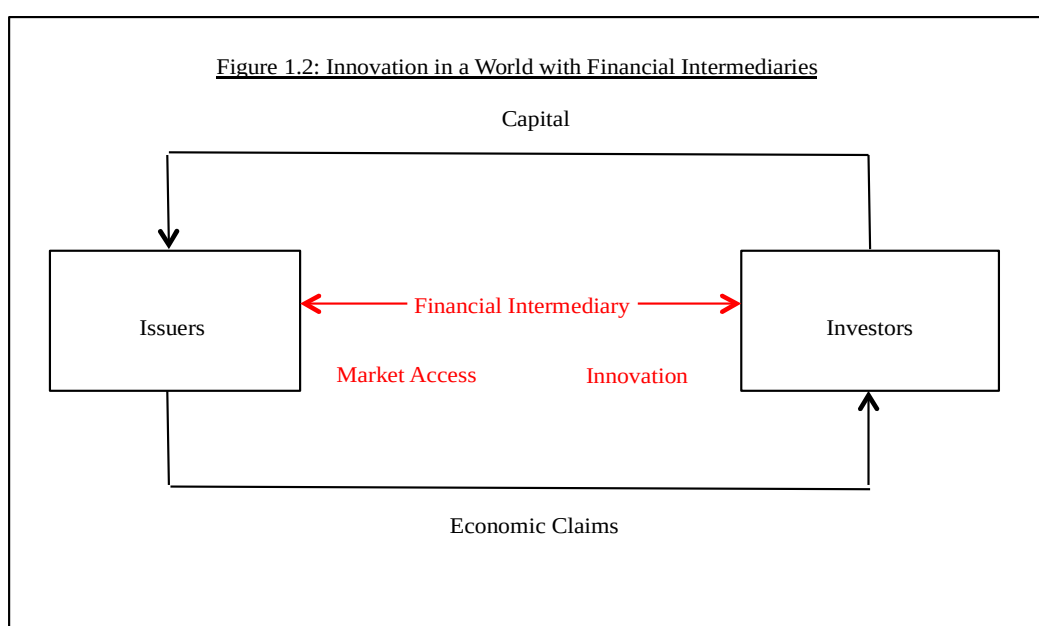
contractual tools – e.g. privately negotiated netting and collateral arrangements – in order to minimize residual exposures (Greenspan, 1998a and 1997b).

In reality, however, both assumptions were deeply flawed. As Alan Morrison points out, the first assumption is rooted in a failure to appreciate the limits of quantitative tools as a means of measuring interactions within *social* (as opposed to *physical*) systems (Morrison, 2012). As Morrison wryly observes (p. 22): “The type of detailed understanding of wing stresses that an aircraft engineer can achieve is simply not attainable for the stresses in complex financial systems at times of systemic fragility”.¹⁷ The second assumption, meanwhile, failed to accurately reflect how market participants behaved in the real world. Manmohan Singh, for example, has estimated that just prior to the collapse of Lehman Bros. swap markets were under-collateralized by as much as USD\$2 trillion (Singh, 2010; Singh and Aitken, 2009; Basurto and Singh, 2008). Perhaps more importantly, prevailing market practice dictated that *intra-dealer* exposures – along with those of large counterparties such as AIG – were often entirely uncollateralized (Singh, 2010). Moreover, even where collateral was provided, it was often re-hypothecated: thereby compounding the complexity and fragility of the counterparty daisy chain (Singh, 2010). With the benefit of hindsight, therefore, it would appear that the faith placed by regulators in the capacity and incentives of private market participants was, ultimately, somewhat misplaced.

Each of these regulatory failures merits further examination. The lacuna at the heart of the present inquiry, however, is the failure of regulators to understand the

¹⁷ Along the same vein, we would expect Knightian uncertainty to be far more prevalent within social as opposed to physical systems.

important role played by financial intermediaries – and derivatives dealers in particular – as the principal *suppliers* of financial innovation. As described above, dealers perform an important function as market makers within bilateral OTC derivatives markets. They are also integral to the structuring and distribution of the securities issued by structured finance vehicles. As a result, we need to update [Figure 1.1](#) to reflect the centrality of financial intermediaries within modern financial markets (Merhling, 2011) and, specifically, the market for financial innovation¹⁸:



Henry Ford was apparently fond of saying that if he had asked people what they wanted, they would have said faster horses. Put another way, the supply-side incentives of innovators can be extremely influential in determining the course and speed of innovation. What we need, therefore, is to compliment the prevailing demand-side view of financial innovation with a corresponding supply-side theory.

¹⁸ Insofar as it describes the market for capital, [Figure 1.2](#) is (on its face) a more accurate depiction of structured finance markets than bilateral derivatives markets. For bilateral derivatives markets – which are essentially markets for *risk* as opposed to *capital* – there is no satisfactory analog for ‘investors’ and ‘issuers’. [Figure 1.2](#) would also need to be amended to reflect the fact that swap dealers, for example, provide innovation and market access to *both* counterparties.

Curiously, the supply-side dynamics of financial innovation have been largely overlooked by academics and policymakers. So why do financial intermediaries innovate? At first glance, the answer to this question might appear relatively straightforward: profit. In a competitive environment, however, we would expect these profits to quickly erode as imitators enter the marketplace, attract market share and drive down margins (Van Horne, 1985).¹⁹ We might further expect the rate of this profit erosion to be a function of the diffusion speed of the innovation.

We would thus expect the incentives of potential innovators to be relatively muted in the absence of some means of preventing imitators from freely appropriating the innovation. This is the traditional economic justification for the extension of intellectual property rights to innovators (Arrow, 1962; Dixit and Stiglitz, 1977). By granting innovators a temporary monopoly on the fruits of their invention, it is thought, these rights provide the economic incentives (rents) necessary to spur innovation. The problem, of course, is that intellectual property rights do not extend to the vast majority of *financial* innovations.²⁰ It is perhaps unsurprising, therefore, that the diffusion rates of many financial innovations are exceptionally high (Hu,

¹⁹ What little empirical evidence exists on this front is inconclusive and not altogether relevant to the present inquiry. In an empirical study of financial innovations from 1976 to 1984, Peter Tufano (1989) found that financial intermediaries did not charge higher prices in the brief ‘monopoly’ period before imitations appeared and, in the long-run, charged lower prices than their rivals. Tufano did find, however, that innovating banks captured a larger share of underwriting business for the relevant products than did imitators. In a more recent study, Kenneth Carrow (1999) found an inverse relationship between the number of imitators and the size of underwriting spreads. Neither study, however, is particularly illuminating or immediately relevant insofar as (1) their research was focused exclusively on innovations within markets for publicly-traded securities, and (2) neither researcher looked beyond underwriting spreads to examine other potential benefits – informational advantages associated with market-making or reputational effects, for example – derived from being an innovator.

²⁰ Outside the limited scope of business method patents in the U.S.; see the Federal Circuit Court of Appeals decision in *State Street Bank v. Signature Financial*, 47 U.S.P.Q. 2nd 1596 (Fed. Cir. 1998) [*“State Street”*]. Even then, however, one would expect such patents to be of limited practical application in the context of financial innovation insofar as the application process contemplates public disclosure as a precondition to protection. It is likely that financial intermediaries will in many instances find such disclosure unpalatable for strategic reasons. This intuition finds empirical support in studies finding that *State Street* did not have an appreciable impact on the number of patent applications filed by financial firms; Hunt (2008).

1992-1993). As a corollary, we might expect to observe relatively little innovation. Yet this is precisely the opposite of what we often observe within modern financial markets. This observation suggests that we need to develop a better understanding of why financial intermediaries innovate.

Upon reflection, financial intermediaries possess at least three very different incentives to innovate. First, reflective of the conventional demand-side view, financial intermediaries innovate in response to the emergence of genuine demand within the marketplace. Second, they innovate with a view to mitigating the impact of various regulatory requirements. A prominent example of this, examined in greater detail in Part V, is the use (and adaptation) of structured finance techniques by banks to circumvent regulatory capital requirements. Third, financial intermediaries innovate with the intention of recreating the monopolistic conditions – usually afforded by intellectual property rights – which allow for the extraction of rents. There are at least two such strategies and, together, they can help us construct a more complete account of the drivers of financial innovation.

The first strategy involves artificially accelerating the pace of innovation (Hu, 1991 and 1992-1993). Financial intermediaries engage in this strategy for the purpose of achieving product differentiation (Tufano, 2003) – not only vis-à-vis the innovations of their competitors but, crucially, between previous generations of their *own* innovations. In this respect, this strategy is broadly analogous to the short-term ‘planned obsolescence’ through innovation observed within the fashion, consumer electronics, software, academic textbook and other industries (Ellison and Fudenberg, 2000; Fudenberg and Tirole, 1998; Waldman, 1993 and 1996; Miller, 1974). Notably, this strategy does not necessarily rely on the existence of any natural demand in the

marketplace, nor on the innovation itself being ‘new’ in any material respect. Rather, it can theoretically be premised on little more than capitalizing on investor short-termism, other behavioral factors, or simply tapping the innate human desire for the ‘next new thing’ (Van Horne, 1985). The practical effect of this strategy is to reset the diffusion clock – in essence creating more (albeit shorter) monopoly-like periods – thereby enabling financial intermediaries to extract greater rents from their innovations.

The second strategy employed by financial intermediaries in response to the appropriability problem is to embrace complexity. More specifically, many financial intermediaries have harnessed technology (and especially financial theory) to develop and move an increasingly large proportion of their business activities into new and relatively opaque institutions, instruments and markets. They have also lobbied fiercely against regulatory reforms which would seek to achieve, amongst other objectives, a leveling of the informational playing field (Rivlin, 2011; Wyatt and Lichtblau, 2010; Dennis and Mufson, 2010). The resulting complexity has been used by these intermediaries to prevent the commoditization of many financial innovations, ultimately forestalling the redistribution of rents from innovators to consumers which one might otherwise expect to take place over time. In many cases, these rents flow not only from higher underwriting spreads, but also the informational advantages derived from the role these financial intermediaries play as market makers.²¹

This, of course, begs an important question: why would consumers of financial innovation – upon learning of the existence and potential use of these strategies – not take appropriate countermeasures? More specifically, why would

²¹ Including pricing and counterparty information and lower search costs for underwriting opportunities.

rational and informed consumers not (1) apply a ‘lemons discount’; (2) insist on the utilization of costly contracting mechanisms to reveal information about the quality of the innovation, or (3) refuse to transact with financial intermediaries with a reputation for engaging in these strategies? As a preliminary matter, one might observe that high information costs for consumers lower down in the informational hierarchy might impede this learning process. (as would accelerating the pace of innovation). However, while this would almost certainly be true on one level, the salient question simply becomes: why would consumers (or competing financial intermediaries) higher up in the hierarchy not share the fruits of their knowledge with less informed consumers? Why, in other words, would this information not ultimately find its way into the marketplace?

There are a number of potential explanations for this apparent market failure. Xavier Gabaix and David Laibson (2006), for example, have developed a model which demonstrates how ‘shrouding’ – i.e. the process by which producers hide information from consumers about high priced add-ons – can flourish even in highly competitive markets. Their model proceeds on the basis of a distinction between ‘sophisticated’ and ‘myopic’ consumers. Using examples drawn from the banking, hospitality and office product industries, Gabaix and Laibson illustrate how producers utilize marketing strategies which obscure high-priced add-ons (often in the ‘fine print’) with the objective of exploiting myopic customers who, by definition, fail to recognize that they are at an informational disadvantage. Sophisticated customers – who can see through the shrouding – then exploit the marketing schemes designed to target myopic customers by, for example, opting out of the add-ons. The result is an equilibrium in which neither producers, competitors offering close substitutes (who risk de-biasing their own customers) nor sophisticated consumers (who receive an

implicit subsidy from the marketing strategies targeting myopic consumers) have any incentive to ‘de-bias’ myopic customers by revealing the existence or true cost of the add-ons. Gabaix and Laisbon further observe that, over the long run, shrouding may be sustained by, *inter alia*, the entrance of new myopic customers; the development of new shrouding techniques or, importantly, new rounds of innovation.

Even where these strategies are transparent to the marketplace, however, there remains the fundamental issue of market access. As described above, the dealer-intermediated microstructure of bilateral OTC derivatives markets – combined with the economies of scale associated with market making – have resulted in the concentration of trading activity within a small oligopoly of financial intermediaries. As of June 2010, for example, the fourteen largest OTC derivatives dealers (the so-called ‘G14’) were counterparties to swaps representing approximately 82% of the global notional amount outstanding (ISDA, 2010).²² What is more, virtually all of these intermediaries are large, complex financial institutions. Market participants looking to utilize swaps have thus historically enjoyed a limited menu of potential counterparty options outside these powerful and opaque institutions. Intuitively, we might expect this to have diluted the impact of any market discipline which might have otherwise been brought to bear on those intermediaries who engage in strategies designed to extract rents from their customers.

The salient point here is not that information problems, behavioral factors, shrouding and/or oligopolistic competition fully explain why these strategies may exist (and persist) in the marketplace. Rather, it is that there exists no shortage of *potential* explanations, each deserving of further inquiry. Nor am I suggesting that

²² Residing at the core of the financial system, these institutions can be seen as the primary source of financial innovation. Simultaneously, these core institutions are the most likely to receive government support in the event of a liquidity crisis (Pistor, 2013).

this nascent supply-side theory of financial innovation fully encapsulates the incentives – or explains the behavior – of all financial intermediaries, in all markets, at all times. What I am suggesting, however, is that by recasting financial innovation as a process of change, influenced by the incentives of innovators (who have the most to gain and possess a comparative informational advantage), we can enhance our understanding of its fundamental nature, sources and potential welfare implications.

V. From Theory to Practice: Three Case Studies in Financial Innovation

Ultimately, the only true measure of a theory is how well it explains what we observe in the real world. So how does the supply-side theory of financial innovation fare? This section briefly examines three case studies demonstrating the importance of supply-side incentives as drivers of financial innovation.

Structured Finance. The case study which has attracted the most scholarly and popular attention is undoubtedly structured finance (Judge, 2011; Gorton, 2010; Bartlett, 2010; Jackson, 2010; Coval, Jurek and Stafford, 2009; Schwarcz, 2009). The emergence and growth of structured finance markets is ultimately attributable to a complex bundle of supply-side, demand-side and other incentives. The agency ABS market, for example, grew at least in part out of a desire on the part of the U.S. federal government to expand home ownership, essentially as a means of ameliorating rising economic inequality (FCIC, 2011; Rajan, 2010). Investors, meanwhile, flocked to ABS, CDOs and other structured finance vehicles in search of (1) higher yields and (2) diversified exposure to, *inter alia*, the U.S. residential and commercial property sectors (Turner, 2009).

At least part of the growth in structured finance markets, however, can be attributed to the supply-side incentives of the commercial and investment banks

which structure and sell these securities. As a preliminary matter, financial institutions sponsoring structured finance offerings earn sizable fees in connection with these transactions. At the same time, structured finance enables originators to shift any market, liquidity, interest rate and other risks associated with the underlying assets off their balance sheets. It has also dramatically expanded the pool of available collateral which can be utilized in connection with wholesale funding (i.e. repo) markets. Perhaps most importantly, however, structured finance has historically enabled banks to secure relief from regulatory capital requirements – thus freeing up capital for reinvestment (Acharya, Schnabel and Suarez, 2010; FCIC, 2010; Greenspan, 1998b). Viewed from this perspective, the supply-side incentives come front and centre: the more assets a bank could repackage and sell, the more capital it could deploy toward new investments, and the more assets it would have to fuel the structured finance machine. Introduce CDOs and CDO-squareds into this mix – and thus the ability to make new assets out of thin air – and it is little wonder that structured finance markets witnessed such exponential growth in the years leading up to the GFC.

The structure of ABS, CDOs and other structured finance vehicles is also the source of acute information problems. The volume of information needed to accurately value these instruments can overwhelm the powerful incentives of even the most sophisticated market participants (Bartlett, 2010). As Gary Gorton has observed, many market participants did not fully understand how sub-prime mortgages – and specifically their short duration, step-up rates and pre-payment penalties – made the MBS and CDOs into which they were repackaged particularly sensitive to volatility in underlying home prices (Gorton, 2010). Joshua Coval, Jakub Jurek and Erik Stafford (2009) have, similarly, demonstrated how market participants

and rating agencies failed to grasp (1) how the structure of CDOs amplified errors with respect to the calculation of default risk on underlying assets, and (2) the systematic interconnections between these assets. These information problems increase the likelihood of both uninformed contracting by investors and opportunism on the part of the financial intermediaries which structure and distribute these securities. As evidenced by the evaporation of structured finance and wholesale banking markets during the crisis, these same problems – compounded by more fundamental uncertainty – can be harbingers of systemic risk during periods of market turmoil as adverse selection problems lead to retrenchment, illiquidity and, ultimately, instability.

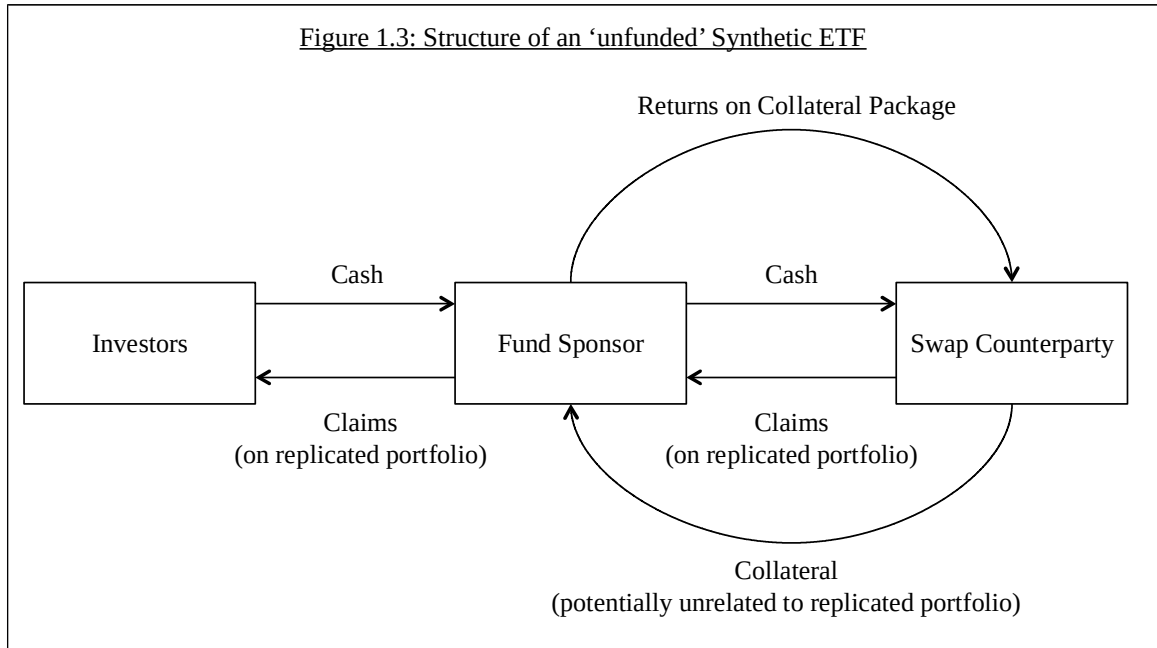
Finally, the development of private label structured finance techniques provides compelling evidence of the legal construction of markets. Arguably, the defining features of structured finance markets prior to the crisis were: (1) the concentration of credit risk through structural subordination (i.e. tranching); (2) the remote origination of loans through special purpose vehicles, and (3) indirect credit enhancement in the form of, *inter alia*, the provision of back-up liquidity facilities by sponsoring financial institutions. However, as described in great detail by Jones (2000) – far from being essential components of these financing techniques – each of these features was motivated by the desire to minimize the impact of the Basel II regulatory capital requirements. Put differently, structured finance markets would likely have evolved quite differently if not for the legal rules designed to ensure the safety and stability of the institutions at the heart of these markets. Even more importantly, there exists a direct link between these non-essential features of structured finance and its role at the epicenter of the GFC.

Synthetic ETFs. A second, more recent, case study is the burgeoning market for synthetic ETFs. ETFs are exchange-traded investment funds designed to replicate the value of a portfolio of assets (e.g. the FTSE, S&P 500 or MSCI Emerging Markets Index). ETFs are thus generally regarded as low cost and liquid vehicles for investors seeking portfolio diversification (IMF, 2011; FSB, 2011; Bank of England, 2011). Introduced in the early 1990s, plain vanilla ETFs physically replicate the reference portfolio by purchasing the underlying assets (BIS, 2011). *Synthetic* ETFs, in contrast, are a more recent innovation designed to replicate the reference portfolio through the use of OTC derivatives (FSB, 2011).

While there exist a number of ways to structure a synthetic ETF, perhaps the most common technique involves the sponsor of the fund entering into a total return swap with another financial intermediary.²³ There are two components – or ‘legs’ – of this swap. In the first leg, the ETF sponsor contracts with the swap counterparty to receive the total return on the reference portfolio in exchange for cash equal to the notional amount of the swap. In return, the swap counterparty transfers a portfolio of collateral to the ETF sponsor. Importantly, the collateral assets are often unrelated to those which the synthetic ETF has been designed to replicate.²⁴ The second leg of the swap then involves the transfer of the total return on the collateral package back to the swap counterparty (BIS, 2011). [Figure 1.3](#) depicts the structure of an ‘unfunded’ synthetic ETF.

²³ This structure is commonly referred to as the ‘unfunded’ swap structure (BIS, 2011). In contrast, the ‘funded’ swap structure involves the ETF sponsor buying a structured note secured by a collateral pledge from a financial intermediary.

²⁴ BIS (2011). For ETFs domiciled in the E.U., for example, the Undertakings for Collective Investments in Transferrable Securities (UCITS) Directive 88/220/EEC (as amended) only prescribes that the collateral assets be selected from among certain prescribed classes of equity or debt securities; see UCITS Directive, Arts. 22 and 23 and FSB (2011).



Synthetic ETFs have proven especially popular in Europe and Asia (FSB, 2011).²⁵ The growing demand for these derivatives has been stoked by institutional investors in search of higher returns in less liquid fixed income and emerging markets where physical replication of the reference portfolio is often prohibitively expensive (BIS, 2011). At least some of the demand, however, stems from the desire on the part of the financial intermediaries acting as swap counterparties to remove less liquid collateral from their balance sheets – ultimately with a view to enhancing their liquidity profile, lowering securities warehousing costs and, once again, obtaining relief from regulatory capital requirements (BIS, 2011; FSB, 2011; Bank of England, 2011). In the extreme – and in particular where the swap counterparty is affiliated with the fund sponsor – synthetic ETFs can thus be utilized as a dumping ground for lower quality assets (IMF, 2011; The Economist, 2011). This, in turn, serves to highlight the fact that these instruments expose investors to both (1) counterparty credit risk in connection with the swap itself and (2) following default, market and

²⁵ Synthetic ETFs are less popular in the U.S. owing to regulatory constraints imposed under the *ICA* (IMF, 2011). In March 2010 the SEC announced that it was conducting a review of the use of derivatives by ETFs; see SEC (2010 and 2011).

liquidity risk in connection with the swap collateral (BIS, 2011; IMF, 2011). Accordingly, while synthetic ETFs are themselves exchange-traded (and thus highly regulated) instruments, their complexity and risk profile more closely resemble the OTC derivatives which reside at the core of this increasingly popular investment fund structure.

Much like structured finance vehicles, the structure of synthetic ETFs generates acute information problems. The nature and extent of these problems are illustrated by a recent exercise conducted by the BIS involving a widely traded synthetic ETF replicating the MSCI Emerging Markets Index (BIS, 2011). With the assistance of the fund sponsor, the BIS was able to determine that the collateral package for this fund contained over 1000 securities, consisting largely of Japanese equities and unrated U.S. corporate bonds. Ultimately, however, the BIS found that a more detailed breakdown of the assets in the collateral package was “not readily available” and that obtaining this information “would be a cumbersome process” (BIS, 2011, p. 9-10). It is also worth noting that the geographic dispersion of the assets within the collateral package bears little relation to the emerging market portfolio the fund is designed to replicate. The BIS exercise thus reinforces the concern that the complex structure of synthetic ETFs may undermine the ability of investors to fully understand the risks to which they are ultimately exposed.

Collateral swaps. The final case study is the emerging market for so-called ‘collateral swaps’. A collateral swap is essentially a form of secured lending whereby one counterparty transfers relatively liquid assets to another in exchange for less liquid collateral. In practice, collateral swaps are the economic equivalent of a long-dated repo agreement. In a typical collateral swap, a bank holding a portfolio of ABS,

CDOs or other securitized assets will transfer these assets to a pension fund or insurance company which, in exchange for a periodic fee, will deliver a portfolio of more liquid collateral such as high-grade government or corporate bonds (Hughes, 2011; Kaminska, 2010a and 2010b; Wollner, 2010). The pension fund or insurer thereby receives a higher yield on its (ostensibly) safe investments, while the bank obtains access to a portfolio of liquid assets which it can then re-hypothecate to obtain funding from central banks and other sources which, in the wake of the GFC, have been less willing to accept ABS, CDOs and other securitized assets as eligible collateral. In effect, the counterparties to collateral swaps are arbitraging the differences in the regulatory capital regimes applicable to banks, on the one hand, and pension funds and insurers, on the other. The emergence of collateral swaps can thus be viewed as an innovative response to both the post-crisis wholesale funding constraints on banks and the need to satisfy new liquidity requirements to be phased in under Basel III. Like structured finance, collateral swaps can also be viewed as evidence of the legal construction of markets.

At present, no one knows with any certainty how big the collateral swap market is, who the major players are, or where the ultimate exposures might reside.²⁶ As a result, it is difficult to ascertain the nature or extent of the attendant risks: including, most importantly, whether this market represents a channel through which contagion might spread from the banking to the insurance and/or pension sectors (Bank of England, 2011). It thus seems reasonable to suggest that collateral swaps might compound adverse selection problems during periods of market turmoil, thereby contributing to the build-up and crystallization of systemic risk.

²⁶ Although it would seem that the Bank of England and FSA have devoted at least some attention to this issue; Bank of England (2011).

Taken together, structured finance, synthetic ETFs and collateral swaps illustrate how important the incentives of financial intermediaries can be in driving financial innovation. They also illustrate how the law – as a driver of financial innovation – is endogenous to finance. The law does not simply facilitate the efficient operation of markets: it actively shapes their development and, in some instances, even provides the impetus for their creation. Simultaneously, these case studies highlight the risks generated by financial innovation. These risks stem from two familiar sources: information problems and regulatory arbitrage. Both of these risks hold the potential to destabilize markets – especially in the presence of significant uncertainty and/or liquidity constraints. As we have seen, the conventional demand-side view of financial innovation influenced an approach to regulation which, prior to the crisis, effectively disregarding these risks. The salient question thus becomes: have we learned our lesson?

VI. Lessons Learned? The *Dodd-Frank Act*, OTC Derivatives and the Supply-Side Theory of Financial Innovation

The GFC spurred U.S. policymakers to fundamentally re-examine their approach toward the regulation of OTC derivatives markets. This crisis of faith was brought on by two principal observations. First, when the chips were down, the size, sophistication, opacity and interconnectedness of OTC derivatives markets undermined the ability of both market participants and regulators to ascertain where or how big the counterparty credit (and thus systemic) risks were. Second, private risk management tools had not effectively mitigated these risks. The results of this re-examination would be unveiled in July 2010 in the form of Title VIII of the *Dodd-Frank Act*. The Obama Administration has characterized the objectives of Title VII as

to: (1) guard against the build-up of systemic risk; (2) promote transparency and efficiency; (3) thwart market manipulation, fraud, insider trading and other abuse, and (4) prevent inappropriate marketing to unsophisticated counterparties (Treasury Department, 2009). It employs four primary mechanisms in pursuit of these objectives.²⁷

First, the *Dodd-Frank Act* confers upon the CFTC and SEC the authority to mandate that financial instruments falling within the definition of either a “swap” or “security-based swap”²⁸ be centrally cleared through CFTC-regulated derivatives clearing organizations or SEC-regulated securities clearing agencies (collectively, CCPs) (ss. 723 and 763).²⁹ In very broad terms, CCPs interpose themselves between the counterparties to bilateral OTC transactions, assuming the obligations of each party to the other (Duffie, Li and Lubke, 2010). The principle advantage of centralized clearing and settlement through CCPs is the potential mitigation of both counterparty credit and systemic risk via the (1) multilateral netting of exposures; (2) collateralization of residual net exposures; (3) enforcement of robust risk management standards, and (4) mutualization of losses resulting from the failure a clearing member (i.e. a swap dealer) (IMF, 2010; BIS, 2007). Simultaneously, CCPs concentrate counterparty credit – and thus systemic – risk.

The *Dodd-Frank Act* contemplates an exemption from the clearing requirement if one of the counterparties (1) is not a “financial entity”; (2) is using the

27 Not including (1) the ‘push out’ of (most) derivatives activities of federally insured banks to separate non-bank affiliates; s. 716 or (2) the so-called ‘Volcker Rule’ limiting the proprietary trading activities of bank holding companies; s. 619.

28 The *Dodd-Frank Act* carves up jurisdiction over bilateral OTC derivatives on the basis of this distinction between (CFTC regulated) swaps and (SEC regulated) security-based swaps; ss. 712, 722 and 761-763.

29 Unless otherwise indicated, all subsequent references to “swap” shall, for the purposes of this description of Title VII of the *Dodd-Frank Act*, include a “security-based swap”.

instrument to “hedge or mitigate commercial risk”, and (3) provides prescribed information to the relevant regulator about how it meets its financial obligations in connection with bilaterally cleared swaps (s. 723(a)(3)).³⁰ For the purposes of this commercial end-user exemption, a financial entity includes a swap dealer, major swap participant, and certain other prescribed classes of financial intermediary (s. 723(a)(3)). In order to incentivize greater utilization of centrally cleared instruments, it is likely that the new regime will ultimately impose higher capital and margin requirements on swap dealers and major swap participants in connection with bilaterally cleared swaps.³¹

Second, the *Act* gives regulators the authority to require that any swap subject to the central clearing requirement also trade on a regulated board of trade, exchange, or alternative swap execution facility (ss. 723 and 763). Crucially, however, this execution requirement will not apply where (1) no board of trade, exchange or swap execution facility makes the swap available to trade or (2) one of the counterparties falls within the commercial end-user exemption.

Third, the *Act* requires all swap dealers, major swap participants, CCPs, swap execution facilities and swap data repositories (SDRs) to register with the SEC, CFTC, and/or federal banking regulators (ss. 725, 728, 731, 733, 763 and 764). Once registered, swap dealers and major swap participants are subject to, *inter alia*, capital; margin; reporting; recordkeeping, and business conduct requirements (ss. 731 and 764).³² CCPs registered with the CFTC, swap execution facilities and SDRs,

³⁰ The non-financial or hedging counterparty retains the option to require that the instrument be centrally cleared; *ibid*.

³¹ See Treasury Department (2009). Ultimately, however, the *Dodd-Frank Act* only mandates that the CFTC, SEC, and federal banking regulators, as applicable, set *minimum* capital and margin requirements; ss. 731 and 764. See CFTC (2011a and 2011b).

³² The capital and margin requirements will only apply in respect of bilaterally cleared swaps. The corresponding requirements for centrally cleared swaps will be set by the relevant CCP.

meanwhile, are required to (1) comply with a set of ‘core principles’ and other requirements and (2) design, implement, monitor, and enforce technical regulation in furtherance of these principles (ss. 725, 728, 733 and 763). While the *Act* does not articulate a similar set of core principles for CCPs registered with the SEC, it does mandate that the two agencies adopt consistent and comparable rules governing these registrants (s. 712(a)(7)).

Finally, the *Dodd-Frank Act* imposes extensive recordkeeping and reporting requirements on these new registrants. Swap counterparties are required to report all centrally and bilaterally cleared swaps to an SDR (ss. 727, 729 and 766). SDRs, CCPs and swap execution facilities are then obligated to provide granular counterparty and transaction information to regulators (ss. 725, 728 and 733). Regulators, in turn, are required to publically disseminate anonymized transaction and pricing data on a “real time” basis (s. 727).

The *Dodd-Frank Act* also seeks to enhance the regulation of ABS and other structured finance vehicles – including, importantly, those offered under exemptions from the prospectus and registration requirements under the *Securities Act*. First, the *Act* requires issuers to disclose information respecting the quality of the assets backing each tranche or class of security (s. 942(b)). Where necessary for investors to perform independent due diligence, issuers must also disclose more detailed asset or loan-level data (s. 942(b)). Second, it requires financial intermediaries structuring, sponsoring or issuing structured finance vehicles (so-called “securitizers”) to disclose fulfilled and unfulfilled repurchase requests (s. 943(2)). Third, it compels credit rating agencies to include information in their reports about the representations, warranties and enforcement mechanisms available to investors and, importantly, how these provisions differ from other offerings of similar securities (s. 943(1) and SEC Rule 15Ga-1). Finally, it imposes risk retention requirements on securitizers:

mandating that in prescribed circumstances they maintain at least 5% of the credit risk in connection with any assets sold into a structured finance vehicle (s. 943(1) and SEC Rule 15Ga-1).

On its face, the *Dodd-Frank Act* represents a wholesale shift in terms of the regulation of U.S. OTC derivatives markets. But how far do these reforms go in responding to the risks arising from the supply-side incentives of financial intermediaries? On at least one level, these reforms hold out some promise. The clearing, execution, registration and trade reporting requirements will enhance market transparency and price discovery within many (standardized) swap markets, thereby promoting more informed contracting, helping to curb opportunism, and enabling regulators to more effectively monitor the location, nature and extent of potential risks (IMF, 2010). Along the same vein, the utilization of CCPs will simplify the complex and constantly evolving network of bilateral derivatives exposures – theoretically making it less costly for market participants and regulators to evaluate counterparty credit risk in connection with centrally cleared swaps (Gai, Haldane and Kapadia, 2012). The enhanced disclosure requirements for ABS and other structured finance offerings are, similarly, a step in the right direction.

Ultimately, however, while timely and comprehensive access to information is undoubtedly a *necessary* condition for both informed private contracting and effective public oversight, it is by no means *sufficient*. As soberly illustrated by the collapse of the U.S. MBS market in 2007-2008 and the subsequent run in the repo market at the epicentre of Lehman's demise, the sheer volume of information available within modern financial markets – combined with the rapid pace of change – can overwhelm the powerful incentives of even the most sophisticated market participants.

Regulators, likewise, have struggled with what is, in effect, information overload. Viewed from this perspective, the marginal benefits of simply generating *more* information may be very limited. Moreover, generating more information may lull us into a false sense of security insofar as it causes us to discount the continued existence and pernicious effects of more fundamental uncertainty within modern financial markets.

Perhaps more importantly, Part VII of the *Dodd-Frank Act* effectively disregards the supply-side incentives of financial intermediaries. Nowhere is this more evident than in connection with the process for determining whether a group, category, type or class of swap will be subject to the central clearing requirement. CCPs are required to submit to the CFTC or SEC, as applicable, any swap which they *plan* to accept for clearing (s. 723(a)(3)). The SEC and CFTC may also initiate a review to determine whether a swap should be centrally cleared (s. 723(a)(3)). In making this determination, the CFTC or SEC must take into account: (1) the existence of significant outstanding notional exposures, liquidity, and adequate pricing data; (2) the availability of a rule framework, capacity, operational expertise and resources, and credit support infrastructure to clear the swap; (3) the effect on the mitigation of systemic risk, taking into account the size of the market for the swap and the resources of the CCP available to clear it; (4) the effect on competition, including appropriate fees and charges applied to clearing, and (5) the existence of reasonable legal certainty in the event of the insolvency of the CCP or one or more of its clearing members with regard to the treatment of customer and swap counterparty positions, funds and property (s. 723(a)(3)). In effect, however, the real litmus test is whether the swap is sufficiently standardized so as to ensure a threshold level of liquidity and facilitate central clearing.

From a supply-side perspective, the dichotomy between centrally and bilaterally cleared swaps created by the *Dodd-Frank Act* generates two distinct payoff structures for market participants. This, in turn, invites financial innovation – or, perhaps more accurately, “faux customization” (Griffith, 2010) – motivated by the desire to avoid the appearance of standardization and, thus, the marginal costs of central clearing. Ultimately, there are any number of reasons why dealers or other counterparties might find it more advantageous to utilize bilateral instruments (even after accounting for higher margin and capital requirements). Post-crisis constraints on the supply of high quality collateral, for example, have increased the opportunity costs of central clearing relative to the often under-collateralized bilateral market (Singh, 2010; Singh and Aitken, 2009). Moving standardized instruments on to CCPs would also require dealers to unbundle netted positions involving both standardized and non-standardized instruments (Singh, 2010). Simultaneously, more bespoke instruments generate more opportunities for rent extraction by dealers. In the end, these collateral, netting and other benefits may be very substantial indeed.

The prospect of faux customization is rendered even more acute by virtue of the fact that, at present, OTC derivatives dealers enjoy effective control over the CCPs which, in the vast majority of cases, will make the initial determinations of a swap’s eligibility for central clearing.³³ As Sean Griffith (2010) explains (p. 23): “major dealers have an incentive to exert governance control to keep clearing eligible products off of clearinghouses so that they can continue to trade in the higher margin bilateral market”. Importantly in this regard, the *Dodd-Frank Act* does not mandate regulatory review of a CCP’s decision that it *does not plan* to accept a swap for

33 Once again giving these ‘core’ institutions control over the innovation process and enhancing the likelihood that they will receive government support in the event of a liquidity crisis.

central clearing. Compounding matters, one might expect regulators to be reluctant to overturn a CCP's initial eligibility determination out of concern that forcing instruments on to CCPs could exacerbate systemic risk (Griffith, 2010).³⁴ Indeed, this reluctance might be reinforced by asymmetries of information and expertise vis-à-vis regulators and CCPs. There would thus appear to be ample scope for improvement in terms of how the *Dodd-Frank Act* addresses the supply-side incentives of financial intermediaries.

Once we understand the nature of the problem, however, it becomes possible to envision how the law might be tailored to address it. Saule Omarova, for example, has argued that, insofar as we have generally failed to understand – let alone contain – the (systemic) risks posed by financial innovation, the most direct way to reduce these risks is to intervene at the product development stage (Omarova, 2012). Drawing parallels with pharmaceutical regulation, Omarova thus proposes an *ex ante* product approval regime for complex swaps, ABS and structured products.³⁵ Under the regime, financial intermediaries seeking approval for a new instrument would be required to satisfy regulators that (1) the innovation had a legitimate economic purpose; (2) the financial intermediary had the institutional capacity to monitor and manage the attendant risks, and (3) the innovation did not pose an unacceptable risk of increasing systemic vulnerability or otherwise raise significant public policy concerns. Once approved, financial intermediaries would then be required to monitor and report new market developments to regulators on an ongoing basis. Omarova's proposal can thus be viewed as both subsidizing the production of valuable information and performing a gatekeeper function: ensuring that new financial

³⁴ In effect because non-standardized (less liquid) instruments are more difficult to hedge.

³⁵ Eric Posner and Glen Weyl have proposed a similar mechanism, albeit with a view to constraining speculation (Posner and Weyl, 2012).

innovations have a legitimate economic rationale and do not exacerbate systemic risk. At the same time, of course, information problems and uncertainty would inevitably represent a formidable obstacle for regulators attempting to perform this gatekeeper function.

The problem of faux customization might also be addressed through the imposition of a targeted anti-arbitrage rule (or TAAR) on swap dealers and other market participants. Much like Omarova's proposal, the primary thrust of a TAAR would be to mandate that market participants obtain regulatory approval as a pre-condition to entering into any new species of bilateral swap. In order to obtain this approval, the market participant(s) submitting the application would need to demonstrate that the innovation responded to a legitimate (i.e. demand driven) economic need and not the desire to avoid central clearing requirements. To minimize the duplication of effort and expense, the relevant regulatory authority could issue 'blanket' orders authorizing other market participants to trade in the new instrument.

A well designed TAAR would offer two potential benefits. First, it would alter the anticipated payoffs from regulatory arbitrage: in effect deterring financial innovation not motivated by a legitimate economic rationale. Second, it would provide an incentive for risk adverse market participants to bring new bilateral instruments to the attention of regulators with a view to obtaining 'pre-clearance' for their prospective use. A TAAR would thus manifest potentially significant informational benefits – bringing new innovations within the perimeter of regulation more rapidly than would otherwise be the case – while simultaneously reducing the deleterious effects of regulatory arbitrage. Once again, however, regulators would

face potentially significant information costs and uncertainty in discharging their *ex ante* screening function. They would also need to design and implement effective *ex post* mechanisms for monitoring, *inter alia*, the effect of new innovations on systemic stability.

Ultimately, the objective of this paper is not to exhaustively canvas the myriad of ways in which the law might be employed in response to the unique challenges posed by the nature and pace of financial innovation. A more fulsome exploration of the prospective benefits and drawbacks of a TAAR or Omarova's product approval regime is thus beyond the scope of this paper. Rather, the objective has been to drive home the fact that simply *acknowledging* the supply-side incentives of financial intermediaries enhances our understanding of the problems we face and, hopefully, how we might go about addressing them. In this important respect, this paper should be understood as attempting to build the theoretical foundations of a broader research agenda.

VII. Conclusion

There is little doubt that conventional financial theory has contributed greatly to our understanding of the economic world. Ultimately, however, it is merely a lens and – like all lens – magnifies some features of the world, and obscures others. Prior to the GFC, the stance adopted by U.S. policymakers toward the regulation of OTC derivatives markets was heavily influenced by the prevailing demand-side view of financial innovation. This view was predicated on the perceived efficiency of markets and the effectiveness of private risk management. Simultaneously, it discounted the supply-side incentives of financial intermediaries, along with the information problems and uncertainty which pervaded these markets. As a consequence, it also

envisioned a limited role for the law and public regulation. By deconstructing this view and examining its manifest blind spots, this paper has attempted to build a more complete theoretical account of the nature, sources and welfare implication of financial innovation. This account arguably supports a fundamentally different relationship between finance and law.

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