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The Political Economy of the Patent System

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THE POLITICAL ECONOMY OF THE PATENT SYSTEM*

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In recent years, many reform proposals have been presented in Congress for changing the patent system in the United States. Most of these proposals have been normative in nature and based on overcoming the many perceived shortcomings of the United States Patent and Trademark Office's ("Patent Office") performance. Nonetheless, actual legislative reforms have failed to materialize.

In this Article, we claim that in order to understand the chances of success of any reform to the patent system, we should take a closer look at the patent system's political economy. In particular, we should be aware of the different pressure groups with a stake in the system and their ability to influence congressional committees through which reform legislation is enacted. We study the different constituencies favoring or opposing the reform and the strength of their bargaining power based on publicly available empirical data on political contributions by different groups and analyze the impact of political contributions to individual congressional representatives on individual floor votes on the Patent Reform Bill of 2007. In addition, we also take into account the effect of the patent system on different technology industries and economic sectors. As we show, each proposal will generate winners and losers who will try to push reforms forward or prevent them from being enacted. In order to succeed, any reform will need a minimum consensus among these stakeholder groups: firms in different technology

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sectors, inventors, the patent bar (divided separately into patent prosecutors and litigators), the Patent Office, and the courts.

Given the political processes, the final result of any reform will depart from any theoretical blueprint we describe in this Article. As a consequence, a deeper understanding of this political process allows us to better understand the dynamics of reforms and the resultant characteristics of the patent system. In the end, as in any other institutional device, the characteristics and performance of the patent system, plus its sustainability or reforms over time, depend on the preferences of the polity, specifically on the preferences of the groups with a definite stake in the performance of the system. We also determine that the effects of the patent system on different technology and economic sectors will ultimately shape the different constituencies favoring or opposing the reform. We observe that support for any patent reform will depend on the specific factors that define the structure of each economic sector. Furthermore, in each sector, firms have different preferences depending on their economic power and particular stakes in the patent system.

INTRODUCTION

The patent system in the United States elicits increasing concerns over its efficiency, especially with respect to the performance of the

U.S. Patent and Trademark Office ("Patent Office").[1] The major criticism leveled at the Patent Office is that the quality of the patents it issues is deficient.[2] Many patents granted are later found invalid, in whole or in part, because they lack innovation.[3] "This type of error has important economic consequences, as it generates inefficient resource allocation and hurts economic growth."[4] Consequently, the Patent Office has faced widespread criticism of its patent-granting procedures.[5] First, patents seem to be granted too fast, without a thorough examination of the requests.[6] Compared to other world-class patent offices, such as those in Japan and the European Union, the U.S. Patent Office fares relatively poorly in terms of high rates of acceptance and low levels of review.[7] Second, the Patent Office is not

1. For a discussion of criticisms of the Patent Office and reform proposals, see generally John Allison & Mark Lemley, *The Growing Complexity of the United States Patent System*, 82 B.U. L. REV. 77 (2002); Kevin M. Baird, *Business Method Patents: Chaos at the USPTO or Business as Usual?*, 2001 J. TECH. L. & POL'Y 347; Jay P. Kesan, *Carrots and Sticks to Create a Better Patent System*, 17 BERKELEY TECH. L.J. 763 (2002); Jay P. Kesan & Andres A. Gallo, *Why "Bad" Patents Survive in the Market and How Should We Change? The Private and Social Costs of Patents*, 55 EMORY L.J. 61 (2006); Mark A. Lemley, *Rational Ignorance at the Patent Office*, 95 NW. U. L. REV. 1495 (2001); Robert P. Merges, *As Many As Six Impossible Patents Before Breakfast: Property Rights for Business Concepts and Patent System Reform*, 14 BERKELEY TECH. L.J. 577 (1999); Cecil D. Quillen, Jr. & Ogden H. Webster, *Continuing Patent Applications and Performance of the U.S. Patent and Trademark Office*, 11 FED. CIR. B.J. 1 (2001–2002); John R. Thomas, *Collusion and Collective Action in the Patent System: A Proposal for Patent Bounties*, 2001 U. ILL. L. REV. 305 [hereinafter Thomas, *Collusion and Collective Action in the Patent System*]; John R. Thomas, *The Responsibility of the Rulemaker: Comparative Approaches to Patent Administration Reform*, 17 BERKELEY TECH. L.J. 727 (2002) [hereinafter Thomas, *The Responsibility of the Rulemaker*].

2. *See* Bronwyn H. Hall & Dietmar Harhoff, *Post-Grant Reviews in the U.S. Patent System: Design Choices and Expected Impact*, 19 BERKELEY TECH. L.J. 989, 996–97 (2004) (defining patent quality).

3. *See* Kesan, *supra* note 1, at 797.

4. *See* Kesan & Gallo, *supra* note 1, at 63–64.

5. *See, e.g.*, *id.* at 63 n.2.

6. *See* Kesan, *supra* note 1, at 765–66; *see also* Eugene R. Quinn, Jr., *The Proliferation of Electronic Commerce Patents: Don't Blame the PTO*, 28 RUTGERS COMPUTER & TECH. L.J. 121, 123 (2002) ("The real problem can be summarized by a 1999 survey conducted by Greg Aharonian, which revealed that fifty percent of all patent applications cited no prior art at all. Mr. Aharonian similarly estimates that somewhere between fifty percent and seventy percent of software patents would likely not issue if the examiners were to conduct prior art searches of both Patent Office archives and databases that are readily available but not accessible within the confines of the Patent Office.").

7. *See* Quillen & Webster, *supra* note 1, at 13 ("From the foregoing, it is evident that the examination of patent applications by the PTO [U.S. Patent and Trademark Office] is significantly less rigorous than is the examination of patent applications by the EPO [European Patent Office], the JPO [Japan Patent Office], or the GPO [Germany Patent Office]. Also, the likelihood of ultimately obtaining allowance of a patent application from the PTO is far higher than in the EPO, the JPO, or the GPO.").

free from political influence.[8] Powerful pressure groups exert their influence over the Patent Office either directly or indirectly by influencing policymakers in Congress to shape patent policy according to their preferences.[9] Third, laws and regulations grant the Patent Office an incentive structure that may adversely affect its performance.[10] The Patent Office is rewarded with a fee for each granted patent, without incurring any penalties for granting wrong ones.[11] Furthermore, the Patent Office knows that it does not have the final word regarding a granted patent. If it grants a "bad" patent, courts may examine and revoke its validity, but there is no direct penalty or consequence to the Patent Office for its mistakes.[12]

Adding to the Patent Office's problems is the fact that, in recent years, the patent system has undergone important changes. Most of the patents granted recently belong to high technology and Internet areas, which are not the traditional areas for patenting.[13] Moreover, because the Court of Appeals for the Federal Circuit allowed for the patenting of business methods in the case *State Street Bank & Trust Co. v. Signature Financial Group, Inc.*,[14] which was followed by a subsequent retreat in *In re Bilski*,[15] the Patent Office had to adapt to new areas that became eligible for patenting.[16] The Patent Office had no experience in granting these types of patents,[17] and therefore,

8. *See* Carl Shapiro, *Patent System Reform: Economic Analysis and Critique*, 19 BERKELEY TECH. L.J. 1017, 1021–23 (2004) (describing the influence of lawyers and inventors on the Patent Office).

9. *See* Michael H. Davis, *Patent Politics*, 56 S.C. L. REV. 337, 339–42 (2004) (explaining the political determinants of the U.S. patent system characteristics).

10. *See* Kesan & Gallo, *supra* note 1, at 65–66 (describing how the regulations affect the performance of the Patent Office).

11. *Id.*

12. *See* Thomas, *The Responsibility of the Rulemaker*, *supra* note 1, at 733 ("In contrast to our surgeon, the USPTO bears no responsibility for allowing an invalid patent to issue. Courts do not fine the USPTO upon invalidating a patent; the examiners who allowed the case are not disciplined for their oversight; nor must the USPTO award damages to affected members of the public to compensate for an improvidently granted patent. The costs of failing to acquire information are simply shifted to the other actors—in particular, the federal courts, the patentee's competitors, and, ultimately, the consumers.").

13. *See* U.S. PATENT & TRADEMARK OFFICE, THE 21ST CENTURY STRATEGIC PLAN 1 (2003), *available at* http://www.uspto.gov/web/offices/com/strat21/stratplan_03feb2003.pdf (discussing the growth in patent and trademark applications during the last decade and the need to address this increase in demand).

14. 149 F.3d 1368, 1370 (Fed. Cir. 1998).

15. 545 F.3d 943, 959–60 (Fed. Cir. 2008).

16. *See* Baird, *supra* note 1, at 347–48.

17. *Id.* at 355.

their chances of making mistakes were higher. New technological advances, the changes in the types of patents granted, and the Patent Office's incentive structure have all contributed to increasing the errors of the Patent Office. The rise in errors has led to more dissatisfaction with the current regime.

The existence of wrongly-granted patents and the general problems facing the patent system generate significant economic costs.[18] Many companies are forced to resort to court action to invalidate patents granted to competitors.[19] The costs of patent litigation are very high and impose important welfare costs, such as increasing transaction costs in technology markets, on businesses, and on the economy.[20] However, even when companies can choose to go to the courts to challenge a patent, the cost of paying a license or reaching a private agreement usually is lower than the cost of litigation.[21] Thus, improvidently granted patents then survive in the market, creating incentives for aggressive patenting. As a result, the Patent Office is presumably inundated with patent applications, which hurts the agency's efficiency.[22] Private firms will behave

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> Another problem at the USPTO that has increased the difficulty in examining business method patent applications is the lack of examiners with backgrounds in business and business methods. Typically, examiners have expertise in technical fields such as engineering or biotechnology; however, they often lack business backgrounds and knowledge. The USPTO has been slow to hire examiners with business backgrounds despite the large increase in business method patent applications.

Id.

18. *See* Hall & Harhoff, *supra* note 2, at 992–94 (analyzing the impact of low quality patents on the economy).

19. Note, *Estopping the Madness at the PTO: Improving Patent Administration Through Prosecution History Estoppel*, 116 HARV. L. REV. 2164, 2165 (2003).

20. *Id.* ("[P]oor patent quality creates uncertainty over patent validity. This uncertainty increases transaction costs in licensing negotiations because parties must conduct duplicative research and prior art searches to determine if a particular patent is valid and worth licensing. Finally, by postponing the true validity determination until litigation, poor patent quality strains judicial resources.").

21. *Id.* "Bad patents can also lead to holdup licensing, whereby patentees license bad patents to many parties for low royalties, knowing that most licensees would rather just pay the fee than become embroiled in expensive patent litigation." *Id.*

22. Hall & Harhoff, *supra* note 2, at 995.

> Since the mid-1980s, utility patent applications to the USPTO have grown at an average rate of five percent per year, rising from approximately 100,000 per year from 1970 through 1984, to about 330,000 per year in 2001. Obviously, this increase has led to an increase in patent office workload, especially since resources at the patent office have not kept pace. Patent pendency has risen from an average of eighteen months in 1990 to twenty-four months in 2002. There is

strategically by obtaining a diverse set of patents to improve their market competitiveness. They would then have the advantage of developing their inventions and delaying the investing processes of their competitors.

In light of the problems facing the patent system, an important debate has emerged concerning the changes needed to improve patenting proficiency. However, most of the discussions and proposals about patent reform neglect the political nature of the patent system and the role of political institutions in the reform.

This Article studies the political economy of patent system reform. The first Part of this Article shows that patent reform is shaped by the preferences of different interest groups with a stake in the patent system. The Article then analyzes how diverse economic and political groups with a stake in the functioning of the patent system influence and shape congressional legislation and determine the direction and scope of the proposed reforms. Next, the Article considers five main actors in the patent system: (1) inventors (individuals, universities, and all firms/corporations); (2) the Patent Office; and the Patent Bar, which we divide among (3) prosecutors; (4) litigators; and (5) the courts. As Part I shows, the specific legislative preferences of these groups will determine the fate of proposed reforms to the patent regime. More importantly, Part I explains how these groups try to shape legislation in their favor or block specific reforms not in their favor, why Congress has failed to introduce comprehensive reforms to the patent system, and what the key factors are that will influence future patent reform.

The second Part of this Article analyzes the vote in the House of Representatives in favor of the Patent Reform Act of 2007, H.R. 1908. By performing a logistic regression, we show that the passage of this bill in the House was strongly correlated to the resources that the primary stakeholders provided to each of the congressional representatives.

In the third Part, we present two case studies based on the implications of our model by examining the outcome of two proposed reforms contained in the Patent Reform Act of 2007. One case study refers to the establishment of a post-grant examination system within the Patent Office; the other case study examines many of the other reforms proposed in the patent reform bill introduced in Congress in

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evidence that patent grant rates have also risen, suggesting that time pressures have led to less scrutiny of each individual application.

Id.

2007. As Part III shows, the preferences of these actors are key to understanding the failure or success of these reforms. We find that several actors have a strong influence on the proposed reforms of the patent system, and that the success of such reforms will be linked to the strength of these groups in Congress. As a result, one should think of patent reform not merely in substantive terms, but as a political economy issue as well.

I. POLITICAL INCENTIVE STRUCTURE OF THE PATENT SYSTEM

According to the literature of New Institutional economics, formal and informal institutions are designed to reduce transaction costs in the economy.[23] Consequently, economic growth will be maximized in societies where institutions minimize transaction costs and foster market exchange.[24] In particular, well-defined and well-enforced property rights are some of the main instruments to minimize transaction costs, because the holders of property rights can readily dispose of their assets into the most productive activities.[25] In any given market or technology, there will be an optimal level of property rights protection. In the case of patents, a balance should exist between the social cost of the patentee's monopoly over the invention and the dynamic gains in innovation that arise from the patentee's disclosure.[26] On the other hand, uncertainty and the high costs of enforcing property rights induce high levels of wasted resources spent validating the property rights of an asset, thereby reducing the level of investment in innovations.[27] In this framework,

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23. DOUGLASS C. NORTH, INSTITUTIONS, INSTITUTIONAL CHANGE AND ECONOMIC PERFORMANCE 66–67 (1990). "Institutions are the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction. In consequence they structure incentives in human exchange, whether political, social or economic." *Id.* at 3.

24. *Id.* at 8.

> Traditional economic analysis of market functioning does not include property rights issues such as enforcement or property rights definition. Generally, transactions costs are neglected and then market results are perfectly efficient. Besides, the importance of the political process that give shape to market regulation and property rights are not taken into account.

Id.

25. *See id.* at 27–35.

26. *See* Nancy Gallini, *The Economics of Patents: Lessons from U.S. Recent Patent Reform*, 16 J. ECON. PERSP. 131, 132 (2002).

27. NORTH, *supra* note 23, at 58. "The more resources that must be devoted to transacting to assure cooperative outcomes, the more diluted are the gains from trade of the neoclassical model. The more complex the exchange in time and space, the more complex and costly are the institutions necessary to realize cooperative outcomes." *Id.*

the design and the functioning of a patent system, together with the enforcement mechanisms needed to sustain it, are key to fostering innovation and investment in new technologies.

The design of a patent system, like any other formal institution, depends not only on objective technical or scientific characteristics that will promote optimal efficiency, but also on the political preferences of the economic actors with a stake in the matter to be regulated. As a result, the definition and enforcement of property rights will depend on the political strength of these economic actors and their respective preferences. Because of the political nature of the property rights regime, the resulting regulatory framework will also depend on the political institutions in place. These institutions are the specific political instruments stakeholders have to influence changes according to their preferences.[28] In the case of patents, political institutions are shaped by the rules and procedures of Congress, where patent legislation is designed and passed. The economic agents with a stake in the patent system approach congresspersons in their respective congressional committees to influence the results of the proposed reforms.[29] We assume the political institutions are a given, and we focus on how these actors act to influence Congress to pass or block patent legislation according to their preferences.

First, we must determine the specific preferences for each stakeholder. We analyze the relationship between the economic results of the patent system and the political forces that determine the changes in the regime to determine each actor's preferences. Figure 1, below, shows how the patent regime works. Congress is in charge of enacting the laws that define and regulate the patent system.[30] The system is formed by a set of rules that provide a given protection of property rights to inventors.[31] Accordingly, Congress created the

28. *See* Robert P. Merges, *One Hundred Years of Solicitude: Intellectual Property Law, 1900–2000*, 88 CAL. L. REV. 2187, 2234–39 (2000) (describing the importance of lobbying on Congress regarding patent law issues).

29. *Id.* at 2235. "Copyright interest groups hold fund raisers for members of Congress, write campaign songs, invite members of Congress (and their staff) to private movie screenings or sold out concerts, and draft legislation they expect Congress to pass without any changes." *Id.* (quoting William F. Patry, *Copyright and the Legislative Process: A Personal Perspective*, 14 CARDOZO ARTS & ENT. L.J. 139, 141 (1996)).

30. U.S. CONST. art. I., § 8, cl. 8 ("Congress shall have the Power . . . . To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.").

31. 35 U.S.C. § 154 (2006).

Patent Office to review and grant patents for inventions.[32] This potential monopoly power,[33] even if it increases transaction costs for the users of the technology, could also generate incentives for further investments in new technologies from the owner of the patent and other inventors.[34] The incentives for future innovations, however, will depend on the specific technology to be patented.[35] Patent owners' competitors in the same economic sector will be worse off because of the monopoly. For many of them, efforts to obtain the patent failed, or they were defeated by the patentee in the patent race. Users will have to pay licenses to the owner of the patent, increasing the cost of using a given technology.[36] In the case of a patent that was improvidently granted, these negative effects—that is, the market losses—would be greater because there is no new invention, just wrongly granted property rights.[37] These patents have an impact on markets and on the economy in general, resulting in gains for some groups and losses for others.[38]

The actors affected by these economic consequences will resort to their political influence in two different ways. Losers will use the political system to change the rules and reverse the negative economic results, while winners will resort to similar political influence in an attempt to sustain the status quo of the patent system.[39] These groups can influence both the Patent Office and Congress, through its committees, to obtain better mechanisms to claim new patents or to improve the functioning of the system in their

32. United States Patent and Trademark Office, Our Business: An Introduction to the USPTO, http://www.uspto.gov/web/menu/intro.html (last visited Apr. 30, 2009) [hereinafter Intro to USPTO].

33. HALL VARIAN, MICROECONOMIC ANALYSIS 233 (3d ed. 1992) ("The word monopoly originally meant the right of exclusive sale. It has come to be used to describe any situation in which some firm or small group of firms has the exclusive control of a product in a given market.... The relevant feature of a monopolist from the viewpoint of economic analysis is that a monopolist has market power in the sense that the amount of output that it is able to sell responds continuously as a function of the price it charges.").

34. Gallini, *supra* note 26, at 136.

35. *Id.* at 139 (analyzing the different incentives and disincentives to investment the patent system induced on specific sectors).

36. *See id.* at 137.

37. *See* Kesan, *supra* note 1, at 767–68 (analyzing the impact of wrongly granted patents).

38. *See* Andrew Beckerman-Rodau, *Patent Law-Balancing Profit Maximization and Public Access to Technology*, 4 COLUM. SCI. & TECH. L. REV. 1, 5–6 (2002), http://www.stlr.org/html/volume4/beckermanintro.php (describing the impact of patents on markets and society).

39. *See, e.g.*, Merges, *supra* note 28, at 2236–37 (discussing lobbying efforts securing passage of the Sonny Bono Copyright Extension Act of 1998, which dramatically increased protections afforded to current copyright owners).

favor. As such, the patent system is not permanently settled but subject to changes due to the interaction between and among the different actors with a stake in the patent system: inventors, the Patent Office, patent lawyers, and the courts. These groups must also contend with Congress' committees, because Congress is the institution in charge of solving the political struggle.

Figure 1

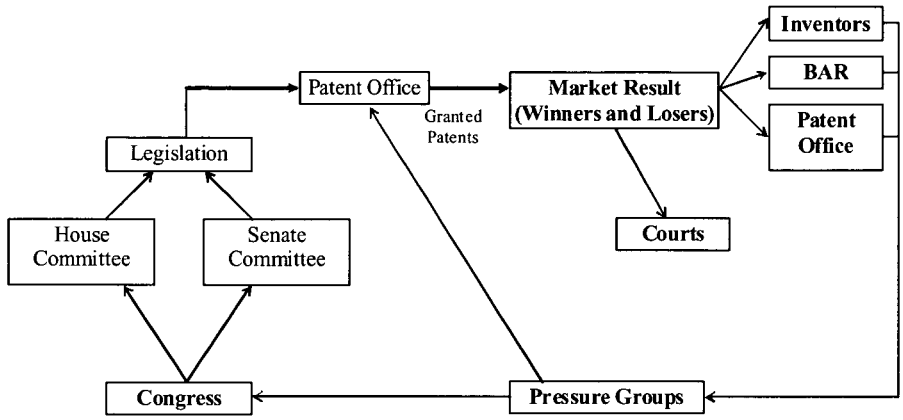
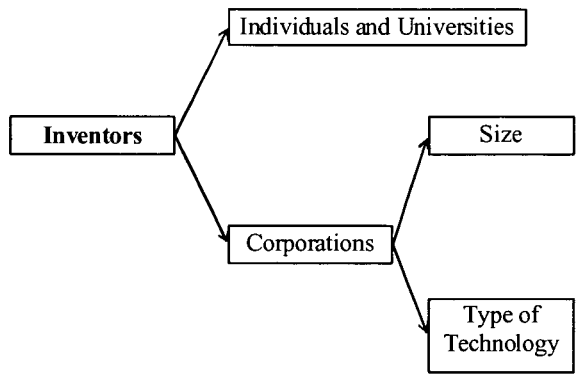


Figure 2



Given these characteristics of the patent system and the economic results the system creates, these groups will organize into more structured political groups to influence how the patent system

will operate. As shown by Figure 1, pressure groups can apply political pressure directly on the Patent Office or indirectly through Congress. Inventors can be classified into different groups: individuals, universities, and firms or industries. However, their stake in the patent regime can vary due to several factors;[40] therefore, individuals, universities, and firms or industries will have different preferences. We assume that individual inventors prefer a strong patent system that protects their inventions against corporations and allows them to profit from their inventions. Universities share some common interests with individual inventors, because their discoveries are also protected through the patent system.[41] Firm or industry preferences depend on other factors, such as type of technology and market power (size).

Figure 2, above, shows the classification of inventors based on type of organization, the technological characteristics of their inventions, and market power or size. While individual inventors depend on the strength of the patent system to reap benefits from their invention efforts, corporations may or may not benefit from a strong patent system. On the one hand, bigger corporations, like Microsoft and IBM, have enough economic resources to protect their technology without having to resort to the patent system.[42] On the

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40. *See* Gallini, *supra* note 26, at 139.

41. *See* Letter from Ass'n of Am. Univs., Am. Council on Educ., Ass'n. of Am. Med. Colls. & Council on Governmental Relations, to Lamar Smith & Howard Berman, Members of Judiciary Subcomm. on Courts, the Internet & Intellectual Prop. (June 23, 2005), *available at* http://www.acenet.edu/AM/Template.Cfm?Section=Home&CONTENTID=10758&TEMPLATE=/CM/ContentDisplay.cfm.

> Although the principal means by which university research results are disseminated is through peer-reviewed publications, conferences, and other forms of open communication, the nation also benefits substantially from university research through technology transfer processes where fundamental discoveries are moved into the commercial sector for development into useful products. The landmark 1980 Bayh-Dole Act, which authorized universities and small businesses to retain patent and licensing rights to inventions resulting from federally funded research, has been an extraordinarily successful mechanism for facilitating the transfer of basic discoveries into the commercial sector for development. The patent system is an integral part of this process.

Id.

42. A good example of the formation of these lobby groups is the Information Technology Industry Council. *See* Information Technology Industry Council, 2009 Member Companies, http://www.itic.org/index.php?submenu=Who&submenu=Who&src=gendocs&ref=membercompanies&category=whoweare (last visited Apr. 30, 2009). The members of this Council are well-known companies: Accenture, Agilent Technologies, AMD, Apple, Applied Materials, Cannon USA, Cisco Systems, Corning, Dell, Eastman Kodak, eBay, EMC, Hewlett-Packard, Honeywell, IBM, Intel, Lexmark International, Micron, Microsoft, National Semiconductor, NRC Corporation, Oracle, Panasonic,

other hand, small companies or individuals can harass these large companies if they hold the patent to a specific component that the bigger companies use in developing new products by withholding the patent or demanding excessive license fees for its use.[43] The existence of numerous patents of this type has brought complaints from the software industry about "patent trolls."[44] In many cases, small companies' competitiveness depends on their ability to patent some innovation and obtain royalties from bigger companies. Consequently, the smaller the company, the higher their preference is likely to be for a strong patent system.

Figure 2 also illustrates that the type of technology a company produces will determine its stance toward the patent system.[45] High-technology sectors, like computer software and web-based technologies, prefer a weaker patent system with weaker injunctive relief instead of a traditional, conventional property rights-based patent system. This preference results from these companies' reliance on non-patent mechanisms (such as network effects or first-mover

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Qualcomm, SAP, Sony electronics, Sun Microsystems, Symbol Technologies, Tektronic, Time Warner, Unisys, and VeriSign. *Id.* Another example is the Business Software Alliance, whose members are among some of the most recognized companies: Adobe, Autodesk, Avid, Bentley, Borland, Mastercam, Intelligent Security Systems, Macromedia, McAfee, Cadence, Cisco Systems, Dell, Entrust, Hewlett Packard, IBM, Intel, RSA, Microsoft, PTC, Solid Works, Sybase, Symantec, The MathWorks, UGS, Veritas, and SAP. Business Software Alliance, http://www.bsa.org/country/BSA%20and%20Members/Our%20Members.aspx (last visited Apr. 30, 2009).

43. Maggie Shiels, *Technology Industry Hits Out at "Patent Trolls,"* BBC NEWS, June 2, 2004, http://news.bbc.co.uk/1/hi/business/3722509.stm.

44. *Id.* ("These are lawyers and investors who buy cheaply or assume control over paper patents, mistakenly granted largely to failed companies, explains David Simon, computer firm Intel's chief patent counsel. The trolls can use these patents to threaten to shut down the entire computing industry with a court order injunction, no matter how minor the feature that has been patented is. Mr. Simon cites one case where a patent troll claimed a patent they had bought for about $50,000 was infringed by all of Intel's microprocessors from the Pentium II onwards and that they were seeking $7 billion in damages. In the end, the case was thrown out by the court, but it still cost Intel $3m to fight it, Mr. Simon says.").

45. *See* Gallini, *supra* note 26, at 144.

> The relationship between patents and innovation is at least as complex as the profile of technological and economic factors that determine innovation. There is no simple or universal correlation between the availability of patents and the incentive to innovate. This is due in part to the fact that the patent system interacts with industries at several different points in the innovation process. Recent evidence has demonstrated that this complex relationship is also industry-specific at each stage of the patent process: deciding to seek protection, obtaining a patent, setting the scope of the patent that results, deciding to enforce a patent, and determining litigation outcomes.

Dan Burk & Mark Lemley, *Policy Levers in Patent Law*, 89 VA. L. REV. 1575, 1589 (2003).

advantage) to appropriate benefits from their innovation and from the fact that the usefulness of their new technologies is limited to a few years, if not months. For example, information technology companies may prefer a system in which property rights are not as well-defined instead of a strict patent system that does not allow for flexibility in creating new technologies.[46] Therefore, such companies will oppose reinforcing and strengthening the current patent regime.[47] Other sectors, for example, biotechnology and pharmaceutical companies, which depend heavily on patents to support their R&D projects and sustain their market positions, will prefer a strong patent system to foster market value for their innovations.[48] Furthermore, these pharmaceutical and biotechnology companies may also use their patents in an offensive role as an instrument to stave off competition from smaller companies.

Based on these varying preferences within firms and industries, we arrive at four different types of net payoff functions:[49] (1) big companies in technology sectors that oppose a stronger patent system, such as those in the information technology sector; (2) big companies in other technological sectors supporting more secure definition and enforcement of patents, such as pharmaceutical and biotechnology companies; (3) small firms in the information technology sector that may or may not prefer a higher degree of property rights protection; and (4) small firms in the pharmaceutical and biotechnology sectors that may or may not prefer a weaker

46. *See generally* Julie E. Cohen & Mark A. Lemley, *Patent Scope and Innovation in the Software Industry*, 89 CAL. L. REV. 1 (2001) (discussing the impacts of broad and narrow software patent systems on the software industry).

47. *See* Burk & Lemley, *supra* note 45, at 1687–88 ("While most biotechnological and chemical inventions require broad patent protection because of their high cost and uncertain development process, the opposite is true in the case of software development. Software inventions tend to have a quick, cheap, and fairly straightforward post-invention development cycle. Most of the work in software development occurs in the initial coding, not in the development or production. The lead time to market in the software industry tends to be short. The capital investment requirement for software development is relatively low—mostly consisting of hiring personnel, not building laboratories or manufacturing infrastructure. Debugging and test marketing is tedious and potentially time consuming, but it does not rival the cost of stringent safety testing and agency oversight that is necessary in the biotechnology and pharmaceutical industries.").

48. A good example of the power of this lobby group is Pharmaceutical Research and Manufacturers of America ("PhRMA"), which represents the most important companies in the pharmaceutical sector. *See* PhRMA Member Company List, http://www.phrma.org/whoweare/members/memlist.phtml?mbrType=members#members ListStart (last visited Apr. 30, 2009) (providing a comprehensive list of PhRMA members).

49. A net payoff function represents the net benefit that an agent receives from different variables that directly affect its benefit.

definition of property rights. As a result, business alliances for or against patent system reform will take shape across these dimensions of companies' technologies and economic strength. Given this information, Figure 2 can be modified to include these four categories of companies:

Figure 3

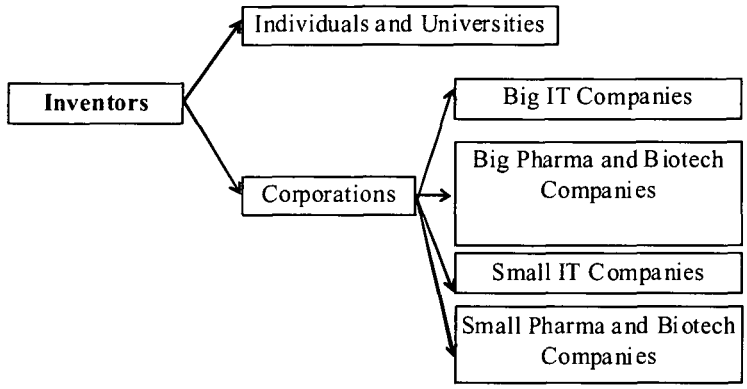

Figure 3 shows that inventors' "pressure groups" will try to influence the Patent Office directly to change the system.[50] More importantly, these groups will also try to influence congressional legislative reforms in an attempt to shape the patent regime according to their preferences. For example, the Patent Office has a Patent Public Advisory Committee, which generates policy recommendations for the agency.[51] Firms, lawyers, and independent inventors that have an important role and interest in the characteristics of the patent system compose this committee.[52] The

50. Shapiro, *supra* note 8, at 1038 ("[A]s reflected by the evidence[,] . . . the USPTO apparently sees its mission as serving its 'customers,' namely patent applicants. This concern is heightened by evidence that the USPTO issues patents for a very high fraction of patent applications. . . . For example, the governance of the USPTO could be changed so that consumer interests were better represented, or the incentives facing USPTO management could be redesigned to place much greater weight on patent quality.").

51. United States Patent and Trademark Office, Public Advisory Committee, http://www.uspto.gov/web/offices/com/advisory/ (last visited Apr. 30, 2009).

52. PATENT PUBLIC ADVISORY COMMITTEE, U.S. PATENT & TRADEMARK OFFICE, ANNUAL REPORT 3–4 (Nov. 30, 2001), *available at* http://www.uspto.gov/web/offices/com/advisory/acrobat/ppacannual11-30-01.pdf. According to the Patent Public Advisory Committee's 2001 Annual Report, the members of the Committee were: Margaret A. Boulware (Chair) (Jenkens & Gilchrist, Houston, Texas), James L. Fergason (Independent Inventor, Redwood City, California), Ronald E. Myrick (Chief Intellectual Property Counsel, General Electric Co., Weston, Connecticut), Gerald Mossinghoff (Senior Counsel, Oblon, Spivak, McClelland, Maier & Neustadt, Arlington, Virginia), Katherine E. White (Assistant Professor of Law, Wayne State University, Detroit,

Patent Office is well aware of the preferences of industries and inventors, because they constitute their customer base. As the Commissioner of the Patent Office expressed in 1996, "[t]he focus of this entire reengineering effort is on the customer as a full partner in the process. To support this commitment, we have embarked upon a series of roundtable discussions with our customers to learn their interests and concerns, and to seek their input on reengineering plans."[53]

Accordingly, the Patent Office's main objective is to design an efficient system to fulfill customers' demands.[54] However, the definition of "customer" is limited to industries and inventors, even though the patent system has an impact on consumers and citizens as well.[55] By granting new patents, the Patent Office not only affects the investment strategy of some firms and inventors, but it also shapes market structure, as Figure 1 illustrates. Furthermore, the Patent Office, as with any government agency, has its own preferences concerning revenue and performance.[56] Because of its unique position as manager of the patent system, the agency has an important role in advising Congress on new legislation.

Congress, however, does not rely exclusively on advice from the Patent Office. As Figure 1 shows, Congress is also directly influenced by pressure groups. Legislators whose constituencies have interests in

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Michigan), and Vernon A. Norviel (General Counsel and Secretary, Perlegen Sciences, Inc., San Jose, California). PATENT PUBLIC ADVISORY COMMITTEE, *supra*.

53. *Patent System and Modern Technology Needs: Meeting the Challenge of the 21st Century: Hearing Before the Subcomm. on Technology of the H. Comm. on Science*, 104th Cong. 11 (1996) (statement of Bruce A. Lehman, Assistant Secretary of Commerce and Comm'r of Patents and Trademarks).

54. Intro to USPTO, *supra* note 32.

> The USPTO mission is to ensure that the intellectual property system contributes to a strong global economy, encourages investment in innovation, and fosters entrepreneurial spirit. The USPTO promotes industrial and technological progress in the United States and strengthens the national economy by:
>
> - *Administering the laws relating to patents and trademarks.*
> - *Advising the Secretary of Commerce, the President of the United States, and the administration on patent, trademark, and copyright protection.*
> - *Advising the Secretary of Commerce, the President of the United States, and the Administration on the trade-related aspects of intellectual property.*

Id.

55. U.S. PATENT & TRADEMARK OFFICE, *supra* note 13, at 2 ("Our products and services will be tailored to meet the needs of customers.").

56. *See* Kesan & Gallo, *supra* note 1, at 66–67.

the design of the patent system usually occupy positions on the House and Senate committees involved in patent legislation, a phenomenon displayed below in Table 1. The states represented in this subcommittee obtained seventy percent of all the patents granted in the United States from 1996 to 2007.[57]

Table 1: Subcommittee on Courts, the Internet and Intellectual Property
House of Representatives, 107th and 110th Congress[58]

	Seats 107th	Seats 110th	Utility Patents 1996–2007	Percentage of Total U.S. Patents 1996–2007
California	5	6	208,280	21.6
North Carolina	1	2	20,405	2.1
Illinois	1		39,951	4.1
Virginia	2	2	12,417	1.3
Tennessee	1	1	8,690	0.9
Utah	1	1	7,793	0.8
South Carolina	1		6,267	0.7
Alabama	1		4,211	0.4
Indiana	1	1	15,562	1.6
Florida	2	3	29,430	3.1
Pennsylvania	1		36,961	3.8
Michigan	1	1	42,517	4.4
Massachusetts	2		40,910	4.2
Wisconsin	1	1	19,283	2.0
New York	1	1	68,626	7.1
Texas		2	67,919	7.1
Ohio		2	35,040	3.6
Georgia		1	15,189	1.6

57. *See infra* note 58.

58. *See* LORRAINE C. MILLER, CLERK OF THE H.R., LIST OF STANDING COMMS. & SELECT COMMS. & THEIR SUBCOMMS. OF THE H.R. OF THE U.S. TOGETHER WITH J. COMMS. OF THE CONG. WITH AN ALPHABETICAL LIST OF THE MEMBERS & THEIR COMM. ASSIGNMENTS, ONE HUNDRED TENTH CONG. (2009), *available at* http://clerk.house.gov/110/scsfinal110.pdf; PATENT TECH. MONITORING TEAM, U.S. PATENT & TRADEMARK OFFICE, PATENTS BY COUNTRY, STATE, & YEAR—UTILITY PATENTS (DECEMBER 2007), http://www.uspto.gov/go/taf/cst_utl.htm; JEFF TRANDAHL, CLERK OF THE H.R., LIST OF STANDING COMM. & SELECT COMMS. & THEIR SUBCOMMS. OF THE H.R. OF THE U.S. TOGETHER WITH J. COMMS. OF THE CONG. WITH AN ALPHABETICAL LIST OF THE MEMBERS & THEIR COMM. ASSIGNMENTS, ONE HUNDRED SEVENTH CONG. (2002), *available at* http://clerk.house.gov/107/scsfinal107.pdf.

The Subcommittee on Courts, the Internet and Intellectual Property in the House of Representatives was mostly dominated by states with high inventive activity. Table 1 shows that California, with nearly twenty percent of total patents granted from 1996 to 2007, has six seats in the subcommittee during the 110th Congress, the most of any state.

Besides inventors and the Patent Office, patent lawyers (both patent litigators and prosecutors) and the courts round out the important players in the patent system. Prosecution and litigation are two of the main services that law firms in the patent arena offer to patentees and patent litigants. The efficiency of the patent system depends on the low cost and accuracy of these services. Furthermore, the design of the patent system gives lawyers the opportunity to profit from their services. Consequently, members of the bar are a very well-organized group that tries to influence patent legislation in Congress.

The courts, too, are important players in the patent system. In contrast to inventors and lawyers, the courts are not organized as a pressure group, but instead serve as a check on the system and on Congress through their decisions and verdicts. Moreover, the courts do not have a typical economic stake in the performance of the patent system as do inventors, the Patent Office, and patent lawyers. As a result, we assume that the courts prefer a system that maximizes quality and performance in correctly assigning property rights.

A. Analyzing Stakeholders

Among the different groups of inventors and lawyers, each exercises a different measure of strength in putting pressure on Congress; therefore, their influence on congressional members varies. To measure each group's importance in Congress, we analyzed how much money these groups spent on lobbying, and inferentially, how important the issues of patent protection were in their agendas. Table 2 shows the breakdown of inventors and lawyers into eight groups and the associations and main actors within each group.

Table 2: Main Stakeholders[59]

Group	Associations and Main Actors
Big Pharmaceutical and Biotechnology Companies	PhRMA (Pharmaceutical Research and Manufacturers of America), BIO (Biotechnology Industry Organization)
Small Pharmaceutical Companies	Generic Pharmaceutical Association
Big Information Technology Companies	BSA (Business Software Alliance), ITIC (Information Technology Industry Council), CCIA (Computer and Communications Industry Association)
Small Information Technology Companies	
Prosecutors	American Intellectual Property Law Association (AIPLA)
Litigators	American Intellectual Property Law Association (AIPLA), Bar Associations
Universities	AAU (Association of American Universities)
Individual Inventors	Professional Inventors Alliance USA, NAPP (National Association of Patent Practitioners)

Table 3, below, specifies the amount of money spent on all lobbying efforts in each sector, not accounting for market power within firms or industries, or differences between public and private universities. As Table 3 shows, pharmaceutical companies are the largest spenders on lobbying, although the amount of money spent by the computer industry has grown more rapidly in the last seven years. Universities also show a substantial increase in the amount of money they devote to lobbying. The slowest growth in expenditures is in law associations. Despite the increasing amount of money spent on lobbying by the computer industry and universities, the pharmaceutical sector represents fifty-one percent of the total amount paid among all these groups. The computer sector represents twenty-five percent, while universities represent twenty percent of the total. Besides the important growth in the amount of money devoted to lobbying, the number of companies or institutions lobbying inside each sector also grew. In this case, it is the computer sector that leads

59. These actors are just examples, and the list is not exhaustive. Large companies are those that have brand name recognition and wide market presence in either the information technology or pharmaceutical sector. Small companies are those that operation in small, specific markets, without a general brand name. The other groups are participants with an interest in patent protection.

the growth rate, with a 229% increase in the number of companies lobbying Congress.

Table 3: Lobby Expenditures by Main Groups[60]
(Millions of Dollars and Number of Participants from Each Industry)

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Percent Increase 1998–2007
Pharma.	72.37	82.09	92.72	100.82	129.33	127.55	142.85	166.99	183.52	228.33	215.5
Number	181	222	237	233	245	284	334	417	446	485	168.0
Computer	39.40	45.15	54.40	64.85	68.02	77.04	86.09	92.33	108.35	112.88	186.5
Number	131	184	226	223	243	288	314	387	407	431	229.0
Univ.	30.80	36.47	46.48	57.22	66.78	73.80	79.01	88.80	89.06	90.23	193.0
Number	362	401	468	587	702	787	815	894	893	882	143.6
Law Assoc.	16.69	14.09	13.95	11.98	15.04	29.27	23.26	23.78	25.21	19.21	15.1
Number	88	98	95	97	98	108	116	122	121	118	34.1

Nonetheless, despite the fact that the more money a sector pays, the greater the influence they will have on Congress, not all this lobbying money is devoted to property rights and patent issues. As shown in Table 4, if one looks at how patent and property rights issues are ranked for each sector, the computer sector leads, followed by pharmaceuticals, law associations, and universities. As a result, even though universities spend a significant amount of money on lobbying, property protection is very low on their list of priorities. As such, they are not going to devote a large amount of resources to this issue. The computer and pharmaceutical sectors, on the other hand, devote more of their resources to patent and property rights issues than the other sectors.

60. OpenSecrets.org, Lobbying Spending Database, http://www.opensecrets.org/lobby/top.php?indexType=i (last visited Apr. 30, 2009) (select relevant industry and click on individual institutions).

Table 4[61]

Sector	Rank of Patent and Copyright Issues 2006	Percentage of Total Filings Regarding Patent and Copyright Issues 2006
Pharmaceuticals	7	4.8
Computer	6	5.3
Universities	11	1.6
Law Associations	21	1.4

Among the most important players to lobby in the patent and copyright arena are pharmaceutical and computer companies; they appear near the top of the list of all sectors interested in patent and copyright policy, as indicated in Table 5. Among these sectors, the top fifteen account for eighty-six percent of all patent and copyright filings for the period 2003–2004.

Table 5: Top 15 Industrial Sectors with an Interest in Patent and Copyright Policy, 2003–2004[62]

	Number of Filings	Percentage of Total Filings
Television, Movie & Music Production	258	21.4
Computer Equipment & Services	200	16.6
Pharmaceuticals & Other Health Products	149	12.3
Printing & Publishing Industries	80	6.6
Private Schools, Colleges and Universities, Education Groups & Related Organizations	48	4.0
Business Associations	44	3.6
Public Schools, Colleges and Universities	42	3.5
Retail Sales	40	3.3
Beer, Wine & Liquor Industries	31	2.6
Telecommunications Services & Equipment	28	2.3
Non-Profit Institutions & Organizations	28	2.3
Miscellaneous Communications & Electronics	26	2.2

61. Authors' own elaboration based on data from www.publicintegrity.org. The data in this Table does not correspond to data currently found on the website, but the authors have informed the editors that the Table reflects the numbers as they appeared in May 2008, when the authors accessed the website. This and other data used by the authors in this Article is on file with the North Carolina Law Review.

62. Center for Public Integrity, http://projects.publicintegrity.org/lobby/profile.aspx?act=issues&year=2003&is=CPT&sub=6 (last visited Apr. 30, 2009).

	Number of Filings	Percentage of Total Filings
Electronics Manufacturing & Services	23	1.9
Miscellaneous Manufacturing and Distributing	22	1.8
Telephone Utilities	20	1.7
Total	1,208	

If we eliminate the copyright-related sectors and focus only on the issues of interest to the Patent Office, the pharmaceutical and biotechnology sectors represented 17.8% of the total patent filings for 2003–2004, the computer sector represented 5%, universities made up 2.8%, law associations represented 4.4%, other property rights associations added up to 5.5%, and other sectors were at 45%.[63] The most important companies in the "other" category are publishers and the media organizations, which are more concerned about copyright protection than the patent system. As a result, we omit these actors from our analysis and focus on the main actors with an interest in the reform of the patent system. Furthermore, Table 6 shows the number and percentage of reports submitted to Congress with respect to property rights and patents. As shown in Table 6, the computer and pharmaceutical sectors are the two most important sectors with an interest in this issue.

Table 6: Number of Reports on Property Rights and Patents (Most Important Sectors, 2007)[64]

	Reports	Percentage of Total Reports
Computer, Software, Internet	226	18.5
Pharmaceutical - Health	333	27.3
Media - Communications - Publishing	237	19.4
Universities	84	6.9
Patent Associations	33	2.7
Other Sectors	280	22.9
Law Firms and Associations	28	2.3
Total	1,221	

63. *Id.*

64. Authors' own elaboration based on data from www.opensecrets.org. The data in this Table does not correspond to data currently found on the website, but the authors have informed the editors that the Table reflects the numbers as they appeared in May 2008 when the authors accessed the website. This, and other, data used by the authors in this Article is on file with the North Carolina Law Review.

Looking closer at each of the main groups that contribute money to lobbying activities, we find that the main contributors are the biggest companies in each sector. According to Table 7, in the case of the pharmaceutical and biotechnology sectors, PhRMA is the leading actor, with the largest amount of money spent on lobbying. Most of the top contributors in this section can be classified as big companies.[65] All companies that devote the most money to lobbying are big companies, which then have an important advantage over small companies. The only actor representative of small laboratories, the Generic Pharmaceutical Association, ranked thirty-sixth in 2007, with approximately $1.1 million spent on lobbying.[66] Furthermore, counting the total money spent by PhRMA and its member companies reveals that they account for sixty percent of the total amount spent on lobbying in 2007.[67]

Table 7: Top Ten 2007 Contributors of Money for Lobbying Within the Pharmaceutical and Biotechnology Sectors (Millions of Dollars)[68]

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Percent Growth	Big Comp.
PhRMA	3.12	5.02	7.48	11.28	14.26	16.04	15.52	13.48	18.1	22.73	628.5	X
Amgen Inc	2.36	3.44	2.68	3.08	2.94	4.96	4.96	5.72	10.22	16.26	589.0	X
Pfizer Inc		2.24	3.44	3.57	4.7	3.72	5.66	6.49	11.8	13.8	516.1	X
Glaxo Smith Kline	3.12	2.74	1.5	4.54	4.1	2.9	4.9	4.86	0.99	8.24	164.1	X
Johnson & Johnson	1.58	1.56	2.78	3.24	3.76	4.34	4.78	5.38	5.38	7.7	387.3	X
Biotech-nology Indus. Org.	1.7	2.56	2.86	3.51	3.54	4.26	5.18	5.82	5.46	7.16	321.2	X
Sanofi-Aventis		0.1	0.2	0.2	0.22	2.57	2.91	3.86	5.68	7.12	7020.0	X
Roche Group	1.68	1.91	2.42	2.98	2.57	3.2	3.14	4.43	6.67	6.45	283.9	X
Novartis AG	1.16	1.78	2.7	2.6	3.22	2.95	3.6	3.77	4.2	6.16	431.0	X
Bristol-Myers Squibb	2.82	3.62	4.66	4.86	4.9	5.32	5.58	5.04	5.74	5.66	100.7	X

65. *See* Figure 3, *supra*.

66. OpenSecrets.org, Lobbying Spending Database Pharmaceuticals/Health Products, 2007, http://www.opensecrets.org/lobby/indusclient.php?lname=H04&year=2007 (last visited Apr. 30, 2009).

67. *Id.*

68. *See id.* (to find all data, click on each respective year).

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Percent Growth	Big Comp.
Top 10 Percent	49.8	51.3	53.5	52.9	56.2	47.8	42.2	36.9	42.1	44.4		
Top 20 Percent	72.7	73.9	76.4	75.8	75.8	66.7	62.0	57.2	57.9	60.2		

Table 8 shows that, in the case of the computer and information technology sectors, the top contributors are also the biggest companies and associations in the sector. Nonetheless, Table 8 illustrates that the top ten percent of the lobbying companies represent just thirty-seven percent of the total money spent in lobbying in 2007, while they represented fifty-seven percent in 1998. As a result, given the increase in the number of companies and associations lobbying for the information technology sector, there is less concentration in the source of the money for lobbying. The same pattern occurs in Table 8 with the top twenty percent of the lobbying companies.

Table 8: Top Ten 2007 Contributors of Money for Lobbying Within the Computer and Information Technology Sectors (Millions of Dollars)[69]

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Percent Growth	Big Comp.
Microsoft Corp	3.74	4.66	6.36	6.56	6.50	8.74	9.46	8.70	8.88	9.00	140.6	X
IBM Corp	5.31	6.14	4.68	4.97	5.05	7.16	6.54	7.18	7.54	7.92	49.1	X
Oracle Corp	1.90	2.28	2.18	2.27	2.58	1.73	2.73	2.87	3.06	5.28	177.9	X
SAP America			0.15		0.24	0.18	0.32	0.80	1.38	4.33	2787.9	X
EDS Corp	3.30	2.86	5.56	2.69	5.12	3.11	2.77	2.72	3.87	3.67	11.0	X
Entertainment Software Assn						0.96	1.76	2.06	2.31	2.85	197.7	X
Texas Instruments	2.26	1.91	2.20	2.09	2.60	1.74	2.12	2.20	2.30	2.76	22.1	X
eBay Inc		0.07	0.27	0.31	0.60	0.56	0.64	1.00	1.97	2.11	2750.7	X
Hewlett-Packard	0.61				0.62	1.06	1.23			1.98	224.6	X
Earthlink Inc		0.04		0.12	0.36	0.36	0.36	0.61	1.87	1.85	4525.0	X
Top 10 Percent	57.2	51.9	50.0	56.9	48.8	44.9	41.0	39.0	39.5	37.0		
Top 20 Percent	74.6	67.2	62.2	67.4	59.6	56.4	53.2	50.0	52.6	51.5		

69. OpenSecrets.org, Lobbying Spending Database Computers/Internet, 2007, http://www.opensecrets.org/lobby/indusclient.php?year=2007&lname=B12&id= (last visited Apr. 30, 2009) (to find all data, click on each respective year).

In the case of universities, both public and private, the amount of money is more evenly distributed.[70] Furthermore, given their structure and similar activities, universities are more homogeneous in their interests compared to the other groups. Finally, as for law organizations, only the American Bar Association has ranked patent and copyright issues on its list of interests.

Table 9: Top Ten 2007 Contributors of Money for Lobbying Within Law Organizations (Millions of Dollars)[71]

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Percent Growth
Am. Assn for Justice	-								8.32	5.74	-31.0
Am. Bar Assn	1.28	1.24	1.08	1.16	1.3	1.2	1.26	1.24	1.18	1.24	-3.1
Akin, Gump et al	-					0.91	1.78	1.14	0.59	0.68	-25.3
Law Offices of John T O'Rourke	0.78	0.66	0.21	0.2	0.12	1.26	0.36	0.46	0.57	0.57	-26.9
Assn of Trial Lawyers of America	2.14	3.52	3	2.2	3.46	6.57	7.07	7.24		0.46	-78.5
Nat'l Org/Social Security Claimant Reps	0.16	0.38	0.56	0.72	0.59	0.57	0.36	0.34	0.34	0.44	175.0
US Investigations Services	-	-	0.02	0	0.16	0.13	0.2	0.14	0.38	0.43	2050.0
Morrison & Foerster	-								0.28	0.4	42.9
Alston & Bird	-								0.28	0.32	14.3
WilmerHale	-	0.02	0.04	0.32	0.12	0.16	0.34	0.61	0.36	0.32	1500.0
Top 10 percent	63.1	61.2	58.5	53.2	59.5	64.0	62.9	58.6	56.6	55.2	
Top 20 percent	79.5	76.8	73.7	70.3	73.9	78.8	73.9	70.2	68.9	69.0	

Based on the money invested in lobbying activities, we generated a ranking in Table 10 of the different sectors according to their

70. *See id.*

71. OpenSecrets.org, Lobbying Spending Database Lawyers/Law Firms, 2007, http://www.opensecrets.org/lobby/indusclient.php?year=2007&lname=K01&id (last visited Apr. 30, 2009) (to find all data, click on each respective year).

influence on Congress. This ranking helped us analyze the direction of the proposed changes and the relative strength of each sector over Congress. At the same time, the aggregate amount of money given cannot be the sole determinant of power in Congress. Rather, rates of giving, the number of companies involved in the activities, and recent increases in lobbying efforts can affect the ranking. We therefore gave each sector a score from one (strong power in Congress) to five (weak power).

Table 10: Ranking of Stakeholders by Power in Congress

Group	Ranking
Big Pharmaceutical and Biotechnology Companies	1
Big Information Technology Companies	1
Litigators	3
Universities	3
U.S. Patent and Trademark Office	3
Courts	3
Prosecutors	4
Small Pharmaceutical Companies	4
Individual Inventors	5
Small Information Technology Companies	5

The strongest group is the big companies in the pharmaceutical and biotechnology sectors. This group is one of the most powerful lobbyist groups in Congress, as demonstrated in Table 7. We gave the same rank to big companies in the computer and information technology sectors, because they have recently shown greater strength and a substantial increase in lobbying expenditures and participation in the legislative process, as shown in Table 8. In the case of small pharmaceutical companies, some lobbying activity occurs, but for small computer and information technology companies, their lobbying presence is undetectable.[72] Universities received a middle score because, even though they contribute a large amount of money to lobbying, they lobby for other issues that are more important to them than patent legislation.[73] In the case of litigators, they garner some support from the American Bar Association and the AIPLA, although most law associations and companies have priorities other than patent reform on their

72. *See supra* Tables 7 and 8.

73. *See* OpenSecrets.org, Lobbying Spending Database Education, 2007, http://www.opensecrets.org/lobby/indusclient.php?year=2007&lname=K01&id (last visited Apr. 30, 2009).

agendas.[74] We assume that prosecutors will not have as much support from these associations as litigators, because they generate lower revenue. Individual inventors obtained a low score, because they lack representation in lobbying activities. Finally, the Patent Office and the courts have a medium level of influence on Congress given their roles as checks on the patent system and on Congress with respect to new patent legislation.

B. Modeling Preferences

To analyze the process of legislative changes in patent law, we will determine the preferences of each group with a stake in the patent system. We assume the following main characteristics of the patent system matter for the groups: (1) the quality of the patents; (2) the strength of the property rights that the system provides; (3) the speed of the granting process; (4) the fees that the Patent Office charges; (5) the legal fees that inventors have to pay prosecutors and litigators; (6) the importance of the Patent Office to the patent system; and (7) the quality of the court system.[75] We distinguish between legal fees charged by prosecutors for patent prosecution and fees charged by litigators for patent litigation. All of these factors will determine the net payoff for each actor involved in the patent system.

In the case of inventors, the payoff can be represented as follows:

Individuals

$$\Pi_I^I = \Pi^I(Q, PR, S, C, P, F, LF_P, LF_L)$$

Universities

$$\Pi_I^U = \Pi^U(Q, PR, S, C, P, F, LF_P, LF_L)$$

Corporations

$$\Pi_{AS}^C = \Pi_{AS}^C(Q, PR, S, C, P, F, LF_P, LF_L)$$

$$\Pi_{AB}^C = \Pi_{AB}^C(Q, PR, S, C, P, LF_L)$$

$$\Pi_{BS}^C = \Pi_{BS}^C(Q, PR, S, C, P, F, LF_P, LF_L)$$

$$\Pi_{BB}^C = \Pi_{BB}^C(Q, PR, S, C, P, LF_L).$$

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74. *See* OpenSecrets.org, Lobbying Spending Database Lawyers/Law Firms, 2007, http://www.opensecrets.org/lobby/indusclient.php?year=2007&lname=K01&id= (last visited Apr. 30, 2009).

75. We determine these main characteristics of the patent system based on our own experience and analysis of such a system. We believe that most of the changes to the patent system will have an impact on some or all of these characteristics.

Π_I^I is the payoff for individual inventors. Π_I^U is the payoff for universities and other nonprofit organizations. Π_{ij}^C is the payoff for corporate inventors, where the index i represents the type of technology (A or B) and j the type of company (big (B) or small (S)). Q is the quality of the patents granted (how well the system identifies innovations that merit a patent). PR is the strength of property rights protection offered by the patent system once one obtains a patent. S is the speed of the services offered by the Patent Office. F represents the fees charged by the Patent Office. LF_P represents the legal fees charged by prosecutors. LF_L represents the legal fees and costs charged by litigators. Variable $C \in (1,0)$ is the quality of the court system in enforcing patent rights; 1 represents the highest quality and 0 the lowest quality. For the Patent Office, $P \in (1,0)$ signifies the relevance of the Patent Office in the enforcement of the patent system; 1 means that the Patent Office is the only enforcer of patents, without any role for the courts, while 0 represents a situation in which the Patent Office grants patents. However, in the latter case, the decision does not carry any weight in the enforcement of the rights, which is then reviewed and determined by the courts.

Next, we determine the outcome for each of the six inventor types: individuals, universities, big and small software and information companies, and big and small pharmaceutical and biotechnology companies. In the case of individual inventors, we assume that increases in the speed of the granting procedure and the quality of the court system will increase their payoff.[76] We assume that higher quality patents will have a negative effect on their payoff function. The higher quality of the patents implies that many of the applications for individual inventors will be rejected by the Patent Office, decreasing the total payoff. Stronger property rights protection for granted patents will reduce the chances of litigation, thereby reinforcing the bargaining power of individual inventors in the market.[77] As for the speed of the granting process, we assume that the faster the Patent Office grants a patent, the higher the payoff for individual inventors, because they can start to enjoy the monopoly benefits of the patent earlier. The existence of an effective court system enhances patent protection against excessive challenges.[78] Even though an effective court increases the chance of a bad patent being revoked, individual inventors would like to use the court as a

76. *See infra* Appendix A (showing how changes in the different variables affect the actors' preferences and net payoff of each group).

77. *See* Kesan & Gallo, *supra* note 1, at 90–93.

78. *See id.*

bargaining tool for obtaining licensing fees from corporations.[79] Assuming most corporations would prefer to avoid costly litigation procedures, they would more likely pay individual inventors a licensing fee. Finally, we assume that an increase in the importance of the Patent Office in the patent system will have a net negative impact on individual investors. Even though it is cheaper to resort to the Patent Office than the courts in certain patent matters, individual inventors may use the courts (even if more expensive) to bargain for their property rights. We assume that an increase in the fees charged by the Patent Office or by prosecuting lawyers will decrease the net payoff from patents. In the case of litigation fees and costs, the net effect is undetermined. On the one hand, higher litigation fees will increase the expected payoff from the settlement with corporations. On the other hand, it will make it more difficult for individuals to pay the cost of taking their cases to court.

This study assumes that universities have a different set of preferences than individual inventors. Researchers at universities will benefit from higher quality patents, the speed of the Patent Office granting process, and an effective court system that enhances patent protection against excessive challenges. In general, universities are indifferent to an increase in the importance of the Patent Office. Increases in the fees charged by the Patent Office or by prosecutors decrease the net payoff from the patents. Litigation fees also have a negative effect on universities. In the case of patent enforcement, universities are largely indifferent. While universities would like their property rights enforced, they may not like strict property rights that do not allow collaboration or the use of previous inventions to advance knowledge and research.

Corporate inventors have a more disparate distribution of preferences. We have divided corporate inventors according to two main variables: the size or market power of the company (big or small) and the type of technology with which the company works. We assume two types of technology: one that does not depend too much on the patent system to promote innovation (A) and one in which patenting is key to fostering innovation and market power (B). The assumption is that the first type of technology is related to software and information technology, where companies prefer a lower level of protection and enforcement for patents, while the second type of technology is related to industries that depend on strong patent protection for their innovations, like pharmaceuticals

79. *See id.* at 93–95.

and biotechnology.[80] We assume that the quality of patents will increase the payoff for big companies in both sectors.[81] Small companies in the information technology sector will be negatively affected by better quality, and small companies in the pharmaceutical and biotechnology sectors, usually start-ups that strongly depend on the success of the patenting of their inventions, will also be negatively affected. Higher quality patents mean that fewer patents will be granted. Small companies in both sectors share a preference for high-quality patents, because small companies in information technology depend on their technology patents to profit.

We assume that greater speed in the Patent Office will have a positive result for all types of companies, except for big companies in the information technology sector. A higher speed in granting patents by the Patent Office has two disparate effects on the companies in all sectors. If a company is patenting an innovation, then an increase in the speed of the Patent Office will increase its payoff. However, if the increase in speed leads to an increase in the issuance of bad patents, then the increase in speed could be harmful in terms of the resulting litigation with competitors. In the case of big companies in the software and information technology sector, the assumption is that the negative effect is greater, in absolute value, than the positive effect. However, smaller companies and companies in the patent-prone sector prefer fast decisions on their pending patents.

In the case of the quality, or ability, of the court system to enforce property rights, preferences will also differ from sector to sector. Big companies in the software and information technology sector will prefer a system with a minimal role for the courts, because most of their innovations contain multiple patented innovations from competing firms. Rather, they would prefer to handle these issues outside the courtroom.[82] We assume that small companies in both sectors prefer a higher degree of court participation, because the small companies frequently provide their innovations to bigger companies in the development of new products. Courts ensure that their property rights are protected.

The degree of property rights protection provided by a patent is related to the role of the courts. This study assumes that big

80. *See* Burk & Lemley, *supra* note 45, at 1589–93 (describing the different needs for property rights protection from different technologies).

81. *See infra* Appendix A (describing factors that impact net payoff for big companies).

82. Kesan & Gallo, *supra* note 1, at 93–95.

companies in the information technology sector prefer a lower degree of property rights protection and enforcement to avoid becoming hostage to small companies' patents. Big companies in the pharmaceutical and biotechnology sector, as well as small companies in both sectors, prefer strong enforcement of their patents.

We assume that the relevance of the Patent Office has a negative effect on smaller companies in the information technology sector and pharmaceutical and biotechnology start-ups. Big companies in the pharmaceutical and biotechnology sectors rely on the courts to protect their property rights.[83] Big companies in software and information technology sectors will prefer a greater role for the Patent Office because of the lower degree of complexity of the process and the better chances of reaching an agreement with competitors to avoid high litigation costs.[84]

This study assumes that prosecution fees have a negative impact on the payoff of small companies in both sectors, while big companies are indifferent. Changes in litigation fees, as in the case of individual inventors, will have an undetermined effect on their payoff functions. In the case of big companies, the effect will depend on the specific situation of each company. For example, companies in the biotechnology and pharmaceutical sectors that have a patent portfolio to protect will prefer higher litigation fees to discourage small companies from challenging them in court. Companies in software and information technology fields are faced with a similar situation with the patents they own. However, they also face an important burden from high litigation fees whenever they are challenged, because they use patents from competitors in developing a new

83. *See* Josephine Hearn, *The Executive: Business on the Prowl for Patent 'Trolls,'* THE HILL, Apr. 14, 2005, *available at* http://thehill.com/the-executive/business-on-the-prowl-for-patent-trolls-2005-04-14.html ("But while nearly all the stakeholders agree that the patent system is broken, industry groups representing patent holders look likely to split on how to address the problem. The Pharmaceutical Research and Manufacturers of America (PhRMA) has indicated that it would prefer fewer curbs on patent litigation . . . because its industry tends to litigate in defense of its own patents more often. 'The pharmaceutical industry, because of the nature of their industry, has different views, an honest difference of opinions,' said Emery Simon at the Business Software Alliance.").

84. *See* Q&A: Microsoft Press Pass, Microsoft Calls for Reforms to the U.S. Patent System (Mar. 10, 2005), http://www.microsoft.com/presspass/features/2005/mar05/03-10patentreform.mspx [hereinafter Q&A: Microsoft Press Pass] ("[W]e need to ensure that interested parties have sufficient opportunities to alert the PTO about questionable patents within the PTO review process itself. Under current law, parties typically can only raise concerns after patent issuance by filing a reexamination request or a lawsuit—an obvious disincentive, given the costs of patent litigation.").

product.[85] This situation is very common in software and information technologies and has raised concerns from companies in this industry.[86]

In the case of the Patent Office, the net payoff can be represented as:

$$\Pi^{PTO} = \Pi^{PTO}(Q, PR, S, C, P, F).$$

We assume that increases in the Patent Office fees, the speed of service, the degree of property rights protection of the patents, and the quality of the court system will increase the payoff for the Patent Office. The effect of higher fees on the net payoff for the Patent Office is obvious. If legislation passes that allows the Patent Office to grant patents faster, it will also increase the Patent Office payoff, since that would imply a less cumbersome procedure and more time for evaluators to process a higher number of patent applications in a given year. The presence of a high-quality court system and strong property rights will increase the Patent Office payoff, because any error the Patent Office makes will be reviewed by the judicial system, and the patents it grants will have a high value in terms of property rights.

The following equation describes patent attorney preferences:

$$\Pi_P^{BAR} = \Pi_P^{BAR}(Q, PR, S, C, P, F, LF_P, LF_L)$$

$$\Pi_L^{BAR} = \Pi_L^{BAR}(Q, PR, S, C, P, F, LF_P, LF_L),$$

where Π_P^{BAR} is the payoff of patent prosecutors, and Π_L^{BAR} is the payoff for patent litigators. Increases in the quality of patents, prosecution fees, the speed of the procedure, the importance of the Patent Office, and the strength of the property rights of patents will all increase the prosecutors' net payoff. An increase in the fees charged by the Patent Office will decrease the payoff of prosecutors, as the cost for filing new inventions increases. Increases in the power of the court system will decrease the payoff for prosecutors because of the diminished role of the Patent Office. The increase in the power of the Patent Office will increase the value of the work of prosecutors, increasing the demand for their services and, therefore, their fees. A higher speed of the Patent Office procedure will increase the payoff for prosecutors because they can process their claims faster. The effect of litigation costs on prosecutors is undetermined.

85. *Id.* "[O]ur popular products and strong balance sheet make us among the largest targets of patent litigation in the country. We typically spend close to US$100 million annually to defend against an average of 35–40 patent lawsuits simultaneously." *Id.*

86. *See* Cohen & Lemley, *supra* note 46, *passim*.

This study assumes that the effect of higher-quality patents on litigators' payoffs is slightly negative. Even though higher quality will increase the ability of litigators to defend their cases in court, a lower level of quality in patents issued would increase the number of challenges in court. As a result, the assumption is that the latter effect is, in general, stronger. As to the power of the Patent Office, litigators would not like an increase in the role of the Patent Office in the patent system, because this increased role could hinder the number of cases going to court. In addition, only litigation fees have a positive effect on profits for litigators. Changes in the Patent Office and prosecutors' fees will have a negative effect on litigators, as fewer inventors will use the patent system. Finally, stronger property rights protection for patents will increase the litigators' payoff, because their services in court will become more valuable.

The payoff for the court system is represented by the following equation:

$$\Pi^{COURT} = \Pi^{COURT}(Q, PR, S, C, P).$$

We assume that increases in the quality of patents will reduce the number of patents being challenged and will make it easier for the courts to decide the matter. Stronger property rights on the patent will facilitate the activities of the court and their ability to enforce property rights. On the other hand, an increase in the speed by which patents are granted will decrease the payoff for the courts because they would receive more cases, and the chances of a mistake by the Patent Office would increase. Courts will prefer not to delegate any power to the Patent Office, while increasing their power to make decisions regarding the enforcement of patents. Nonetheless, this study assumes that the courts do not play a major role in pushing for any particular patent legislation reform because they have no economic stake in the patent system beyond maximizing their own leisure.

Table 11 shows how changes in each of the factors analyzed will impact the different actors.

Table 11: Preferences of Stakeholders

	Speed	Quality	Property Strength	Power PTO	Power Court	PTO Fees	Litigation Fees	Prosecution Fees
Individual Inventors	+	-	+	-	+	-	+/-	-
Universities	+	+	+/-	+/-	+	-	-	-
Small Companies A	+	-	+	-	+	-	+/-	-

	Speed	Quality	Property Strength	Power PTO	Power Court	PTO Fees	Litigation Fees	Prosecution Fees
Big Companies A	-	+	-	+	-		-	
Small Companies B	+	-	+	-	+	-	+/-	-
Big Companies B	+	+	+	-	+		+	
Prosecutors	+	+	+	+	-	-	+/-	+
Litigators	+	-	+	-	+	-	+	-
Courts	-	+	+	-	+			
Patent Office	+	+	+	+	-	+		

Note: + Positive Effect; - Negative Effect; +/- Indefinite Effect

These preferences play an important role in shaping congressional decisions about the patent system because the decisions are made according to the preferences of these different groups. The preferences of Congress can be summarized as follows:

$$\Pi^{CO} = \Pi^{CO}(Q, S, q, p, F, LF_P, LF_L).$$

In this case, changes in any of the variables will generate an ambiguous effect on congressional preferences. Therefore, the final result will be determined based on the strength of these players' ability to influence Congress.

Now that we have determined the preferences for each group in the political economy of the patent system, we analyze the case of a proposal to decrease the presumption of validity of a patent and its effect on each group. The presumption of validity[87] is one of the most controversial issues regarding the patent system.[88] When a patent is granted, it is presumed valid. If legislation passes decreasing the presumption of validity for patents, the current patent system will undergo two major changes. First, the quality of the patents would increase, because bad patents granted by the Patent Office would be open to a stronger challenge in court. Therefore, inventors will not risk obtaining a patent unless they can get it through the Patent

87. John A. Jeffrey, *Preserving the Presumption of Patent Validity: An Alternative to Outsourcing the U.S. Patent Examiner's Prior Art Search*, 52 CATH. U. L. REV. 761, 765 (2003) ("U.S. patents are presumed valid. Because courts defer to the USPTO's special technical expertise and have faith in the examination process, challengers must show a patent is invalid by clear and convincing evidence. The courts' deference to the integrity of the examination process, however, is predicated on the examiner's consideration of the most pertinent prior art during examination.").

88. *See id.*

Office and the courts. Second, the strength of the property rights obtained through a patent would decrease, as patents become subject to more challenges than would occur with a stronger presumption of validity.

Table 12 shows the preferences of each group in the case of a decrease in the presumption of validity for patents. In this case, the assumption is that a decrease in the presumption of validity will decrease the strength of property rights and enhance the quality of the patent system in general. For simplicity, we assume that there are no changes in the other factors.

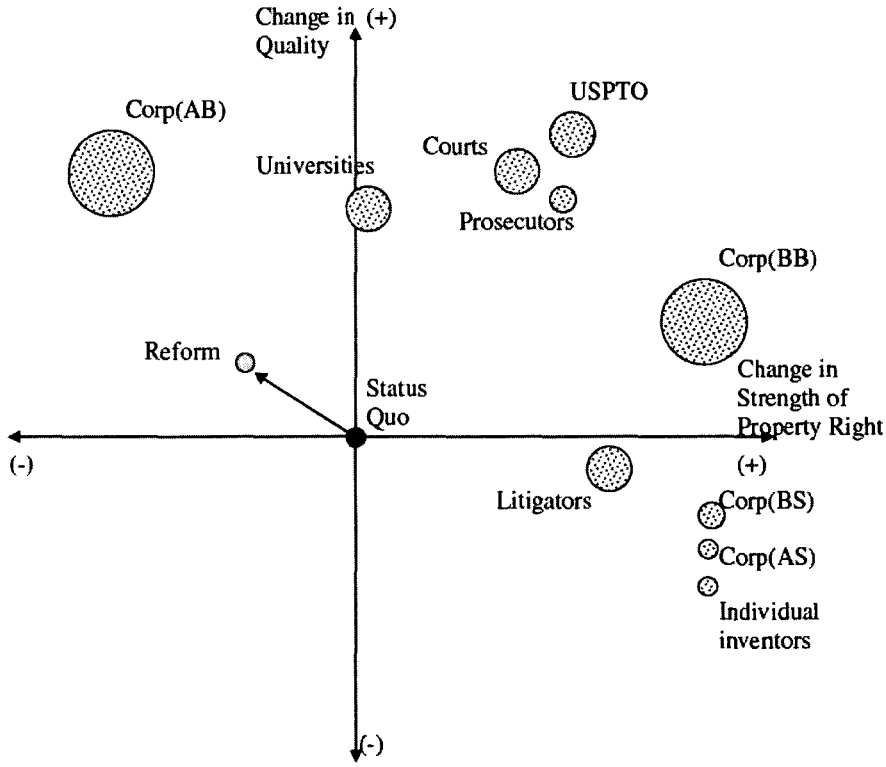
Table 12: Decrease in the Presumption of Validity

	Decrease on Property Rights Strength	Increase in Quality	Total Effect
Inventors (Individuals)	$\frac{\partial \Pi_I^I}{\partial PR} < 0$	$\frac{\partial \Pi_I^I}{\partial Q} < 0$	Negative
Universities	$\frac{\partial \Pi_U^I}{\partial PR} = ?$	$\frac{\partial \Pi_U^I}{\partial Q} > 0$	Positive
Corp (AS)	$\frac{\partial \Pi_{AS}^C}{\partial PR} < 0$	$\frac{\partial \Pi_{AS}^C}{\partial Q} < 0$	Negative
Corp (AB)	$\frac{\partial \Pi_{AB}^C}{\partial PR} > 0$	$\frac{\partial \Pi_{AB}^C}{\partial Q} > 0$	Positive
Corp (BS)	$\frac{\partial \Pi_{BS}^C}{\partial PR} < 0$	$\frac{\partial \Pi_{BS}^C}{\partial Q} < 0$	Negative
Corp (BB)	$\frac{\partial \Pi_{BB}^C}{\partial PR} < 0$	$\frac{\partial \Pi_{BB}^C}{\partial Q} > 0$	Negative
Patent Office	$\frac{\partial \Pi^{PTO}}{\partial PR} < 0$	$\frac{\partial \Pi^{PTO}}{\partial Q} > 0$	Undetermined
BAR (Prosecutors)	$\frac{\partial \Pi_P^{BAR}}{\partial PR} < 0$	$\frac{\partial \Pi_P^{BAR}}{\partial Q} > 0$	Undetermined
BAR (Litigators)	$\frac{\partial \Pi_L^{BAR}}{\partial PR} < 0$	$\frac{\partial \Pi_L^{BAR}}{\partial Q} < 0$	Negative
Court	$\frac{\partial \Pi^{COURT}}{\partial PR} < 0$	$\frac{\partial \Pi^{COURT}}{\partial Q} > 0$	Undetermined

The effect on the different groups is very heterogeneous, as seen in Figure 4. The "status quo" is represented by the intersection of both axes. The positive vertical axis represents an increase in the quality of the patents, while the positive horizontal axis represents an increase in the property-rights strength of patents. The circle for each actor represents their preferred point (for example, for the Patent Office, the preferred point is one where patents have high quality and strong property-rights protection). The size of the points represents the strength of each of these actors in Congress, as defined in Table 10.

The reduction in the presumption of validity will move the status quo to the point labeled "Reform," where the quality of the patents increases and the strength of property rights of patents decreases. Big companies in the information technology sector will support the reform, because it will move the system toward their preferred points of quality and property rights.

Figure 4



On the opposite end, small companies in the information technology sector, start-ups in the biotechnology and pharmaceutical sectors, litigators, and individual inventors will strongly oppose the reform. Universities will support the reform, because the increase in quality should compensate them for the decrease in property rights strength. The effect of the reform on the courts, the Patent Office, and prosecutors is uncertain; they will support the reform only if the gains from higher quality can compensate them for the losses from lower property rights strength for patents. Finally, big companies in the pharmaceutical and biotechnology sectors will oppose the reform, because they value property protection much more than quality. As a result, even if the reform improves the quality of the patents, companies will not be compensated for the loss in property-rights protection. This situation illustrates the strong confrontation between the biggest players in Congress—the pharmaceutical and biotechnology sectors against the information technology sector. As a result, a proposal like this will be very difficult, if not impossible, to pass. Furthermore, this issue could become highly polarized, and the actors left in the middle could be forced to pick a side, increasing the divide in Congress.

II. PATENT REFORM IN 2007–2008

Given the preferences of the different actors, Congress becomes the focal point where these preferences will play out in pursuing a reform to the current patent system. In general, the strength of each group inside Congress will depend on its ability to lobby and obtain the support from a majority of congresspersons. This Part analyzes how the fate of the proposed legislation ("the bill") depends on the ability of these groups to mobilize resources to support their preferences.

As we demonstrated in Part I, the most important lobby groups are the information technology and pharmaceutical sectors, since they provide the bulk of money to lobby for or against patent reform. Table 13 shows the money given by different economic sectors with an interest in patent reform to the members of the House of Representatives that are part of the Judiciary Committee's subcommittee in charge of the patent reform. As one can see, most of these groups interested in patent reform are giving, on average, more to the members of the subcommittee than to the members of the Judiciary Committee in general.

Table 13: Groups' Contributions to Members of the House of Representatives in the Judiciary Committee and Subcommittee from 2007–2008 (dollars)[89]

Name	Sector					
	Comp. /IT	Pharm.	Lawyers & Law Assocs.	Banks	Manuf.	Univers. & Educ. Assocs.
House Subcommittee						
Smith	54,561	18,750	30,400	27,050	3,500	2,550
Issa	18,125	44,250	19,210	0	3,170	775
Keller	8,800	3,500	45,960	12,800	8,250	4,800
Feeney	13,300	23,100	52,525	42,500	13,300	1,000
Coble	5,000	13,000	26,400	3,000	13,300	0
Goodlatte	42,900	1,000	52,227	5,500	17,000	3,000
Chabot	17,600	16,800	68,200	36,500	52,200	0
Cannon	40,092	25,400	24,150	3,000	7,000	1,350
Gallegly	5,100	17,800	13,950	4,000	1,500	1,100
Sensenbrenner	4,000	2,500	17,732	9,500	8,000	1,250
Pence	14,387	11,500	45,250	18,350	20,100	2,750
Berman	50,928	2,000	127,600	22,700	8,000	0
Conyers	43,068	7,500	91,722	3,000	4,000	0
Schiff	14,500	8,600	90,894	7,927	4,500	5,760
Sherman	9,450	11,600	43,546	12,000	12,300	5,350
Lofgren	119,943	34,500	44,090	4,000	4,500	8,050
Boucher	56,700	24,100	76,497	23,500	57,750	3,600
Wexler	25,475	3,250	209,985	20,500	2,300	10,210
Watt	3,006	5,000	34,550	31,000	2,000	3,000
Jackson-Lee	1,500	0	19,950	0	5,350	500
Cohen	0	4,500	36,063	5,500	0	1,500
Johnson	1,000	8,000	45,850	2,000	500	0
Weiner	2,500	2,000	3,050	2,000	0	1,000
Sutton	1,250	2,550	63,048	(2,250)	9,100	1,250
Total Contribution to All Members	553,185	291,200	1,282,849	294,077	257,620	58,795
Average Contribution	23,049	12,133	53,452	12,253	10,734	2,449

89. Authors' own elaboration based on data from www.opensecrets.org. The data in this Table does not correspond to data currently found on the website, but the authors have informed the editors that the Table reflects the numbers as they appeared in August 2008, when the authors accessed the website. This and other data used by the authors in this Article is on file with the North Carolina Law Review.

Name	Sector					
	Comp. /IT	Pharm.	Lawyers & Law Assocs.	Banks	Manuf.	Univers. & Educ. Assocs.
Rest of House Judiciary Comm.						
Lungren	14,800	6,000	45,600	9,000	11,000	0
King	2,250	1,000	2,000	12,000	7,000	0
Forbes	9,600	0	18,500	14,000	9,600	485
Franks	2,000	0	8,500	5,000	2,000	0
Jordan	2,750	6,750	16,950	7,000	38,800	1,225
Gohmert	3,750	0	29,250	12,800	7,000	0
Nadler	3,000	0	122,750	0	2,500	8,800
Scott	2,750	1,000	33,050	6,000	2,500	13,050
Delahunt	0	0	11,000	0	0	0
Sanchez	10,741	0	31,600	6,144	5,000	1,250
Baldwin	3,050	13,348	29,000	1,000	4,000	11,450
Davis	8,000	33,715	153,853	21,500	8,250	13,700
Wasserman-Schultz	14,164	10,716	117,317	15,000	9,500	0
Gutierez	4,600	0	36,800	2,500	0	0
Waters	0	0	13,253	0	0	250
Ellison	19,100	9,300	58,481	11,700	2,017	12,300
Total Contributions to the Rest of the Jud. Comm.	100,555	81,829	727,904	123,644	109,167	62,510
Average Contribution	6,285	5,844	45,494	7,727	6,822	3,907

Table 14 shows that the same patterns repeat in the Senate's Judiciary Committee.

Table 14: Groups' Contributions to Senate Members in the Judiciary Committee from 2007–2008 (dollars)[90]

Name	Sectors					
	Comp /IT	Pharm.	Lawyers & Law Assocs.	Banks	Manuf.	Univers. & Educ. Assocs.
Senate Judiciary Committee-Republicans						
Specter	101,143	167,349	462,225	31,750	62,000	32,900
Hatch	5,000	15,800	4,750	6,000	1,000	0
Cornyn	119,367	93,196	521,292	111,448	64,600	14,900
Coburn	2,000	13,051	10,455	0	2,000	0
Sessions	22,300	21,700	254,567	50,250	27,650	9,300
Brownback	7,000	0	1,000	0	0	0
Graham	14,300	43,550	388,760	49,363	44,300	7,000
Grassley	1,000	31,000	17,115	10,500	9,500	1,500
Kyl	3,000	14,000	500	4,000	0	0
Total Contributions to Repub. Members of the Comm.	275,110	399,646	1,660,664	263,311	211,050	65,600
Average Contribution to Repub. Members of the Comm.	30,568	44,405	184,518	29,257	23,450	7,289
Senate Judiciary Committee-Democrats						
Whitehouse	8,000	0	15,250	2,000	1,000	0
Kohl	0	0	0	0	0	0
Kennedy	22,804	55,900	24,550	5,850	0	0
Feinstein	3,500	5,000	0	0	1,000	0
Biden	3,500	700	65,820	12,000	1,750	4,800
Leahy	55,891	7,000	105,830	18,000	4,500	0
Cardin	3,000	5,000	48,700	1,500	0	4,500

90. Authors' own elaboration based on data from www.opensecrets.org. The data in this Table does not correspond to data currently found on the website, but the authors have informed the editors that the Table reflects the numbers as they appeared in August 2008 when the authors accessed the website. This, and other, data used by the authors in this Article is on file with the North Carolina Law Review.

Name	Sectors					
	Comp /IT	Pharm.	Lawyers & Law Assocs.	Banks	Manuf.	Univers. & Educ. Assocs.
Schumer	1,000	0	1,000	5,000	0	0
Feingold	8,075	7,466	81,850	5,700	2,300	15,150
Durbin	53,050	28,950	952,443	30,600	35,000	61,250
Total Contributions to Dem. Members of the Comm.	158,820	109,016	1,295,443	80,650	45,550	85,700
Average Contribution to Dem. Members of the Comm.	15,882	10,901.60	129,544.30	8,065	4,555	8,570

In order to see how these groups influence Congress, we have analyzed the Patent Reform Act of 2007, introduced as House Bill 1908 in Congress, which proposed an ambitious reform to the U.S. patent system.[91] In particular, we analyze the general vote in favor of this bill in the House of Representatives. House Bill 1908 was passed on September 7, 2007 by the House of Representatives by 220 favorable votes against 175 negative votes and 37 non-voting congresspersons.[92] Accordingly, the following logistic model is used to analyze voting behavior:

$$P(Y=1)=F(x)=\frac{e^{x'\beta}}{1+e^{x'\beta}}.$$

In this equation, Y=1 refers to a vote in favor of the bill and β is a set of parameters that captures the effects of changes in variables x on the probability of the bill being passed. The explanatory variables (i.e., independent variables, x) used are the following:

91. Patent Reform Act of 2007, H.R. 1908, 110th Cong. (2007), *available at* http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=110_cong_bills&docid=f:h1908ih.txt.pdf.

92. OFFICE OF THE CLERK OF THE U.S. HOUSE OF REPRESENTATIVES, H.R. 1908: FINAL VOTE RESULTS FOR ROLL CALL 863 (Sept. 7, 2007), http://clerk.house.gov/evs/2007/roll863.xml [hereinafter ROLL CALL].

Republican	Dummy variable equals 1 if the congressperson is Republican and 0 if he/she is a Democrat
Pharma Percentage	Percentage of total money pharmaceutical companies give to each congressperson as percentage of the total money given to House representatives
IT Percentage	Percentage of total money information technology companies give to each congressperson as percentage of the total money given to House representatives
Attorney Percentage	Percentage of total money attorneys and law associations give to each congressperson as percentage of the total money given to House representatives
Manufacturing Percentage	Percentage of total money manufacturing/chemicals companies give to each congressperson as percentage of the total money given to House representatives
Sub-Committee	Dummy variable equals 1 if the congressperson is member of the subcommittee in the judiciary committee in charge of discussing the bill

California, Texas, Ohio, New Jersey	Dummy variables equal 1 if the congressperson comes from one of these states
SubcommPharma	Variable with the percentage of money given by the pharmaceutical sector to each member of the subcommittee in charge of the bill
SubcommIT	Variable with the percentage of money given by the information technology sector to each member of the subcommittee in charge of the bill
SubcommAttorney	Variable with the percentage of money given by the attorney sector to each member of the subcommittee in charge of the bill
SubcommManuf	Variable with the percentage of money given by the manufacturing/chemical sector to each member of the subcommittee in charge of the bill
PharmaRep	Percentage of money given by the pharmaceutical sector to Republicans
ITRep	Percentage of money given by the information technology sector to Republicans

Accordingly, Table 15 shows the econometric results for three different specifications for the econometric model. Model 1 shows that Republican members of Congress generally opposed the bill, while Democrats were more inclined to support it. The money received by the information technology sector has a positive effect on the voting result, since congresspersons that received a higher percentage of money voted for the bill. The same positive effect in favor of the bill is seen for the percentage of money received from attorneys and law organizations. In the case of manufacturing, higher contributions implied a vote against the bill. Contributions from the pharmaceutical sector have a negative sign (against the bill), but its coefficient is not significant. In the case of the states, congresspersons from California and Texas, which have important sectors related to information technology, tended to vote for the bill, while those from states like Ohio and New Jersey, more related to traditional manufacturing and pharmaceutical industries, tended to vote against the bill.[93] Finally, the members of the subcommittee in charge of the bill voted, in general, favorably for this bill. While the financial sector, universities, and small companies were affected by this House bill, their contributions were not found to be statistically significant. Instead, lobbying efforts by large information technology companies, large pharmaceutical companies, attorney groups, and the manufacturing sector were most significant.

In order to better understand the relationship between the votes and the contributions made by these lobby groups, Model 2 in Table 15 includes four more variables with the contributions that each of the main groups gave to the members of the subcommittee in charge of the bill. In this case, while there are no changes in the variables included in the first model, congresspersons in the subcommittee who received more money from the pharmaceutical sector voted strongly against the bill. This corroborates the suspicion that the pharmaceutical sector was against this bill. Similarly to the results in Model 1, in the subcommittee, contributions from the information technology and attorney sectors are associated with votes for the bill, while manufacturing contributions were associated with votes against the bill.

93. In this model, we include variables for those states that have a significant coefficient. For example, in the case of representatives from Pennsylvania, we would expect that they would be against the law, given the strong presence of traditional manufacturing in that state. When we ran the regression, the coefficient for Pennsylvania was negative, as expected, but it was not significant. Accordingly, we decided not to include it.

Table 15: Econometric Model
Dependent Variable Positive Vote for House Bill 1908

	Model 1	Model 2	Model 3
Variable	Coefficient	Coefficient	
republican	-1.54714 *** 0.261662	-1.55098 *** (0.269444)	-1.30192 *** 0.392937
itpercentage	106.4904 ** 50.49571	90.4158 * 47.99229	
pharmaperc~e	-3.83921 *** 37.46632	12.05006 38.56906	
attorneyperc	151.7506 *** 53.08203	166.1444 *** 58.21919	
manufperc	-87.1842 *** 29.93012	-102.498 *** 37.82971	
texas	1.320997 *** 0.492367	1.348921 *** 0.504386	1.357605 *** 0.508268
california	1.657468 *** 0.429963	1.659149 *** 0.43186	1.678006 *** 0.447417
ohio	-1.53776 * 0.828268	-1.46857 0.899108	-1.47614 * 0.81032
newjersey	-1.89967 *** 0.885239	-2.00109 ** 0.902252	-2.2775 ** 1.028431
subcommittee	1.683704 *** 0.628334	7.567173 *** 1.913171	1.724832 *** 0.657546
subcompharma		-1686.05 *** 426.3161	
subcomit		764.2731 *** 208.1647	
subcomatto~y		-1306.16 *** 296.2498	
subcomanuf		-47.378 65.57166	
PharmaDem			110.7505 * 62.87282
PharmaRep			-106.15 * 59.49987
ITDem			32.02913 42.66964
ITRep			225.516 *** 80.8383

	Model 1	Model 2	Model 3
Variable	Coefficient	Coefficient	
AttorneyRep			77.34039 127.1144
AttorneyDem			177.2783 *** 67.81946
ManufRep			-98.7381 * 54.91936
ManufDem			-93.7182 ** 41.0438
Constant	0.368218 0.23282	0.368926 0.236703	0.245051 0.26785
Observations	395	395	395
Wald Chi2 (Prob)	84.5 (0.000)	97.8 (0.000)	81.5 (0.000)
Pseudo R2	0.241	0.265	0.2592
Correctly classified	75.44%	75.70%	76.71%
Note: *** Statistically significant at 1% ** Statistically significant at 5% * Statistically significant at 10%			

The higher coefficient in the regression for members of the subcommittee in Model 2 indicates that the companies concentrate their lobbying efforts on the subcommittee members, who set the agenda and draft and move legislation. Finally, we introduce another twist to this model by separating the money given by these groups to Republicans and Democrats. Since Republicans were generally against the bill, while Democrats seemed to vote for the bill, we would like to see how each of these parties was influenced by the contributions from these interest groups. As Model 3 shows, contributions from the pharmaceutical sector did not seem to motivate Democrats against the legislation since they still voted for the bill. On the other hand, the more contributions Republicans received from the pharmaceutical sector, the more inclined they were to vote against the bill. The fact that Republicans received, on average, $16,200 from pharmaceuticals, while Democrats received $14,800, could be a factor in this decision.[94] In the case of information technology contributions, there seems to be no significant effect on Democrats. Nonetheless, Republicans seemed to vote for the bill

94. Authors' own elaboration based on data from www.opensecrets.org. The data does not correspond to data currently found on the website, but the authors have informed the editors that the Table reflects the numbers as they appeared in August 2008, when the authors accessed the website. This and other data used by the authors in this Article is on file with the North Carolina Law Review.

when they received more contributions from the information technology sector. The information technology sector contributed on average $12,900 to Democrats and $9,200 to Republicans.[95] In Model 3, the difference in the sign of the coefficients for lobbying contributions made by pharmaceutical and information technology companies for Democrats and Republicans shows the differences that the lobbying efforts had on both parties. The higher coefficient for the information technology sector contributions could be an indication of the renewed efforts showed by the information technology sector in lobbying contributions in the last few years. The attorney sector was more successful in getting Democrats to vote for the bill, because the more contributions they made to Democrats, the higher the probability of Democrats voting for the bill. The contributions from the attorney sector did not have any effect on the vote of Republicans. Finally, the manufacturing sector had a strong effect on both Republicans and Democrats, as the more contributions they received, the less they were willing to vote for the bill. These results show that these groups have a strong influence on the voting behavior of congresspersons, and they have a real influence on the direction of patent reform. Further, these results reinforce the relationship between the different groups' preferences and their lobbying strength in Congress. As Table 15 shows, these models can predict the votes in Congress with respect to this bill with seventy-five percent accuracy. This is an excellent rate of prediction given the simplicity of our model.[96]

In order to analyze the importance of each variable on the probability of voting, we use Models 1 and 2 to see how an increase in any of the explanatory variables is going to affect the probability of the congresspersons voting affirmatively for the bill.[97] As Table 16 shows, in both cases, the size of the increase or decrease in the probability of voting is very important due to changes in each of the independent variables. These results corroborate not only that the

95. Authors' own elaboration based on data from www.opensecrets.org. The data does not correspond to data currently found on the website, but the authors have informed the editors that the Table reflects the numbers as they appeared in August 2008, when the authors accessed the website. This and other data used by the authors in this Article is on file with the North Carolina Law Review.

96. If we run this model with just a dummy variable, without any of the independent variables, the explanatory power of the model decreases to fifty-five percent of the observations.

97. It is common to calculate the model in the mean values of the explanatory variables and then to increase each of the variables by a standard deviation in order to see what the effect is on the probability of voting.

explanatory variables' coefficients are statistically significant, but also that they are practically important in explaining voting behavior in Congress.

Table 16: Effects of Changes in Independent Variables on the Probability of Voting

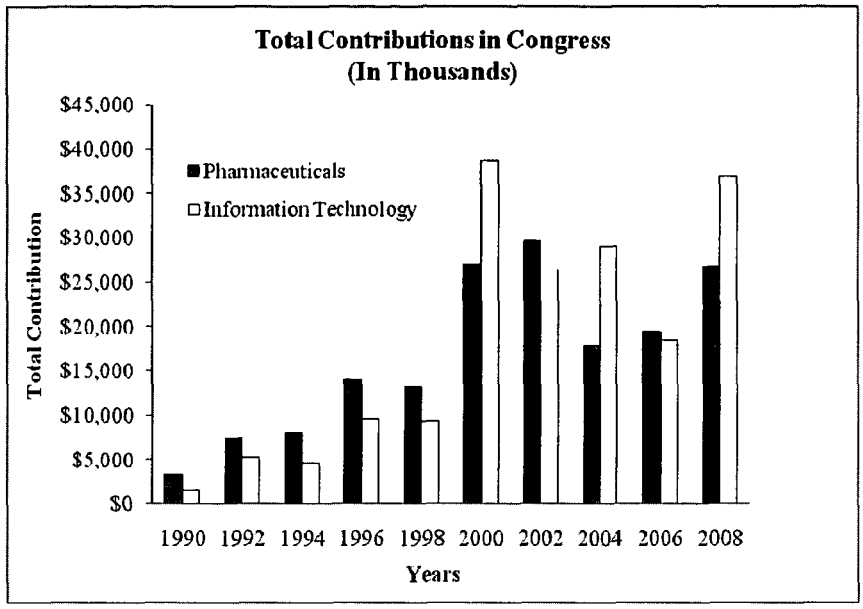
	Probability	Change from Baseline (%)
Model 1		
Baseline Probability (*)	0.32	
Change in Variable		
Change in IT	0.42	31.3
Change in Attorney	0.43	35.6
Change in Manufacturing	0.24	-25.2
From Texas	0.63	99.5
From California	0.71	122.6
From Ohio	0.09	-71.1
From New Jersey	0.06	-79.4
Belongs to Subcommittee	0.72	124.2
Democrat	0.68	115.3
Model 2		
Baseline Republican (**)	0.26	
Change in Pharma	0.20	-21.1
Change in IT	0.37	43.1
Change in Manufacturing	0.20	-23.6
Belongs to Committee	0.66	155.9
From Texas	0.58	122.5
From California	0.65	151.8
From Ohio	0.07	-71.5
From New Jersey	0.03	-86.6
Baseline Democrat (***)	0.66	
Change in Pharma	0.73	10.6
Change in IT	0.69	4.0
Change in Manufacturing	0.58	-11.6

	Probability	Change from Baseline (%)
Model 1		
Belongs to Committee	0.92	38.9
From Texas	0.88	33.9
From California	0.91	38.4
From Ohio	0.31	-53.5
From New Jersey	0.17	-74.9

Notes: (*) The baseline represents a Republican representative who is not part of the subcommittee and is not from any of the states used as dependent variables. (**) This baseline represents a Republican representative who does not come from any of the states used in the model and does not belong to the subcommittee. (***) This baseline represents a Democrat representative who does not come from any of the states used in the model and does not belong to the subcommittee. The dependent variables are changed by one standard deviation and the probability is calculated in order to see the predicted change in the probability of voting for the bill.

One of the main results from these models is that the effect of the information technology lobbying data on voting behavior is larger than the effect of the pharmaceutical lobbying data on voting behavior. Several possible reasons explain these different magnitudes. First, as evidenced in Graph 1, the information technology sector increased the amount of money spent on lobbying during the last few congressional cycles at a larger rate than the pharmaceutical sector. This could have generated a stronger reception to the ideas of reforming the patent system according to their preferences.

Graph 1[98]

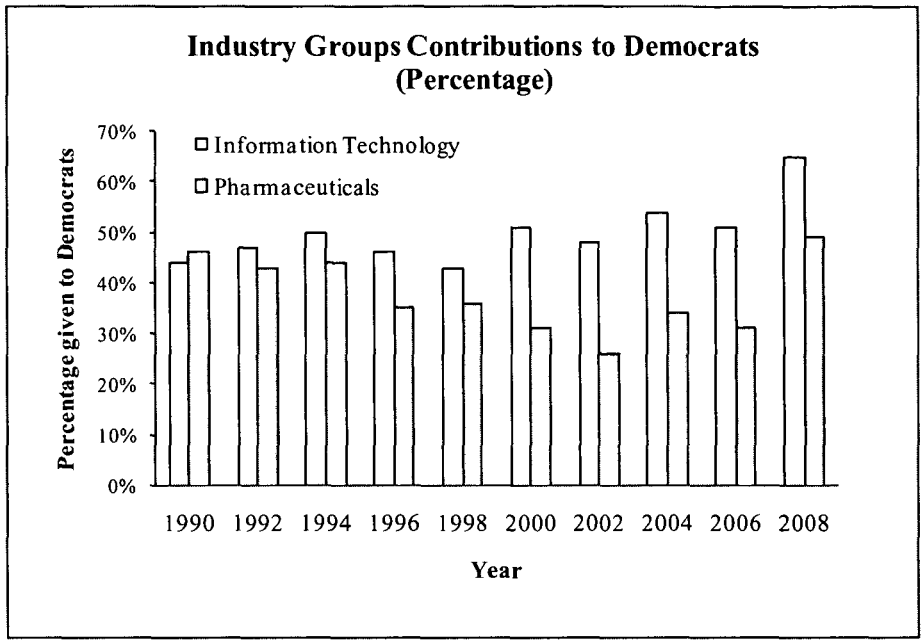


Second, Graph 2 illustrates that the information technology sector could have targeted members of the majority (Democrats in the last two election cycles) more aggressively, creating a stronger environment for support for a friendlier patent system. The logistic regression analysis of the voting in the House on patent reform shows that Congress does not appear to have a strong ideological point of view independent of the stakeholders in the patent system. Instead, their votes are closely associated with the lobbying efforts of the major stakeholders, and the success of any patent reform effort will depend on the ability of the major sectors[99] to come together and coordinate their activities and preferences.

98. OpenSecrets.org, Industry Profiles, http://www.opensecrets.org/industries/index.php (last visited Apr. 30, 2009) (to find data, click on "Pharmaceuticals" and "Computer Equipment & Services").

99. The major sectors are information technology, pharmaceuticals, manufacturing companies, and the patent attorney group, based on our analysis of voting on H.R. 1908.

Graph 2[100]



In the end, these and other political factors could have increased the probability of success for the bill in the House. However, despite the strong effect of information technology spending on the final vote for the bill, it was not strong enough to carry the day in the Senate, where the legislation died.

One of the main problems with these kinds of models is that campaign contributions can be an endogenous variable. For example, donors do not give money just to induce the congressperson to vote for the bill but also because the congressperson shares an ideological position with the donor. In this case, we should control for the presence of endogenous variables, as well-explained in literature.[101] Most of these studies estimate a simultaneous system of equations using the Full Information Maximum Likelihood ("FIML") to solve

100. Open Secrets.org, Industry Profiles, *supra* note 98.

101. For a discussion on how to treat endogeneity in these econometric models, see Henry Chappel, *Campaign Contributions and Congressional Voting: A Simultaneous Probit-Tobit Model*, 64 REV. ECON. & STAT. 77, 77–83 (1982); Thomas Stratmann, *Campaign Contributions and Congressional Voting: Does the Timing of Contributions Matter?*, 77 REV. ECON. & STAT. 127, 127–36 (1995) [hereinafter Stratmann, *Contributions and Voting*]; Thomas Stratmann, *What Do Campaign Contributions Buy? Deciphering Causal Effects of Money and Votes*, 57 S. ECON. J. 606, 606 (1991).

the problem of endogeneity.[102] In our case, we also solve a simultaneous system of equations using the Maximum Likelihood regression model, but following William Greene, we also pursue a probit model with 3SLS.[103] By using this technique, we want to corroborate that the contribution variables have an effect on voting behavior after controlling for possible endogenous issues. In our case, we contend that the case for endogeneity is not as plausible as with more ideological issues. The case for patent reform is not as ideologically divisive as the cases for death penalty or gun control. We are confronted with a case in which all economic sectors pursue property-rights protection, but they prefer a system that is more adaptable to their industry conditions. As a consequence, controlling for endogeneity could introduce other factors that undermine the full extent of the relationship between the economic groups' contributions and a congressperson's willingness to vote for the bill. In this case, we use the percentage of vote obtained by each congressperson in the last election as an instrumental variable. This variable should not be related to the particular vote with respect to this bill, but it could be related to the amount of contributions given to the congresspersons. Given the large number of instrumental variables needed to be able to run the full models as specified above, we proceed to estimate the models with one contribution variable at a time. The results are shown in Appendix C. As shown, most of the contribution variables retain their explanatory power after correcting for endogeneity.

III. CASE STUDIES

Based on the econometric results, which corroborate our preferences' model, in this Part, we will analyze two very important proposals for the reform of the patent system. First, we look at the proposal of a third party opposition regime where challengers can request that patents undergo additional examination within the Patent Office without having to go through the courts. Second, we focus on the main changes proposed in the patent reform bill

102. *See, e.g.*, Stratmann, *Contributions and Voting*, *supra* note 101, at 129.

103. *See* WILLIAM GREENE, ECONOMETRIC ANALYSIS 407 (5th ed. Prentice Hall 2003) (1990). "For normally distributed disturbances, it can also be shown that 3SLS has the same asymptotic distribution as the full-information maximum likelihood estimator, which is asymptotically efficient among all estimators." *Id.* Three Stages Least Squares ("3SLS") is an econometric technique used when dealing with simultaneous equations models. *Id.* at 405–07, 414.

introduced in Congress in 2005 and again in 2007.[104] The success of the reforms depends on the strategic position of the groups with a stake in the patent system. As a result, the patent system, as with most regulatory systems in the economy, is not the result of technocratic design but rather a result of political and economic interests. The understanding of the functioning of these political institutions will help explain the success of the proposed reforms and the viability of the actual patent system.

A. Third Party Opposition System

One of the most important proposals of reform of the patent regime in the United States is the creation of a post-grant opposition/reexamination process for patents in the Patent Office.[105] The creation of this new regime has been the subject of intense debate in academia, in law practice, and in the political spheres.[106] Those who favor adopting a post-grant reexamination system emphasize the ways in which it will increase the quality of patents and the ability of the Patent Office to detect errors and, therefore, decrease the number of bad patents before these patents are widely enforced.[107] The system will also give challengers the ability to raise concerns over new patents without having to resort to expensive legal procedures.[108] The low cost of the opposition process would increase

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104. The bill introduced in 2005 was not successful in Congress. Patent Reform Act of 2005, H.R. 2795, 109th Cong. (2005), *available at* http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=109_cong_bills&docid=f:h2795ih.txt.pdf. The bill introduced in 2007 was voted on by the House of Representatives in September 2007 and submitted to the Senate. Patent Reform Act of 2007, H.R. 1908, 110th Cong. (2007); ROLL CALL, *supra* note 92.

105. *See* Allen M. Leung, *Legal Judo: Strategic Applications of Reexamination Versus an Aggressive Adversary (Part I)*, 84 J. PAT. & TRADEMARK OFF. SOC'Y 471, *passim* (2002).

106. *Id.* at 478.

107. *See* John Kasdan, *Obviousness and New Technologies*, 10 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 159, 164–66 (1999) (describing the problems of the USPTO in detecting obviousness in new technology patent requests); *see also* John R. Allison & Mark A. Lemley, *Empirical Evidence on the Validity of Litigated Patents*, 26 AIPLA Q.J. 185, 210 (1998) (describing how prior art and obviousness are the main factors mentioned in court for challenging the validity of patents).

108. *See* Daniel A. Crane, *Exit Payments in Settlement of Patent Infringement Lawsuits: Antitrust Rules and Economic Implications*, 54 FLA. L. REV. 747, 757 (2002).

> Anyone who has ever been involved in a patent infringement lawsuit knows that "patent litigation is a very costly process." Attorneys and experts must be hired and associated litigation costs incurred. According to a 1999 study by the Intellectual Property Law Association, the median total cost through the end of suit for patent litigation where the dollar amount at risk is $10-$100 million is $2,225,000. Just to take the case through discovery costs $1,491,000.

the access of these challengers to an efficient system for examining patent validity.[109] The economic efficiency of the patent system should increase, as more "bad" patents or errors made by the Patent Office are detected and challenged using this inexpensive mechanism.[110] Finally, the opposition process would provide incentives to the Patent Office to grant only high-quality patents and avoid granting "bad" or obvious patents.[111] Frequent opposition requests within the Patent Office would reflect badly on the examiners and increase the Office's workload. This is important because recently the Patent Office has been under fire for granting an allegedly high number of partially or wholly invalid patents.[112]

Despite these advantages, those opposed to the system point out the many disadvantages of a post-grant opposition system.[113] An opposition system should not be in charge of an administrative agency like the Patent Office; the courts have been performing this task since the Patent Office was established.[114] Furthermore, the expense of litigating in court deters the inventor's competitors from challenging

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> The costs of litigation to parties involves more than the costs of retaining attorneys and experts and paying for court costs, copying expenses, and transcripts. Litigation also drains away firm resources by requiring managers and other employees to focus time and attention on the litigation, instead of ordinary firm business. For every hour that a lawyer spends preparing for, taking, or defending a deposition, the client often spends an hour in fact-gathering or being deposed.
>
> Patent litigation imposes costs not only on parties, but also on courts. For every incremental dollar spent in litigation by the litigants, additional costs are often incurred by the judicial system as well. Thus, a rule that requires parties to litigate instead of settling thus imposes substantial direct costs on the court system and on the taxpayers who fund the system.

Id.

109. *See* Kesan & Gallo, *supra* note 1, at 108 (noting that if an examination process was cheaper, "the probability of a challenge will be higher").

110. *See id.* at 107–08 (explaining the cost advantages of a review system).

111. *See id.* at 108–09 (describing the gains from implementing a review system).

112. *See supra* note 7.

113. FED. TRADE COMM'N, TO PROMOTE INNOVATION: THE PROPER BALANCE OF COMPETITION & PATENT LAW & POLICY 18 (2003) ("Skeptics feared that opposition procedures will be abused. They saw possibilities for expense and delay. For example, former PTO Director Q. Todd Dickinson, although supporting an enhanced reexamination/opposition system, drew attention to the fears that have been expressed by the independent inventor community that oppositions could be used to impede their ability to assert their patents. Some panelists questioned whether oppositions can ever meaningfully substitute for litigation, and others expressed doubt that competitors will risk 'paint[ing] big targets on themselves' by actively opposing others' patents.").

114. *See* Allison & Lemley, *supra* note 107, at 205 (finding that just fifty-four percent of the patents contested in court were considered valid).

every patent in an attempt to impede the operation of business and take economic advantage of it. Some groups also resist the implementation of this "second window" for opposition, because it allows challengers to come forward even after the maximum time span allowed by the bill.[115]

Most of the debate on an opposition system has concentrated on the normative side of the reform.[116] However, most studies have failed to address the probability of Congress enacting these reforms.[117] Despite any supposed advantage of any of these regimes, the proposal can advance in Congress only if the groups with a stake in the patent system and with influence over the congressional committees will expect an increase in the net payoff they receive from the patent system. Accordingly, we can use our model to understand a proposal's chances of success, as well as the position each actor will take with respect to it. This analysis allows us to assess and understand the political nature of the patent system.

Next, we consider the consequences of implementing a post-grant opposition system. First, the introduction of an opposition system, with a second window option, should improve the degree of supervision over the Patent Office's examiners, because excessive challenges to patents granted by a given examiner could lead to questions regarding the examiner's competence.[118] As a result, examiners will try to increase the quality of their work to avoid too many oppositions to the patents they have granted. Today, there is no incentive for examiners to increase quality, because the examination performed by the courts is detached from the performance of the Patent Office.[119] Furthermore, most of the cases

115. Dale L. Carlson & Robert A. Migliorini, *Patent Reform at the Crossroads: Experience in the Far East with Oppositions Suggests an Alternative Approach for the United States*, 7 N.C. J.L. & TECH. 261, 261 (2006) ("On September 1, 2005, Representative Lamar Smith introduced a 'Coalition Print' version of a patent reform bill (Substitute bill H.R. 2795) into Congress. That bill included a post-grant opposition procedure not later than nine months after grant. On April 5, 2006, Representative Howard Berman introduced the Patents Depend on Quality Act of 2006 ("PDQ Act"), H.R. 5096, 109th Cong., (2006), into Congress. The proposed PDQ Act includes a so-called 'second window' for bringing an opposition, namely within six months of the alleged infringer's receiving notice of suit.").

116. *See* Mark D. Janis, *Rethinking Reexamination: Toward a Viable Administrative System for U.S. Patent Law*, 11 HARV. J.L. & TECH. 1, 102–17 (1997) (comparing U.S. and European patent reexamination systems).

117. *See id.* at 117–22 (concluding that Congress should take action but not addressing the chance of Congress taking action).

118. *See* Kesan & Gallo, *supra* note 1, at 108–09 (analyzing the advantages of a third party review system to control for bad patents).

119. *See* Thomas, *The Responsibility of the Rulemaker*, *supra* note 1, at 733.

taken to court will end up in settlement between the parties without receiving a final decision by the court on the validity of the patent.[120] As a consequence of instituting the opposition system, we would expect the quality of patents to increase.

Second, since the Patent Office will be in charge of, or closely involved in, the opposition process, the fees for this procedure should increase the revenue for the agency. Furthermore, since the new regime will have an impact on the performance of the agency, application fees could increase. As a result, Patent Office revenue should increase. The speed of the Patent Office examination process should decrease, as the new regime will increase the quality expected from examiners. Prosecution fees should increase, because the new examination procedure will require higher quality standards from examiners and prosecution lawyers could then benefit from the higher requirements to present a successful application. Furthermore, prosecutors would need to make a better case to the Patent Office if they want to avoid, or succeed in, opposition. The impact of the proposed reform on litigation fees is ambiguous. Legal fees should go down, since the new regime will be cheaper than resorting to the courts.[121] They could, however, stay the same, given that cases taken to court require a higher level of research than the process of review at the Patent Office, and in addition, litigation may continue after an opposition. Without loss of generality, we assume legal fees will stay constant. The quality of the courts should not experience major changes. Nonetheless, because patents could be challenged in this opposition system for an undetermined time through the second window, the strength of a patent's exclusionary rights should decrease. Given these changes, Table 17 presents the partial and total effects for each actor if a post-grant opposition system becomes a reality.

120. Kimberly A. Moore, *Empirical Statistics on Willful Patent Infringement*, 14 FED. CIR. B.J. 227, 234 (2004–05) (noting that a sampling of patent cases settled 71.7% of the time).

121. *See* Kesan & Gallo, *supra* note 1, at 108 (noting that lower costs will increase patent validity and patent validity will decrease costs).

Table 17: Introduction of an Opposition System

	Increase in Quality	Increase in Patent Office Fees	Increase in Prosecution Fees	Decrease in Property Rights	Increase in Power of Patent Office	Decrease in Patent Office Processing Speed	Total Effect
Inventors (Individuals)	$\frac{\partial \Pi_I^I}{\partial Q} < 0$	$\frac{\partial \Pi_I^I}{\partial F} < 0$	$\frac{\partial \Pi_I^I}{\partial LF_P} < 0$	$\frac{\partial \Pi_I^I}{\partial PR} < 0$	$\frac{\partial \Pi_I^I}{\partial P} < 0$	$\frac{\partial \Pi_I^I}{\partial S} < 0$	Negative
Universities	$\frac{\partial \Pi_U^I}{\partial Q} > 0$	$\frac{\partial \Pi_U^I}{\partial F} < 0$	$\frac{\partial \Pi_U^I}{\partial LF_P} < 0$	$\frac{\partial \Pi_U^I}{\partial PR} = ?$	$\frac{\partial \Pi_U^I}{\partial P} = ?$	$\frac{\partial \Pi_U^I}{\partial S} < 0$	Uncertain
Corp (AS)	$\frac{\partial \Pi_{AS}^C}{\partial Q} < 0$	$\frac{\partial \Pi_{AS}^C}{\partial F} < 0$	$\frac{\partial \Pi_{AS}^C}{\partial LF_P} < 0$	$\frac{\partial \Pi_{AS}^C}{\partial PR} < 0$	$\frac{\partial \Pi_{AS}^C}{\partial P} < 0$	$\frac{\partial \Pi_{AS}^C}{\partial S} < 0$	Negative
Corp (AB)	$\frac{\partial \Pi_{AB}^C}{\partial Q} > 0$			$\frac{\partial \Pi_{AB}^C}{\partial PR} > 0$	$\frac{\partial \Pi_{AB}^C}{\partial P} > 0$	$\frac{\partial \Pi_{AB}^C}{\partial S} > 0$	Positive
Corp (BS)	$\frac{\partial \Pi_{BS}^C}{\partial Q} < 0$	$\frac{\partial \Pi_{BS}^C}{\partial F} < 0$	$\frac{\partial \Pi_{BS}^C}{\partial LF_P} < 0$	$\frac{\partial \Pi_{BS}^C}{\partial PR} < 0$	$\frac{\partial \Pi_{BS}^C}{\partial P} < 0$	$\frac{\partial \Pi_{BS}^C}{\partial S} < 0$	Negative
Corp (BB)	$\frac{\partial \Pi_{BB}^C}{\partial Q} > 0$			$\frac{\partial \Pi_{BB}^C}{\partial PR} < 0$	$\frac{\partial \Pi_{BB}^C}{\partial P} < 0$	$\frac{\partial \Pi_{BB}^C}{\partial S} < 0$	Uncertain
Patent Office	$\frac{\partial \Pi^{PTO}}{\partial Q} > 0$	$\frac{\partial \Pi^{PTO}}{\partial F} > 0$		$\frac{\partial \Pi^{PTO}}{\partial PR} < 0$	$\frac{\partial \Pi^{PTO}}{\partial P} > 0$	$\frac{\partial \Pi^{PTO}}{\partial S} < 0$	Positive
BAR (Prosecutors)	$\frac{\partial \Pi_P^{BAR}}{\partial Q} > 0$	$\frac{\partial \Pi_P^{BAR}}{\partial F} < 0$	$\frac{\partial \Pi_P^{BAR}}{\partial LF_P} > 0$	$\frac{\partial \Pi_P^{BAR}}{\partial PR} < 0$	$\frac{\partial \Pi_P^{BAR}}{\partial P} > 0$	$\frac{\partial \Pi_P^{BAR}}{\partial S} < 0$	Uncertain
BAR (Litigators)	$\frac{\partial \Pi_L^{BAR}}{\partial Q} < 0$	$\frac{\partial \Pi_L^{BAR}}{\partial F} < 0$	$\frac{\partial \Pi_L^{BAR}}{\partial LF_P} < 0$	$\frac{\partial \Pi_L^{BAR}}{\partial PR} < 0$	$\frac{\partial \Pi_L^{BAR}}{\partial P} < 0$	$\frac{\partial \Pi_L^{BAR}}{\partial S} < 0$	Negative
Court	$\frac{\partial \Pi^{COURT}}{\partial Q} > 0$			$\frac{\partial \Pi^{COURT}}{\partial PR} < 0$	$\frac{\partial \Pi^{COURT}}{\partial P} < 0$	$\frac{\partial \Pi^{COURT}}{\partial S} > 0$	Uncertain

Figure 5 shows each of the consequent factors from implementing the opposition system on the actors' preferences. In this figure, the width of the bars represents the strength of each group in Congress—as defined in Part I—and the height of the bars represents the size of the impact on their preferences.[122]

The introduction of this reform will decrease the net benefit to individual inventors, because the quality of patents will increase and litigation fees will be reduced (Figure 5). In addition, the increase in the Patent Office fees, the increase in prosecution fees, the decrease in the speed of processing, and the weakening of property rights will decrease an individual inventor's net benefits. As a result, many of the advantages that the current patent system provides for small

122. See Appendix B *infra* for an explanation on the relative size of the impact of each factor on actors' preferences.

inventors (e.g., strong property rights and costly litigation through the courts) will be eliminated. For example, the National Association of Patent Practitioners ("NAPP"), which serves small inventors, presented the following comments to Congress regarding the proposed introduction of a post-grant opposition system:

> If a District Court infringement case and an opposition, both involving the same patent, are running simultaneously, there should not be an automatic stay of either action. Courts should have the same flexibility in this instance as they already employ in determining whether to stay a District Court action in favor of a reexamination. For example, if a patentee files an infringement suit in District Court well before the opposition commences, there should be no stay. Indeed in "rocket docket" jurisdictions, the court may decide the case well before the Patent Office can decide the opposition.[123]

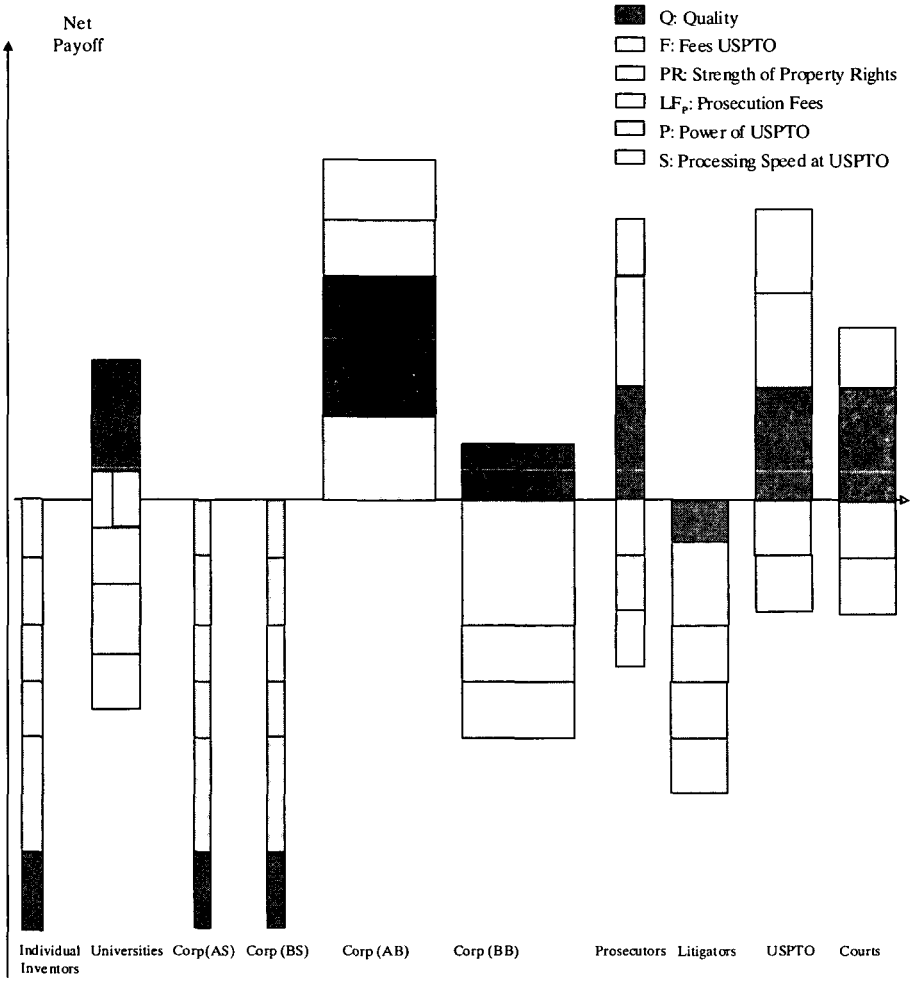
According to these comments, the NAPP accepts implementing an opposition system but wants to limit the extent of the procedures at the Patent Office and wants to preserve the ability of inventors to resort to the courts. In this respect, the second window alternative has a negative impact on individual inventors, because it will allow challengers to use the Patent Office instead of the court system. Companies affected by individual inventors' patents can resort to low-cost opposition to challenge the validity of the patent.[124] In addition, the cost of obtaining a patent will rise, imposing an extra cost on individual inventors. As a result, individual inventors will not support the opposition system. As a solution for individual inventors, the new system could be designed to minimize the increases in prosecution and processing fees, while allowing a small decrease in the speed of examination. Furthermore, the elimination of the

123. NAT'L ASS'N OF PATENT PRACTITIONERS, COMMENTS OF THE NATIONAL ASSOCIATION OF PATENT PRACTITIONERS ON THE PROPOSED PATENT ACT OF 2005, at 16 (2005), *available at* http://www.napp.org/resources/Comments%20-%20NAPP%202005%20patent%20bill.doc.

124. Christopher L. Logan, *Patent Reform 2005: H.R. 2795 and the Road to Post-Grant Oppositions*, 74 UMKC L. REV. 975, 994 (2006) ("Since the introduction of H.R. 2795, small-firms around the country have been voicing their opposition to oppositions. Ronald Riley, president of the Professional Inventor's Alliance, has been quoted as saying 'I honestly feel that if we don't stop what the big companies are trying to do, there won't be any opportunity for us. What they call patent reform is all about making it virtually impossible to enforce the patents.' One commentator has noted that '[p]atents legendarily protect the lone inventor, the pioneering genius in a garage, against the predation of big companies. In reality, the opposite has usually been true.' Post-grant oppositions under H.R. 2795 merely provide another tool with which large corporations may unfairly prey on the little guy.").

second window would make individual inventors less likely to fight the opposition system.

Figure 5: Payoff for Each Group



The opposition system will have the same effect on individual inventors and small companies in the information technology, pharmaceutical, and biotechnology sectors. These individuals and small companies will lose because the Patent Office will have greater power, patents will have higher quality, property rights will diminish, patent application and prosecution fees will increase, and the speed of processing applications will decrease. As a result, opposition system reform will not be well received among individual inventors and small

companies. They face higher costs, less bargaining power with bigger companies, and a higher chance that their patents will be rejected.

In the case of universities, an increase in the quality of patents will increase their payoff, while higher patent filing and prosecution fees and the decrease in the speed of processing will have a negative impact on their net payoff. An increase in the power of the Patent Office and a decrease in the strength of property rights will have a mixed effect on the payoff of universities. As a result, universities will support this reform as long as the net result gives a positive benefit, depending on which issue has more weight for their purposes.[125]

Big corporations' preferences for an opposition system will split among industries. Big corporations in technological sectors with a low reliance on patents, like Microsoft and IBM, will welcome an opposition system because they could resort to cheaper ways to

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125. *See* Press Release, Ass'n of Am. Univs., H.R. 2795, The "Patent Act of 2005": Comments by Ass'n of American Univs., American Council on Educ., Ass'n of American Med. Colls., and Council on Gov't Relations (June 23, 2005), *available at* http://www.acenet.edu/AM/Template.cfm?Section=Home&ContentID=10758&Template=/CM/Contentdisplay.cfm.

> The associations strongly support the creation of an administrative post-grant opposition procedure such as that proposed in H.R. 2795. An opposition procedure that is of finite, predictable duration and allows third parties to challenge a patent based on the full array of issues of patentability, utility, and adequacy of written descriptions would improve patent quality by providing a relatively low-cost alternative to litigation to establish patent validity.
>
> Two modifications to the post-grant opposition procedure of H.R. 2795 would significantly improve this important new procedure:
>
> - *Identify all parties requesting an opposition*: All persons requesting an opposition should be required to identify themselves and the real party in interest, if different. It is fair and appropriate that a patent holder should be able to know the identity of the party opposing the patent, and no useful purpose is served by withholding the identity of the opposer.
> - *Expand the timing of the opposition request*: A 12-month, rather than 9-month, window could benefit smaller entities, which may need more time to identify and respond to patents about which they have concerns. The added three months would still keep the opposition procedure within the framework of a finite, predictable process.
>
> It will be critical, however, for the United States Patent and Trademark Office (U.S. PTO) to receive the resources necessary to implement this additional administrative procedure. Failure to do so could cause significant increases in patent pendency, undermining the considerable benefits that an effective post-grant opposition procedure could bring to the patent system.

Id.

resolve conflicts than going to court.[126] For example, Microsoft has been pushing for reforms because of the high litigation costs of having to defend itself against smaller companies' patented inventions.[127] The availability of a cheaper procedure will certainly enhance its

126. *See Patent Quality Improvement: Hearing Before the H. Subcomm. on Courts, the Internet, and Intellectual Property*, 109th Cong. 17–21 (Apr. 20, 2005) (testimony of Richard J. Lutton, Jr., Chief Patent Counsel, Apple Inc.), *available at* http://promotetheprogress.com/ptpfiles/patentreform/houseoversight/042005/prepared/lutton(bsa).pdf.

Apple attorney Richard Lutton testified before Congress on behalf of the Business Software Alliance. Lutton testified,

> [t]he Committee print . . . addresses the two major areas where . . . patent reform is now timely: improving the quality of patents issued by the [PTO] and alleviating the disruptive effects that excessive patent litigation now poses. . . .
>
> . . . Congress should focus on four key areas that will facilitate the issuance of higher quality patents:
>
> 1. enhanced post-issuance processes to provide a second chance to intercept bad patents;
>
> 2. curtailment of abusive continuation practices that lead to endless chains of patents with ever-broader claims;
>
> 3. better support for receiving prior art, and better processes for building a contemporaneous record that reflects the extent of the examination by the patent examiner; and
>
> 4. adequate PTO training and funding. . . .
>
> . . . .
>
> [On the effects of excessive patent litigation] . . . BSA believes there are five key areas where changes are needed:
>
> 1. making clear that a patentee is entitled to claim damages only on the proportion of the allegedly infringing product attributable to the patent, and not [on the entire] multi-faceted product or system;
>
> 2. recalibrating the standard for an award of punitive damages for willful infringement to focus on reprehensible conduct, [rather than the current gamesmanship involving notice and opinions];
>
> 3. clarifying and reiterating the current . . . statutory requirement that the issuance of an injunction . . . should be based on "principles of equity";
>
> 4. reducing the burden of proving a patent invalid to a "preponderance of the evidence" in cases where the [PTO] did not consider the allegedly invalidating prior art; and
>
> 5. clarifying section 271(f) of the existing patent statute to avoid discouraging research and development work done inside the United States.

Id.

127. Q&A: Microsoft Press Pass, *supra* note 84.

ability to defend itself.[128] These big tech companies have formed different organizations, like the Business Software Alliance and the Information Technology Industry Council, to push for patent reform that adequately reflects the new information technologies industry requirements.[129] The positive payoff for these companies will come from an increase in patent quality, the greater power of the Patent Office, and the lower speed of processing for patent applications.

On the other hand, in the case of pharmaceutical and biotechnology sectors, bigger companies will not accept the reform so readily, because they believe they are better protected by the courts and the current patent system.[130] These companies have also formed their own organizations to lobby for strengthening the patent system. The Biotechnology Industry Organization and PhRMA are two of the best-known representatives of these sectors.[131] The net payoff of these companies will increase because of the higher quality of patents; the net payoff will likewise decrease because lower legal fees do not offer effective protection in court against other competitors. The increase in power of the Patent Office will increase the likelihood of challenges to their patents, and more careful processing will slowdown the granting of new patents. However, some big companies in both sectors will have a positive net impact from the lower legal fees (i.e., their payoff increases because having to pay lower legal fees offsets the cost of having to face more challenges in court).

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128. *Perspectives on Patents: Hearing Before the S. Comm. on the Judiciary*, 109th Cong. 173 (2005) (statement of David Simon, Chief Patent Counsel, Intel Corp.), *available at* http://judiciary.senate.gov/hearings/testimony.cfm?id=1475&wit_id=4229. "Establishing an administrative procedure for post-grant review and opposition would permit important challenges to patent validity, short of litigation. Under such a system, the person opposing the patent should be required to make a suitable threshold showing." *Id.*

129. *See* Business Software Alliance, http://www.bsa.org (last visited Apr. 30, 2009); Information Technology Industry Council, http://www.itic.org (last visited Apr. 30, 2009).

130. *Amendment in the Nature of a Substitute to H.R. 2795, the "Patent Reform Act of 2005": Hearing Before the Subcomm. on Courts, the Internet, and Intellectual Property*, 109th Cong. 25 (2005) (testimony of Robert B. Chess, Executive Chairman, Nektar Therapeutics), *available at* http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=109_house_hearings&docid=f:23434.pdf ("Mr. Chairman, perhaps no other industry is as dependent upon patents as is the biotechnology industry. It is safe to say that most, if not all, of the revolutionary medical advances developed by the biotechnology industry would not exist had the U.S. Supreme Court not ruled in 1980 that biotechnology inventions were entitled to patent protection. Because of the complexity of biotechnology, it can easily take one or two decades, or more, for a biotechnology company to discover and develop a profitable product that revolutionizes treatment of a disease that has resisted conventional pharmaceutical or other medical treatment.").

131. *See* Biotechnology Industry Organization, http://www.bio.org (last visited Apr. 30, 2009); PhRMA, http://www.phrma.org (last visited Apr. 30, 2009).

The most important issue for pharmaceutical and biotechnology companies is the decrease in the strength of the exclusionary rights associated with patents.[132] These companies would vigorously oppose such a reduction in property rights, because the success of their investments depends on strong enforcement of patents.[133] Big companies in the software and information technology sectors will undoubtedly support the reform, while companies in biotechnology and pharmaceutical sectors will be reticent to do so. By eliminating the second window, pharmaceutical and biotechnology companies may support the reform, as the negative effect on property rights would be reduced. As a result, we can see how the specific characteristics of the technology sector and the ability of companies to profit from the patent system will determine their willingness to support this reform proposal.

The Patent Office will benefit from the increase in fees from both the examination of patent grants and the management of the new opposition regime. This increase in the net benefit of the Patent Office would also be enhanced by the prospect that the agency will gain political and bureaucratic influence with the introduction of the new opposition regime. The costs for the Patent Office will be represented by the decrease in the speed of processing, the higher quality required by the new system, and the decrease in the strength of property rights. If the Patent Office will manage the new opposition system, then we believe that the gains for the agency will compensate them for the costs, and therefore, the net effect of the reform should be positive.

Prosecutors will be favored by the increase in quality and the increase in importance of the Patent Office in managing this stage of the patent system. These two positive factors should generate an increase in prosecution fees. The higher cost for prosecutors will arise from the decrease in the speed of processing and the diminished strength of property rights. In general, the new system should imply new business for prosecutors because of the enhancement of the Patent Office's ability to manage and control the patent system. As a

132. *See* Stephen P. Marks, *Typing Prometheus Down: The International Law of Human Genetic Manipulation*, 3 CHI. J. INT'L L. 115, 125 (2002) (noting the reliance of biotechnology companies on property rights).

133. *See* Insoon Song, *Old Knowledge into New Patent Law: The Impact of United States Patent Law on Less-Developed Countries*, 16 IND. INT'L & COMP. L. REV. 261, 262 (2005) (commenting on why patent protection enables biotechnology companies to "stay in business").

result, the reform should increase the net benefits for prosecutors, who will then favor enacting the opposition reform.[134]

Litigators will experience a different effect. Their net benefits will decrease as a consequence of the higher quality of patents, the lower strength of property rights, and the lower speed of the granting process. Furthermore, as many patent challenges could be channeled through the new opposition regime, the use of the courts will decrease, and litigators will suffer from loss of business. As a consequence, litigators should be expected to oppose the reform. The only positive effect for litigators is that they could participate in the challenges to new patents through the opposition process. However, the fees for Patent Office opposition processes would be much lower than in the case of court litigation. The income received in fees by litigators could increase only if the increase in the volume of patents challenged under the new system can produce an income in excess of the loss for the lower number of patents being litigated in the courts.

Finally, for the courts, the increase in patent quality and the decrease in processing speed should increase their net benefit, but the lower strength of property rights would have a negative effect. Courts should receive a lower load of patent cases, and the information on the validity of the patent would be more efficient than under the current system. Thus, the courts should be supportive of the introduction of the new system as long as the positive effects dominate.

Consequently, the success of this reform in Congress will depend on the net effect it will generate on each of these groups and on the specific political power each group exerts on congressional committees. Individual inventors and small companies will not support the reform. Because of their important influence on Congress, big corporations will be the key for securing the passage of the opposition system. Software and information technology companies will openly push for the reform, while biotechnology and pharmaceutical companies' support will depend on the extent of the reform. For example, if proposals like the second window are eliminated, the chances of the pharmaceutical and biotechnology companies supporting the reform will increase; otherwise, they will

134. *See* NAT'L ASS'N OF PATENT PRACTITIONERS, *supra* note 123, at 16 ("Post-grant opposition has the potential to improve the U.S. patent system by quickly weeding out invalid patents that slip through the USPTO despite the best efforts of patent examiners and honest intentions of inventors, patent agents, and patent attorneys. This procedure may assist holders of valid patents, because this forum permits validity issues to be quickly and inexpensively resolved instead of having to resort to litigation.").

oppose it. Given the increase in its revenue and the increase in the regulatory and political status of the agency, the Patent Office will favor the reform. Prosecutors and the courts will also back the reforms, but litigators will oppose these reforms. As a result, the political division among patent lawyers will be reflected in Congress, given the political importance of the legal industry. Their influence on Congress will be one of the deciding factors on the fate of the reform.

B. Patent Reform 2007–2008

Congress is currently considering an extensive proposed reform to the patent system. This is not the first time Congress has considered reforming the patent system. On June 8, 2005, Representative Lamar Smith (Texas) introduced H.R. 2795 to the Judiciary Committee of the House of Representatives.[135] This bill established several changes to patent law in an attempt to improve the system.[136] After long debate and hearings, the bill did not advance in Congress.[137] More recently, under the 110th Congress, Representative Howard Berman (California) introduced H.R. 1908 to the House of Representatives.[138] The main changes proposed in this bill are: implementing a post-grant opposition system, imposing ex-parte reexamination, limiting injunctions, reducing infringement payments, changing the system to a "first inventor to file" system, eliminating best mode regulation, imposing a duty of candor, regulating continuation of applications, and creating a universal eighteen months publication rule.[139] These changes prompted an intense debate among different constituencies and groups affected by the reform.[140] In this Section, we evaluate some of the most important changes proposed to understand the patent reform bill's

135. Patent Reform Act of 2005, H.R. 2795, 109th Cong. (2005).

136. Among the main changes are: the Rights of the First Inventor to File, Inventor's Oath or Declaration, Right of the Inventor to Obtain Damages, Post Grant Procedures and Other Quality Enhancements, Post Grant Review Procedure, Submissions by Third Parties and Other Quality Enhancements, Tax Planning Methods not Patentable, Venue and Jurisdiction, Inequitable Conduct as Defense to Infringement, Best Mode Requirement, Regulatory Authority, and some other minor proposals. *See id.*

137. *See* THOMAS (Library of Congress), http://thomas.loc.gov/cgi-bin/bdquery/D?d109:1:./temp/~bdcpkr:@@@Xl/bss/109search.htmll (last visited Apr. 22, 2009) (summarizing the status of the Bill and all the actions taken by Congress).

138. Patent Reform Act of 2007, H.R. 1908, 110th Cong. (2007).

139. *Id.*

140. *See* Anne Broache, *Congress Takes New Stab at Patent System Overhaul*, CNET NEWS, Apr. 18, 2007, http://news.cnet.com/Congress-takes-new-stab-at-patent-system-overhaul/2100-1028_3-6177376.html.

chances of passage. Because the creation of a post-grant opposition regime was analyzed in the previous Section, we will not address that issue here. Nor are we going into a detailed analysis of the first inventor to file, because this has not been a highly debated issue, and it is intended to bring the U.S. patent system in line with international standards on patents.[141] Instead, we will address a few of the remaining proposals as follows.

1. Ex-parte Reexamination

The ex-parte reexamination provision in the law allows for third parties to bring additional information on a patent application to the Patent Office during the examination period.[142] This reform is an attempt to reduce the number of frivolous patents and to increase the quality of the patents granted.[143] The third party submitting additional information would pay a fee to the Patent Office.[144] The bill also provides extra funding to the Patent Office to help cover the

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141. *See Perspective on Patents: Harmonization and Other Matters: Hearing Before the Subcomm. on Intellectual Property of the S. Comm. of the Judiciary*, 109th Cong. 2 (2005), *available at* http://www.access.gpo.gov/congress/senate/pdf/109hrg/24582.pdf (containing the introductory remarks of Sen. Orrin Hatch that he "hope[s] that it will clarify some of the arguments from multiple perspectives regarding moving from our traditional first-to-invent regime to the internationally adopted first-to-file system").

142. H.R. 1908 ("Any person may submit for consideration and inclusion in the record of a patent application, any patent, published patent application, or other publication of potential relevance to the examination of the application . . . ."). This language is similar to H.R. 2795, proposed in 2005.

143. Katharine Zandy, *Too Much, Too Little, Or Just Right? A Goldilocks Approach To Patent Reexamination Reform*, 61 N.Y.U. ANN. SURV. AM. L. 865, 879–80 (2006).

> Reexamination must provide a viable mechanism for challenging patents that may have been granted improperly, thus decreasing the licensing fees and chilling effects caused by a multitude of bad patents impeding innovation. In order to do so, such a reexamination process must provide a mechanism to present evidence to an impartial judge who can determine whether or not a claim has merit. Such a process must also be run efficiently and effectively within the PTO's resources—a necessity which cannot be taken lightly, given current criticism of the PTO's determinations of patent validity at the application stage.
>
> However, if reexamination is too similar to litigation itself, it risks losing the advantage of decreased time and cost for the parties involved. After all, in creating a reexamination procedure, Congress implicitly recognized that some alternative to litigation is needed to achieve the elusive balance between the needs of patent challengers for a method to argue their claims and the needs of patent-holders to be free from harassing challenges.

Id.

144. *See* H.R. 1908.

costs of implementing this system.[145] We assume that the fees and the extra budget will allow the Patent Office to provide extra services in order to maintain a similar speed of service, even though the time of examination should increase. The reform would also discourage individuals with less innovative inventions from applying, thereby maintaining the current processing time. As a result, we assume that the speed of examination does not change.

According to our model, this reform should have a direct increase on the quality of granted patents and should discourage further litigation in court, as there will be a decreased chance of having an improvidently granted patent (Appendix A). The decrease in court challenges should reduce litigation fees and increase the power of the Patent Office, because the Office will more closely examine patent applications. Since patent applications are going to be subject to increased scrutiny, prosecutors' fees will increase, because applications will have to be better prepared.

Table 18: Ex-parte Reexamination

	Increase in Quality	Increase in Prosecution Fees	Decrease in Litigation Fees	Increase in Power of Patent Office	Total Effect
Inventors (Individuals)	$\frac{\partial \Pi_I^I}{\partial Q} < 0$	$\frac{\partial \Pi_I^I}{\partial LF_P} < 0$	$\frac{\partial \Pi_I^I}{\partial LF_L} = ?$	$\frac{\partial \Pi_I^I}{\partial P} < 0$	Negative
Universities	$\frac{\partial \Pi_U^I}{\partial Q} > 0$	$\frac{\partial \Pi_U^I}{\partial LF_P} < 0$	$\frac{\partial \Pi_U^I}{\partial LF_L} > 0$	$\frac{\partial \Pi_U^I}{\partial P} = ?$	Undetermined
Corp (AS)	$\frac{\partial \Pi_{AS}^C}{\partial Q} < 0$	$\frac{\partial \Pi_{AS}^C}{\partial LF_P} < 0$	$\frac{\partial \Pi_{AS}^C}{\partial LF_L} = ?$	$\frac{\partial \Pi_{AS}^C}{\partial P} < 0$	Negative
Corp (AB)	$\frac{\partial \Pi_{AB}^C}{\partial Q} > 0$		$\frac{\partial \Pi_{AB}^C}{\partial LF_L} > 0$	$\frac{\partial \Pi_{AB}^C}{\partial P} > 0$	Positive

145. *See The Patent System Today and Tomorrow: Hearing Before the Subcomm. on Intellectual Property of the S. Comm. of the Judiciary*, 109th Cong. 4 (2005) (statement of David Simon, Chief Patent Counsel, Intel Corp.), *available at* http://judiciary.senate.gov/hearings/testimony.cfm?id=1475&wit_id=4229. Different groups giving testimony to Congress have mentioned this concern regarding funding. *See id.* ("BSA encourages Congress to ensure that the U.S. Patent and Trademark Office has the resources it needs to conduct patent examinations that are efficient, expedient and of the highest quality. . . . Allowing the Patent and Trademark Office to retain fees that it generates would help ensure that the Office is able to provide high-quality examinations and to fund further improvements.").

	Increase in Quality	Increase in Prosecution Fees	Decrease in Litigation Fees	Increase in Power of Patent Office	Total Effect
Corp (BS)	$\frac{\partial \Pi_{BS}^{C}}{\partial Q} < 0$	$\frac{\partial \Pi_{BS}^{C}}{\partial LF_P} < 0$	$\frac{\partial \Pi_{BS}^{C}}{\partial LF_L} = ?$	$\frac{\partial \Pi_{BS}^{C}}{\partial P} < 0$	Negative
Corp (BB)	$\frac{\partial \Pi_{BB}^{C}}{\partial Q} > 0$		$\frac{\partial \Pi_{BB}^{C}}{\partial LF_L} < 0$	$\frac{\partial \Pi_{BB}^{C}}{\partial P} < 0$	Negative
Patent Office	$\frac{\partial \Pi^{PTO}}{\partial Q} > 0$			$\frac{\partial \Pi^{PTO}}{\partial P} > 0$	Positive
BAR (Prosecutors)	$\frac{\partial \Pi_{P}^{BAR}}{\partial Q} > 0$	$\frac{\partial \Pi_{P}^{BAR}}{\partial LF_P} > 0$	$\frac{\partial \Pi_{P}^{BAR}}{\partial LF_L} = ?$	$\frac{\partial \Pi_{P}^{BAR}}{\partial P} > 0$	Positive
BAR (Litigators)	$\frac{\partial \Pi_{L}^{BAR}}{\partial Q} < 0$	$\frac{\partial \Pi_{L}^{BAR}}{\partial LF_P} < 0$	$\frac{\partial \Pi_{L}^{BAR}}{\partial LF_L} < 0$	$\frac{\partial \Pi_{L}^{BAR}}{\partial P} < 0$	Negative
Court	$\frac{\partial \Pi^{COURT}}{\partial Q} > 0$			$\frac{\partial \Pi^{COURT}}{\partial P} < 0$	Undetermined

Table 18 presents the effect of the reform on all inventor types. As we can see in Table 18, individual inventors and small companies in both technology sectors will be worse off with the reform. The quality of the patents is going to increase the Patent Office's power, thereby giving more validity to its patents. This will have a negative impact on individual inventors and small companies, because the chances of getting a patent through the Patent Office will decrease. The decrease in litigation fees will have a mixed impact on their payoff. Finally, higher prosecution fees will impose an important cost on these actors. The net payoff for big companies in software and information technology sectors will increase with the improvement in the quality of patents and the greater role for the Patent Office in conducting the examination process. The reduction of litigation fees will have a positive impact on information technology companies, as their cost of resorting to the courts will decrease. The reduction in legal fees will have a negative effect on the payoffs of pharmaceutical and biotechnology companies that strongly rely on patents. In the case of big companies in biotechnology and pharmaceutical sectors, the increase in quality will have a positive effect on payoff. The higher scrutiny of submissions at the Patent Office and the chances of competitors presenting further information and delaying the granting process for companies will generate a negative effect on net payoff. Big biotechnology and pharmaceutical companies are not as

supportive of this change, in contrast to big companies in the other technology sectors. Universities will benefit from the higher quality of patents and the greater power of the Patent Office, but they are going to be hurt by the general increase in fees.

Prosecutors are much better off with this reform. The enhanced power of the Patent Office increases the demand for their services. In addition, it could charge higher fees, and there would be extra demand for the higher quality patents that would be granted. On the other hand, litigators should be worse off, as the higher quality of the patents and the enhanced role of the Patent Office will decrease the need to use the courts, and this will result in reduced litigation fees. The Patent Office will be better off because of its greater power, the increase in fees for these processes, and the increase in its budget. However, the increase in the efforts to provide better quality patents through thorough examinations will decrease their payoff. The Patent Office will be better off if the payment it receives is greater than the costs of improving patent quality. Finally, the courts will be indifferent to the reform, because the positive effect from the higher quality of patents will be offset, in part, by the greater power of the Patent Office. The final effect of this reform on the courts is somewhat undetermined.

2. Damages

H.R. 1908 proposes to award reasonable damages and relate the damages to the contributions in the patent over the prior art involved.[146] The decrease in the payment of damages for

146. H.R. 1908.

> SEC. 5 RIGHT OF THE INVENTOR TO OBTAIN DAMAGES.... [section b.] ... '(1) IN GENERAL.—An award pursuant to subsection (a) that is based upon a reasonable royalty shall be determined in accordance with this subsection. Based on the facts of the case, the court shall determine whether paragraph (2), (3), or (4) will be used by the court or the jury in calculating a reasonable royalty. The court shall identify the factors that are relevant to the determination of a reasonable royalty under the applicable paragraph, and the court or jury, as the case may be, shall consider only those factors in making the determination.
>
> '(2) RELATIONSHIP OF DAMAGES TO CONTRIBUTIONS OVER PRIOR ART.—Upon a showing to the satisfaction of the court that a reasonable royalty should be based on a portion of the value of the infringing product or process, the court shall conduct an analysis to ensure that a reasonable royalty under subsection (a) is applied only to that economic value properly attributable to the patent's specific contribution over the prior art. The court shall exclude from the analysis the economic value properly attributable to the prior art, and other

infringement can be seen as a decrease in the legal and other costs paid for using the court system (LF_L) and a decrease in the strength of property rights in the courts (PR). Table 19 shows the payoff each actor receives from this reform. As we can see, individual inventors will be worse off with this reform. The decrease in the power of the courts to establish damage awards will have a negative effect on individual inventors, because it will decrease their ability to profit from their inventions, especially when they try to obtain royalties from corporations. On the other hand, the lower litigation costs will have a mixed effect on their payoff function. Universities will benefit from the lower costs of using the courts, and the effects of weaker property rights will be mixed.[147]

Small corporations face a situation similar to individual inventors. They will be indifferent because of the lower litigation fees, but they will strongly oppose the reduction in the strength of property rights. Big companies in industries like software and information technology will benefit from the decrease in the strength of property rights because of lower infringement-related payments for licenses and the like. They have historically had high costs associated with handling these cases in court.[148] Hence, they will also benefit from a decrease in litigation fees, which has been a substantial burden on their budgets.

In sectors like pharmaceuticals, big companies will be worse off, because their royalties or damage awards will decrease and the ability

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features or improvements, whether or not themselves patented, that contribute economic value to the infringing product or process.

'(3) ENTIRE MARKET VALUE.—Upon a showing to the satisfaction of the court that the patent's specific contribution over the prior art is the predominant basis for market demand for an infringing product or process, damages may be based upon the entire market value of the products or processes involved that satisfy that demand.

'(4) OTHER FACTORS.—If neither paragraph (2) or (3) is appropriate for determining a reasonable royalty, the court may consider, or direct the jury to consider, the terms of any nonexclusive marketplace licensing of the invention, where appropriate, as well as any other relevant factors under applicable law.

Id.

147. Press Release, Ass'n of Am. Univs., *supra* note 125 ("Section 6 (1)(B) appears essentially to codify current case law. Since judges have ample discretion under current law to assess the relative value of a patented technology in determining damages, we believe Section 6 (1)(B) is unnecessary, and the attempt to codify case law could have unintended negative consequences. Therefore, we encourage deletion of this subsection.").

148. *See, e.g.*, Q&A: Microsoft Press Pass, *supra* note 84.

to enforce their property rights will be diminished. At the same time, it is less costly for competitors to challenge their patents in court. Lawyers, both litigators and prosecutors, will be negatively affected by this reform, because their fees will decrease as a consequence of the lower payments courts can award and the decrease in the effectiveness of their legal actions. The Patent Office will have a negative payoff, because the decrease in the enforcement of patents in courts will decrease the value of the patent the agency grants. Courts will be negatively affected by this reform because of the decrease in their enforcement power.

Table 19: Decrease Payments for Infringement

	Decrease in Strength of Property Rights	Decrease in Litigation Fees	Total Effect
Inventors (Individual)	$\frac{\partial \Pi_I^I}{\partial PR} < 0$	$\frac{\partial \Pi_I^I}{\partial LF_L} = ?$	Negative
Universities	$\frac{\partial \Pi_U^I}{\partial PR} = ?$	$\frac{\partial \Pi_U^I}{\partial LF_L} > 0$	Positive
Corp (AS)	$\frac{\partial \Pi_{AS}^C}{\partial PR} < 0$	$\frac{\partial \Pi_{AS}^C}{\partial LF_L} = ?$	Negative
Corp (AB)	$\frac{\partial \Pi_{AB}^C}{\partial PR} > 0$	$\frac{\partial \Pi_{AB}^C}{\partial LF_L} > 0$	Positive
Corp (BS)	$\frac{\partial \Pi_{BS}^C}{\partial PR} < 0$	$\frac{\partial \Pi_{BS}^C}{\partial LF_L} = ?$	Negative
Corp (BB)	$\frac{\partial \Pi_{BB}^C}{\partial PR} < 0$	$\frac{\partial \Pi_{BB}^C}{\partial LF_L} < 0$	Negative
Patent Office	$\frac{\partial \Pi^{PTO}}{\partial PR} < 0$		Negative
BAR (Prosecutors)	$\frac{\partial \Pi_P^{BAR}}{\partial PR} < 0$	$\frac{\partial \Pi_P^{BAR}}{\partial LF_L} = ?$	Negative
BAR (Litigators)	$\frac{\partial \Pi_L^{BAR}}{\partial PR} < 0$	$\frac{\partial \Pi_L^{BAR}}{\partial LF_L} < 0$	Negative
Court	$\frac{\partial \Pi^{COURT}}{\partial PR} < 0$		Negative

3. Best Mode Regulation

H.R. 1908 proposes to eliminate a clause in 35 U.S.C. § 112.[149] As a result, inventors will no longer need to disclose the best mode to replicate their invention at the moment of examination by the Patent Office. Accordingly, it is expected that this reform will decrease litigation costs and increase the predictability of litigation, thereby increasing the quality of patents. Small companies and individual inventors will be negatively affected by the increase in quality. Big companies in software and information technology will be better off, because litigation costs will go down. Moreover, they will no longer have to provide the specific examples and methods of the invention, which will eliminate some maneuvers by inventors trying to change claims and procedures in slight ways in an effort to obtain new patents or change their products to avoid infringement. However, biotechnology and pharmaceutical companies that rely on extensive patenting and litigation will be against this reform. Litigators' payoff will decrease because of lower litigation costs.

From the analysis of these case studies, one can see that the proposed changes affect each actor differently. Because of the different results on net payoffs, the different sectors will try to shape the reform according to their preferences in order to maximize their net gains. As analyzed before, the final result will depend on the degree of influence each sector has on Congress. In order to evaluate how each sector will benefit from this reform, Table 20 summarizes the results of the foregoing analysis. Across sectors, small businesses and individual investors are not favored by the reform, while big software and information technology companies are the main beneficiaries and, not surprisingly, the main supporters of the reform.[150] Big companies in biotechnology and pharmaceutical sectors are not as favored by the reform as the other sectors, so we would expect stronger opposition from them. Prosecutors, the Patent Office, and the courts should support the changes because their tasks will be facilitated. However, litigators are the main losers from this

149. H.R. 1908 ("Section 282(b) (as designated by section 12(b) of this Act) is amended by striking paragraph (3) and inserting the following: '(3) Invalidity of the patent or any claim in suit for failure to comply with—'(A) any requirement of section 112 of this title, other than the requirement that the specification shall set forth the best mode contemplated by the inventor of carrying out his invention; or '(B) any requirement of section 251 of this title.'.").

150. *See, e.g.*, BUSINESS SOFTWARE ALLIANCE, PATENT REFORM: THE VERDICT IS IN 9–10 (2007), http://www.bsa.org/~/media/63E3364BBA7148828D2CE880AF5371D2.ashx.

reform because of the improvements in quality and the fact that the reduction in litigation and litigation costs would have a negative impact on the number of cases taken to court and the associated litigation fees.

Among the reforms with higher chances of passing without major revision are the best mode regulation, duty of candor, and the eighteen months publication regulation. Among the reforms that are likely to pass with some changes are the opposition system and inter-party examinations. Finally, the proposed reforms with higher degrees of debate, and that are therefore unlikely to pass, are the ones limiting injunctions and damage awards. As a consequence, the success of the reform in Congress will depend on the ability of the different sectors to bargain and reach agreement on the most divisive issues proposed.

Table 20: Summary of Each Group Position with Respect to the Reform

Reform	Individual Inventors	Universities	Corp (AS)	Corp (AB)	Corp (BS)	Corp (BB)
Opposition System	-	+	-	+	-	-
Ex-Parte Examination	-	+	-	+	-	+
Infringement (Damages)	-	-	-	+/-	-	-
Best Mode Regulation	-	-	-	+	-	+

Reform	Prosecutors	Litigators	Patent Office	Courts	Chance of Passing
Opposition System	+	-	+	+	High
Ex-Parte Examination	+	-	+/-	+	High
Infringement (Damages)	-	-	-		Low
Best Mode Regulation		-			Moderate

CONCLUSION

In recent years, many proposals have arisen for changing the patent system in the United States. Most of these proposals have been normative in nature and based on overcoming the many perceived shortcomings of the patent system. Nonetheless, actual legislative reforms have failed to materialize.

In this Article, we claim that in order to understand the chances of success of any reform to the patent system, we should take a closer look at the system's political economy. In particular, we should be aware of the different pressure groups with a stake in the system and their ability to influence the congressional committees in which reform legislation is enacted. We have studied the different constituencies favoring or opposing the reform and the strength of their bargaining power based on publicly available empirical data of political contributions by different groups and by taking into account the effect of the patent system on different technology industries and economic sectors. As shown, each proposal will generate winners and losers who will try to push reforms forward or prevent them from being enacted. In order to succeed, any reform needs a minimum consensus among these groups of firms in different technology sectors, the inventors, the patent bar (divided separately into patent prosecutors and litigators), the Patent Office, and the courts. Furthermore, our econometric analysis has demonstrated that the passage of the bill in the House of Representatives was strongly correlated to the resources that the primary stakeholders provided to each of the congressional representatives. These results corroborate our model of preferences of different groups and their pressure on Congress to obtain the desired legislative outcomes and results.

In order to understand the dynamic interaction among these groups, we evaluated three important proposed reforms: third party reexamination, changes to the presumption of validity of patents, and changes suggested in the Patent Reform Act of 2007. Important conclusions emerged from this political economy analysis. First, we concluded that the passage of any of these reforms is far from straightforward. The gains and costs of each constituency have to be addressed to reach a final determination of how one might reform the patent system. Furthermore, the final result of any reform will depart from the theoretical blueprint, given the political process we described in this Article. As a consequence, a deeper understanding of this political process allows us to better understand the dynamics of reforms and the characteristics of the patent system. In the end, as in

any other institutional device, the characteristics and performance of the patent system, plus its sustainability or reforms over time, depends on the preferences of the polity, specifically on the preferences of the groups with a definite stake in the performance of the system.

This Article also determined that the effects of the patent system on different technology and economic sectors will ultimately shape the different constituencies favoring or opposing the reform. Companies in networked industries, where the pace of innovation is fast, may not rely heavily on the patent system. Excessive enforcement of patent property rights can produce negative effects for them, even though some companies in this sector will benefit. Specifically, we showed that small companies that use patents as leverage over big companies benefit from strict property rights enforcement. Nonetheless, big companies, like Microsoft or IBM, form a more powerful lobby in Congress to push for reform. On the other hand, there are economic sectors that depend significantly on patents for market innovation. These are sectors, like pharmaceutical and biotechnology, where innovations are produced by more monolithic, vertically integrated companies. For these sectors, one of the main defenses against appropriation of their technological innovation is the patent system and the courts. As a result, we observed that the support for any reform to the patent system will depend on the specific factors that define the structure of each economic sector. Furthermore, we found that in each sector, there are different preferences, depending on the economic power and particular stake in the patent system. Our analysis of the votes cast by individual congresspersons, correlating the votes to contributions made by various sectors, shows that Congress does not have a point of view independent from the stakeholders in the patent system. Rather, their votes on the Patent Reform Act of 2007, H.R. 1908, reflect the participation and preferences of major stakeholders, such as the information technology industry, the pharmaceutical industry, the law associations, and the manufacturing sector.

In the past fifty years, we have witnessed piecemeal patent legislation (e.g., the American Inventors Protection Act) passed by Congress, but no comprehensive effort at patent reform culminating in congressional floor votes prior to 2007. In the coming years, if we see more congressional votes on comprehensive patent reform bills, our understanding of the political economy of the patent system will most certainly improve.

APPENDIX A

Signs of the first derivative for the net payoff function of each actor:

Individual Inventors

$$\frac{\partial I^{I}}{\partial Q}<0 \quad \frac{\partial I^{I}}{\partial S}>0 \quad \frac{\partial I^{I}}{\partial q}<0 \quad \frac{\partial I^{I}}{\partial p}>0 \quad \frac{\partial I^{I}}{\partial F}<0 \quad \frac{\partial I^{I}}{\partial LF_{P}}<0 \quad \frac{\partial I^{I}}{\partial LF_{L}}=\text{Indet.}^{*}$$

Universities

$$\frac{\partial I^{U}}{\partial Q}=\text{Indet.} \quad \frac{\partial I^{U}}{\partial S}>0 \quad \frac{\partial I^{U}}{\partial q}>0 \quad \frac{\partial I^{U}}{\partial p}=\text{Indet.} \quad \frac{\partial I^{U}}{\partial F}<0 \quad \frac{\partial I^{U}}{\partial LF_{P}}<0 \quad \frac{\partial I^{U}}{\partial LF_{L}}=\text{Indet.}$$

Corporate Inventors

Small Companies in Technology A

$$\frac{\partial I^{C}_{AS}}{\partial Q}<0 \quad \frac{\partial I^{C}_{AS}}{\partial S}>0 \quad \frac{\partial I^{C}_{AS}}{\partial q}>0 \quad \frac{\partial I^{C}_{AS}}{\partial p}<0 \quad \frac{\partial I^{C}_{AS}}{\partial F}<0 \quad \frac{\partial I^{C}_{AS}}{\partial LF_{P}}<0 \quad \frac{\partial I^{C}_{AS}}{\partial LF_{L}}=\text{Indet.}$$

Big Companies in Technology A

$$\frac{\partial I^{AB}_{C}}{\partial Q}>0 \quad \frac{\partial I^{AB}_{C}}{\partial S}<0 \quad \frac{\partial I^{AB}_{C}}{\partial q}<0 \quad \frac{\partial I^{AB}_{C}}{\partial p}>0 \quad \frac{\partial I^{AB}_{C}}{\partial LF_{L}}<0$$

Small Companies in Technology B

$$\frac{\partial I^{BS}_{C}}{\partial Q}<0 \quad \frac{\partial I^{BS}_{C}}{\partial S}>0 \quad \frac{\partial I^{BS}_{C}}{\partial q}>0 \quad \frac{\partial I^{BS}_{C}}{\partial p}<0 \quad \frac{\partial I^{BS}_{C}}{\partial F}<0 \quad \frac{\partial I^{BS}_{C}}{\partial LF_{P}}<0 \quad \frac{\partial I^{BS}_{C}}{\partial LF_{L}}=\text{Indet.}$$

Big Companies in Technology B

$$\frac{\partial I^{BB}_{C}}{\partial Q}>0 \quad \frac{\partial I^{BB}_{C}}{\partial S}=\text{Indet.} \quad \frac{\partial I^{BB}_{C}}{\partial q}>0 \quad \frac{\partial I^{BB}_{C}}{\partial p}<0 \quad \frac{\partial I^{BB}_{C}}{\partial LF_{L}}=\text{Indet.}$$

*Indet. = Indeterminate

Members of the Bar

Prosecutors

$$\frac{\partial I^{P}_{BAR}}{\partial Q} > 0 \quad \frac{\partial I^{P}_{BAR}}{\partial S} > 0 \quad \frac{\partial I^{P}_{BAR}}{\partial p} > 0 \quad \frac{\partial I^{P}_{BAR}}{\partial q} < 0 \quad \frac{\partial I^{P}_{BAR}}{\partial F} < 0 \quad \frac{\partial I^{P}_{BAR}}{\partial LF_{P}} > 0 \quad \frac{\partial I^{P}_{BAR}}{\partial LF_{L}} = \text{Indet.}$$

Litigators

$$\frac{\partial I^{L}_{BAR}}{\partial Q} < 0 \quad \frac{\partial I^{L}_{BAR}}{\partial S} > 0 \quad \frac{\partial I^{L}_{BAR}}{\partial p} < 0 \quad \frac{\partial I^{L}_{BAR}}{\partial q} > 0 \quad \frac{\partial I^{L}_{BAR}}{\partial F} < 0 \quad \frac{\partial I^{L}_{BAR}}{\partial LF_{P}} < 0 \quad \frac{\partial I^{L}_{BAR}}{\partial LF_{L}} > 0$$

Courts

$$\frac{\partial I^{COURT}}{\partial Q} = \text{Indet.} \quad \frac{\partial I^{COURT}}{\partial S} = \text{Indet.} \quad \frac{\partial I^{COURT}}{\partial p} < 0 \quad \frac{\partial I^{COURT}}{\partial q} > 0$$

$$\frac{\partial I^{COURT}}{\partial LF_{P}} = \text{Indet.} \quad \frac{\partial I^{COURT}}{\partial LF_{L}} = \text{Indet.}$$

Patent Office

$$\frac{\partial I^{PTO}}{\partial Q} > 0 \quad \frac{\partial I^{PTO}}{\partial S} > 0 \quad \frac{\partial I^{PTO}}{\partial p} > 0 \quad \frac{\partial I^{PTO}}{\partial q} < 0$$

$$\frac{\partial I^{PTO}}{\partial F} > 0 \quad \frac{\partial I^{PTO}}{\partial LF_{P}} = \text{Indet.} \quad \frac{\partial I^{PTO}}{\partial LF_{L}} = \text{Indet.}$$

APPENDIX B

In general, the effect of each factor on the payoff function of each actor is determined subjectively. Nonetheless, from our analysis, we can infer that there are some issues that matter more to some groups than others. Accordingly, to reflect this in our analysis, we assume the following:

Change	Rank of Effects on Preferences (In absolute value)
Patent Office Fees	Patent Office >Individual=Universities=AS= BS=Prosecutors=Litigators
Quality	AB>Court=Patent Office=Universities=Prosecutors> Individual=AS=BS>BB>Litigators
Prosecution Fees	Prosecutors>Universities=Individuals=AS=BS
Power of Patent Office	Patent Office>AS=AB=BS=BB=Universities= Individuals=Court=Litigators=Prosecutors
Speed	Patent Office=AS=AB=BS=BB=Universities= Individuals=Court=Litigators=Prosecutors
Strength of Property Rights	BB=AS=BS=Individual>AB=Litigators>Patent Office=Court=Prosecutors>Universities

Nonetheless, this rank could change depending on the issue at stake.

APPENDIX C: SIMULTANEOUS PROBIT MODEL

Probit: Simultaneous Probit								
	Vote	Elasti-cities	Vote	Elasti-cities	Vote	Elasti-cities	Vote	Elasti-cities
Contributions from the Pharmaceutical Sector								
	Republicans				**Democrats**			
pharmarep	-55.2175	-21.68	-329.823	-329.82				
	28.0579		113.5541					
pharmadem					61.05324	23.9	-357.682	-357.68
					28.91405		72.71588	
republican	-0.97128	-0.37	0.133773	0.13	-0.96919	-0.37	-1.03182	-1.03
	0.15692		0.739386		0.153779		0.525094	
texas	0.65258	0.23	0.498725	0.5	0.662757	0.23	-0.1729	-0.17
	0.293418		0.351995		0.286415		0.429883	
california	0.952349	0.32	0.643935	0.64	0.94587	0.32	0.215886	0.22
	0.251686		0.411273		0.247116		0.608665	
ohio	-0.93938	-0.35	-0.32746	-0.33	-0.92005	-0.35	-0.34112	-0.34
	0.42708		0.6679		0.413639		0.542323	
newjersey	-1.01426	-0.37	-0.28161	-0.28	-1.15691	-0.41	0.371281	0.37
	0.516463		0.694695		0.552107		0.769978	
subcommittee	1.024262	0.33	0.669292	0.67	0.995636	0.32	0.085712	0.09
	0.3664		0.50232		0.373634		0.632721	
_cons	0.531429		0.3205		0.403604		0.957462	
	0.1011		0.230461		0.118242		0.188905	
sigma			0.002571				0.002693	
			0.000249				0.000329	
rho			0.75912				0.988871	
			0.337904				0.090997	
Loglike	-214.791		1572.03		-214.518		1554.272	
Contributions from the Technology Sector								
	Republicans				**Democrats**			
pharmarep	93.03405	36.49	-446.438	-446.44				
	33.71894		111.4999					
pharmadem					41.13099	16.09	-187.266	-187.27
					28.99827		104.9213	
republican	-1.29311	-0.48	0.644164	0.64	-0.99757	-0.38	-1.2873	-1.29
	0.161756		0.525302		0.158827		0.149676	
texas	0.633224	0.22	0.208534	0.21	0.652371	0.23	0.312913	0.31
	0.291131		0.34411		0.288497		0.334022	
california	0.964846	0.32	0.164734	0.16	0.950874	0.32	0.812855	0.81
	0.251097		0.358435		0.247035		0.329382	

Contributions from the Information Sector								
	Republicans				**Democrats**			
ohio	-0.98356	-0.36	-0.02594	-0.03	-0.95024	-0.36	-0.71583	-0.72
	0.425774		0.469437		0.423108		0.395976	
newjersey	-0.97748	-0.36	-0.60741	-0.61	-0.9874	-0.37	-0.86969	-0.87
	0.527172		0.348032		0.502665		0.456196	
subcommittee	0.941485	0.31	0.499764	0.5	1.013044	0.32	1.049224	1.05
	0.356842		0.400462		0.366911		0.422788	
_cons	0.534097		0.130392		0.429475		0.888149	
	0.101074		0.181981		0.123224		0.141578	
sigma			0.002057				0.003401	
			0.000414				0.000466	
rho			0.967495				0.737935	
			0.08839				0.292638	
Loglike	-213.077		1661.614				1461.901	
Contributions from the Manufacturing Sector								
	Republicans				**Democrats**			
manufrep	-49.9396	-19.61	-302.885	-302.81				
	27.98754		64.58375					
manufdem					-2.78071	-1.09	-254.575	-254.58
					18.92053		83.74559	
republican	-0.96314	-0.37	0.369248	0.37	-1.10469	-0.42	-1.15247	-1.15
	0.1571		0.64954		0.148929		0.316897	
texas	0.688177	0.24	0.570671	0.57	0.631779	0.22	0.262612	0.26
	0.297161		0.363449		0.292124		0.364018	
california	0.899525	0.31	0.22605	0.23	0.938855	0.32	0.245954	0.25
	0.244042		0.465814		0.247911		0.505366	
ohio	-0.94449	-0.35	-0.05432	-0.05	-0.9593	-0.36	-0.49214	-0.49
	0.420133		0.668029		0.418369		0.48524	
newjersey	-1.06381	-0.39	-0.75177	-0.75	-1.029	-0.38	-0.59122	-0.59
	0.496266		0.480359		0.509055		0.515181	
subcommittee	1.018463	0.32	0.449991	0.45	1.013538	0.32	0.714448	0.71
	0.370152		0.529345		0.367639		0.606114	
_cons	0.535454		0.263847		0.540858		0.867742	
	0.101003		0.24469		0.110052		0.100744	
sigma			0.003148				0.003296	
			0.000502				0.00063	
rho			0.881946				0.836932	
			0.240018				0.275472	
Loglike	-214.54		1492.681		-216.411		1472.83	

Contributions from the Attorney Sector								
	Republicans				Democrats			
AttorneyRep	9.234871	3.62	-678.145	-678.15				
	55.72249		274.4216					
AttorneyDem					97.93576	38.26	-119.003	-119
					37.14739		100.4039	
republican	-1.11318	-0.42	0.338292	0.34	-0.80762	-0.31	-1.32086	-1.32
	0.167126		0.798828		0.175174		0.19598	
texas	0.635138	0.22	0.247097	0.25	0.682552	0.24	0.357996	0.36
	0.29281		0.333144		0.285406		0.306611	
california	0.944821	0.32	0.410365	0.41	1.009494	0.33	0.599337	0.6
	0.248673		0.427065		0.241954		0.323342	
ohio	-0.96129	-0.36	-0.5079	-0.51	-0.87307	-0.33	-0.87597	-0.88
	0.419967		0.483423		0.415077		0.334561	
newjersey	-1.02888	-0.38	-0.49192	-0.49	-1.09016	-0.4	-0.92047	-0.92
	0.509369		0.577201		0.519614		0.554346	
subcommittee	1.009157	0.32	0.859951	0.86	1.041444	0.32	0.78287	0.78
	0.367507		0.38372		0.358069		0.376102	
_cons	0.534323		0.362688		0.228292		0.902423	
	0.101003		0.190952		0.146796		0.267459	
sigma			0.001107				0.002809	
			0.000151				0.000434	
rho			0.761145				0.592474	
			0.292903				0.229209	
Loglike	-216.408		1901.545		-212.122		1540.93	