COULD A LACK OF STRONG PATENTS SPUR THE NEXT GLOBAL MARKET COLLAPSE?

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I. INTRODUCTION ............................................................. 184

II. FINANCIAL INDUSTRY BENEFITS FROM MARKET RESTRAINTS .................................................................... 185

III. PATENTS ARE BUYER-SIDE MARKET RESTRAINTS 190

IV. AN EMPIRICAL LOOK AT PATENTS IN REGULATING THE COMMERCIALIZATION OF FINANCIAL INNOVATION ................................................ 195

A. METHODOLOGY ........................................................ 196

B. FINANCE PATENTS DURING THE GLOBAL FINANCIAL MELTDOWN ............................................. 196

V. CONCLUSION ............................................................... 205

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ABSTRACT

The purpose of the patent is to encourage potential inventors to undergo the risky venture of innovation. Since an issued patent then stands in the way of competition and follow-on innovation, it is generally thought desirable only to grant patents for inventions that would not otherwise occur without the patent incentive. Professor Mark Lemley once explained that "if we do not need patents to encourage new inventions, we certainly do not want to grant them in an effort to regulate the use of those inventions in the marketplace." However, this paper is the first to suggest that the traditionally negative consequences of patents may actually promote innovation in long-term. This paper questions the conventional risk-seeking approach that favors the unbridled commercialization of all new inventions. Instead, it suggests that it may actually be desirable for patents to regulate the diffusion of new inventions into the marketplace. This paper focuses on how, in the lead-up to the global financial crisis in 2008, Congress, the courts, and the U.S. Patent and Trademark Office all supported removing any patent barriers to the widespread use and commercialization of financial innovation. The uninhibited spread of high-risk financial innovations went on to spur global economic crisis. This may have been an instance where the traditionally negative consequences of patent holdup, stifling litigation, and limited commercialization of innovation would have been keenly beneficial — not only in the short-term, but also in the long-term and with effects across many industries. Strong patents may have been able to contain the use of high-risk financial innovation and, in turn, isolate the global financial crisis to the bankruptcy of just a few firms. This would have had profound effects on countless other industries that were hampered by the financial crisis. While industry-specific regulations have since been enacted to reduce the possibility of repeating past mistakes, patents in the area of financial and business innovation are still highly disfavored. And while industry-specific regulations tend to focus on past problems, patents tend to focus on future problems. This paper suggests that patents may provide a valuable mechanism for market regulation. A lack of strong patents could spur the next global market collapse.
I. INTRODUCTION

Patents are traditionally viewed as monopolistic, anti-competitive market restraints that are an acceptable tradeoff to achieve greater incentives to innovate.1 The price of that tradeoff is that, after the innovation has been achieved, commercialization of that innovation as well as follow-on innovation may be slowed.2 This balance is important because the purpose of patents is to “Promote the Progress of Science and useful Arts.”3

One area where the effect of patents has recently been of great concern is financial innovation and business methods. After State Street Bank & Trust Co. v. Signature Financial Group, Inc.4 in 1998, the United States Patent and Trademark Office (USPTO) and the courts began a trend to remove any patent barriers to the widespread commercialization of financial innovation.5 The concern seemed to be whether or not patents in this area “would, on balance, facilitate or impede the progress of American business.”6 But in the context of high-risk financial innovation, it may have actually been desirable to impede "progress" towards global financial meltdown. By 2008, high-risk financial innovations created in the late 1990s and early 2000s had plunged economies around the world into massive recession.7

If Congress, the courts, and the USPTO had instead supported State Street and accorded strong patent rights to financial innovations, the excessively risky financial innovations that caused the global market collapse could have been isolated to a much smaller group of parties (i.e., the patent owners and licensees). In the competitive industry of financial product offerings,8 patent owners may have offered very few

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1 See Diamond v. Chakrabarty, 447 U.S. 303, 319 (1980) (Brennan, J., dissenting) (explaining that patent laws are a reconciliation of dislike for monopolies with the “need to encourage progress”).
2 Id. at 317.
3 U.S. CONST. art I, § 1, cl. 8.
8 See generally Stijn Claessens, Competition in the Financial Sector: Overview continued . . .
licenses and restricted the reach of these risky innovations even further. Patent owners would have been able to raise prices to monopolistic levels and limit the supply to only a select few.\footnote{See Jerry A. Hausman & Jeffrey K. MacKie-Mason, \textit{Price Discrimination and Patent Policy}, 19 RAND J. ECON. 253, 254 n.5 ("[P]atents may establish the necessary monopoly power for price discrimination to take place . . .").} And when the market finally collapsed, all of the typically negative monopolistic behaviors would have actually protected the broader markets because so few parties would have been participating in the collapse.

This paper is the first to suggest that strong patent rights may provide a valuable regulation on the participation in the commercialization of innovation by limiting excessive risk taking to patent owners and parties sophisticated enough (and wealthy enough) to acquire a license. Wholly independent of the traditional justification for the patent system, this paper will argue that market regulation actually promotes the long-term health of competitive financial markets. In Section II, the paper will describe how market restraints serve to stabilize financial markets. Section III will then describe how the patent system shares many of the same qualities as the finance industry and how strong patent rights can serve the same market stabilization function. In Section IV, the paper will assess empirical data on patent rights as market regulators. Finally, Section V will present conclusions and broader policy implications.

\section{II. Financial Industry Benefits from Market Restraints}

Restraints on competition are generally considered economically inefficient.\footnote{See Richard A. Posner, \textit{Antitrust Law} 2 (Univ. Chi. Press 2d ed. 2001) ("[E]conomic theory provides a solid basis for the belief that monopoly pricing, which results when firms create an artificial scarcity of their product and thereby drive price above its level under competition, is presumptively inefficient . . .").} But at the same time, market restraints are sometimes necessary to achieve a healthy, sustainable market. For example, a completely unregulated financial industry experiences destructive and abusive behavior due to information asymmetry in investment offerings between sellers and buyers.\footnote{Duke K. Bristow, Benjamin D. King & Lee R. Petillon, \textit{Venture Capital Formation and Access: Lingering Impediments of the Investment Company Act of 1940}, 2004 COLUM. BUS. L. REV. 77, 85 (2004).}

This led to market regulations for publicly offered financial products, mostly in the form of requiring sellers to make numerous mandatory disclosures.\footnote{Id.} These restraints actually stabilized a
competitive market for these products. But the regulations also made exceptions for private (non-public) offerings. Private offerings are often called "unregulated markets," but these markets simply regulate the buyers who can participate, rather than regulating the sellers. Unregulated markets nonetheless require that only sophisticated (i.e., wealthy) buyers be allowed to take the risks associated with participating in financial offerings in the absence of mandatory disclosures by the seller. The theory behind this non-regulation is that sophisticated buyers are sufficiently able to protect themselves in the absence of regulation through their own research, private contracts, and greater ability to absorb loss of wealth. Similar access and tools are unavailable for unsophisticated buyers, and therefore participation by an unsophisticated buyer in an unregulated market is excessively risky and thus disallowed.

For example, venture capital ("VC") funds are high-risk private investment offerings. Most VC-backed startup companies fail, and, since 1999, VC funds have failed to generate positive returns. Because of the extreme uncertainty and information asymmetry between sellers and buyers present in this system, VC fund investors rely extensively on private contracts. But the private nature of these offerings does not alone create an exemption from mandatory disclosures required by securities law. VC funds are still limited to accredited investors only. The Securities Act of 1933 requires an investor to have a net worth of at least $1,000,000 or an income of at least $200,000 per year. In the state of California, an investor must have $250,000 in tangible net worth and $5,000,000 in funds to be invested. These requirements recognize that these investments are too risky to allow truly unregulated participation. Removal of these accredited investor requirements forfeits available exemptions from

\[13 \text{ Id. at 87–88.} \]
\[14 \text{ See id.; Olufunmilayo B. Arewa, Financial Firewalls: The Credit Crisis and Network Contagion, 4 ENTREPRENEURIAL BUS. L. J. 304, 312–13 (2010).} \]
\[15 \text{ Bristow et al., supra note 11, at 103–05.} \]
\[16 \text{ Id. at 95, 103.} \]
\[17 \text{ See id. at 88.} \]
\[18 \text{ See id. at 119; Arewa, supra note 14, at 314.} \]
\[19 \text{ Diane Mulcahy, Six Myths About Venture Capitalists, HARV. BUS. REV., May 2013, at 80, 81.} \]
\[20 \text{ Ronald J. Gilson, Engineering a Venture Capital Market: Lessons from the American Experience, 55 STAN. L. REV. 1067, 1069, 1078 (2003).} \]
\[21 \text{ Bristow et al., supra note 11, at 110.} \]
\[22 \text{ Id.} \]
\[23 \text{ Id. at 104.} \]
\[24 \text{ Id. at 98.} \]
\[25 \text{ Id. at 102.} \]
mandatory disclosures.26 Rather, decreased regulation on the buyers would need to be supplemented by increased regulation on the sellers (e.g., disclosures), which amounts to substituting one form of regulation for another.27

Another example of a high-risk private investment offering is the over-the-counter (“OTC”) derivative. OTC derivatives are exempt from regulation under the Commodity Futures Modernization Act of 200028 because the transactions involve sophisticated parties.29 Again, the theory is that sophisticated buyers are able to protect themselves without the need for regulation.30 Participation by unsophisticated buyers would deny the exemption from regulation on the seller-side.31 Thus, while the "regulated" and "unregulated" markets derive their names from whether or not sellers are regulated, both markets are actually regulated. This is summarized below in Table 1.32 A true unregulated financial industry could not survive because sellers would cheat buyers.33

Table 1: Financial markets are regulated, either from the seller-side or buyer-side.

<table>
<thead>
<tr>
<th>Market</th>
<th>Seller-side</th>
<th>Buyer-side</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Unregulated&quot;</td>
<td>No mandatory disclosures</td>
<td>Sophisticated only</td>
<td>VC, hedge funds</td>
</tr>
<tr>
<td>&quot;Regulated&quot;</td>
<td>Mandatory disclosures</td>
<td>Open participation</td>
<td>Common stock</td>
</tr>
</tbody>
</table>

It is beyond the scope of this paper to explain why the free market does not fix this problem without regulation. In theory, buyers could simply stop buying from sellers who do not provide truthful and adequate disclosures. Accordingly, buyers could stop buying from sellers who do not produce adequate returns, regardless of disclosures. However, I will proceed under the assumption that Congress was correct in concluding that public markets cannot function without seller-side regulation and that private markets cannot function without buyer-

26 Id. at 122.
27 Id. at 125.
29 Arewa, supra note 14, at 313.
30 Id.
31 Cf. id.
32 See infra Table 1.
33 See infra Table 1.
side regulation. The underlying theory seems to be that the more private the transaction, the less regulation is necessary, provided that the parties are sophisticated. Thus, I turn to how this system responds to the excessive risk-taking incentivized by the asymmetric payout structure pervasive in the American economy.

America conducts transactions through “agents,” such as various corporations, banks, and money managers, to whom people give money in the form of investments, loans, or savings. When agents perform well, they receive a portion of the earnings. When agents perform poorly, they pay nothing. Thus, agents participate in the gains but not the losses that result from their decisions. This is called an asymmetric payout structure. Once short-term gains are rewarded, long-term losses usually do not require paying back any of the already-rewarded short term gains. Furthermore, the increase in the number of investors after profitable years exceeds the decrease in the amount of investors after unprofitable years. In other words, most buyers do not stop investing with agents to punish their agents for losses. This perhaps explains why some studies have shown that compensation in underperforming years does not seem to decrease as much as the outperforming years as one might expect. This is most frequently observed in high-risk financial investments, such as venture capital or hedge funds, but also occurs for relatively “safe” investments in the common stock of publicly traded financial institutions. Thus, asymmetric payout structures affect risk-taking in both the regulated and unregulated markets. They incentivize our agents to take disproportionate risks even in situations where the likelihood of success is overwhelmingly small.

In response, some industries have developed measures to combat excessive risk-taking incentives. For instance, many hedge funds have

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34 See infra Table 1.
35 See Arewa, supra note 14, at 313–14.
36 See BLACK’S LAW DICTIONARY 232 (10th ed. 2014) (“an agent who acts as an intermediary or negotiator esp. between buyers and sellers”).
37 12 AM. JUR. 2D § 278 (2009).
38 Assuming that no crime has been committed. Typically, we still pay a management or transaction fee even if our agent loses our money.
40 Id. at 2.
41 Id. at 3.
42 Id. at 4.
43 Id. at 6.
44 Id. at 3.
45 Id. at 2.
a “hurdle” rate of return, below which no performance-related compensation will be paid to the fund manager.\textsuperscript{46} Some even have a “high water mark,” whereby funds must actually make up for past losses before profits can be accounted.\textsuperscript{47} VC funds also have similar protections, such as paying investors back before compensating the fund managers and “claw back” provisions that retrieve compensation from profitable investments to reimburse investors for unprofitable investments.\textsuperscript{48} However, it has been suggested that none of these provisions provides adequate protection against excessive risk-taking, given that funds can be easily shuttered and new ones created with little long-term accountability.\textsuperscript{49}

Certain industries appear more affected than others by the asymmetric payout structure, but the structure is pervasive in the American economy.\textsuperscript{50} That is, it exists in every market, not just the financial market.\textsuperscript{51} Taking excessive risks can easily evolve into a herd mentality throughout any industry.\textsuperscript{52} Fortunately, the majority of business decisions are likely to have sufficiently limited negative consequences for this not to matter most of the time. However, this fact may not provide much insulation from even a few high-risk decisions, if the bets are big enough. In the regulated market, the hope is that mandatory disclosures allow the unsophisticated buyer to avoid parties who take excessive risks.\textsuperscript{53} In the unregulated market, the hope is that excessive risk-taking is limited to a small percentage of the population (i.e., the sophisticated buyers). However, after the financial crisis of 2007-2009, this system was found to not adequately limit the effects of excessive risk-taking.\textsuperscript{54} This will be further analyzed in Section IV, but perhaps the asymmetric payout structure was simply too strong for the regulations that were in place before 2007.\textsuperscript{55}

\textsuperscript{46} Id. at 5.
\textsuperscript{47} Id.
\textsuperscript{48} Gilson, supra note 20, at 1072.
\textsuperscript{49} Sharma, supra note 39, at 5.
\textsuperscript{50} Id. at 3.
\textsuperscript{51} Almost all of us are compensated by an asymmetric payout structure in our own jobs. For instance, if I do well at my job and make the company money, I may receive a year-end bonus. If I do poorly and lose the company money, I may be fired, but I will not be forced to reimburse the company or its clients for any losses that I may have caused (assuming no fraud or crime has been committed).
\textsuperscript{52} See Sharma, supra note 39, at 4.
\textsuperscript{54} See id. at 1050.
\textsuperscript{55} See Paul Slattery, Note, Square Pegs in a Round Hole: SEC Regulation of continued . . .
Would a stronger patent system have provided the necessary regulation to bridge the gap? More specifically, would excessively risky financial innovations have been patented and effectively enforced through infringement litigation to stifle the widespread use of those financial innovations? Before addressing this question in Section IV, Section III explains how patents can provide such a market regulating mechanism.

III. PATENTS ARE BUYER-SIDE MARKET RESTRAINTS

A patent creates exclusionary rights with respect to the subject matter claimed in the patent. A patentee may legally prevent others from making, using, or selling the patented invention. These rights are restrictions on the free market. They create static inefficiencies, dynamic inefficiencies, rent-seeking behavior, administrative costs, and distortionary overinvestment in research and development. The American system generally accepts these otherwise undesirable qualities because they purportedly encourage inventions that we would not otherwise get. There are many theories as to how this mechanically works. First, prospect theory supposes that a patent right gives the patentee incentive to maximize the value of the subject matter covered by the patent. Second, commercialization theory focuses on post-invention and argues that a patent right provides the patentee with the incentive to undertake the risky venture of commercializing a new invention. Third, disclosure theory asserts that a patent right is the “quid pro quo” for dissemination of information to the public. There are other alternative theories, but these are the main three. Naturally,


59 Id.
60 Id. at 738.
61 Id. at 739.
62 See id. at 745; Eldred v. Ashcroft, 537 U.S. 186, 224 (2003) (Stevens, J., dissenting) (“Complete disclosure as a precondition to the issuance of a patent is part of the quid pro quo that justifies the limited monopoly for the inventor as consideration for full and immediate access by the public when the limited time expires.”); Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 535 U.S. 722, 736 (2002) (“[P]atent rights are given in exchange for disclosing the invention to the public.”).
63 Lemley, supra note 58, at 711.
none of these is without serious criticism. Prospect theory implies that a lack of competition better serves innovation, while most other theories and evidence strongly suggest the opposite. Commercialization theory fails to recognize that once an invention exists, a patent primarily stands in the way of (rather than assists) commercialization. Disclosure theory belies the reality that scientists and innovators generally do not learn the latest information by reading patents.

In response to these criticisms, many have searched for alternative justifications for the patent system, such as patent racing theory, which posits that multiple parties racing to acquire a patent leads to more inventions, at a quicker pace. Others have argued that the patent system needs reform to account for its perceived shortcomings, such as issuing more patent rights based on commercialization activity. Some have even suggested that it is best to eliminate patents altogether. As Professor Mark Lemley states: “If we don’t need patents to encourage new inventions, we certainly don’t want to grant them in an effort to regulate the use of those inventions in the marketplace.”

But is that necessarily true? In this paper, I argue that it is not. Even if I assume that all innovation occurs without the promise of exclusive patent rights and that inventors disclose them to the public too, nevertheless, there still remains a reason to have patents. Section II described the characteristics of the financial markets and why the so-called “unregulated” markets are in fact necessarily regulated in order to build a sustainable, healthy marketplace. Since private investment offerings are excessively risky, their access is limited to sophisticated buyers through buyer-side regulation. This type of limited access could also be a valuable function of patents if there was some reason to

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64 Id. at 738.
66 Lemley, supra note 58, at 739–44.
67 Id. at 745.  
68 Id. at 749–60.
71 Lemley, supra note 58, at 745.
72 These sophisticated buyers subject to regulation are known as accredited investors. See 17 C.F.R. § 230.501 (2012).
want to regulate the diffusion of innovation into the commercial marketplace. Such a reason could be that the commercialization of innovation is essentially an extremely risky private investment offering.\textsuperscript{73}

First, the vast majority of attempts to commercialize innovation will fail because the vast majority of patentable inventions are commercially worthless.\textsuperscript{74} Studies have found that most patents are worth so little that the patent owner cannot even justify paying the maintenance fee.\textsuperscript{75} This applies broadly across all industries and patented subject matter.\textsuperscript{76} Litigation-based metrics come to similar conclusions: fewer than 1\% of patents have any value at all.\textsuperscript{77} Of course, a patent’s litigation value is not quite the same as its commercial value, but the two values are related. For example, a patent must have commercialization value in order to have litigation value. Overall, the success rate of finding value in patentable inventions is so low that some even compare patents to lottery tickets.\textsuperscript{78} This is true despite the assertion that many patents are only incremental improvements over existing knowledge.\textsuperscript{79} Thus, even an incremental improvement is statistically likely (in fact, overwhelmingly so) to be a losing commercial investment.

Second, there is little disclosure to protect the “buyer” (which in this case is the party attempting to commercialize the innovation) in the form of information that may help differentiate which inventions may be riskier than others. Some argue that the disclosure requirements to receive a patent do not actually produce enough information to allow a person having ordinary skill in the art to effectively make or use the invention (despite that being the required benchmark).\textsuperscript{80} Furthermore, the patent disclosure requirements do not include how much the invention costs to develop, how much it costs to make and use, what its potential value is, how its worth should be calculated, probability of success, market analysis, or any disclosures that approximate disclosure.

\textsuperscript{74} \textit{Id.} at 437.
\textsuperscript{75} \textit{Id.} at 441.
\textsuperscript{76} \textit{Id.}
\textsuperscript{77} \textit{Id.} at 441–45.
\textsuperscript{79} Value studies do not evaluate incremental inventions separately from truly “ground-breaking” ones. So value measures apply to all patents as a whole.
requirements of publicly offered securities.81

Third, Section II discussed how asymmetric payout structures create incentives for agents to take excessive risk.82 In this case, the excessive risk is the attempted commercialization of a patentable invention. While it may appear most salient in the financial industry, almost every industry in the United States compensates its employees on an asymmetric payout structure.83 At our own jobs, we are the very agents who are incentivized to take more risk than we otherwise would. If we perform well, we may be rewarded with additional compensation. But if we lose our company's or client's money, we will not have to pay it back.84 Thus, across all industries in general, the market for commercializing innovation looks just like the unregulated financial markets. The lack of seller-side regulation must be compensated by buyer-side regulation, which is provided by patents. Here, patents effectively serve as the same type of sophisticated parties limitation that exists in the unregulated financial markets. That is, only a sophisticated party is likely to own a patent or otherwise be able to contact the patent owner, successfully negotiate a license, and then pay for that license.85 Therefore, with patents, only sophisticated parties may participate in the market for commercialization of innovation.86

Again, the question arises as to whether the free market should be allowed to govern success and failure in the commercialization of innovation. The regulatory function of patents could deter useful, low-risk innovation along with excessively high-risk innovation. Strong patent rights could potentially transfer benefits from society as a whole to relatively few sophisticated parties. However, this is also true of securities offerings. Mandatory disclosures are not exempted simply because a particular industry has been deemed “low-risk.”87 And there

82 Sharma, supra note 39, at 5.
83 Id. at 2.
84 Id. We may be fired, but we do not reimburse the money that we lost (assuming no illegal activity).
85 See Robert A. Matthews, Jr., 5 Annotated Patent Digest § 35:31 (2015) (demonstrating that parties involved in patent negotiation are, as a general proposition, sophisticated).
86 Of course, an unsophisticated party may participate without authorization and risk being sued for patent infringement just like an unsophisticated party may participate in a private investment vehicle and risk imprisonment for violating securities laws.

continued . . .
are many fair and lucrative deals in which only wealthy investors can participate. So again, there is the assumption that Congress was correct in determining that high-risk private markets cannot function properly without buyer-side regulation. Moreover, as discussed in Section II, the prevalence of asymmetric payout structures make the prospect of functioning properly in the absence of regulation even more dubious.88 Therefore, if the commercialization of innovation is a sufficiently risky private offering (not only in the financial industry but in any industry), then it follows that the marketplace should benefit from the buyer-side regulation that patents provide.

Of course, the patent system has never been justified as any kind of mechanism to mitigate excessive risk-taking. In fact, the patent reward deliberately encourages taking at least some risk in order to innovate in the first place.89 Innovation is valuable, but also risky. Given that the vast majority of patents are worthless,90 unregulated commercialization of innovation is perhaps excessively risky.91 Thus, independent of any value in incentivizing innovation in the first place, patents may actually perform a valuable gating function that limits excessively risky attempts at commercializing innovation to only sophisticated parties.92 Similar to the case with securities law described in Section II, relaxing buyer-side restrictions must be accompanied by compensating regulation somewhere else, if the health and sustainability of the marketplace is to be maintained.93 Therefore, if patent rights are weakened or narrowed in a particular high-risk market (and no compensating regulation is added somewhere else), that market may lose a valuable restriction on

88 See supra note 81 and accompanying text.
89 Douglas Gary Lichtman, The Economics of Innovation: Protecting Unpatentable Goods, 81 MINN. L. REV. 693, 718 (1997) (“The point here is that patent law is an effective incentive system because it rewards innovators—and, hence, investors—at levels above those available in traditional markets. This is why investors choose to support the work of modern-day Edisons; this is why innovators are willing to assume the risks of innovation. Systematically under-rewarding innovators who produce unpatentable goods, however, is not a necessary part of this calculus.”).
90 See Allison et al., supra note 73, at 440–41.
91 This paper emphasizes the difference between the acceptable risk associated with innovation and the excessive risk associated with the attempted commercialization of that innovation.
92 Raising the price is the equivalent of restricting participation. As in the case with accredited investor requirements, every price increase excludes another potential buyer who cannot or will not pay the higher price.
93 See Bristow et al., supra note 11, at 122.
excessive risk-taking and become ripe for destabilization.94

In the next section, I take an empirical look at finance-related patents and their role in providing a potentially valuable market regulation mechanism.

IV. AN EMPIRICAL LOOK AT PATENTS IN REGULATING THE COMMERCIALIZATION OF FINANCIAL INNOVATION

In order to assess the value of patents as a market-regulating mechanism, it is necessary to understand how patents affect market behavior. Some studies argue that the mere existence of patents has little effect on what products are produced and sold in the marketplace.95 From a product availability standpoint, it would seem that patents are basically ignored.96 This could be because most patents are never read by competitors.97 On the other hand, there is some evidence that publication citation rates drop 10-20% once information is patented.98 This indicates that patents do become known and may have some cooling effect on follow-up research.99 But still, patent language can be quite vague. Even after reading a patent, it might not be clear whether there is enough of a risk of infringement to alter one's plans for commercialization.100 Furthermore, over 99% of patent owners never sue for infringement.101

On the other hand, once a patent lawsuit is initiated, the situation is much less vague, at least in the sense that there is a real dispute that is going to cost money to resolve. A number of studies have shown that patent litigation decreases a company's stock price and, in turn, the resources available for future research and development.102 Results have reported a mean stock value loss of $122 million due to patent

94 See Abramowicz, supra note 69, at 41.
96 Id. at 21.
97 Id. at 20–22.
99 See id. at 673.
101 Allison et al., supra note 73, at 435. Additionally, there are a host of reasons why a party may wish to obtain patents but not assert them. These include defensive reasons, leverage in cross-licensing negotiations, perceived asset value to the public, freedom to operate, and marketing. See Stuart J.H. Graham & Ted Sichelman, Why Do Start-Ups Patent?, 23 BERKELEY TECH. L.J. 1063, 1065–69 (2008).
litigation, the vast majority of which does not return after the lawsuit is resolved.103 Interestingly, both the plaintiff and the defendant lose stock value; not surprisingly, the defendant tends to lose more stock value.104 Some cases show that defendants’ product innovation ceases altogether.105

Thus, in looking for empirical evidence of patents in marketplace regulation, it is important to examine not only the existence of patents but also their assertion and enforcement. If patents are to provide a meaningful market regulation mechanism, they must not only be issued, but also successfully enforced. The next section will examine whether a lack of strong patents failed to limit participation in the commercialization of high-risk financial innovation and helped spur market failure.

A. Methodology

As mentioned earlier, it is important to examine both the existence of patents and the assertion (and enforcement) of those patents. I obtained the number of patent issues, patent applications, and patent applications that issue by keyword searches on the USPTO Patent Full-Text and Image Database (PatFT) and USPTO Patent Application Full-Text and Image Database (AppFT).106 I measured assertion activity from Derwent Litigation Alerts 107 and measured the enforcement outcomes by any published final judgment.108

B. Finance Patents During the Global Financial Meltdown

Excessive risk-taking by the financial industry plunged economies across the globe into massive recession beginning in 2007.109 This dramatically highlighted the growing intricacy and interconnectivity of marketplaces.110 The regulated financial markets had tied themselves to the unregulated financial markets because banks and pension funds

103 Bessen et al., supra note 100, at 31–32.
106 Both of these are publicly available on uspto.gov. USPTO publishes applications that were filed on or after November 29, 2000. Publication usually occurs about 18 months after filing.
107 Available on Westlaw.
108 Available on Westlaw.
109 Bhattacharyya & Purnanandam, supra note 7, at 8–12.
110 Id. at 1–2.
(for instance) were invested in highly risky private offerings, such as venture capital and hedge funds.111 At the other end of the investment lifecycle, the unregulated markets were tied to the regulated markets because those private investors relied on healthy common stock markets to exit their investments.112 And because big businesses, small businesses, and individuals rely on banks to finance investments, homes, cars, and to store money, the result was that the entire economy took these excessive risks together.

Prior to this, financial innovation was widely believed to be positive.113 Perhaps it is still generally positive, but it is clear that not every financial innovation ought to enjoy widespread commercialization. However, leading up to the global financial meltdown, the USPTO and the courts tended to remove any patent barriers to the widespread commercialization of highly risky financial innovation.114 Even after the crisis, this trend continued.115 It began with State Street in 1998, when the Federal Circuit validated a 1991 patent claiming a system for mutual fund investment accounting.116 Congress almost immediately created a statutory defense against business method patents that was interpreted as legislative disapproval of the State Street decision.117 Not long after, the courts also seemed to have a change of heart. In 2003, the court in American Stock Exchange, LLC v. Mopex, Inc.,118 went out of its way to invalidate a patent on exchange traded funds.119 By 2006, the USPTO also seemed to agree with the trend of unpatentability when it rejected a patent application on hedging commodities after review by the Board of Patent Appeals and

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111 Bristow et al., supra note 11, at 113.
112 Arewa, supra note 14, at 316.
119 Id. at 329–30 (finding a prior art reference qualified as a printed publication despite not being indexed anywhere because a person skilled in the art would be able to find it among hundreds of documents in the one room where the publication physically resided).
Interferences. Both the Federal Circuit and eventually the Supreme Court of the United States affirmed the denial of this patent application. Barely batting an eye at the global financial crisis and the potentially devastating power of “desired” financial innovations, by 2010, the Supreme Court had four Justices willing to categorically invalidate all business method patents on the fear that they "may prohibit a wide swath of legitimate competition and innovation." In 2012, the Federal Circuit reconfirmed this sentiment when it invalidated both method and system patents regarding a technique for mitigating transaction settlement risk.

In *Bilski v. Kappos*, the four concurring Supreme Court Justices explained their concerns that “even if patents on business methods were useful for encouraging innovation and disclosure, it would still be questionable whether they would, on balance, facilitate or impede the progress of American business.” But in the context of high-risk financial innovations, it may have actually been desirable to impede “progress” towards global financial meltdown. If Congress, the courts, and the USPTO had instead supported *State Street* and accorded strong patent rights to financial innovations, the excessively risky financial innovations that caused the global market collapse could have been isolated to a much smaller group of parties (i.e., the patent owners and licensees). In the competitive industry of financial product offerings, the patent owners may have offered very few licenses and restricted the reach of these risky innovations even further. Patent owners would have been able to raise prices to monopolistic levels and limit the supply to only a select few. When the market finally collapsed, all of the typically negative monopolistic behaviors would have actually protected the broader markets because so few parties would have been participating in the collapse.

121 *In re* Bilski, 545 F.3d 943, 997–98 (Fed. Cir. 2008); *Kappos*, 561 U.S. at 613.
122 *Id.* at 653 (Stevens, J., concurring).
125 *Id.* at 653 (Stevens, J., concurring).
126 See Bristow et al., *supra* note 11, at 80–82 (examining the “inherent” risks to the “pursuit of economic and technological advances”).
Of course, it is possible that a patent owner could serve the entire market demand for a product or otherwise license the patent to others to address any demand beyond the capacity of the patent owner to supply. But generally, the theory is that a monopolist does not do that. The whole point of a monopoly is that the monopolist can restrict supply and raise prices above the competitive level. By raising prices above the competitive level, the monopolist necessarily restricts access to the patented product. The stronger the patent right, the more drastic the monopolist’s power. In sum, weak patent rights may have spurred along the commercialization of excessively risky financial innovation. A bolder version of this statement is that stronger patent rights could have helped avoid the global financial meltdown of 2007-2009.

But Judge Mayer's dissent in In re Bilski points out that there are mountains of patents in this area and that the number of patents are growing exponentially. A more in-depth study found that patent applications on new types of securities initially increased in the early 2000s, but subsequently fell off after 2004. Perhaps by 2004, it was obvious to potential patentees that the USPTO and the courts had changed positions on these types of patents. But in the years leading up to the financial crisis, finance-related patents were litigated at a rate twenty-seven times that of patents as a whole. This was true both before and after the State Street decision. So if there were plenty of patents in the space, and those patents were being litigated frequently, then why was there no shut down in the commercialization of high-risk financial innovation (sometimes referred to as a patent holdup)?

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128 See LOUIS ALTMAN & MALLA POLLACK, 1 CALLMANN ON UNFAIR COMPETITION, TRADEMARKS & MONOPOLIES § 4:56 (4th ed. 2015). See also Chien, supra note 127, at 321–22 (discussing the advantages of cross-licensing to expand the patent holder’s market and use of the holder’s product).


130 ALTMAN & POLLACK, supra note 128, at § 4:56.

131 Ill. Tool Works, 547 U.S. at 31.

132 See id. at 33 (finding that increasing the scope of a patent tends to strengthen the monopoly and burden the public).

133 In re Bilski, 545 F.3d 943, 1004 (D.C. Cir. 2008) (Mayer, J., dissenting) (arguing that all business methods should be categorically unpatentable subject matter).


136 Interestingly, litigation in this area did not actually increase as a result of State Street. See Josh Lerner, The Litigation of Financial Innovations, 53 J.L. & ECON. 807, 808 (2010).

closer look at the data reveals that the patent system was (and likely still is) weaker here than has been suggested by other studies.
Figure 1 displays the number of patents issued by year in the business method class (“705 issues”) along with a subset of those patents that match financial keywords (“705/Terms issues”). As Judge Mayer noted, the number of patents in this space seems to exponentially rise.

Examination of patent applications lends a more nuanced explanation. As shown in Figure 2, the number of patent applications is rising, but not exponentially. Moreover, the number of issued patents are rising at an even slower pace. Thus, the exponential rise in patents issued is likely almost entirely due to the USPTO's increased pace of approving patent applications that had previously been tied up in the patent office for years. In fact, the ratio of applications that

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138 See infra Figure 1. USPTO class 705 is the business method class. Additionally, the class was searched for patents with any of the following keywords in the specification: financial OR trading OR securities OR debt OR mortgages OR commodities OR banking. See infra Figure 1.

139 In re Bilski, 545 F.3d 943, 1004 (D.C. Cir. 2008) (Mayer, J., dissenting).

140 See infra Figure 2.

141 See infra Figure 2.

142 There was a significant uptick in applications after State Street, but the dramatic rise in issues is an exaggeration of this behavior. But see John R.

continued . . .
ultimately get approved is decreasing slightly over time.143

Figure 2: Patent applications per year in the 705 class (business methods) and the subset of the class that match financial keywords in the patent specifications.

Still, there are (and were) plenty of patents to assert. Surely, thousands of patents are enough to stifle progress in an industry if those patents are successfully asserted. To assess litigation activity, I randomly selected twenty-one patents from each year between 1999-2006144 for the subset of the 705 class that matched financial keywords and traced any litigation history for those patents.145 Additionally, I examined all of the patents from the subset that belonged to a notable bank.146 Such notable banks represent the most sophisticated parties in

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Allison & Starling D. Hunter, On the Feasibility of Improving Patent Quality One Technology at a Time: The Case of Business Methods, 21 BERKELEY TECH. L.J. 729, 734–35 (2006). Allison and Hunter suggest that some applicants may have strategically avoided language that resulted in categorization in class 705 to circumvent the patent office's enhanced scrutiny of the class—or worse, the patent examiners themselves avoided the class to simplify their own work. Id.

143 Id. at 761.
144 See infra Table 2. These are the years between State Street and the start of the global financial crisis. The 21 patents selected were simply every fifth patent of the first 100 patents listed for that year in USPTO.gov database.
145 See infra Table 2.
146 "Notable" simply means a handful of household bank names that were still in existence after the financial crisis. The list of banks is provided in the table footnotes. See infra Table 2.
the industry and are the most likely parties in that class to have the resources to assess the likelihood of successful assertion.\textsuperscript{147} Litigation activity is summarized in Tables 2 and 3.\textsuperscript{148}

Table 2: Finance patent litigation summary table. Of the 248 total unique patents analyzed, fifteen were litigated, and two received final judgments.

<table>
<thead>
<tr>
<th>Year</th>
<th>Finance Related Patents \textsuperscript{1}</th>
<th># Litigated</th>
<th># with Final Judgment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>21</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>2000</td>
<td>21</td>
<td>2</td>
<td>1 - invalid</td>
</tr>
<tr>
<td>2001</td>
<td>21</td>
<td>1</td>
<td>0</td>
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<td>2002</td>
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<td>1</td>
<td>0</td>
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<tr>
<td>2003</td>
<td>21</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>2004</td>
<td>21</td>
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<td>0</td>
</tr>
<tr>
<td>2006</td>
<td>21</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Notable Banks Patents \textsuperscript{2}</th>
<th># Litigated</th>
<th># with Final Judgment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>16</td>
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<td>0</td>
</tr>
<tr>
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<td>17</td>
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<td>0</td>
</tr>
<tr>
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<td>0</td>
</tr>
<tr>
<td>2006</td>
<td>16</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

\textsuperscript{1} Randomly selected patents by issue year from ccl/705/$ and spec/(financial OR trading OR securities OR debt OR mortgages OR commodities OR banking)

\textsuperscript{2} Patents filed by issue year from ccl/705/$ and an/((Goldman Sachs) or (Merrill Lynch) or (Morgan Stanley) or (Citibank) or (Bank of America)). Four of these patents overlap with those analyzed in the Finance Related Patents group \textsuperscript{1}.


\textsuperscript{148} See infra Tables 2 and 3.
Of the 248 unique patents that were analyzed, fifteen of them had been asserted.\textsuperscript{149} This would seem to be consistent with other studies reporting relatively high rates of patent litigation for finance-related patents.\textsuperscript{150} However, only one of the assertions came from a notable bank,\textsuperscript{151} indicating that the more sophisticated parties may have known that assertions would not be fruitful.\textsuperscript{152} Indeed, only two of the fifteen total assertions were carried to final judgment, and in neither case was the patent successfully enforced. As shown in Table 3, the vast majority of patents were never asserted.\textsuperscript{153} Additionally, the total number of lawsuit filings is skewed by the focus on a few asserted patents.\textsuperscript{154}

Table 3: Finance patent assertion counts for the 248 unique patents analyzed through 1999-2006.

<table>
<thead>
<tr>
<th>Total assertions</th>
<th># Patents</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>233</td>
</tr>
<tr>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
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<tr>
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<td>7</td>
<td>1</td>
</tr>
</tbody>
</table>

Thus, finance-related patents actually appear much weaker when it comes to enforcement than relative litigation rates alone would imply.\textsuperscript{155} They are growing at a much slower pace than some studies suggest.\textsuperscript{156} While they may be asserted more than other types of

\textsuperscript{149} See infra Table 3.

\textsuperscript{150} Lerner, supra note 113, at 4.

\textsuperscript{151} See supra Table 2. Notable banks included in the author’s search were Goldman Sachs, Merrill Lynch, Morgan Stanley, Citibank, and Bank of America.

\textsuperscript{152} Larger companies have fewer potential defendants that are economically worthwhile to sue. There are also a number of reasons why a party may obtain a patent besides the value in asserting it, such as defensive reasons, leverage in cross-licensing negotiations, perceived asset value to the public, freedom to operate, and marketing. See Graham & Sichelman, supra note 101, at 1065–69.

\textsuperscript{153} See infra Table 3.

\textsuperscript{154} See supra Table 2; infra Table 3.

\textsuperscript{155} See supra Table 2.

\textsuperscript{156} See supra Figures 1 and 2.
COULD A LACK OF STRONG PATENTS SPUR A GLOBAL MARKET COLLAPSE?

In the few instances where they were carried to final judgment, they did not prevail. A stronger patent system may have yielded more patent enforcement, encouraged patent litigation, and ultimately slowed the pace of the commercialization of highly risky financial innovation. While these effects are usually considered undesirable, they may provide an extremely valuable market regulation mechanism in high-risk areas that are controlled by asymmetric payout structures. They might have restrained the industry enough to have prevented the global financial collapse. But instead, patent rights had been weakened over time in this area, and there was no regulation elsewhere added to compensate for this loss of regulation. When the global financial collapse occurred, Congress responded by adding such compensatory financial-specific regulation. Unfortunately, these regulations were reactionary. Thus, while strong patents could have potentially avoided the disaster in the first place, reactive industry-specific regulation may only prevent repeating past mistakes.

V. CONCLUSION

When patent rights are weakened, the overall regulation necessary to sustain a healthy market is weakened. During the lead up to the financial crisis of 2007-2009, Congress, the courts, and the USPTO had been on a trend to remove any patent barriers to the widespread commercialization of high-risk financial innovation. If they had instead followed State Street and accorded strong patent rights to financial innovations, the excessively risky financial innovations that

157 See Lerner, supra note 113, at 4 (noting that finance-related patents are asserted about 27 times more often than other types of patents).
158 See supra Table 2 (showing that only two of the fifteen litigated patents analyzed received a final judgment).
159 See supra Part IV.B (finding that in neither of the two patent litigations that received a final judgment were the patents successfully enforced).
160 An important note is that innovations that are kept trade secret cannot be directly regulated by the patent system. However, strong patent rights may encourage less use of trade secrets given the risk that a competitor can independently discover the same invention. With high employee turnover in the financial industry, the strength of the patent system could have significant effects in that regard. Moreover, patent claims can always be written to cover an invention broadly without disclosing the actual underlying trade secrets needed to most effectively practice the invention.
161 See generally Sharma, supra note 39.
164 See supra note 5.
caused the global market collapse may have been isolated to a much smaller group of parties (i.e., the patent owners and licensees). Patent holdup, stifling litigation, and other typically negative consequences of patents may have actually been a good thing. Although industry-specific regulation was subsequently passed to prevent repeating mistakes of the past, strong patents could limit the reach of mistakes in the future that have yet to be predicted.

However, the trend disfavoring finance and business method patents has actually continued. For instance, four Supreme Court Justices believe innovation is best served by the categorical elimination of all business method patents. This paper argues that strong patents can regulate the pace of commercialization of risky innovations, which may best serve overall innovation rates in the long term. Given that the vast majority of commercialization attempts will fail and that there is strong incentive created by the asymmetric payout structure to take excessively risky bets that any given commercialization is nevertheless worth attempting, the absence of sufficient regulation in any particular industry threatens the health of the market. In this way, commercialization of innovation mimics the high-risk private financial market, which is regulated by limiting participation to sophisticated parties. Patents provide an analogous buyer-side restriction because patents require market participants to be sophisticated enough to either be a patentee or one who can negotiate and pay for a license. The financial crisis of 2007-2009 affected every industry, which in turn significantly reduced resources that would have otherwise been available to fund innovation. The continued weakening of patent rights for financial and business method innovations, without compensating regulation elsewhere, may spur the next global market collapse.

There also may be other areas where the risks or the costs of failed innovation are sufficiently high as to justify using patents as market regulators, but more work must be done to examine whether or not such broad value exists. It may be the case that in other areas, the consequences of failure are small enough that nothing more than reactive industry-specific regulation is desirable. On the other hand, early in a technology's lifecycle might be the most critical time to use


167 See Sharma, supra note 39, at 6.

168 See supra Part II.

169 See supra Part III.

patents to actively regulate a market and give a fledgling industry time to sort out the good innovations from the bad ones. An industry without strong patents in the beginning may lose the ability to meaningfully restrict the market later because the foundational tools are already free to use. There are still too many factors to simply conclude that stronger patents across the board will best serve innovation and society's goals, but it may very well be the case that sometimes patent holdup can be more of a good thing than a bad thing.