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Competitive Patent Law

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COMPETITIVE PATENT LAW

*William Hubbard**

Abstract

Can U.S. patent law help American businesses compete in global markets? In early 2011, President Barack Obama argued that, to obtain economic prosperity, the United States must “out-innovate . . . the rest of the world,”¹ and that patent reform is a “critical dimension[]”² of this innovation agenda. Soon thereafter, Congress enacted the most sweeping reforms to U.S. patent law in more than half a century, contending that the changes will “give American inventors and innovators the 21st century patent system they need to compete.”³ Surprisingly, no legal scholar has assessed whether patent reform is capable of making American firms more competitive in global markets.

This Article begins to fill this void by examining whether U.S. patent law can provide U.S. innovators with enhanced incentives to invent. This Article argues that traditional approaches to improving U.S. patent law, including the recent patent reform act, likely will do little to help Americans invent more than their foreign rivals. Nevertheless, helping U.S. businesses compete in global markets is vital to our economic

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1. President Barack Obama, Remarks by the President in State of Union Address (Jan. 25, 2011), *available at* <http://www.whitehouse.gov/the-press-office/2011/01/25/remarks-president-state-union-address>.

2. NAT'L ECONOMIC COUNCIL, ET AL., A STRATEGY FOR AMERICAN INNOVATION: SECURING OUR ECONOMIC GROWTH AND PROSPERITY 2 (Feb. 2011).

3. Press Release, Senator Patrick Leahy, Comment of Senator Leahy on the Senate Motion to Proceed to the America Invents Act (Aug. 2, 2011), *available at* <http://www.leahy.senate.gov/press/comment-of-senator-leahy-on-the-senate-motion-to-proceed-to-the-america-invents-act>.

prosperity, as we face a crippling recession, declining innovation capacity, and increasing pressure from foreign competition. Accordingly, this Article argues that federal lawmakers should consider nontraditional approaches to U.S. patent law, including using law to foster a culture in the United States that promotes innovation.

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INTRODUCTION

For over a century, the United States has been one of the most innovative countries in the world.⁴ U.S. inventors pioneered the airplane,⁵

4. See, e.g., JUDY ESTRIN, CLOSING THE INNOVATION GAP: REIGNITING THE SPARK OF CREATIVITY IN A GLOBAL ECONOMY 71 (2009) (asserting that in the 1970s the United States was technologically preeminent); Rep. Lamar Smith, *Pass Patent Reform to Create Jobs*, POLITICO.COM

the electric light bulb,⁶ the polio vaccine,⁷ the transistor,⁸ the personal computer,⁹ and the Internet.¹⁰ Indeed, in 2005, the National Council on Competitiveness (a nonpartisan and nongovernmental organization composed of CEOs, university presidents, and labor leaders) proclaimed that “[i]nnovation has always been deep in America’s soul.”¹¹

Recently, however, many commentators have voiced fears that America’s innovation position is starting to erode.¹² By some measures, it appears that the United States is not as focused on innovation as some countries.¹³ For example, Europe, not the United States, now hosts the

(Mar. 30, 2011, 4:47 AM), <http://www.politico.com/news/stories/0311/52141.html> (“American inventors have led the world in innovations for more than a century.”); *see also* John C. Lechleiter, *America’s Growing Innovation Gap*, WALL ST. J. (July 9, 2010), <http://online.wsj.com/article/SB10001424052748704111704575354863772223910.html> (“America is the inventing nation.”); Fareed Zakaria, *The Future of American Innovation: Can America Keep Pace?*, TIME (June 5, 2011), <http://www.time.com/time/nation/article/0,8599,2075226,00.html> (“Innovation is as American as apple pie.”).

5. U.S. Patent No. 821,393 (filed Mar. 23, 1903) (describing a “flying machine”). This patent issued to “Orville Wright and Wilbur Wright, citizens of the United States, residing in the city of Dayton, county of Montgomery, and State of Ohio.” *Id.*

6. U.S. Patent No. 223,898 (filed Nov. 4, 1878) (describing an “electric lamp”). This patent issued to “Thomas Alva Edison of Menlo Park, in the State of New Jersey, United States of America.” *Id.*

7. Jonas Salk was born in New York City and developed the polio vaccine in Pittsburgh, Pennsylvania. JANE S. SMITH, PATENTING THE SUN: POLIO AND THE SALK VACCINE 102 (1990).

8. Three Americans—John Bardeen, Walter Brattain, and William Shockley—developed the transistor at Bell Labs in the 1940s. *See* David B. Haviland, *The Transistor in a Century of Electronics*, NOBELPRIZE.ORG (Dec. 19, 2002), <http://www.nobelprize.org/educational/physics/transistor/history/>. For their work, Bardeen, Brattain, and Shockley received the Nobel Prize in Physics in 1956. THE NOBEL PRIZE IN PHYSICS 1956, http://www.nobelprize.org/nobel_prizes/physics/laureates/1956/ (last visited Dec. 15, 2011).

9. *Inventor of the Week: The Personal Computer*, LEMELSON-MIT (Apr. 2007), <http://web.mit.edu/invent/iow/apple.html>.

10. JANET ABBATE, INVENTING THE INTERNET 1–2 (1999).

11. COUNCIL ON COMPETITIVENESS, INNOVATE AMERICA: NATIONAL INNOVATION INITIATIVE SUMMIT AND REPORT 8 (2005) [hereinafter “INNOVATE AMERICA”]; COUNCIL ON COMPETITIVENESS, *About Us*, <http://www.compete.org/about-us/> (last visited Mar. 2, 2013).

12. *See, e.g.*, NORMAN R. AUGUSTINE, IS AMERICA FALLING OFF THE FLAT EARTH? 17–20 (2007) (arguing that the United States is doing poorly in “the global competition for jobs”); ESTRIN, *supra* note 4, at 4–5 (arguing that “America has lost the core values that were the catalysts of its [innovation] success”); JOHN KAO, INNOVATION NATION: HOW AMERICA IS LOSING ITS INNOVATION EDGE, WHY IT MATTERS, AND WHAT WE CAN DO TO GET IT BACK 2 (2007) (asserting that America’s “capacity for innovation is eroding”); INNOVATE AMERICA, *supra* note 11, at 38; NAT’L ACADS. PRESS, RISING ABOVE THE GATHERING STORM, REVISITED 5 (2010) [hereinafter “GATHERING STORM, REVISITED”]; Gary P. Pisano & Willy C. Shih, *Restoring American Competitiveness*, HARV. BUS. REV., July 2009, at 114–16; Lechleiter, *supra* note 4; *see also* MICHAEL E. PORTER, THE COMPETITIVE ADVANTAGE OF NATIONS 12 (1990) (“America, with skilled labor, preeminent scientists, and ample capital, has seen eroding export market share in industries where one would least expect it, such as machine tools, semiconductors, and sophisticated electronic products.”).

13. *See, e.g.*, *infra* notes 72–102 and accompanying text.

largest particle accelerator in the world.¹⁴ The United States is also investing less in innovation than other countries, ranking eighth in the world in spending on research and development as a percentage of gross domestic product (GDP).¹⁵ In 2000, the United States led the world in the deployment of broadband Internet, but by 2007, the United States ranked sixteenth.¹⁶ Similarly, U.S. citizens are focusing less on careers related to innovation than citizens of many other countries. U.S. educational performance related to science and engineering is notoriously mediocre.¹⁷ “U.S. high school students underperform most of the world in international science and math tests,”¹⁸ and the United States ranks seventeenth in the world in high school graduation rate.¹⁹ Student performances during college and after college are similar: the United States ranks fourteenth in the world in college graduation rate, and thirteenth in the world in doctoral graduation rates.²⁰ The United States does not lead the world in the number of researchers per capita,²¹ and even U.S. companies are offshoring their research and development efforts.²² General Electric, a company founded by American Thomas Edison,²³ now has more research and development employees located outside of the United States than within it.²⁴ General Electric is not alone. According to the National Science Foundation, almost

14. Alex L. Pasternack, *World's Largest Particle Accelerator Offers Window into Laws of Nature*, CNN.COM (May 17, 2011, 11:31 AM), <http://www.cnn.com/2011/TECH/innovation/05/11/motherboard.hadron.collider/index.html>; Brian Vastag, *Tevatron Atom Smasher's Close Ends Era of Big Science*, WASH. POST (Sept. 29, 2011), http://www.washingtonpost.com/national/health-science/tevatron-atom-smashers-close-in-illinois-ends-era-of-big-science/2011/09/29/gIQAR9SK8K_story.html.

15. *Main Science and Technology Indicators Database*, OECD, 1, 14–17 (June 2012), <http://www.oecd.org/dataoecd/27/52/47406944.pdf>. Sweden, Finland, Denmark, Switzerland, Israel, Japan, and South Korea all spend more on research and development as a percentage of GDP than the United States spends. *Id.* at 15.

16. ESTRIN, *supra* note 4, at 151.

17. AUGUSTINE, *supra* note 12, at 30–34.

18. INNOVATE AMERICA, *supra* note 11, at 49; *see also Staying Competitive*, NAT'L MATH + SCIENCE INITIATIVE, <http://www.nationalmathandscience.org/solutions/challenges/staying-competitive> (last visited Mar. 2, 2013) (reporting alarming statistics regarding the performance of U.S. schools vis-à-vis foreign educational systems).

19. AUGUSTINE, *supra* note 12, at 19.

20. *Id.*; *New Doctorate Graduates*, OECD iLIBRARY, http://www.oecd-ilibrary.org/sites/sti_scoreboard-2011-en/02/01/index.html?contentType=&itemId=/content/book/sti_scoreboard-2011-en&containerItemId=/content/book/sti_scoreboard-2011-en&accessItemIds=&mimeType=text/html (last visited Mar. 2, 2013). To make matters worse, the United States ranks twenty-sixth in the world in the percentage of doctoral degrees that are awarded in science and engineering. *Id.*

21. *Main Science and Technology Indicators Database*, *supra* note 15.

22. *See* Pisano & Shih, *supra* note 12, at 116.

23. *Thomas Edison & GE*, GE.COM, <http://www.ge.com/company/history/edison.html> (last visited Mar. 2, 2013).

24. Ron Hira, *U.S. Workers in a Global Job Market*, ISSUES IN SCI. & TECH. ONLINE (Spring 2009), <http://www.issues.org/25.3/hira.html> (last visited Mar. 2, 2013).

a quarter of all research and development workers employed by U.S. companies work outside of the United States.²⁵

Unfortunately, the weakening of American innovation could not come at a worse time, as the United States struggles to overcome a crippling economic recession.²⁶ Innovation and economic prosperity are closely linked in that “innovation provides the fuel for economic expansion.”²⁷ Indeed, economists estimate that innovation accounts for the majority of growth in the U.S. economy.²⁸ Innovation also has a significant impact on competition within global markets, and today many markets are global because “aviation and telecommunication revolutions have conspired to make distance increasingly irrelevant.”²⁹ In these global markets, domestic businesses will often lose market share to more innovative foreign competitors. As the National Academy of Science, the National Academy of Engineers, and the Institute of Medicine stated in 2010, “A nation that does not embrace innovation will soon be left behind in the 21st century economy.”³⁰

Because of the connection between innovation and domestic economic prosperity, our political leaders have argued that America should refocus its attention on innovation to overcome its recent economic woes. Specifically, U.S. politicians contend that American innovation will help U.S. businesses capture greater shares of global markets. For example, in his 2011 State of the Union address, President Obama argued: “The future is ours to win. But to get there, we can’t just stand still.”³¹ President Obama noted that other countries have made great technological progress and urged Americans to “out-innovate . . . the rest of the world.”³² The Obama Administration later stated that patent law is a “critical”

25. Francisco Moris & Nirmala Kannankutty, *New Employment Statistics from the 2008 Business R&D and Innovation Survey*, NAT’L SCI. FOUND. INFOBRIEF 1 (July 2010), <http://www.nsf.gov/statistics/infbrief/nsf10326/nsf10326.pdf> (last visited Mar. 2, 2013).

26. Bob Willis, *U.S. Recession Worst Since Great Depression, Revised Data Show*, BLOOMBERG, (Aug. 1, 2009), <http://www.bloomberg.com/apps/news?pid=news archive&sid=aNivTjr852TI> (last visited Mar. 2, 2013).

27. INNOVATE AMERICA, *supra* note 11, at 37.

28. *See infra* notes 52–53 and accompanying text.

29. AUGUSTINE, *supra* note 12, at 1. As one commentator has observed, globalization has “made Boston and Bangalore next-door neighbors.” THOMAS L. FRIEDMAN & MICHAEL MANDELBAUM, *THAT USED TO BE US: HOW AMERICA FELL BEHIND IN THE WORLD IT INVENTED AND HOW WE CAN COME BACK* 62 (2011).

30. *See, e.g.*, GATHERING STORM, REVISITED, *supra* note 12, at 42; *accord* AUGUSTINE, *supra* note 12, at 67 (“The choice is straightforward: in the 21st century, a developed nation can either innovate or evaporate.”).

31. President Obama, *supra* note 1.

32. *Id.* In the 2012 State of the Union address, President Obama similarly warned, “Don’t let other countries win the race for the future.” President Barack Obama, Remarks by the President in State of Union Address (Jan. 24, 2012), *available at* <http://www.presidency.ucsb.edu/ws/index.php?pid=99000>.

mechanism for achieving this goal.³³

Congress agreed with President Obama, and in the fall of 2011 it passed the America Invents Act,³⁴ which enacted the most sweeping changes to patent law since 1952. Congressional sponsors for the Act insisted that it would help Americans compete against foreign rivals. Senator Patrick Leahy claimed that the Act would “give American inventors and innovators the 21st century patent system they need to compete.”³⁵ Representative Lamar Smith likewise stated that “[w]e need to modernize our patent system to maintain U.S. global competitiveness and bolster the economy.”³⁶ Other members of Congress agreed that the reforms would “increase our competitiveness.”³⁷ With bipartisan support uncommon in an era of bitter partisanship, the Act passed,³⁸ and President Obama quickly signed it into law.³⁹ In a speech the same day, President Obama reiterated: “[I]f we’re going to create jobs now and in the future, we’re going to have to . . . out-innovate every other country on Earth.”⁴⁰ President Obama claimed that “[t]his change in our patent laws is part of our agenda for making us competitive over the long term.”⁴¹

The appeal to U.S. politicians of using patent law to boost American competitiveness is perhaps understandable, as invention, innovation, and competition are closely linked. The goal of patent law is to encourage the discovery of new inventions,⁴² and the conventional view is that patent law

33. NAT’L ECONOMIC COUNCIL, ET AL., *supra* note 2, at 2; *see also* INNOVATE AMERICA, *supra* note 11, at 11 (arguing that the United States must “[c]reate a 21st Century Intellectual Property Regime”).

34. Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011).

35. Sen. Leahy, *supra* note 3.

36. Rep. Smith, *supra* note 4.

37. Press Release, Senator Al Franken, Sen. Franken: Long-Overdue Patent Reform Will Create U.S. Jobs (Sept. 8, 2011), *available at* http://franken.senate.gov/?p=press_release&id=1721; Press Release, Sen. Chris Coons, Senator Coons Praises Senate Progress in Passing Sweeping Patent Reform Legislation (Sept. 6, 2011), *available at* <http://coons.senate.gov/newsroom/releases/release/senator-coons-praises-senate-progress-in-passing-sweeping-patent-reform-legislation>.

38. *See* Sen. Chris Coons, *supra* note 37.

39. Press Release, The White House Office of the Press Secretary, President Obama Signs America Invents Act, Overhauling the Patent System to Stimulate Economic Growth, and Announces New Steps to Help Entrepreneurs Create Jobs (Sept. 16, 2011), *available at* <http://www.whitehouse.gov/the-press-office/2011/09/16/president-obama-signs-america-invents-act-overhauling-patent-system-stim> (noting that “the President’s Council on Jobs and Competitiveness . . . has been a strong advocate for patent reform as a way to support job creation and strengthen America’s competitiveness in the global economy”).

40. *Id.*

41. *Id.*

42. By constitutional directive, patent law encourages invention by “securing for limited Times to . . . Inventors the exclusive Right to their respective . . . Discoveries.” U.S. CONST. art I, § 8, cl. 8. Not all new discoveries, however, are patentable inventions. *Bilski v. Kappos*, 130 S. Ct. 3218, 3225 (2010) (stating that laws of nature, physical phenomena, and abstract ideas cannot be patented).

achieves this goal by providing incentives to invent in the form of exclusive rights to an invention.⁴³ Commercializing new inventions may yield innovative products, services, or processes, and these innovations may significantly affect competition.⁴⁴

Surprisingly, although legal scholars recognize the potential of patent law to affect competition, they overlook the possibility that U.S. patent law⁴⁵ might help American inventors and companies effectively compete against foreign rivals.⁴⁶ Typically, legal scholars analyze patent law from a law-and-economics perspective under which the goal of patent law is the general promotion of economically efficient invention, ignoring the nationality of the inventor.⁴⁷ Competitive concerns, such as which countries' inventors receive patents, have received almost no attention from legal scholars.⁴⁸ However, if changes to U.S. patent law affect

43. See 35 U.S.C. § 271 (2006).

44. See Brett M. Frischmann & Mark A. Lemley, *Spillovers*, 107 COLUM. L. REV. 257, 259 n.4 (2007) ("We use the term innovation . . . to refer to the process of research, invention, and development and refinement of new ideas."); see also Harry Surden, *Efficient Uncertainty in Patent Interpretation*, 68 WASH. & LEE L. REV. 1737, 1740–55 (2011) (describing effects of patent law on innovation). Admittedly, some inventions may have little commercial value. See, e.g., U.S. Patent No. 6,490,999 (filed Aug. 29, 2001) (describing a collar for walking a snake); U.S. Patent No. 6,293,874 (filed Jan. 4, 2000) (describing "a user-operated and controlled apparatus for self-infliction of repetitive blows to the user's buttocks").

45. "Patent law" is a vague and ambiguous term. Under a broad reading, patent law includes all laws related to patents. Under such a broad reading, patent law would include a provision of the tax code allowing an inventor to deduct costs related to obtaining a patent. See 26 U.S.C. § 174 (2006). Under a broad reading, patent law would also include laws related to the ownership of patents produced using funding from the Federal Government. See 35 U.S.C. §§ 200–12 (2006). Under a narrower interpretation, however, patent law includes only the laws related to the availability, scope, and enforcement of exclusive rights created by patents. This Article uses this narrower meaning of patent law.

46. Robert C. Bird, *Law, Strategy, and Competitive Advantage*, 44 CONN. L. REV. 61, 64 (2011) ("[T]he notion that law may be a source of competitive advantage remains largely unexplored.")

47. Surden, *supra* note 44, at 1743; see, e.g., DAN L. BURK & MARK A. LEMLEY, *THE PATENT CRISIS AND HOW THE COURTS CAN SOLVE IT* 7–8 (2009) (examining the costs and benefits of patents); ROBERT P. MERGES, ET AL., *INTELLECTUAL PROPERTY IN THE NEW TECHNOLOGICAL AGE* 13 (5th ed. 2010) ("Patent law provides a market-drive incentive to invest in innovation, by allowing the inventor to appropriate the full economic rewards of her invention."); Stuart J.H. Graham et al., *High Technology Entrepreneurs and the Patent System: Results of the 2008 Berkeley Patent Survey*, 24 Berkeley Tech. L.J. 1255, 1283 (2009) (stating that "the patent monopoly is most commonly justified on the ground of providing incentives to innovate"); Mark A. Lemley, *Ex Ante Versus Ex Post Justifications for Intellectual Property*, 71 U. CHI. L. REV. 129, 129 (2004) ("The traditional economic justification for intellectual property is well known. Ideas are public goods: they can be copied freely and used by anyone who is aware of them without depriving others of their use."); see also Ted Sichelman, *Commercializing Patents*, 62 STAN. L. REV. 341, 357–58, 377 (2010).

48. In the few instances in which scholars have analyzed distributive concerns, the focus is on distributive justice. For example, scholars have examined the impact of patent law on racial minorities, Shubha Ghosh, *Race-Specific Patents, Commercialization, and Intellectual Property*

domestic inventors more than foreign inventors, U.S. patent law may affect the competitiveness of American firms in global markets—for better or for worse. This Article thus begins to fill this void in the literature by considering the relative effects of U.S. patent law incentives to invent for domestic and foreign inventors.⁴⁹

This Article makes three contributions to the scholarship regarding patent law and global competition. First, it applies competition analysis to patent law, highlighting the importance of competitive considerations in an increasingly global economy. Second, this Article evaluates whether patent law can use three mechanisms to increase U.S. incentives to invent relative to foreign inventors: (1) protectionist patent laws, (2) patent laws that improve the processing of patent applications by the U.S. Patent and Trademark Office, and (3) patent laws that support a culture in the United States that fosters innovation. From these perspectives, this Article assesses the capacity of the recent America Invents Act to boost U.S. inventiveness, and concludes that the law likely will provide little enhanced incentive for U.S. invention. Finally, by identifying limitations of U.S. patent law in fostering domestic competitive advantage, this Article highlights the importance of considering alternate approaches to boosting U.S. competitiveness.

Following this Introduction, this Article proceeds in five parts. Part II assesses the importance of relative incentives to invent. It considers whether the United States must “out-innovate every other country on Earth”⁵⁰ in order to obtain economic prosperity, and it examines the current invention and innovation capacity of the United States vis-à-vis other countries. That Part concludes that relative levels of invention and innovation between the United States and other countries are important to U.S. economic prosperity and that the United States’ capacity to invent likely has diminished compared to other countries. Part III analyzes whether protectionist patent law can effectively increase domestic incentives to invent and concludes that this approach should be avoided because it would ultimately undermine American prosperity. Part IV examines whether U.S. patent law can provide American inventors and businesses with relatively enhanced incentives to invent by improving the

Policy, 56 BUFF. L. REV. 409, 416 (2008), and developing countries, Jerome H. Reichman, *Intellectual Property in the Twenty-First Century: Will the Developing Countries Lead or Follow?*, 46 HOUS. L. REV. 1115, 1120 (2009).

49. Conversely, nonlegal commentators focusing on competition issues have occasionally asserted that patent law is important to American economic prosperity but have not analyzed whether U.S. patent law can help American inventors be more productive than their foreign counterparts. See, e.g., AUGUSTINE, *supra* note 12, at 67; ESTRIN, *supra* note 4, at 171 (asserting that the U.S. patent system should be reformed); KAO, *supra* note 12, at 232; INNOVATE AMERICA, *supra* note 11, at 68–70; NAT’L ECONOMIC COUNCIL, ET AL., *supra* note 2, at 8; GATHERING STORM, REVISITED, *supra* note 12, at 57.

50. President Obama, *supra* note 39.

processing of patent applications by the U.S. Patent and Trademark Office. That Part concludes that typical approaches to improving patent examination, like the America Invents Act, will have little effect on American inventors, at least vis-à-vis foreign inventors. Part V examines whether U.S. patent law can relatively increase U.S. incentives to invent through a less traditional use of law: using patent law to promote social norms and values among Americans that contribute to invention and innovation. That Part concludes that the expressive impact of patent law may help but the magnitude of this effect is unclear. Part VI concludes by summarizing and by identifying additional avenues for research. In particular, given the obstacles to using U.S. patent law to create competitive advantage in inventing, other areas of law may be better tools to help U.S. companies and inventors compete in a global marketplace.

I. U.S. INNOVATION AND THE U.S. ECONOMY

A. *The Importance of Out-Innovating the World*

Innovation is unquestionably vital to the American economy.⁵¹ The U.S. Department of Commerce estimates that innovation produced almost 75% of the growth in the U.S. economy since World War II.⁵² Similarly, economists contend that as much as 80% of growth in the gross domestic economy stems from the introduction of new technologies.⁵³ But is President Obama correct that the United States must “out-innovate . . . the rest of the world”?⁵⁴

In one sense, President Obama may be overstating the importance of superlative innovation. Countries that “out-innovate” the United States may enjoy greater economic growth than the United States, but second-rate economic growth may still be significant. Moreover, the United States may gain from economic prosperity in foreign countries.⁵⁵ U.S. consumers

51. In this Article, innovation is “defined broadly, to include both improvements in technology and better methods or ways of doing things.” PORTER, *supra* note 12, at 45.

52. ARTI RAI ET AL., U.S. DEP’T OF COMMERCE, PATENT REFORM: UNLEASHING INNOVATION, PROMOTING ECONOMIC GROWTH & PRODUCING HIGH-PAYING JOBS 2 (2010). Other estimates are lower, but still significant. See INNOVATE AMERICA, *supra* note 11, at 36 (stating that “economists estimate [that innovation] has accounted for half of U.S. GDP growth over the past 50 years”); see also ESTRIN, *supra* note 4, at 142 (“The growth of the U.S. economy has become dependent on the small, innovative companies that have thrived for decades in places like Silicon Valley.”).

53. KAO, *supra* note 12, at 21–22; see Robert M. Solow, *Technical Change and the Aggregate Production Function*, 39 REV. ECON. & STAT. 312, 320 (1957) (finding that technological change accounted for 87.5% of increases in labor productivity between 1909 and 1949). For his work regarding innovation and economic growth, Robert Solow won the 1987 Nobel Prize in Economics. *The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 1987*, NOBELPRIZE.ORG, http://www.nobelprize.org/nobel_prizes/economics/laureates/1987/ (last visited on Mar. 2, 2013).

54. President Obama, *supra* note 39.

55. See ESTRIN, *supra* note 4, at 155 (asserting that global economic growth will promote

“may benefit from lower import prices and a greater variety of imports,”⁵⁶ and U.S. citizens may be able to invest in foreign companies.⁵⁷ “Similarly, a prosperous world will provide more potential customers for U.S. products and cheaper and more diverse products for U.S. consumers.”⁵⁸ However, two considerations indicate that President Obama may be correct that unsurpassed domestic innovation is important to the United States.

First, innovation affects the capacity of domestic companies⁵⁹ to compete successfully against foreign rivals.⁶⁰ “Prosperity is not necessarily a zero-sum game, but there will inevitably be winners and losers.”⁶¹ As more markets become global, domestic businesses face greater pressure from international competition.⁶² “[F]irms gain and sustain competitive advantage in international competition through improvement, innovation, and upgrading.”⁶³ This process of improving goods and services is ongoing because the advantages of today’s products are superseded by tomorrow’s innovations.⁶⁴ Recent experience in the music industry illustrates the importance of innovation. Few people today buy vinyl records,⁶⁵ and even

U.S. economic prosperity); KAO, *supra* note 12, at 242–43 (asserting that “what is good for the world is good for the United States”); PORTER, *supra* note 12, at 30; Thomas L. Friedman, *What Goes Around...*, N.Y. TIMES, Feb. 26, 2004, <http://www.nytimes.com/2004/02/26/opinion/what-goes-around.html> (“What goes around comes around, and also benefits Americans.”).

56. Mary Amity & Kevin Stiroh, *Is the United States Losing Its Productivity Advantage?*, 13 CURRENT ISSUES IN ECON. & FIN. 1, 1 (2007), available at http://www.newyorkfed.org/research/current_issues/ci13-8.html; see also Catherine Rampell, *‘Made in China,’ but Still Profiting Americans*, N.Y. TIMES, Aug. 15, 2011, <http://economix.blogs.nytimes.com/2011/08/15/made-in-china-but-still-profiting-americans/> (noting that domestic businesses profit from the sale of imports).

57. See, e.g., FRIEDMAN & MANDELBAUM, *supra* note 29, at 28–29 (discussing American investment in companies in India).

58. AUGUSTINE, *supra* note 12, at 20.

59. Admittedly, it is difficult to clearly identify which businesses are “U.S. businesses.” See *id.* at 26; Pisano & Shih, *supra* note 12, at 8. Some businesses may be located in the United States but owned by foreign investors. AUGUSTINE, *supra* note 12, at 26. For simplicity, “U.S. business” in this Article refers to a business that contributes to the U.S. GDP. Foreign businesses contribute to the American economy. Pisano & Shih, *supra* note 12, at 8. There may, however, be particularly significant economic benefits to a country when a foreign business locates its headquarters in that country. See PORTER, *supra* note 12, at 69–70 (“The home base is where strategy is set, core products and process development takes place, and the essential and proprietary skills reside.”).

60. See AUGUSTINE, *supra* note 12, at 17, 20.

61. *Id.* at 20; accord GATHERING STORM, REVISITED, *supra* note 12, at 19.

62. See AUGUSTINE, *supra* note 12, at 1 (“The aviation and telecommunication revolutions have conspired to make distance increasingly irrelevant.”).

63. PORTER, *supra* note 12, at 70; accord GATHERING STORM, REVISITED, *supra* note 12, at 43.

64. See PORTER, *supra* note 12, at 50–51.

65. Recently, sales of vinyl records have increased, perhaps because of their high sound quality. Eliot Van Buskirk, *Vinyl May Be Final Nail in CD’s Coffin*, WIRED (Oct. 29, 2007), http://www.wired.com/entertainment/music/commentary/listeningpost/2007/10/listeningpost_1029. Nevertheless, sales of vinyl records are miniscule compared to compact discs (CDs) and internet downloads. See *2010 Year-End Shipment Statistics*, RECORDING INDUS. ASS’N OF AM., <http://76.74>.

CD sales are declining as online sales of music have increased.⁶⁶ A music company that fails to adjust to these technological changes cannot compete. More generally, American companies must innovate in global markets, or they will lose market share.⁶⁷ In the face of declining market share, those non-innovating U.S. companies will employ fewer American workers and pay less in U.S. taxes.⁶⁸

Domestic innovation also affects the global competitiveness of U.S. workers, and “[t]he possession of quality jobs is the foundation of a high quality life for the nation’s citizenry.”⁶⁹ Unfortunately, many U.S. jobs are in jeopardy.⁷⁰ By one estimate, nearly a third of all jobs in the United States could potentially be exported to foreign workers.⁷¹ This offshoring is particularly likely because foreign labor, both skilled and unskilled, is often far cheaper than American labor.⁷² For example, “eight engineers can be hired in India for the cost of one in the United States. Five chemists can be employed in China for the cost of one in the United States.”⁷³ Advances in

24.142/548C3F4C-6B6D-F702-384C-D25E2AB93610.pdf (last visited Mar. 2, 2013).

66. In 2010 alone, CD sales dropped more than 20%; in contrast, downloads of music increased significantly. See *2010 Year-End Shipment Statistics*, *supra* note 65.

67. Not all innovations significantly affect market share. For example, if Honda develops an innovative new latch for a car door, Ford may not lose significant market share. Consumers may not consider the innovation significant enough to adjust their buying habits. Similarly, other aspects of a product, such as brand recognition, may overshadow even substantial innovations.

68. See *GATHERING STORM, REVISITED*, *supra* note 12, at 5, 17–18. Promoting innovation may not guarantee that the United States will be a good place for all businesses. Countries that promote innovation might be well-suited for research and development functions but not manufacturing. For example, Apple received a great deal of attention for its innovations, but Apple employs only about 50,000 people. See *Zakaria*, *supra* note 4. In contrast, Foxconn, which produces many of Apple’s products, employs 1,000,000 people. *Id.* Nevertheless, promoting innovation will help the U.S. economy even if some aspects of a business remain tied to foreign economies. If research and development functions are conducted in the United States, the U.S. economy will benefit more than if those activities were located in other countries.

69. *GATHERING STORM, REVISITED*, *supra* note 12, at 2.

70. See *AUGUSTINE*, *supra* note 12, at 65–66 (explaining that American businesses can thrive by outsourcing while U.S. workers become unemployed).

71. Alan S. Blinder, *How Many US Jobs Might Be Offshorable?*, 10 *WORLD ECON.* 41, 69 (2009) (estimating that “between 22% and 29% of all of the jobs in the 2004 US workforce” could be “offshored”). Investing in foreign companies will not sufficiently offset domestic losses because nearly half of all Americans do not invest in stocks. Dennis Jacobo, *In U.S., 54% Have Stock Market Investments, Lowest Since 1999*, *GALLUP* (Apr. 20, 2011), <http://www.gallup.com/poll/147206/Stock-Market-Investments-Lowest-1999.aspx>.

72. See *AUGUSTINE*, *supra* note 12, at 28–29.

73. *Id.* at 28. If U.S. workers are less innovative than workers in other countries, even U.S. companies may outsource their research and development to centers in foreign countries. See *id.* at 63 (reporting that “only 41% of the global corporations responding to a recent survey ranked the United States as an ‘attractive’ location for new R&D facilities, compared with 62% for China”); *KAO*, *supra* note 12, at 39 (“More than 40 percent of our high-tech companies invest in substantial R&D operations overseas, and at least a third of them are intent upon increasing their foreign stakes in R&D capability.”). This approach to innovation for U.S. companies may be short-sighted,

technology that enhance the productivity of U.S. workers may protect these U.S. jobs from international outsourcing. Furthermore, innovation can generate new employment opportunities in the United States because “the creation of new, high-quality jobs is today disproportionately dependent upon advances in science and engineering.”⁷⁴

The second reason that superlative innovation is important to the U.S. economy is that exceptional economic growth is necessary to “sustain[] the lifestyle which has come to be enjoyed—and expected—by America’s citizenry.”⁷⁵ U.S. citizens are some of the wealthiest people on the planet. Among developed countries, the United States has the second highest median household income.⁷⁶ To maintain these exceptional income levels, American businesses and workers must compete effectively in global markets, and domestic innovation is critical to that competition.⁷⁷ In the words of one commentator, “What’s at stake is nothing less than the future prosperity and security of our nation.”⁷⁸

B. Current U.S. Innovation Performance

Although measuring innovation is difficult,⁷⁹ it does not appear that the United States is “out-innovat[ing] . . . the rest of the world.”⁸⁰ The Introduction highlighted a number of troubling facts regarding U.S. innovation. Other measures also indicate problems. For example, economic analysts have compiled global innovation rankings that rely on multiple factors related to innovation, and the rankings of the United States in these studies are disquieting.⁸¹ The Information Technology and Innovation

however, because innovation “thrives in face-to-face interactions and in fruitful collaborations among engineering, marketing, and management.” ESTRIN, *supra* note 4, at 138; accord KAO, *supra* note 12, at 40–41. Businesses likewise benefit when their research and development sectors are close to their marketing and manufacturing centers. See PORTER, *supra* note 12, at 93.

74. AUGUSTINE, *supra* note 12, at 15; accord GATHERING STORM, REVISITED, *supra* note 12, at 18.

75. GATHERING STORM, REVISITED, *supra* note 12, at 41.

76. OECD, SOCIETY AT A GLANCE 2011: OECD SOCIAL INDICATORS 43 (2011).

77. See Pisano & Shih, *supra* note 12, at 2; Zvi Griliches, *Patent Statistics as Economic Indicators: A Survey*, 28 J. ECON. LITERATURE 1661, 1698 (1990) (noting that “the ‘required’ number of inventions for a steady positive rate of growth in productivity has also to grow”).

78. KAO, *supra* note 12, at 3.

79. See Michael E. Porter & Scott Stern, *Innovation: Location Matters*, 42 MIT SLOAN MGMT. REV. 28, 31 (2001) (“Of course, no single measure of innovation is ideal.”).

80. President Obama, *supra* note 1.

81. See ROBERT D. ATKINSON & SCOTT M. ANDES, THE INFO. TECH. & INNOVATION FOUND., THE ATLANTIC CENTURY II: BENCHMARKING EU & U.S. INNOVATION AND COMPETITIVENESS, 20–23 (2011), available at <http://www.itif.org/files/2011-atlantic-century.pdf>; EUROPEAN BUSINESS SCHOOL, THE INNOVATION FOR DEVELOPMENT REPORT 2010–2011: INNOVATION AS A DRIVER OF PRODUCTIVITY AND ECONOMIC GROWTH x–xi (Augusto López-Claros ed., 2011), available at http://www.innovationfordevelopmentreport.org/papers/ICIranks2010_11.pdf; JAMES P. ANDREW ET AL., INNOVATION 2010: A RETURN TO PROMINENCE—AND THE EMERGENCE OF A NEW WORLD ORDER

Foundation recently released a study comparing the innovative capacity of forty different countries.⁸² The study considered sixteen factors to measure innovation capacity in each country, including the number of science and technology researchers; the amount of capital invested in research; the number of scholarly publications; the availability of technological infrastructure such as high-speed Internet; tax rates; gross domestic product per working-age adult; and worker productivity.⁸³ The study concluded that the United States ranked fourth, behind Singapore, Finland, and Sweden.⁸⁴ Most alarming, however, was the study's consideration of investment in innovation in the past twelve years. In that comparison, the United States ranked an abysmal *thirty-ninth* in research and *forty-third* overall.⁸⁵ Another multifactor analysis of innovation ranked the United States fifth in the world in 2011.⁸⁶ Similarly, in a 2010 Boston Consulting Group report identifying new, innovative companies, six out of seven companies were from outside the United States.⁸⁷ Likewise, a report by the *Economist* evaluated the capacity of different countries to capitalize on information technologies and ranked the United States third.⁸⁸

Patents provide another gauge of the innovation output of different countries. A patent gives a person the exclusive right to use a new technology in the country that issued the patent. For example, a U.S. patent gives its owner the exclusive right to make, use, sell, and offer for sale an invention in the United States.⁸⁹ These rights encourage an inventor to invest time and resources in developing new technology by allowing the inventor to obtain supracompetitive profits during the period of exclusivity.⁹⁰ Because of the value of patents, important innovations are

17 (2010), available at <http://tobiaslist.files.wordpress.com/2010/06/innovation-2010-bcg.pdf>; see also ECONOMIST INTELLIGENCE UNIT, DIGITAL ECONOMY RANKINGS 2010: BEYOND E-READINESS 3–4 (2010), available at http://www-935.ibm.com/services/us/gbs/bus/pdf/eiu_digital-economy-rankings-2010_final_web.pdf (ranking the countries' digital development).

82. See ATKINSON & ANDES, *supra* note 81, at 9.

83. *Id.* at 5.

84. *Id.* at 9.

85. See *id.* at 11.

86. See EUROPEAN BUSINESS SCHOOL, *supra* note 81, at x–xi.

87. See ANDREW ET AL., *supra* note 81, at 17. Three companies are from China, one is from Japan, one is from Taiwan, and one is from Brazil. *Id.*

88. ECONOMIST INTELLIGENCE UNIT, *supra* note 81, at 2, 4. Some other studies evaluating U.S. innovation are more optimistic. See WORLD ECON. FORUM, THE GLOBAL COMPETITIVENESS REPORT 2010–2011 340 (Klaus Schwab ed., 2010) (ranking the United States first in “innovation” but fourth in overall “competitiveness”); INNOVATE AMERICA, *supra* note 11, at 36 (“America today is a clear No. 1 in productive innovation.”).

89. See 35 U.S.C. § 271(a) (2006).

90. See *id.* U.S. patents are particularly valuable because the United States economy is the largest market in the world according to GDP. See *The World Factbook, Field Listing: GDP (Official Exchange Rate)*, CENT. INTELLIGENCE AGENCY, <https://www.cia.gov/library/publications/the-world-factbook/fields/2195.html> (last visited Mar. 2, 2013).

frequently patented.⁹¹ Moreover, in many countries, patents provide data regarding the nationality of the inventor who obtained the patent. As a result, patent activity can serve as a proxy for the innovation output of different countries.⁹² Americans are not leading the world in patenting. For example, in 2011, Japanese inventors received 304,604 patents in various patent offices around the world.⁹³ In contrast, American inventors received only 201,158 patents.⁹⁴ This trend likely will continue, as Japanese inventors are also filing more patent applications than American inventors, although the gap may be narrowing: In 2011, Japanese inventors outpaced their American counterparts by more than 40,000 patent applications.⁹⁵ U.S. inventors are even struggling to maintain dominance in the U.S. Patent and Trademark Office. Since 2008, foreign inventors have received more than 50% of the patents issued by the U.S. Patent and Trademark Office.⁹⁶ In 1963, foreign inventors accounted for just 18.6% of U.S.

91. Indeed, patent numbers closely correlate with other measures of innovation. See Griliches, *supra* note 77, at 1673 (noting the “strong relationship between R&D and the number of patents received”); Porter & Stern, *supra* note 79, at 30.

92. Importantly, however, patents are only a proxy for innovation, and not a precise measure. First, some companies do not consider patents to be important for competition. See Graham et al., *supra* note 47, 1290 fig. 1. Other forms of intellectual property, such as trade secrets, may protect inventions. *Id.* Second, even when inventions are patented, they may not be commercialized. Sichelman, *supra* note 47, at 343–44; see also Elizabeth Webster & Paul H. Jensen, *Do Patents Matter for Commercialization?*, 54 J. L. & ECON. 431, 431 (2011) (finding that “a patent grant had no effect on the decision to proceed with the commercialization process”); *supra* notes 42–44 and accompanying text. Indeed, some patents are invalid because they do not describe sufficiently new technology. See *Microsoft Corp. v. i4i Ltd. P’ship*, 131 S. Ct. 2238, 2242–43 (2011). Some patents thus do not reflect innovation. See Frischmann & Lemley, *supra* note 44, at 259 n.4 (distinguishing between “invention” and “innovation”). Finally, even among patents that are commercialized, the number of patents that different industries obtain often varies. Other things being equal, inventors in patent-intensive industries will obtain more patents than inventors in other industries. As a result, differences in patent quantities between inventors from different countries may stem from one country’s economy involving more patent-intensive industries, rather than a difference in the capacity of the inventors from the countries to develop new, commercially significant ideas. Despite these concerns, patent counts can serve as a meaningful proxy for the number of inventions a country produces. See Griliches, *supra* note 77, at 1673, 1702 (arguing that “patents may indeed be a good indicator of unobserved inventive output”); Porter & Stern, *supra* note 79, at 31 (measuring innovative output by the number of patents granted).

93. Appendix A *infra* (tabulating patent and patent application data from the World Intellectual Property Organization).

94. *Id.*

95. *Id.*

96. See Patent Tech. Monitoring Team, *U.S. Patent Statistics, Calendar Years 1963–2011*, U.S. PATENT & TRADEMARK OFFICE (May 22, 2012), available at http://www.uspto.gov/web/offices/ac/ido/oeip/taf/us_stat.pdf. When a patent issues to multiple inventors, the U.S. Patent and Trademark Office only reports the nationality of the first inventor listed on the patent. Patent Tech. Monitoring Team, *Patents By Country, State, and Year—Utility Patents (December 2011)*, U.S. PATENT & TRADEMARK OFFICE, available at http://www.uspto.gov/web/offices/ac/ido/oeip/taf/cst_utl.htm. On patents with both a foreign and a U.S. inventor, there is no reason to expect that the

patents.⁹⁷ Matters are worse when adjusted for population. The United States is the third most populous country in the world.⁹⁸ If innovation is to drive economic prosperity in the United States, then the United States likely will need more innovations than a less populous country.⁹⁹ Among major patenting countries in 2011, the United States ranked *ninth* in patents per capita.¹⁰⁰ Per capita, Japanese inventors received more than three times as many patents as U.S. inventors in 2011.¹⁰¹

Thus, by many measures, the United States trails other countries in innovating.¹⁰² Indeed, many commentators argue that the United States is beginning to suffer from an “innovation gap.”¹⁰³ In the words of one commentator, “America’s economy is in danger of losing what has always been our greatest competitive advantage: our genius for innovation.”¹⁰⁴ The remainder of this Article addresses whether U.S. patent law can help U.S. inventors close this gap by providing U.S. entities with enhanced incentives to invent vis-à-vis the incentives for foreign inventors.

foreign inventor will be listed first more frequently than the U.S. inventor. As a result, if the U.S. Patent and Trademark Office were to track the nationalities of all inventors, the ratio of foreign to domestic inventors would probably remain unchanged. *See also infra* note 340 (discussing similar issues for patent statistics reported by the World Intellectual Property Organization).

97. Patent Tech. Monitoring Team, *U.S. Patent Statistics, Calendar Years 1963–2011*, *supra* note 96.

98. *Population 2011*, World Development Indicators Database, THE WORLD BANK, available at <http://databank.worldbank.org/databank/download/POP.pdf>.

99. GATHERING STORM, REVISITED, *supra* note 12, at 46 (arguing that “the size of the economy to be maintained affects the size of the effort needed for its maintenance”). Per capita patent figures favor countries in which much of the industry is focused on technologically sophisticated industries. For example, if every employable citizen in a country were in a technologically sophisticated industry, the citizenry of such a country would produce more patents on a per capita basis than a country where only a handful of people are focused on developing new technology.

100. *See Appendix A infra* (calculating patents per capita and patent applications per capita using figures from the World Intellectual Property Organization and the World Bank). Similarly, for per capita patent application in 2011, the United States ranked tenth. *Id.*

101. *Id.*

102. INNOVATE AMERICA, *supra* note 11, at 37 (noting that “we now face much more serious competitive challenges from new centers of innovation across an increasingly interconnected planet”).

103. *E.g.*, ESTRIN, *supra* note 4, at 4–5 (arguing that America “has lost the core values that were the catalysts of its [innovation] success”); KAO, *supra* note 12, at 2 (asserting that America’s “capacity for innovation is eroding”); INNOVATE AMERICA, *supra* note 11, at 38; Lechleiter, *supra* note 4 (stating that “America’s economy is in danger of losing what has always been our greatest competitive advantage: our genius for innovation”); *see also* AUGUSTINE, *supra* note 12, at 4 (stating that “America is rapidly losing its competitive position”).

104. Lechleiter, *supra* note 4; *accord* Daniel McGinn, *The Decline of Western Innovation: Why America Is Falling Behind and How to Fix It*, NEWSWEEK, Nov. 23, 2009, at 34 (stating that in a 2009 survey, only 41% of Americans stated that the United States “is staying ahead of China on innovation”).

II. PROTECTIONISM AND U.S. PATENT LAW

One potential mechanism for using U.S. patent law to give American companies and American inventors relatively enhanced incentives to invent would be for U.S. patent law explicitly to favor American interests in awarding and enforcing patents. For example, federal law could require that the U.S. Patent Office prioritize the review of applications from American inventors, apply more lenient standards when examining patent applications filed by American citizens, or charge different application fees depending on inventor nationality. U.S. patent law could also be facially neutral but still discriminate against foreign inventors. For instance, U.S. patent law could deny patent protection for inventions that lacked domestic manufacturing in the United States. These types of protectionist patent laws might help domestic innovators obtain patents and thus might increase the returns on investments in innovation in the United States.

This Part examines the capacity of U.S. patent law to implement a protectionist agenda, and begins by examining the extent to which U.S. patent law historically has embraced protectionism. Next, this Part examines the extent to which international treaties prevent the United States from enacting protectionist patent law and determines that the United States would risk international sanctions if it were to return to its protectionist past. Finally, in light of these risks, this Part considers whether implementing protectionist patent law would make domestic firms more innovative than their foreign rivals.

A. *Protectionist Roots in U.S. Patent Law*

In the past, U.S. patent law was often explicitly protectionist. For example, under the Patent Act of 1793, U.S. patents could only issue to “a citizen or citizens of the United States.”¹⁰⁵ In 1800, Congress amended the Patent Act to extend patent eligibility to foreign inventors, but only if those inventors resided in America for two years and took an oath of their intention to become United States citizens.¹⁰⁶ For more than forty years, the United States offered no patent protection to the discoveries of nonresident foreign inventors, so that “foreign inventions could be introduced to America without the additional cost of the inventor’s monopoly rights.”¹⁰⁷ In 1836, Congress amended the Patent Act to allow nonresident foreign inventors to obtain U.S. patents,¹⁰⁸ but simultaneously introduced a protectionist scheme of patent application fees. The fee

105. Patent Act of 1793 § 1, ch. 11, 1 Stat. 318, 318–19.

106. S. REP. NO. 24-239 (1836), available at http://ipmall.info/hosted_resources/lipa/patents/Senate_Report_for_Bill_No_293.pdf.

107. Susan Sell, *Intellectual Property and Public Policy in Historical Perspective: Contestation and Settlement*, 38 LOY. L.A. L. REV. 267, 286 (2004) (internal quotation marks and citation omitted).

108. Patent Act of 1836 § 8, ch. 357, 5 Stat. 117, 120.

schedule required that a U.S. citizen pay \$30 to file a patent application, a “subject of the King of Great Britain” pay \$500, and any other nonresident noncitizen pay \$300 to file an application for a U.S. patent.¹⁰⁹ Protectionist application fees remained in place until 1870, when Congress established uniform fees for all patent applicants regardless of nationality or residency.¹¹⁰

Even after the elimination of discriminatory fees, U.S. patent law retained protectionist elements, particularly in addressing concurrent invention by American and foreign inventors. For instance, the Patent Act of 1870 established a “caveat” system that, until 1903, was only available to U.S. citizens and foreign inventors who “resided in the United States one year next preceding the filing of [their] caveat[s], and made oath[s] of [their] intention[s] to become . . . citizen[s].”¹¹¹ Under this system, an inventor could file with the Patent Office an abbreviated patent application called a “caveat” that would serve as a placeholder for a normal patent application. If another inventor later filed an application on the same invention, the first inventor could file a patent application, which the U.S. Patent and Trademark Office would treat as if it were filed on the date the inventor filed the caveat.¹¹² The caveat thus preserved an inventor’s chronological priority while giving the inventor an opportunity to allow the “invention or discovery . . . to mature” into a commercially successful endeavor.¹¹³ If an invention did not prove commercially viable, an inventor who filed a caveat would have avoided the greater expense of filing a complete patent application.¹¹⁴

Significant protectionist features of U.S. patent law existed as recently as 1994.¹¹⁵ Prior to that time, U.S. patent law favored American inventors over nonresident foreign inventors regarding the establishment of “invention dates.” For more than a century, certain issues in U.S. patent law depended on the date an invention was discovered. For example, an inventor could not obtain a patent if “the invention was . . . described in a printed publication . . . before the invention thereof [that is, before the

109. Patent Act of 1836 § 9, ch. 357, 5 Stat. 117, 121 (stating that a foreign inventor could avoid these heightened fees if he “ha[d] been resident in the United States for one year . . . and . . . made oath of his intention to become a citizen thereof”).

110. Patent Act of 1870 §§ 24–25 & 68, ch. 230, 16 Stat. 198, 201, 209; *see also* Nuno Pires de Carvalho, *The Primary Function of Patents*, 2001 U. ILL. J.L. TECH. & POL’Y 25, 43 n.90 (2001).

111. Patent Act of 1870 at § 40, ch. 230, 16 Stat. 198, 204; The Patent Act of 1903 § 4, ch. 1019, 32 Stat. 1225, 1227 (extending the caveat system to foreign, nonresident inventors).

112. Patent Act of 1870 § 40, ch. 230, 16 Stat. 198, 203 (stating that by statute, a caveat would only protect an inventor for one year).

113. *Id.*

114. Patent Act of 1870 §§ 40, 68, ch. 230, 16 Stat. 198, 203, 209 (showing that caveat applications were shorter than patent applications and also involved smaller fees).

115. *See* K. William Watson, *Still a Protectionist Trade Remedy: The Case for Repealing Section 337*, Policy Analysis no. 708, Cato Institute, Sept. 19, 2012, at 1, 5.

invention date].”¹¹⁶ Similarly, when two people discovered the same invention and both applied for patents, U.S. patent law awarded a patent only to the person with the earlier invention date, even if the first person to invent was the second person to apply for a patent.¹¹⁷ In determining dates of invention, U.S. patent law disfavored foreign inventors in that “an applicant for a patent . . . may not establish a date of invention by reference to . . . activity with respect thereto, in a foreign country.”¹¹⁸

As a result, foreign, nonresident inventors usually could not establish invention dates that were earlier than the dates they filed U.S. patent applications because they performed the activities relevant to establishing the invention date in foreign jurisdictions.¹¹⁹ In contrast, most American inventors performed these activities within the United States. Because of this protectionist difference, a foreign inventor could fail to obtain a U.S. patent even if the foreign inventor discovered an invention before its American counterpart.¹²⁰ The protectionist restrictions of this aspect of U.S. patent law significantly diminished over time. For example, in 1994, Congress amended the Patent Act so that inventive activity in foreign countries that are members of the World Trade Organization (WTO) could be used to establish invention dates under U.S. patent law.¹²¹ For non-WTO countries,¹²² this protectionist provision of U.S. patent law was not eliminated until 2011.¹²³

116. 35 U.S.C. § 102(a) (2006); *see also* Patent Act of 1870 § 24, ch. 230, 16 Stat. 198, 201 (preventing a person from obtaining a patent on an invention that had been “described in any printed publication in this or any foreign country, before his invention or discovery thereof”).

117. *See, e.g.*, *Griffith v. Kanamaru*, 816 F.2d 624, 625–26 (Fed. Cir. 1987) (discussing invention dates). When determining which inventor was first, U.S. patent law defined the date of invention as the date that an idea was initially conceived, provided that the first person to conceive of an invention was diligent in reducing that conception to practice. *See infra* note 182 and accompanying text.

118. Patent Act of 1952, Pub. L. No. 82-593, § 104, ch. 950, 66 Stat. 792, 798.

119. *See, e.g.*, *Rousseau v. Brown*, 21 App. D.C. 73, 79 (1903).

120. *See id.*

121. Uruguay Round Agreements Act, Pub. L. No. 103-465, tit. 5, 108 Stat. 4809, 4973–89 (1994) (codified at 35 U.S.C. § 104 (2006)).

122. At present, there are 157 countries that are members of the WTO. *See Understanding the WTO: The Organization, Members and Observers*, WORLD TRADE ORG., http://www.wto.org/english/thewto_e/whatis_e/tif_e/org6_e.htm (last visited Mar. 2, 2013).

123. Pub. L. No. 112-29, § 3(d), (n), 125 Stat. 287, 293 (2011). Some other provisions of U.S. law that are related to patent law arguably are still protectionist. For example, 35 U.S.C. § 204 (2006) states that a small business or nonprofit organization that receives a patent for an invention discovered using federal funds shall not grant an exclusive license to use an invention in the United States unless the licensee “agrees that any products embodying the subject invention or produced through the use of the subject invention will be manufactured substantially in the United States.” As noted, this is not the type of law included in the term “patent law” for this Article. *See supra* note 45.

B. *The Legality of Protectionist U.S. Patent Law*

U.S. patent law could favor U.S. interests by resurrecting the protectionism historically embraced by U.S. patent law. For example, the U.S. Patent and Trademark Office could examine patent applications filed by American inventors before applications filed by foreign inventors.¹²⁴ Similarly, Congress could require that foreign inventors pay larger filing fees.

Such protectionist actions, however, would violate the terms of international treaties that the United States has joined. For example, in 1887, the United States signed the Paris Convention for the Protection of Industrial Property (Paris Convention).¹²⁵ Article 2 of this treaty provides:

The subjects or citizens of each of the contracting States shall enjoy, in all the other States of the Union, so far as concerns patents for inventions, trade or commercial marks, and the commercial name, the advantages that the respective laws thereof at present accord, or shall afterwards accord to subjects or citizens. In consequence they shall have the same protection as these latter, and the same legal recourse against all infringements of their rights, under reserve of complying with the formalities and conditions imposed upon subjects or citizens by the domestic legislation of each State.¹²⁶

Similarly, in 1994, the United States signed the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs).¹²⁷ Article 3 of TRIPs states that “[e]ach Member shall accord to the nationals of other

124. Indeed, as recently as June 2010, the U.S. Patent Office proposed delaying the examination of many applications submitted by foreign inventors. Enhanced Examination Timing Control Initiative, 75 Fed. Reg. 31,764 (June 4, 2010). Specifically, the U.S. Patent and Trademark Office proposed regulations that would accelerate the examination of some patent applications while delaying the examination of others. *Id.* As part of a scheme, the U.S. Patent and Trademark Office recommended delaying the examination of any U.S. patent application that relied on a foreign patent application for a filing date. *Id.* At present, however, this part of the proposal has not been implemented. *See* Changes to Implement the Prioritized Examination Track (Track 1) of the Enhanced Examination Timing Control Procedures, 76 Fed. Reg. 18,399 (Apr. 4, 2011) (to be codified at 37 C.F.R. pt. 1) (implementing part of the proposed changes but not the portion dealing with U.S. applications based on foreign patent applications). The Korean Intellectual Property Office objected to the proposed delay. Letter from Jeong-yeol Park, Director General, Electronic and Electric Examination Bureau, Korean Intellectual Property Office, to Robert L. Stoll, Commissioner for Patents, U.S. Patent and Trademark Office (Aug. 20, 2010), http://www.uspto.gov/patents/law/comments/3track_kipo_20aug2010.pdf.

125. Paris Convention for the Protection of Industrial Property, Mar. 20, 1883, 25 Stat. 1372.

126. *Id.* at art. 2. The Paris Convention also prohibits some laws that are facially neutral but have differential impact on foreign inventors. For example, the Paris Convention states that “no requirement as to domicile . . . may be imposed.” *Id.*

127. Agreement on Trade-Related Aspects of Intellectual Property Rights, Annex 1C to the Marrakesh Agreement Establishing the World Trade Organization, Apr. 15, 1994 1869 U.N.T.S. 299 [hereinafter “TRIPs Agreement”].

Members treatment no less favorable than that it accords its own nationals with regard to the protection of intellectual property.”¹²⁸ Furthermore, under Article 27 of TRIPs, patent rights must be available “without discrimination as to the place of invention, . . . and whether products are imported or locally produced.”¹²⁹

Although these treaties appear to prohibit protectionist U.S. patent law, their effect is limited in two ways. First, Congress can repudiate these treaties by passing a contrary statute, like a protectionist provision of patent law. The U.S. Constitution declares that “all Treaties made, or which shall be made, under the Authority of the United States, shall be the supreme Law of the Land.”¹³⁰ However, “Congress has the power, accepted since at least 1798, to terminate, or repudiate, treaty obligations altogether.”¹³¹ As an administrative agency, the power of the U.S. Patent and Trademark Office to repudiate a treaty may be more limited than Congress’s. The U.S. Patent and Trademark Office may nevertheless be able to embrace protectionism because of the second limit on the scope of these two treaties: They cannot be applied in U.S. courts. Treaties can only be judicially enforced if they are “self-executing,” in which case courts apply such treaties like federal statutes.¹³² If a treaty is held to be “non-self-executing,” supporting federal legislation is required to give legal effect to the treaty’s provisions.¹³³ Significantly, courts have generally held that the Paris Convention and TRIPs are not self-executing.¹³⁴ As a result, if the U.S. Patent and Trademark Office were to implement a protectionist agenda, foreign inventors and businesses could not bring challenges in U.S. courts.¹³⁵

128. *Id.* at art. 3(1). “Protection” in this provision “shall include matters affecting the availability, acquisition, scope, maintenance and enforcement of intellectual property rights.” *Id.* at art. 3 n.3. The antiprotectionist provisions of TRIPs and the Paris Convention overlap. John F. Duffy, *Harmony and Diversity in Global Patent Law*, 17 BERKLEY TECH. L.J. 685, 703 (2002).

129. TRIPs Agreement, *supra* note 127, at art. 27(1).

130. U.S. CONST. art. VI.

131. Tim Wu, *Treaties’ Domains*, 93 VA. L. REV. 571, 587 (2007).

132. *ITC Ltd. v. Punchgini, Inc.*, 482 F.3d 135, 161 n.21 (2d Cir. 2007); Wu, *supra* note 131, at 578.

133. Wu, *supra* note 131, at 579–80. Determining whether a treaty is self-executing is a complicated analysis involving many factors. *Id.*

134. *ITC Ltd.*, 482 F.3d at 161 (holding that TRIPs is not self-executing); *In re Rath*, 402 F.3d 1207, 1210–11 n.2 (Fed. Cir. 2005); *Int’l Café, S.A.L. v. Hard Rock Café Int’l, Inc.*, 252 F.3d 1274, 1277 n.5 (11th Cir. 2001) (holding that the Paris Convention is not self-executing); *Caveats for Patents for Inventions*, 19 Op. Att’y Gen. 273, 275–76 (1889) (holding that there are classes of treaties that are not self-executing). *But see* *Vanity Fair Mills v. T. Eaton Co.*, 234 F.2d 633, 640 (2d Cir. 1956) (stating in dicta that the Paris Convention is self-executing).

135. For example, in 1889 a Swiss inventor challenged under the Paris Convention the provision of U.S. patent law barring nonresident foreign inventors from filing caveats. *Caveats for Patents for Inventions*, 19 Op. Att’y Gen. 273, 274–75 (1889). In a published opinion, the U.S. Attorney General agreed that the Paris Convention conflicted with U.S. patent law but nevertheless held that the Paris Convention “requires legislation to render it effective for the modification of

Although these treaties provide little obstacle to protectionism under federal law, they may nonetheless be enforced through international enforcement mechanisms. The Paris Convention provides that “[a]ny dispute between two or more countries . . . concerning the interpretation or application of this Convention, not settled by negotiation, may, by any one of the countries concerned, be brought before the International Court of Justice.”¹³⁶ Under TRIPs, a foreign country could initiate enforcement proceedings in the World Trade Organization.¹³⁷ In fact, the United States has initiated numerous dispute resolution proceedings under TRIPs.¹³⁸ In some instances, the United States has used WTO enforcement mechanisms to attack protectionist patent laws of other countries.¹³⁹ Similarly, another country could use the enforcement mechanisms of the WTO and TRIPs to oppose protectionist patent law in the United States, and a successful challenge to protectionist U.S. patent law would entitle the prevailing country to enact retaliatory measures.¹⁴⁰

C. Policy Concerns with Protectionism

Although the United States might incur international sanctions for returning U.S. patent law to its protectionist roots, the United States has the ability to do so. If the domestic benefits of protectionism outweigh the costs, protectionist patent law might increase American prosperity.

existing [U.S. patent] laws.” *Id.* at 279.

136. Paris Convention for the Protection of Industrial Property, art. 28(1), Sept. 28, 1979 (as amended).

137. TRIPs Agreement, *supra* note 127, at art. 64; *see also* Understanding on Rules and Procedures Governing the Settlement of Disputes, Annex 2 of the Marrakesh Agreement Establishing the World Trade Organization, art. 23, Apr. 15, 1994, 33 I.L.M. 1125, 1226 (1994) [hereinafter Annex 2 of the Marrakesh Agreement] (describing WTO dispute resolution proceedings). Because TRIPs incorporates the antiprotectionist provisions of the Paris Convention, an aggrieved country could also invoke WTO dispute resolution mechanisms to address a violation of Article 2 of the Paris Convention. TRIPs Agreement, *supra* note 127, art. 2(1).

138. *See Dispute Settlement: The Disputes, Disputes by Agreement*, WORLD TRADE ORG., http://www.wto.org/english/tratop_e/dispu_e/dispu_agreements_index_e.htm?id=A26#selected_agreement (last visited Mar. 2, 2013).

139. For example, in May 2000, the United States initiated proceedings against Brazil because Brazil’s patent laws stated that a patent was subject to compulsory licensing if the subject matter of the patent was not manufactured in Brazil. Request for Consultations by the United States, *Brazil—Measures Affecting Patent Protection*, WT/DS199/1 (June 8, 2000). Although facially neutral, such a provision favors Brazilian industries because they are naturally more likely to manufacture products in Brazil. The United States argued that this provision of Brazilian patent law violated the prohibition in TRIPs of “discrimination regarding the availability of patents and the enjoyment of patent rights on the basis of whether products are imported or locally produced.” Request for the Establishment of a Panel by the United States, *Brazil—Measures Affecting Patent Protection*, WT/DS199/3 (Jan. 9, 2001). After the WTO constituted a panel to resolve the issue, the United States and Brazil settled. Notification of Mutually Agreed Solution, *Brazil—Measures Affecting Patent Protection*, WT/DS199/4 (July 19, 2001).

140. Annex 2 of the Marrakesh Agreement, *supra* note 137, at art. 23.

However, protectionism likely would not increase American innovation.

In general, governments eschew protectionism because it is economically inefficient.¹⁴¹ For example, if tariffs on imported goods prevent foreign businesses from selling equivalent products at lower prices than domestic rivals, then those tariffs actually create economic losses.¹⁴² Protectionism nevertheless might be defended on the theory that, even if it reduces *global* economic prosperity, it increases *domestic* prosperity because it protects domestic manufacturers.¹⁴³ For example, if Chinese companies can more cheaply manufacture computers than U.S. businesses, U.S. tariffs on Chinese computers might help some domestic manufacturers, at least in the short term.¹⁴⁴ However, for almost two hundred years, economists have argued that protectionism reduces domestic prosperity.¹⁴⁵ In general, protectionist tariffs on imports raise prices and thus create deadweight losses, in part because some domestic consumers cannot afford to pay the higher prices.¹⁴⁶ Protectionism also reduces domestic prosperity by insulating domestic businesses from the competitive pressures that lead to the development of superior products and services.¹⁴⁷ As John Stuart Mill argued in 1848, protectionist tariffs “render the labour and capital of the country less efficient in production than they would otherwise be.”¹⁴⁸

For these same reasons, even if protectionist patent law might increase the incentives for American inventors to discover new ideas, it likely would undermine American innovation. For example, if protectionist patent law increased the price of inventions in the United States, some U.S. consumers and U.S. businesses would be unable to afford these increased prices. Protectionist patent laws would also shield American inventors from competitive pressures that spur innovation, and American inventors

141. Duffy, *supra* note 128, at 702; John O. McGinnis & Mark L. Movsesian, *The World Trade Constitution*, 114 HARV. L. REV. 511, 521 (2000).

142. NIGEL GRIMWADE, *INTERNATIONAL TRADE POLICY: A CONTEMPORARY ANALYSIS* 22–24 (1996).

143. Certainly, politicians who promote protectionism often claim to be helping domestic industries.

144. See McGinnis & Movsesian, *supra* note 141, at 522 (noting that “free trade does not make everyone within a nation better off, at least in the short term”). See generally DOUGLAS A. IRWIN, *AGAINST THE TIDE: AN INTELLECTUAL HISTORY OF FREE TRADE* 92 (1996).

145. IRWIN, *supra* note 144, at 93 (“All the leading economists of the first half of the nineteenth century—James Mill, David Ricardo, Robert Torrens, John Stuart Mill, John Ramsay McCulloch, Nassau Senior, to mention but the most eminent—wrote . . . in favor of free trade and stood in virtual unanimity against protectionist import duties.”).

146. GRIMWADE, *supra* note 142, at 24. Protectionism regarding innovation may increase domestic welfare if domestic innovation “has important spillover effects on other sectors of the economy.” *Id.* at 32. Even in this situation, however, a direct subsidy of domestic innovation would be better than protectionist patent law. *Id.*

147. PORTER, *supra* note 12, at 30.

148. JOHN STUART MILL, *PRINCIPLES OF POLITICAL ECONOMY* 917 (1909).

might actually become less innovative.¹⁴⁹ Finally, protectionist U.S. patent law might also undermine domestic prosperity by prompting other countries to enact their own protectionist measures.¹⁵⁰ Indeed, as described above, protectionist U.S. patent law would violate TRIPs, and the WTO's dispute resolution procedures encourage aggrieved countries to address violations through action in "the same sector(s) as that in which . . . [there has been] a violation."¹⁵¹

III. TYPICAL APPROACHES TO IMPROVING U.S. PATENT OFFICE PROCEDURES

Protectionism is not the only way that law can help American companies and inventors compete against foreign rivals. Protectionism shields domestic businesses from competitive forces in the naïve hope of increasing domestic prosperity. Sometimes, however, domestic entities outperform their foreign rivals simply because they are better able to compete in global markets. Such innovators have a "competitive advantage" over their rivals.¹⁵² More specifically, a competitive advantage is "a value-creating strategy using firm resources to improve a firm's efficiency or effectiveness in ways not in use by current or potential competitors."¹⁵³

Many factors contribute to competitive advantage, including law.¹⁵⁴ For example, federal law governs the use of the airwaves for radio transmissions throughout the United States.¹⁵⁵ If the federal government were to make more bandwidth available for commercial use, innovators

149. PORTER, *supra* note 12, at 30.

150. Of course, the extent to which foreign governments and researchers retaliate against U.S. inventors depends upon the nature of U.S. protectionist measures. Some protectionist measures may be less inflammatory than others.

151. Annex 2 of the Marrakesh Agreement, *supra* note 137, at art. 22. Protectionist U.S. patent law thus may undermine the efforts of U.S. inventors to obtain foreign patents. Importantly, foreign patents provide U.S. inventors with significant returns: from 1995 to 2009, U.S. inventors obtained approximately 41% of their patents in foreign jurisdictions. See Econ. and Statistics Div., *Patent Grants by Country of Origin and Patent Office (1995-2010)*, WORLD INTELLECTUAL PROP. ORG., (Dec., 2011), http://www.wipo.int/export/sites/www/ipstats/en/statistics/patents/xls/wipo_pat_grant_by_origin_office_table.xls.

152. See generally PORTER, *supra* note 12, at 129–30 (describing competitive advantage in global markets).

153. Bird, *supra* note 46, at 71.

154. See PORTER, *supra* note 12, at 70 (noting that certain conditions encourage "firms [to] improve and innovate and continue to do so faster and in the proper directions compared to their international rivals"). See generally MIHALY CSIKSZENTMIHALYI, *CREATIVITY: FLOW AND THE PSYCHOLOGY OF DISCOVERY AND INVENTION* 326–30 (1996) (discussing ways to increase "the proportion of people showing the traits of creativity"); Bird, *supra* note 46, at 71–76, 78–80 (modeling the determinates of competitive advantage in global markets).

155. 47 U.S.C. § 151 (2006) (empowering the Federal Communications Commission to regulate "communication by wire and radio").

located in the United States might be better able to develop new wireless technologies than foreign counterparts operating in countries where less bandwidth is available for innovation.¹⁵⁶ A change in the regulation of the airwaves therefore might encourage domestic competitive advantage without protectionist side effects.¹⁵⁷ Importantly, unlike protectionism, laws that create competitive advantage for domestic businesses do not reduce domestic or global prosperity.¹⁵⁸ Instead, laws that promote U.S. competitive advantage *increase* global welfare and simultaneously enable the United States to capture a greater share of global markets.¹⁵⁹

As described above, patent law is closely related to competition.¹⁶⁰ Valuable patent rights encourage firms and individuals to discover new inventions, and new ideas are central to success in international competition.¹⁶¹ This Part assesses whether U.S. patent laws can provide American entities with competitive advantages by creating relatively enhanced incentives for these entities to invent.

A. Examples

In the past, some simple aspects of U.S. patent law have provided American companies and inventors with enhanced incentives to invent without being protectionist. One example is the use of the English language by the U.S. Patent and Trademark Office. American inventors are more likely to speak English than foreign inventors, who may face significant translation costs both in understanding U.S. patent laws and in drafting U.S. patent applications.¹⁶² Cheaper access to U.S. patents likely

156. Indeed, the Federal Communications Commission recently required changes to television broadcasts in part to “allow[] some of the spectrum to be auctioned to companies that will be able to provide consumers with more advanced wireless services (such as wireless broadband).” *Learn About DTV: Frequently Asked Questions*, DTV.GOV, <http://www.dtv.gov/consumercorner.html> (last visited Mar. 2, 2013). *But see* PORTER, *supra* note 12, at 82–83 (discussing the impact of overcoming shortcomings on innovation).

157. Law can also create competitive disadvantages through restrictive regulations. For example, the German chemical company BASF recently announced plans to move a major research facility focusing on genetically modified organisms from Germany to the United States because “there is still a lack of acceptance for this technology in many parts of Europe—from the majority of consumers, farmers and politicians.” *BASF to Concentrate Plant Biotechnology Activities on Main Markets in North and South America*, BASF (Jan. 16, 2012), <http://www.basf.com/group/pressrelease/P-12-109>.

158. *See* PORTER, *supra* note 12, at 631 (discussing how policy that promotes innovation must also encompass competition, and how technological progress that addresses these concerns not only helps the technology industry, but the entire national industry as well).

159. Within some industries, the competitive advantages of foreign rivals may stem from economic conditions that are unique to that country that the United States cannot emulate. PORTER, *supra* note 12, at 194–95.

160. *See supra* notes 42–49, 59–69 and accompanying text.

161. *Id.*

162. Patent applications may be filed “in a language other than English.” Patents, Trademarks,

provides American inventors with a small competitive advantage because U.S. patents—and only U.S. patents—provide exclusive rights to make, use, or sell an invention throughout the United States, which is the largest market in the world.¹⁶³

Similarly, in the past the existence and strength of U.S. patent law may have provided American inventors with a domestic competitive advantage because strong patent laws favor innovators over imitators, and American companies historically have been world-leading innovators.¹⁶⁴ Without patent law, American businesses might not have been able to recover the investments required to develop new technologies.¹⁶⁵ Foreign competitors could have copied American innovations and undercut American inventors' prices because the foreign copies would not have needed to include development costs in their pricing.¹⁶⁶ Based on such fears, the United States was a major proponent of international treaties, particularly TRIPs, that required all signatories to enact laws providing for robust patent rights.¹⁶⁷ Countries whose citizens produce fewer inventions may benefit from weaker patent protection.¹⁶⁸

Today, these two sources of competitive advantage likely are eroding. The use of English in U.S. patent law may not provide significant competitive advantage in the near future because citizens of many

and Copyrights, 37 C.F.R. § 1.52(d) (2011). Before a patent can be examined by the U.S. Patent and Trademark Office, however, a patent applicant must provide an English language translation of the application, a statement that the translation is accurate, and an additional processing fee. *Id.*

163. AUGUSTINE, *supra* note 12, at 61. A foreign inventor may face lower costs in obtaining a foreign patent, but that patent is less valuable because it applies to a smaller market. Recent patent activities in Europe demonstrate the potential impact of foreign languages on competitive advantage. Europe lacks a unified patent system, despite widespread agreement that such a system would benefit Europe. See Joe Kirwin, *Much Celebrated Breakthrough on EU's Patent System Proves to Be a Bit Premature*, 84 Pat. Trademark & Copyright J. (BNA) 401 (2012). For years, disagreements among European countries regarding the official languages to be used in a unified patent system have blocked unification efforts. *Id.* Recently, the European Commission proposed a unified patent system using only English, French, and German as languages, prompting Spain and Italy to object. *Id.*

164. See Duffy, *supra* note 128, at 695–96 (noting that countries with many innovators favor patent protection, while countries with many copyists do not). For a long time, U.S. inventors apparently obtained more patents than inventors from any other country in the world. Econ. & Statistics Div., *Total Number of Patent Grants (1985–2009) by Resident and Non-Resident*, WORLD INTELLECTUAL PROP. ORG., <http://www.wipo.int/ipstats/en/statistics/patents/> (follow “Total number of patent grants (1985–2009) by resident and non-resident” hyperlink to XLS or CSV file) (last visited Mar. 2, 2013) (reporting patent grants by patent office, broken down by resident and nonresident from 1883–2009).

165. See William Hubbard, *Inventing Norms*, 44 CONN. L. REV. 369, 374–75 (2011) (discussing how inventors monetize their inventions).

166. MERGES ET AL., *supra* note 47, at 12.

167. Duffy, *supra* note 128, at 688, 695.

168. *Id.* at 695–96.

countries around the world are learning English.¹⁶⁹ By one estimate, “China graduates more English-speaking engineers than the United States.”¹⁷⁰ Moreover, the magnitude of any “English advantage” may be decreasing because U.S. patents soon may not be the most valuable type of patents in the world: “Between 2012 and 2020, China will pass the United States to become the largest consumer market in the world.”¹⁷¹ As a result, cheap access to Chinese patents may become as important as cheap access to U.S. patents. Similarly, strong U.S. patent law by itself may be insufficient to provide domestic competitive advantage because foreign inventors obtain many U.S. patents.¹⁷² In fact, in some technological areas, foreign inventors obtain more U.S. patents than U.S. inventors.¹⁷³

B. *Improving the U.S. Patent and Trademark Office*

Traditionally, patent scholars and policymakers attempt to improve the workings of the U.S. Patent and Trademark Office by reducing (1) the cost and duration of the examination of patent applications and (2) the number of invalid patents¹⁷⁴ issued by the U.S. Patent and Trademark Office.¹⁷⁵ Indeed, President Obama and the congressional supporters of the America Invents Act contend that the Act achieves all of the traditional types of improvements to the processes of the U.S. Patent and Trademark Office, and that these improvements will increase American competitiveness in global markets.¹⁷⁶ This Section reviews the alleged improvements to the procedures of the U.S. Patent and Trademark Office and analyzes whether these traditional types of improvements will provide American entities with enhanced incentives to invent vis-à-vis foreign inventors.¹⁷⁷

169. By some accounts, the number of English speakers in China will soon exceed the number of English speakers in the United States. John Gregg, *Jon Huntsman says more English speakers in China than United States*, POLITIFACT.COM (Aug. 19, 2011, 4:46 PM), <http://www.politifact.com/truth-o-meter/statements/2011/aug/19/jon-huntsman/jon-huntsman-says-more-english-speakers-china-unit/>.

170. AUGUSTINE, *supra* note 12, at 44.

171. *Id.* at 61.

172. *See supra* notes 96–101 and accompanying text.

173. *See infra* note 219 (discussing technological areas in which foreign inventors obtain more U.S. patents than U.S. inventors). *But see infra* notes 209–12.

174. A U.S. patent can be invalid for many reasons. *See* 35 U.S.C. §§ 102–03, 112.

175. For a sample of typical approaches to improving the processing of patent applications by the U.S. Patent and Trademark Office, *see generally supra* note 47 and accompanying text.

176. Sen. Chris Coons, *supra* note 37; Sen. Franken: Long-Overdue Patent Reform Will Create U.S. Jobs, *supra* note 37; Sen. Patrick Leahy, Comment of Senator Leahy on the Senate Motion to Proceed to the America Invents Act, *supra* note 3; President Obama, *supra* note 39; Rep. Smith, *supra* note 4; *see also* NATIONAL ACADEMY OF SCIENCES ET AL., RISING ABOVE THE GATHERING STORM: ENERGIZING AND EMPLOYING AMERICA FOR A BRIGHTER ECONOMIC FUTURE 187–88 (2007) (arguing that the United States should shift to a first-to-file system to “increase the efficiency and predictability of the US system”).

177. The Act contains other provisions that may improve the speed and quality of patent

1. Improvements in the America Invents Act

The America Invents Act contains numerous, significant changes to U.S. patent law that are designed to reduce the cost and delay of obtaining a U.S. patent.¹⁷⁸ For example, in previous years, some of the fees that the U.S. Patent and Trademark Office collected were used to support other parts of the Federal Government. The Act ensures that the U.S. Patent and Trademark Office will retain more of its fees.¹⁷⁹ With more money, the Patent and Trademark Office can hire more patent examiners and purchase better equipment, thereby decreasing the time required to examine patent applications. The Act also reduces the cost of filing patent applications for certain inventors working for small businesses.¹⁸⁰

Perhaps the largest, potentially cost-saving, reform in the Act is the change from a “first-to-invent” system to a “first-to-file” system.¹⁸¹ Under the older first-to-invent system, important aspects of patent law depended upon the “invention date” for a discovery, which was defined as the date an inventor conceived of an idea, provided that the inventor was sufficiently diligent in reducing that conception to practice.¹⁸² For example, an inventor could not obtain a patent for a discovery that was “known or used by others in this country . . . before the invention thereof by the applicant for patent.”¹⁸³ Similarly, when two separate inventors sought to obtain patents on the same discovery, the inventor with the earlier invention date would receive the patent.¹⁸⁴ In contrast, for both of these issues, a first-to-file system uses the dates that inventors actually file patent applications, not the invention dates.¹⁸⁵ Because an inventor conceives of an invention well before filing a patent application, the determinative dates in a first-to-invent system are sometimes earlier than the corresponding dates under a first-to-file system.¹⁸⁶ This difference in dates can affect both the validity

examination by the U.S. Patent and Trademark Office.

178. See, e.g., Sen. Franken, *supra* note 37.

179. See Leahy–Smith America Invents Act, Pub. L. No. 112-29, § 22, 125 Stat. 284 (2011).

180. *Id.* § 10 (providing reduced filing fees for applicants that are “micro entities”).

181. *Id.* § 3. Compare 28 U.S.C. § 102(g), with Leahy–Smith America Invents Act § 3.

182. 35 U.S.C. §§ 102(a), 102(g). Conception occurs “when the inventor has a specific, settled idea, a particular solution to the problem at hand” *Creative Compounds, LLC v. Starmark Labs.*, 651 F.3d 1303, 1312 (Fed. Cir. 2011) (quoting *Burroughs Wellcome Co. v. Barr Labs., Inc.*, 40 F.3d 1223, 1228 (Fed. Cir. 1994)). “In order to establish an actual reduction to practice, the inventor must prove that: (1) he constructed an embodiment or performed a process that met all the limitations of the interference count; and (2) he determined that the invention would work for its intended purpose.” *Cooper v. Goldfarb*, 154 F.3d 1321, 1327 (Fed. Cir. 1998).

183. 35 U.S.C. § 102(a).

184. *Id.* § 102(g).

185. Leahy–Smith America Invents Act, Pub. L. No. 112-29, § 3, 125 Stat. 284 (2011). Even under the older first-to-invent system, some aspects of patent validity depended upon the filing date. See, e.g., 35 U.S.C. § 102(b) (referencing “the date of the application for patent”).

186. Under the old first-to-invent system, a patent applicant could use the patent application filing date as the constructive date of conception and reduction to practice. *Solvay S.A. v.*

and ownership of patents. For example, if a discovery was groundbreaking on the date of conception but common knowledge by the time the inventor filed a patent application, the inventor might be able to obtain a patent under a first-to-invent system but not under a first-to-file system.¹⁸⁷ Likewise, in a first-to-file system, the first person to file a patent application will have priority and receive the patent.¹⁸⁸ The outcome may be different in a first-to-invent system, where the second person to file a patent application will receive the patent if she establishes an earlier conception date and demonstrates diligent reduction to practice.¹⁸⁹

Proponents of the shift to a first-to-file system argued that a first-to-file system was cheaper and faster to operate than a first-to-invent system in at least two respects.¹⁹⁰ First, because conception and reduction to practice are fact-intensive issues, determining invention dates is complicated and expensive.¹⁹¹ For example, “[c]onception is complete only when the idea is so clearly defined in the inventor’s mind that only ordinary skill would be necessary to reduce the invention to practice, without extensive research or experimentation.”¹⁹² As a result, determining conception requires detailed investigation into the “inventor’s mind,” the level of “ordinary skill,” and the difficulty of “reduc[ing] the invention to practice.”¹⁹³ Moreover, much information regarding these issues is not publicly available, such as the inventor’s mental state prior to filing a patent application.

Challenges in determining invention dates under the first-to-invent system can hamper the efforts of patent owners, patent examiners, and

Honeywell Int’l., Inc., 622 F.3d 1367, 1376 (Fed. Cir. 2010).

187. See 35 U.S.C. § 102(a) (stating that “[a] person shall be entitled to a patent unless . . . the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent . . .”); *id.* § 103 (“A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.”). Under the America Invents Act, some public disclosures up to one year before the date a patent application is filed do not prevent an inventor from obtaining a patent. Leahy–Smith America Invents Act § 3.

188. The America Invents Act also establishes new “derivation proceedings” that prevent a person from obtaining a patent by copying an invention from an inventor and filing a patent application before that inventor files a patent application. Leahy–Smith America Invents Act § 3. Derivation proceedings, however, must be initiated “within the 1-year period beginning on the date of the first publication of a claim to an invention . . .” *Id.*

189. 35 U.S.C. § 102(g); see also *Griffith v. Kanamaru*, 816 F.2d 624, 629 (Fed. Cir. 1987) (awarding a patent to the first inventor to file a patent application because the second inventor to file an application was not diligent in reducing his prior conception to practice).

190. Alexander Poltorak, *First-to-File vs. First-to-Invent*, WEALTH OF IDEAS NEWSL., Oct. 2007, at 40, available at http://www.generalpatent.com/ip_articles/Poltorak-IPToday-Apr2008.pdf.

191. *Id.*

192. *Burroughs Wellcome Co. v. Barr Labs., Inc.*, 40 F.3d 1223, 1228 (Fed. Cir. 1994).

193. *Id.*

competitors to assess the validity of a patent or patent application.¹⁹⁴ Likewise, near simultaneous inventors in a first-to-invent patent system may incur substantial costs in resolving competing claims to the same discovery.¹⁹⁵ In contrast, determining priority dates in a first-to-file system is quick and inexpensive. Patent filing dates are easy to identify and published online.

A second reason that a first-to-file system may be cheaper than a first-to-invent system is that nearly every other patent office in the world uses a first-to-file system rather than a first-to-invent system.¹⁹⁶ Consequently, proponents of the America Invents Act argued that the Act “would make it easier for U.S. inventors to get innovations patented overseas because they would not have to prepare applications for two different systems.”¹⁹⁷

The America Invents Act also contains numerous provisions designed to reduce the number of invalid patents issued by the U.S. Patent and Trademark Office. For example, the America Invents Act creates a new process through which third parties can submit information “of potential relevance to the examination of [an] application,” including a statement explaining the relevance of the information.¹⁹⁸ Prior to the Act, U.S. patent law allowed third parties to submit to the U.S. Patent and Trademark Office “patents or publications relevant to a pending published application” but prohibited third parties from including “any explanation of the patents or publications, or any other information.”¹⁹⁹ Expanding the capacity of third parties to help the U.S. patent examiners evaluate patent applications may reduce the number of invalid patents that the U.S. Patent and Trademark Office issues.²⁰⁰ The America Invents Act also may improve the quality of U.S. patents by expanding the administrative procedures available to third parties for challenging the validity of issued U.S. patents. Even before the Act, a third party could challenge a U.S. patent’s validity through an administrative process known as reexamination, but U.S. patent law limited these proceedings in two significant respects.²⁰¹ First, reexamination could only address “a

194. See Sean T. Carnathan, *Patent Priority Disputes—A Proposed Re-Definition of “First-to-Invent,”* 49 ALA. L. REV. 755, 793 n.190 (1998).

195. *Id.* at 793.

196. *Id.* at 757.

197. Rep. Smith, *supra* note 4.

198. Leahy–Smith America Invents Act, Pub. L. No. 112-29, § 8, 125 Stat. 284 (2011). Submitted information must be in the form of “a patent application, any patent, published patent application, or other printed publication . . .” *Id.*

199. 37 C.F.R. §§ 1.99(a), (d) (2012); see also 35 U.S.C. § 301 (2006) (providing that, for an issued U.S. patent, a third party may submit to the U.S. Patent and Trademark Office “patents or printed publications” and a statement of their relevance to the validity of the U.S. patent).

200. WENDY H. SCHACHT & JOHN R. THOMAS, CRS REPORT FOR CONGRESS, PATENT REFORM IN THE 112TH CONGRESS: INNOVATION ISSUES 19 (2011).

201. 35 U.S.C. §§ 301–18 (2006).

substantial new question of patentability,” thus excluding any validity issues already considered in the initial examination of the patent.²⁰² Second, third parties could not raise certain types of validity challenges in reexaminations, such as asserting that a patent does not cover patent-eligible technology.²⁰³ The America Invents Act creates a new “post-grant review” procedure that lacks both of these limitations.²⁰⁴ In a post-grant review, a third party will be able to assert any invalidity critique that could be made in federal court.²⁰⁵ Post-grant review proceedings, however, can only be initiated within nine months of a patent’s issuance.²⁰⁶ For challenges after this initial time period, the America Invents Act replaces the older reexamination procedures with a new administrative procedure called “inter partes review.”²⁰⁷ Like the older reexaminations, certain validity challenges cannot be raised in inter partes reviews, but in other respects inter partes reviews are broader than reexamination. Significantly, inter partes reviews are not limited to “substantial new question[s] of patentability” like reexaminations; instead, third parties can raise, in inter partes reviews, some validity issues that were already considered in the initial examination of the patent.²⁰⁸

2. The Impact of Traditional Improvements on Incentives to Invent

At first blush, one might assume that making the processes at the U.S. Patent and Trademark Office cheaper, faster, and more accurate would encourage U.S. entities to patent and ultimately to innovate. After all, U.S. patents provide exclusive rights to inventions throughout the United States, and—by a wide margin—American inventors receive more U.S. patents than inventors from any other single country.²⁰⁹ For example, in 2011, the U.S. Patent Office issued approximately 224,000 patents.²¹⁰ American inventors received about 109,000 of those patents.²¹¹ The second largest number of U.S. patents issued to Japanese inventors, who received only 46,000 U.S. patents.²¹²

202. *Id.* § 303(a); *In re NTP, Inc.*, 654 F.3d 1268, 1275 (Fed. Cir. 2011).

203. *In re NTP*, 654 F.3d at 1275–76.

204. Leahy–Smith America Invents Act, Pub. L. No. 112-29, § 6, 125 Stat. 284, 306–07 (2011).

205. *Id.*

206. *Id.* at 306.

207. *Id.* at 299.

208. *Id.* at 305.

209. See Patent Tech. Monitoring Team, *Patents By Country, State, and Year - Utility Patents (December 2011)*, U.S. PATENT AND TRADEMARK OFFICE, http://www.uspto.gov/web/offices/ac/ido/oeip/taf/cst_utl.pdf (last modified Mar. 21, 2012).

210. *Id.*

211. *Id.*

212. *Id.*

Moreover, all of the traditional improvements to the U.S. Patent and Trademark Office can increase the value of U.S. patents. Reducing the cost of obtaining U.S. patents increases their net value. Likewise, when U.S. patents issue more quickly, innovators may be able to commercialize new technology more quickly.²¹³ Reducing the number of invalid U.S. patents in circulation also can increase the value of valid U.S. patents because invalid patents often decrease the returns from innovation. After a business commercializes a valid U.S. patent, the business may be sued for allegedly infringing an invalid U.S. patent. Even if an accused innovator litigates and successfully demonstrates that a patent is invalid, such a successful legal defense is expensive, in part because the innovator must prove that the patent is invalid by clear and convincing evidence.²¹⁴ These litigation costs reduce the profits from valid U.S. patents.²¹⁵ Alternatively, an innovator “may choose to make payments under licensing arrangements, or perhaps decide not to market its product at all, rather than contest the patent proprietor’s claims.”²¹⁶ Thus, traditional improvements to U.S. patent law increase the value of U.S. patents. Because more U.S. patents issue to American inventors than to inventors from any other country, these improvements provide more benefit to American inventors as a group than to inventors from any other country.

Nevertheless, for two reasons it is doubtful that reducing the cost, duration, and inaccuracy of the U.S. Patent and Trademark Office’s patent application processing will increase incentives to invent in the United States relative to the incentives for foreign inventors. First, traditional improvements to the U.S. Patent and Trademark Office will help any inventor when she obtains a U.S. patent, regardless of her nationality. For example, if the America Invents Act reduces the cost of obtaining a U.S. patent by \$10, both foreign and domestic inventors will save \$10 when they apply for a patent. Moreover, an inventor who uses the U.S. Patent and Trademark Office more will receive greater benefits. If the cost of obtaining a U.S. patent drops by \$10, an inventor who obtains ten patents will save \$100, while an inventor who obtains five patents will save only \$50. Likewise, if the U.S. Patent and Trademark Office were to process patent applications 20% faster, an inventor who previously would have received only five patents would instead receive six patents, while an inventor who previously would have received ten patents would receive

213. Inventors may also use issued U.S. patents to obtain capital that can be used to commercialize new technology. Clarisa Long, *Patent Signals*, 69 U. CHI. L. REV. 625, 642 (2002) (discussing the use of patents as signals in capital markets).

214. See 35 U.S.C. § 282 (2006); *Microsoft Corp. v. i4i Ltd. P’ship*, 131 S. Ct. 2238, 2242 (2011).

215. Indeed, James Bessen and Michael J. Meurer have argued that “by the late 1990s, litigation costs clearly exceeded the profits from patents outside the chemical and pharmaceutical industries.” JAMES BESSEN & MICHAEL J. MEURER, *PATENT FAILURE* 140 (2008).

216. SCHACHT & THOMAS, *supra* note 200, at 29.

twelve patents. Similarly, if the value of U.S. patents increases by \$10 per patent because the U.S. Patent and Trademark Office issues fewer invalid patents, an inventor who obtains more U.S. patents will receive a larger gain than someone who obtains fewer U.S. patents. In short, the traditional improvements to the U.S. Patent and Trademark Office will magnify existing disparities in the acquisition of U.S. patents.

Unfortunately, this magnification will not help American firms compete against foreign rivals. Although American inventors obtain more U.S. patents than inventors from any one foreign country, in global markets, American firms compete against *all* rivals from *all* countries. For the past four years, the U.S. Patent and Trademark Office has issued more U.S. patents to foreign inventors on the whole than U.S. inventors.²¹⁷ For example, in 2011, the U.S. Patent and Trademark Office issued 108,626 patents to American inventors and 115,879 patents to foreign inventors.²¹⁸ If improvements to the procedures at the U.S. Patent and Trademark Office increase the rate at which it issues patents by 10%, American inventors would receive 10,863 more patents, while foreign inventors would receive an even larger increase of 11,182 more patents. As a result, the improvements to the U.S. Patent and Trademark Office would extend the lead of foreign inventors over American inventors by an additional 319 U.S. patents.

Similarly, foreign inventors would benefit more if the cost of obtaining U.S. patents declines. If the cost of obtaining a U.S. patent in 2011 had been \$10 less, foreign inventors as a group would have saved more than \$30,000 more than American inventors. Improving the functioning of the U.S. Patent and Trademark Office may particularly disfavor American inventors in technological fields in which foreign inventors obtain substantially more U.S. patents than domestic inventors.²¹⁹ Within these

217. Patent Tech. Monitoring Team, *U.S. Patent Statistics, Calendar Years 1963–2011*, *supra* note 96.

218. *Id.*

219. The U.S. Patent and Trademark Office categorizes patents into approximately 400 technology classes, although this classification system “is based primarily on technological and functional principles and is only rarely related to economists’ notions of products or well-defined industries (which may be a mirage anyway).” Griliches, *supra* note 77, at 1666. In 2010, more U.S. patents were issued to foreign inventors than domestic inventors in many of these classes. See Patent Tech. Monitoring Team, *Patenting In Technology Classes, Breakout by Geographic Origin (State and Country)*, U.S. PATENT & TRADEMARK OFFICE, available at http://www.uspto.gov/web/offices/ac/ido/oeip/taf/tecstc/clstc_gd.htm (last modified Mar. 27, 2012). Some significant technology classes in which U.S. inventors substantially trail foreign inventors in obtaining U.S. patents include: Dynamic Information Storage or Retrieval; Dynamic Optical Information Storage or Retrieval; Electrical Generator or Motor Structure; Electric Lamp and Discharge Devices; Electricity: Motive Power Systems; Incremental Printing of Symbolic Information; Chemistry: Electrical Current Producing Apparatus, Product, and Process; Television; Liquid Crystal Cells, Elements and Systems; Optics: Image Projector; Photocopying; Facsimile and Static Presentation Processing; Optics: Systems and Elements; Motion Video Signal Processing for Recording or

fields, the magnification of patenting disparities discussed above would be particularly dramatic. In other words, the U.S. Patent and Trademark Office cannot save dying domestic industries by improving processes contributing to their decline.²²⁰

The second reason that improving procedures at the U.S. Patent and Trademark Office may not provide American inventors with relatively enhanced incentives to invent is that domestic and foreign inventors may respond differently to changes to U.S. patent law. For instance, American and foreign inventors may face different costs in taking advantage of the improvements to U.S. patent law. Some foreign inventors may be less responsive to changes in U.S. law because these inventors face additional transaction costs, including language and cultural barriers.²²¹ Indeed, some foreign inventors may be entirely unaware of improvements to U.S. patent law. On the other hand, American inventors sometimes may be slower to respond to changes to U.S. patent law. For example, even if the shift to a first-to-file system ultimately improves the efficiency of procedures at the U.S. Patent Office, American inventors may initially face additional costs in that many U.S. inventors must learn the new first-to-file system.²²² In contrast, because almost every foreign patent system is already a first-to-file system, foreign inventors may not face similar obstacles.²²³ Even when foreign and American inventors face similar transaction costs in responding to changes to U.S. patent law, foreign inventors may react more positively to those changes. Economic conditions may make some foreign inventors more sensitive to changes in the cost of applying for a U.S. patent.²²⁴ In a developing country, a \$10 reduction in the cost of obtaining

Reproducing; Photography; Electrophotography; Radiation Imagery Chemistry: Process, Composition, or Product Thereof. *Id.* In classes where U.S. inventors lag behind foreign inventors, those foreign inventors frequently are from Japan, South Korea, Taiwan, or Germany. *Id.*

220. As noted above, patent numbers are only proxies for innovation. *See supra* note 92 and accompanying text. Even if foreign inventors receive more patents than U.S. inventors, U.S. businesses might enjoy a competitive advantage if the U.S. patents obtained by U.S. inventors are more commercially valuable.

221. *See infra* notes 321–326 and accompanying text.

222. Inventors cannot simply rely on their attorneys learning the new first-to-file system. For example, to ensure that an inventor obtains a patent on a new discovery, she must be the first to file a patent application. *See supra* note 189 and accompanying text. An inventor therefore must understand the first-to-file system well enough to determine when to contact an attorney.

223. Michael Murray, *Did Patent Reform Level the Playing Field for Foreign Entities?*, BNA'S PAT. TRADEMARK & COPYRIGHT J., Oct. 7, 2011 (arguing that the changes worked by the America Invents Act had "several significant benefits for foreign inventors"); *see also* Duffy, *supra* note 128, at 703–06 (noting that global harmonization of patent law may be suboptimal because of differences between different countries, including culture).

224. The impact on different suppliers of changes in supply conditions will depend on the elasticity of the supply curves. GRIMWADE, *supra* note 142, at 24. If foreign inventors are more sensitive to changes in patenting costs, their supply curve for U.S. patents will be more elastic. If domestic inventors are less sensitive to changes in patent costs, then their curve for supplying U.S. patents will be less elastic.

a patent may be more impactful than the same savings in the United States. In such a situation, improvements in U.S. Patent and Trademark Office procedures might increase patenting by American inventors but increase even more patenting in the United States by foreign inventors.

In sum, it is unclear whether typical approaches to improving the processing of applications by the U.S. Patent and Trademark Office will meaningfully increase the incentives for American entities to invent. Improving procedures at the U.S. Patent and Trademark Office should help American inventors, but because many foreign inventors also use the U.S. Patent and Trademark Office, such improvements will also help foreign inventors, and therefore may not significantly affect American competitiveness in global markets.²²⁵

C. *Selective Improvements to U.S. Patent Law*

Although general improvements to U.S. patent law may equally impact incentives to invent for foreign and domestic inventors, more limited changes to U.S. patent law may provide enhanced incentives to invent for American inventors. To do so, changes to U.S. patent law must affect foreign and domestic businesses differently. To achieve this differential impact while avoiding explicit protectionism, U.S. patent law often must leverage factors extrinsic to law. This Section explores potential improvements to U.S. patent law that narrowly focus on situations in which American inventors differ from their foreign rivals.

1. Reducing Patenting Costs for a Selective Group of Inventors

One potential way to provide enhanced incentives for American inventors vis-à-vis foreign inventors would be to reduce the cost of obtaining U.S. patents for a subgroup of patent applicants dominated by U.S. inventors. Independent inventors form such a group. For example, in 2011, the U.S. Patent and Trademark Office issued 15,890 patents to U.S. independent inventors but only 6,572 patents to foreign independent inventors—a difference of more than 9,000 patents.²²⁶ In fact, U.S. patent law already charges lower patent application fees for independent inventors,²²⁷ and the Patent Office's website provides detailed information

225. The effect of the America Invents Act on U.S. competitiveness may also be affected by certain inventor demographics. For example, inventors starting new businesses may focus on obtaining patents in their home countries. If so, improving the workings of the U.S. Patent and Trademark Office would favor U.S. inventors hoping to start new businesses without simultaneously favoring foreign inventors. *See supra* note .

226. *See* Patent Tech. Monitoring Team, *Independent Inventors by State by Year, Utility Patents Report, January 1, 1975–December 31, 2011*, U.S. PATENT & TRADEMARK OFFICE, available at http://www.uspto.gov/web/offices/ac/ido/oeip/taf/inv_utl.pdf (last modified Mar. 2012).

227. 35 U.S.C. § 41(h)(1) (2006) (stating that an “independent inventor” shall have fees

to assist independent inventors.²²⁸ This special treatment ultimately helps more American inventors than foreign inventors. Further reducing the costs of obtaining a U.S. patent for independent inventors accordingly might improve incentives to invent more for American inventors than for foreign inventors. Indeed, the America Invents Act establishes even lower fees for particularly small and unsophisticated patent applicants.²²⁹ In addition, the Act establishes a “Patent Ombudsman Program,” and the sole objective of this program is “providing patent filing support and services to small businesses and independent inventors.”²³⁰

Nevertheless, it is unclear whether favoring independent inventors in U.S. patent law meaningfully helps American businesses compete in global markets. To start, many patent law scholars dismiss the inventive contribution of independent inventors and contend that contrary claims are “frequently hyped and distorted.”²³¹ For instance, in 2011, the U.S. Patent and Trademark Office issued approximately 224,000 patents;²³² independent inventors consequently accounted for only 10% of U.S. patents. More generally, a provision of patent law that is designed to favor American inventors because of their nationality may suffer from the protectionist pitfalls noted above, even if it hides its protectionist features behind other group selection criteria.²³³

2. Expediting Patent Application

Another potential way to provide relatively enhanced incentives for American inventors may be to streamline and to improve patent processes in particular industries in which American inventors and American businesses already enjoy competitive advantages.²³⁴ Many factors affect competition, and different countries are successful in creating competitive

“reduced by 50 percent”).

228. See *Inventors Resources*, OFFICE OF INNOVATION DEV., <http://www.uspto.gov/inventors/index.jsp> (last modified July 10, 2012).

229. Leahy–Smith America Invents Act, Pub. L. No. 112-29, § 10, 125 Stat. 284, 316–318 (2011).

230. *Programs*, U.S. PATENT & TRADEMARK OFFICE, http://www.uspto.gov/aia_implementation/programs.jsp (last modified Sept. 9, 2012).

231. BESSEN & MEURER, *supra* note 215, at 166; see GAMBARDILLA ET AL., *THE VALUE OF EUROPEAN PATENTS: EVIDENCE FROM A SURVEY OF EUROPEAN INVENTORS 23* (2005), available at <http://www.alfonsogambardella.it/PATVALFinalReport.pdf> (reporting that only 7.81% of European patentees are self-employed).

232. Patent Tech. Monitoring Team, *Patents By Country, State, and Year—Utility Patents (December 2011)*, *supra* note 96.

233. See *supra* notes 124–52 and accompanying text.

234. It is not entirely clear whether expediting innovation only within certain industries is not protectionism. If the U.S. Patent and Trademark Office expedites only certain patent applications, other applications may not be processed as quickly as they might have been. At the very least, however, selectively expediting patent processes is not facially protectionist.

advantages in different industries.²³⁵ For example, American companies have been effective in producing medical equipment and pharmaceuticals.²³⁶ Reducing the costs and delays of patents in these areas should increase, to some extent, the incentives to invent within these industries.²³⁷ Because American businesses already dominate these industries, American inventors and American businesses may most strongly feel the effects of these enhanced incentives to invent.

Recently, the U.S. Patent and Trademark Office has developed two programs that streamline patent procedures in certain industries. In 2006, the U.S. Patent and Trademark Office started the Accelerated Examination Program, under which the Office accelerates the examination of applications that are particularly amenable to faster resolution.²³⁸ To qualify for this program, an inventor generally must pay an additional fee, but the U.S. Patent and Trademark Office waives the requirement for an additional fee if the invention “(i) [e]nhance[s] the quality of the environment; (ii) [c]ontribute[s] to the development or conservation of energy resources; or (iii) [c]ontribute[s] to countering terrorism.”²³⁹ Similarly, in 2010, the U.S. Patent and Trademark Office implemented a program to accelerate the patenting of inventions “pertaining to green technologies including greenhouse gas reduction (applications pertaining to environmental quality, energy conservation, development of renewable energy resources or greenhouse gas emission reduction).”²⁴⁰ The program intended to “accelerate the development and deployment of green technology, create green jobs, and promote U.S. competitiveness in this vital sector.”²⁴¹ The program was limited to processing only 3,500 patent

235. PORTER, *supra* note 12, at 196–97.

236. *Id.*; Econ. & Statistics Div., WORLD INTELLECTUAL PROP. ORG., *Patent Applications by Field of Technology and Origin: Top Origins, 2005–2009*, WORLD INTELLECTUAL PROP. INDICATORS 2011, 77 (2011), available at <http://www.wipo.int/ipstats/en/statistics/patents/> (last visited Mar. 2, 2013) (reporting patent applications worldwide by field of technology from 2005 to 2009); Patent Tech. Monitoring Team, *Patenting In Technology Classes, Breakout by Geographic Origin (State and Country)*, *supra* note 219 (reporting U.S. patents between 2007 and 2011 by technology class and country of origin).

237. Currently, patents are not used a great deal in some industries, particularly software and Internet firms. Graham et al., *supra* note 47, at 1290, 1292–93.

238. For example, to qualify for the Accelerated Examination Program, an inventor must file an application electronically; the application must contain only a limited number of patent claims; the inventor must agree to have an interview with the patent examiner; and the inventor must provide a statement that a pre-examination search for prior art was conducted. U.S. PATENT & TRADEMARK OFFICE, MANUAL OF PATENT EXAMINING PROCEDURE, § 708.02(a) (8th ed., 9th rev. 2012), available at <http://www.uspto.gov/web/offices/pac/mpep/index.html>.

239. 37 C.F.R. § 1.102(c) (2010).

240. Office of Patent Legal Admin., *Green Technology Pilot Program*, U.S. PATENT & TRADEMARK OFFICE, http://www.uspto.gov/patents/init_events/green_tech.jsp (last modified May 7, 2012).

241. Press Release, United States Patent and Trademark Office, The U.S. Commerce Department's Patent and Trademark Office (USPTO) will pilot a program to accelerate the

applications and ended March 30, 2012.²⁴² Nevertheless, the U.S. Patent and Trademark Office likely will develop additional programs to expedite patent examination in certain industries. The recent America Invents Act gives the Director of the Patent Office the power to prioritize the “examination of applications for products, processes, or technologies that are important to the national economy or national competitiveness.”²⁴³ By expediting the examination of inventions for “products, processes, or technologies” in which American inventors already enjoy competitive advantages, the U.S. Patent Office may be able to magnify those competitive advantages.²⁴⁴

Although expediting patent examination within certain industries thus may help American inventors, these potential benefits should be weighed against four potential pitfalls. First, identifying which areas of technology to expedite may be difficult. In some industries, American companies may only have a competitive advantage in certain market segments. For example, the U.S. commercial airplane industry may be well-positioned to compete in the market for long-range commercial jets but not smaller, short-range commuter jets.

Second, even when areas of U.S. competitive advantage can be identified, American industries could lose that advantage regardless of favorable patent laws. Reducing the cost and delay of patenting in certain industries may encourage foreign inventors and businesses to focus on these industries, speeding the decline of once-dominant American companies.²⁴⁵ In that situation, expediting patent processes eventually would magnify the competitive advantages of foreign inventors. Consequently, to enhance existing domestic competitive advantage, lawmakers likely would need to constantly monitor the performance of American innovators and quickly change which industries are expedited.²⁴⁶

Third, even if the U.S. Patent and Trademark Office could implement a system that effectively expedites patent processes in appropriate industries,

examination of certain green technology patent applications (Dec. 7, 2009), *available at* http://www.uspto.gov/news/pr/2009/09_33.jsp.

242. Sunset of the Patent Application Backlog Reduction Stimulus Plan and a Limited Extension of the Green Technology Pilot Program, 76 Fed. Reg. 77,979 (Dec. 15, 2011).

243. Leahy-Smith America Invents Act, Pub. L. No. 112-29, § 25, 125 Stat. 284, 337–38 (2011).

244. *See infra* notes 310–311 and accompanying text. This approach may also foster norms that support innovation.

245. The impact of changes in patenting costs within certain industries will depend on the cross elasticity of demand for foreign and domestic inventors. *See supra* note 224 and accompanying text.

246. Indeed, because of the difficulties of foreseeing future changes related to technology, technology-specific patent laws are often disfavored. BURK & LEMLEY, *supra* note 47, at 98–99 (“The history of industry-specific statutes suggests that many fail because they are drafted with then-current technology in mind and are not sufficiently general to accommodate the inevitable changes in technology.”).

other countries might enact reciprocal measures, thereby reducing American prosperity. For example, the Korean Intellectual Property Office might enact similar provisions to enhance the competitive advantage of Korean inventors over American inventors within certain industries. Finally, selectively expediting invention in certain industries may violate TRIPs, which prohibits “discrimination” in the availability of patents based on “the field of technology.”²⁴⁷ If so, countries that are members of the World Trade Organization may seek sanctions against the United States for expediting patent examinations within certain industries.

Because of these challenges to obtaining domestic competitive advantage by expediting innovation, the U.S. Patent and Trademark Office should be cautious in selecting industries in which to expedite patent examinations. The U.S. Patent and Trademark Office should only expedite examinations in an area of technology following a careful analysis of the resulting costs and benefits, including effects on competitive advantage. One potential approach would focus on expediting examinations in a small number of industries in which the United States appears to have a clear competitive advantage. For example, between 2007 and 2011, approximately 80% of U.S. patents on surgical instruments were issued to American inventors.²⁴⁸ By focusing on technological areas in which U.S. competitive advantage is clear, like surgical instruments, the U.S. Patent and Trademark Office can reduce the likelihood of inadvertently magnifying the competitive advantage of foreign inventors. Also, by limiting the number of affected industries, the U.S. Patent and Trademark Office would reduce both the chance of widespread retaliation by foreign patent offices and the likelihood that a foreign country would invoke the dispute resolution mechanisms of TRIPs. Unfortunately, if the U.S. Patent and Trademark Office expedited patent examination in only a small number of technological areas, the competitive benefits to domestic inventors and businesses would be limited.

IV. CHANGING U.S. CULTURE

Some have called for a change in U.S. culture to boost American innovation.²⁴⁹ For example, economist Tyler Cohen has argued that, to

247. TRIPs Agreement, *supra* note 127, art. 27.1. This provision of TRIPs, however, relates to “Patentable Subject Matter,” and therefore may not govern procedures for obtaining patents. *Id.*

248. Patent Tech. Monitoring Team, *Patenting In Technology Classes, Breakout by Geographic Origin (State and Country): Class 606, Surgery (instruments)*, U.S. PATENT & TRADEMARK OFFICE, http://www.uspto.gov/web/offices/ac/ido/oeip/taf/tecstc/606clstc_gd.htm (last modified Mar. 27, 2012).

249. “Culture” is difficult to define precisely. See GEERT HOFSTEDE, *CULTURE’S CONSEQUENCES: INTERNATIONAL DIFFERENCES IN WORK RELATED VALUES* 25 (1980) (describing cultural values as “the collective programming of the mind which distinguishes the members of one human group from another”); Maike Didero et al., *Differences in Innovation Culture Across Europe* 4 (2008) (TRANSFORM Project Discussion Paper), available at

obtain economic prosperity, we should “[r]aise the social status of scientists.”²⁵⁰ President Obama made a similar appeal in his 2011 State of the Union address: “We need to teach our kids that it’s not just the winner of the Super Bowl who deserves to be celebrated, but the winner of the science fair.”²⁵¹ Innovation analysts likewise have argued that culture “play[s an] indispensable role[] by training, inspiring, and motivating the innovators of the future.”²⁵² Because typical approaches to improving patent law provide little relative increase in incentives to invent, nontraditional uses of patent law should be considered, such as the use of U.S. patent law to create a culture in the United States that fosters innovation. In such a culture, inventors would receive social subsidies for their work thereby increasing the incentives to invent vis-à-vis inventors from other cultures.

A. Law and Culture

Because law and culture are interrelated, each can affect the other.²⁵³ For instance, racist cultural views contributed to the passage of laws requiring racial segregation in education, while beliefs in equality contributed to desegregation.²⁵⁴ Similarly, legal scholars have identified complex interactions between law and norms, including numerous mechanisms by which law may affect social norms.²⁵⁵ For example, de jure

eu.org/publications/documents/Differences%20in%20Innovation%20Culture.pdf (collecting numerous definitions of culture used by sociologists); Stephen L. Mueller & Anisya S. Thomas, *Culture and Entrepreneurial Potential: A Nine Country Study of Locus of Control and Innovativeness*, 16 J. BUS. VENTURING 51, 58–59 (2000) (exploring the relationship between culture and entrepreneurial traits).

250. TYLER COWEN, *THE GREAT STAGNATION: HOW AMERICA ATE ALL THE LOW-HANGING FRUIT OF MODERN HISTORY, GOT SICK, AND WILL (EVENTUALLY) FEEL BETTER* 83 (2011).

251. President Obama, *supra* note 1.

252. ESTRIN, *supra* note 4, at 4; INNOVATE AMERICA, *supra* note 11, at 8; KAO, *supra* note 12, at 266 (discussing adjustments to American values related to innovation); PORTER, *supra* note 12, at 30, 113–15; DAVID SHENK, *THE GENIUS IN ALL OF US: NEW INSIGHTS INTO GENETICS, TALENT, AND IQ* 144 (2010) (“It must not be left to genes and parents to foster greatness; spurring individual achievement is also the duty of society. Every culture must strive to foster values that bring out the best in its people.”); *see also* SCOTT BERKUN, *THE MYTHS OF INNOVATION* 117 (2010) (arguing that culture impacts a society’s receptiveness to new ideas); CSIKSZENTMIHALYI, *supra* note 154, at 325 (“The culture that survives to direct the future of the planet will be one that encourages as much creativity as possible . . .”).

253. Alex Geisinger, *A Belief Change Theory of Expressive Law*, 88 IOWA L. REV. 35, 37 (2002).

254. *E.g.*, Va. Code § 22-221 (1950) (requiring racial segregation).

255. *See, e.g.*, ERIC A. POSNER, *LAW AND SOCIAL NORMS* 2 (2000) (describing multiple ways that legal intervention can change social norms); Geisinger, *supra* note 253, at 68 (noting the effect of motorcycle helmet laws on individual certainty of helmet safety); Timothy R. Holbrook, *The Expressive Impact of Patents*, 84 WASH. U. L. REV. 573, 591 (2006) (describing the social impact of racial segregation on understandings of race relationships); Hubbard, *supra* note 165, at 390; Lawrence Lessig, *The Regulation of Social Meaning*, 62 U. CHI. L. REV. 943, 964–65, 1016 (1995)

racial segregation in education likely affected behavior outside of schools by reinforcing racist social norms.²⁵⁶

One important way that law can affect culture is by impacting the “social meaning” of an activity.²⁵⁷ Many actions convey a social meaning in that performing the action expresses certain attitudes and commitments.²⁵⁸ Social meanings therefore form part of the costs and benefits associated with an action, and some people will avoid performing an action in order to avoid expressing the character traits, commitments, or connotations associated with the social meaning of that action.²⁵⁹ For example, at one point, smoking cigarettes may have expressed sensuality, sophistication, and independence.²⁶⁰ At that time, more people were likely to smoke because of those positive social meanings. Today, however, many people associate smoking with deleterious health effects.²⁶¹ Because smoking has a more negative social meaning today, people tend to be less

(describing the efforts by the Soviet government to transform the social meaning of wearing a helmet); Richard H. McAdams, *An Attitudinal Theory of Expressive Law*, 79 OR. L. REV. 339, 342–43 (2000) [hereinafter McAdams, *Attitudinal Theory*]; Richard H. McAdams, *The Origin, Development, and Regulation of Norms*, 96 MICH. L. REV. 338, 349 (1997) (stating that laws can both intentionally and unintentionally affect social norms); Arti Kaur Rai, *Regulating Scientific Research: Intellectual Property Rights and the Norms of Science*, 94 NW. U. L. REV. 77, 86–88 (1999) (listing ways in which normative behavior and positive laws are interrelated); Cass R. Sunstein, *On the Expressive Function of Law*, 144 U. PA. L. REV. 2021, 2043 (1996) (noting the effect of civil rights laws on the social meaning of nondiscrimination); Cass R. Sunstein, *Social Norms and Social Roles*, 96 COLUM. L. REV. 903, 923 (1996) [hereinafter Sunstein, *Social Roles*] (describing how laws may define social roles).

256. *Brown v. Bd. of Educ.*, 347 U.S. 483, 494 (1954) (“Segregation of white and colored children in public schools has a detrimental effect upon the colored children. The impact is greater when it has the sanction of the law; for the policy of separating the races is usually interpreted as denoting the inferiority of the negro group.”).

257. See Lessig, *supra* note 255, at 951 (suggesting that these laws can be used by individuals or groups “to advance individual or collective ends”); see also Holbrook, *supra* note 255, at 591 (“[I]t is beyond cavil that ‘the linguistic meaning of governmental action can have a moral impact.’”) (quoting Matthew D. Adler, *Expressive Theories of Law: A Skeptical Overview*, 148 U. PA. L. REV. 1363, 1494 (2000)); Sunstein, *Social Roles*, *supra* note 255, at 949 (noting that government may use vivid images and rhetoric as a means of affecting social norms).

258. Lessig, *supra* note 255, at 951 (defining social meaning as the “semiotic content attached to various actions”); see also Sunstein, *Social Roles*, *supra* note 255, at 925–28.

259. Lessig, *supra* note 255, at 956–58, 1001; see also Harry Surden, *Structural Rights in Privacy*, 60 SMU L. REV. 1605, 1610 (2007) (“[S]ocial norms impose social costs . . .”).

260. See Meghan Daum, *Smoking’s Sinful Sensuality in Movies*, L.A. TIMES, May 19, 2007, at A23 (discussing the connection between the portrayal of smoking and sensuality in film).

261. See Lessig, *supra* note 255, at 1029 (describing how smoking stands “at odds” with the emerging health campaigns); Sunstein, *Social Roles*, *supra* note 255, at 926 (explaining that in the United States as opposed to other countries, smoking cigarettes may signal “something relatively precise and very bad” about an individual’s “self-conception” and “concern for others”); see also Lessig, *supra* note 255, at 963, 1008 (noting that the perceived legitimacy of a law affects its capacity to connect specific actions to broad norms).

inclined to smoke.²⁶²

Perhaps the simplest way that law can affect the social meaning of an activity is by criminalizing it. Such a law may give the activity a negative social meaning.²⁶³ For example, criminalizing driving while under the influence of alcohol (DUI—commonly called “drunk driving”) may cause the social meaning of drunk driving to become more negative and therefore may dissuade people from engaging in the prohibited conduct.²⁶⁴ In addition to affecting social meanings, a law will also publicize a social view. In a majoritarian government, a law criminalizing an activity indirectly indicates that many people believe the activity already has a negative social value.²⁶⁵ For example, a law criminalizing drunk driving indicates that many people disfavor such behavior. Even if a DUI law does not affect an individual’s personal evaluation of the meaning of drunk driving, the law may affect that individual’s expectations regarding others’ beliefs. In the face of a criminal DUI statute, an individual may avoid driving intoxicated to avoid social sanctions from others.²⁶⁶

Another way that law can affect the social meaning of an activity is by “tying” that activity to another aspect of society that has an established social meaning.²⁶⁷ For example, a proponent of a ban on flag burning may claim that the ban will promote a widely held value like patriotism.²⁶⁸ Similarly, opponents to such a ban may claim that the ban would undermine the different goal of liberty.²⁶⁹ Regardless of the truth of these empirical claims, support for the ban can be influenced by its perceived connection to patriotism or liberty.²⁷⁰ The success of an effort to affect

262. See *supra* note 285 and accompanying text.

263. See Kenneth Dau-Schmidt, *An Economic Analysis of the Criminal Law as a Preference-Shaping Policy*, 1990 DUKE L.J. 1, 37 (1990).

264. This understanding of the social meaning of crime perhaps explains why some people assert that activities that are not crimes in fact are not crimes. For example, the website <http://www.privacyisnotacrime.com> asserts that “privacy is not a crime . . .” The website does not contend that under the current law privacy is in fact a crime. Rather, the website contends that people should have stronger rights to privacy. PRIVACY IS NOT A CRIME, <http://www.privacyisnotacrime.com> (last visited Mar. 2, 2013); see also PHOTOGRAPHY IS NOT A CRIME, <http://www.photographyisntacrime.com> (last visited Mar. 2, 2013); SKATEBOARDING IS NOT A CRIME, <http://www.skateboardingisnotacrime.com/extras> (last visited Feb. 27, 2013).

265. See Geisinger, *supra* note 253, at 64–65, 70; McAdams, *Attitudinal Theory*, *supra* note 255, at 358. This inference is undermined if some people cannot or do not vote or if the validity of the vote count is suspect.

266. Law may also affect activities with positive social meanings. For instance, allowing taxpayers to deduct charitable contributions from their taxable income may help give such contributions a positive social meaning and may indicate that many people believe such contributions already have a positive social meaning.

267. Lessig, *supra* note 255, at 1009.

268. POSNER, *supra* note 255, at 112 (noting the symbolism of honoring and desecrating the flag).

269. *Id.*

270. *Id.*

social meaning through tying therefore depends in part upon the perceived legitimacy of the tying.²⁷¹

Social meaning is closely linked to the concept of “salience,” which describes the extent to which the public pays attention to an issue.²⁷² “Due to limited attention span, apprehension, and information processing abilities, individuals can only process a small number of beliefs at any single time.”²⁷³ New legislation can raise the salience of the issues addressed by those laws, particularly if politicians discuss the legislation in high-profile contexts.²⁷⁴ Moreover, tying can affect the salience of an issue: associating an activity with a high-salience issue can increase that activity’s salience.²⁷⁵ For example, a connection between the war on terrorism, which arguably has high salience, and the war on drugs may increase the salience of the latter.

B. *Culture and Innovation*

Culture affects competitive advantage in innovation in at least three respects.²⁷⁶ First, countries may develop innovative industries related to activities that are particularly important in that culture.²⁷⁷ “[N]ations tend to be competitive in activities that are admired or depended upon; that is, where the heroes come from.”²⁷⁸ For example, Americans’ love of sports has likely contributed to the success of American businesses in producing athletic products.²⁷⁹ The United States is home to the corporate headquarters for three of the top four manufacturers of sporting equipment: Nike, Reebok, and Under Armour.²⁸⁰ With national passions like this, a

271. Professor Lawrence Lessig has argued that when government attempts to change social norms, there is a risk of causing an “Orwell effect: when people see that the government or some relatively powerful group is attempting to manipulate [norms], they react strongly to resist any such manipulation.” Lessig, *supra* note 255, at 1017; *see also id.* at 963, 1008 (noting that the perceived legitimacy of a law affects its capacity to connect specific actions to broad norms). As a result of the Orwell effect, the government may have an incentive to minimize the extent to which its message seems to be from the government. *Id.* at 1017–18.

272. Geisinger, *supra* note 253, at 60.

273. *Id.*

274. *Id.* at 63 (noting that “passage of a law may not be the main source of information” regarding a law and that “publicity about the reasons for the passage of law will be the main source of information”); *see also* ESTRIN, *supra* note 4, at 159 (“The role of a nation’s leaders is to foster the right environment for innovation through inspiration, funding, and policy.”).

275. *See* Geisinger, *supra* note 253, at 61.

276. This list is not exclusive; many factors potentially affect innovation.

277. PORTER, *supra* note 12, at 90–91.

278. *Id.* at 115.

279. *Id.* at 91.

280. *See The Forbes Fab 40: The World’s Most Valuable Sports Brands*, FORBES.COM, <http://www.forbes.com/pictures/mlm45jemm/the-most-valuable-company-brands#content> (last visited Mar. 2, 2013); *see also About Nike, Inc.*, NIKE, INC., <http://nikeinc.com/pages/about-nike-inc> (last visited Mar. 2, 2013) (identifying the location of Nike’s corporate headquarters); *Environment*

substantial portion of the domestic labor market may participate in the activity, and domestic businesses therefore benefit from access to labor with skills and knowledge tailored to the industry. Domestic businesses are also well-positioned to monitor domestic consumer demand. Furthermore, because domestic demand for industries related to national passions is sophisticated, global demand trends may trail domestic trends.²⁸¹ By focusing on domestic demand, domestic industries related to national passions are able to anticipate (and perhaps influence) changes in global demand.²⁸² “If prestige and national priority favor an industry, the ripple effect on competitive advantage can be enormous.”²⁸³

The second manner in which culture can affect innovation is that some societies foster “inventing norms,” which generate praise and respect for innovators.²⁸⁴ In cultures with such norms, inventors receive additional benefits from their discoveries in the form of enhanced social status.²⁸⁵ There are good reasons to believe that inventing norms are widely accepted and enforced in the United States.²⁸⁶ For example, successful innovators in the United States are often publicly praised.²⁸⁷ When Thomas Edison died, President Herbert Hoover turned off all of the lights in the White House for one minute.²⁸⁸ More recent examples of innovators who achieved celebrity status include Bill Gates (founder of Microsoft, Inc.), Steve Jobs (cofounder of Apple, Inc.), and Mark Zuckerberg (founder of Facebook, Inc.). Reactions to the death of Steve Jobs in 2011 revealed the extent to which he was widely esteemed even outside of technology circles. The day he died, Jobs was praised by President Obama as “exemplif[ying] the spirit of American ingenuity.”²⁸⁹ Mainstream media also praised Jobs as a “visionary,”²⁹⁰ likening him to Thomas Edison, Henry Ford, and John D.

at *Headquarters*, REEBOK.COM, http://corporate.reebok.com/en/corporate_citizenship/environment_at_headquarters/default.asp (last visited Feb. 27, 2013) (identifying the location of Reebok’s corporate headquarters); *Careers*, UNDER ARMOUR, <http://www.underarmour.jobs> (last visited Mar. 2, 2013).

281. PORTER, *supra* note 12, at 86–90.

282. *Id.*

283. *Id.* at 115.

284. See Hubbard, *supra* note 165, at 373.

285. *Id.* at 378–82.

286. See BERKUN, *supra* note 252, at 111 (“Americans hold ingenuity to be one of the best kinds of goodness . . .”); see generally Hubbard, *supra* note 165, at 378–88 (discussing inventing norms).

287. BERKUN, *supra* note 252, at 71 (“Innovators became easy heroes in America . . .”).

288. Randy Alfred, *Aug. 4, 1922: For Whom the Bell Tolls Not*, WIRED (Aug. 4, 2010, 12:00 AM), <http://www.wired.com/thisdayintech/2010/08/0804alexander-graham-bell-funeral-silence>.

289. Press Release, Office of the Press Secretary, Statement by the President on the Passing of Steve Jobs (Oct. 5, 2011), available at <http://www.whitehouse.gov/the-press-office/2011/10/05/statement-president-passing-steve-jobs>.

290. John Markoff, *Apple’s Visionary Redefined Digital Age*, N.Y. TIMES (Oct. 5, 2011), <http://www.nytimes.com/2011/10/06/business/steve-jobs-of-apple-dies-at-56.html?pagewanted=all>.

Rockefeller.²⁹¹

A third way in which culture contributes to competitive advantage in innovation also involves social norms. Inventing norms directly praise innovation, but other social norms may encourage activities and values that indirectly encourage innovation.²⁹² For example, a society in which education and hard work are lauded may produce greater numbers of creative, educated, and skilled citizens,²⁹³ which may help domestic businesses develop new technologies²⁹⁴ and create domestic demand for those technologies.²⁹⁵

Finally, sociological studies have identified “innovation values,” which are broad cultural characteristics that correlate with innovation. These studies begin by determining the extent to which certain cultural characteristics are present in some countries and absent from others, and then correlate these characteristics with a country’s innovation output.²⁹⁶ In

291. Walter S. Mossberg, *Mossberg: The Steve Jobs I Knew*, WALL ST. J. (Oct. 6, 2011), http://online.wsj.com/article/SB10001424052970203476804576613732041665792.html?mod=technology_newsreel; Patricia Sullivan, *Steve Jobs Dies; Apple Co-Founder Was 56*, WASH. POST (Oct. 5, 2011), http://www.washingtonpost.com/local/obituaries/steve-jobs-apple-computer-co-founder-dies/2010/09/21/gIQAcl4aOL_story.html?hpid=z1.

292. See ESTRIN, *supra* note 4, at 7–33 (arguing that certain values contribute to innovation). Other social norms may hamper innovation. For example, social norms based on erroneous stereotypes may dissuade women from pursuing careers in science and invention. See AUGUSTINE, *supra* note 12, at 49 (“Women constitute 46% of the US workforce, but only 23% of the science and engineering workforce.”); John P. Walsh & Sadao Nagaoka, *Who Invents?: Evidence from the Japan-US Inventor Survey* 9 (RIETI discussion paper series, 09-E-034, 2009), available at <http://www.rieti.go.jp/jp/publications/dp/09e034.pdf> (reporting that only 5% of U.S. patentees are women).

293. See AUGUSTINE, *supra* note 12, at 69 (“Patience, continuity, and their close relative perseverance are all fundamental catalysts of successful innovation.”); BERKUN, *supra* note 252, at 172 (“Study the histories of great creators, and you’ll find a common core of willpower and commitment as their driving force.”); CSIKSZENTMIHALYI, *supra* note 154, at 61 (noting that creative, successful individuals are often tenacious workers); PORTER, *supra* note 12, at 114 (“In no small part, a nation’s success depends on the types of education [that] talent chooses to obtain and where it chooses to work.”).

294. ESTRIN, *supra* note 4, at 170 (“One of the most significant factors in deciding where to locate an R&D center is a strong research community and talent base.”); Porter & Stern, *supra* note 79, at 29; Scott Shane, *Cultural Influences on National Rates of Innovation*, 8 J. BUS. VENTURING 59, 63 (1993) [hereinafter Shane, *Innovation*] (noting that “[i]nnovation requires skilled engineers and scientists”).

295. PORTER, *supra* note 12, at 95 (“Provided it anticipates buyer needs in other nations, early local demand for a product or service in a nation helps local firms to move sooner than foreign rivals to become established in an industry.”).

296. See, e.g., Anneli Kaasa & Maaja Vadi, *How Does Culture Contribute to Innovation? Evidence from European Countries*, 19 ECON. OF INNOVATION & NEW TECH. 583, 592 (2008); Mueller & Thomas, *supra* note 249, at 51; Shane, *Innovation*, *supra* note 294, at 59–60; Scott A. Shane, *Why Do Some Societies Invent More than Others?*, 7 J. BUS. VENTURING 29, 29 (1992) [hereinafter Shane, *Invent*]; Hongyi Sun, *A Meta-Analysis on the Influence of National Culture on Innovation Capability*, 10 INT’L J. OF ENTREPRENEURSHIP & INNOVATION MGMT 353, 354 (2009).

determining national characteristics to test for correlations with innovation, sociologists often rely on a system of cultural characteristics developed by Geert Hofstede.²⁹⁷ For example, “individualism” is one of Hofstede’s cultural characteristics.²⁹⁸ In highly individualistic cultures, people prefer to act in the interests of themselves and their families rather than acting in the interests of a larger group of people.²⁹⁹ Another important cultural dimension that Hofstede developed is tolerance of “power distance,” which describes the extent to which people from a country accept inequality in power between people.³⁰⁰ A country that exhibits significant power distance embraces hierarchy and resists change.³⁰¹ In non-power distant countries, “people believe in shared power, equality, and social mobility.”³⁰² Using survey responses from more than 88,000 people from thirty-three different countries, Hofstede determined the extent to which these countries exhibited certain cultural characteristics, including individualism and power distance.³⁰³

Building on Hofstede’s work, sociologists have identified statistically significant correlations between high levels of innovation³⁰⁴ and two cultural characteristics: high levels of individualism and low tolerance of power distance.³⁰⁵ For example, Scott Shane has identified a positive correlation between per capita patenting rates and individualism, and a negative correlation between per capita patenting rates and tolerance of power distance.³⁰⁶ Although these studies demonstrate only correlations

297. See generally GEERT HOFSTEDÉ, *CULTURE’S CONSEQUENCES: INTERNATIONAL DIFFERENCES IN WORK RELATED VALUES* (1980) (describing Hofstede’s system for classifying cultures).

298. Shane, *Innovation*, *supra* note 294, at 60–61.

299. *Id.*

300. Shane, *Invent*, *supra* note 294, at 30.

301. Shane, *Innovation*, *supra* note 294, at 61.

302. Shane, *Invent*, *supra* note 294, at 31.

303. *Id.* at 30. A single country may contain multiple cultures, though Hofstede’s categorization of countries does not reflect this possibility. Didero, et al., *supra* note 249, at 3.

304. Sociologists measure innovation in different ways. See, e.g., Kaasa & Vadi, *supra* note 296, at 588 (using patent applications in the European Patent Office); Mueller & Thomas, *supra* note 249, at 52 (survey data); Shane, *Innovation*, *supra* note 294, at 64 (per capita trademark rates); Shane, *Invent*, *supra* note 294, at 30 (per capita patent rates); Sun, *supra* note 2966, at 353 (a blended innovation index).

305. Kaasa & Vadi, *supra* note 296, at 592; Mueller & Thomas, *supra* note 249, at 59; Shane, *Innovation*, *supra* note 294, at 67; Shane, *Invent*, *supra* note 294, at 30 (per capita patent rates); Sun, *supra* note 296, at 353 (analyzing whether Hofstede’s cultural characteristics correlate with a “national innovation capability index”); see also ESTRIN, *supra* note 4, at 18 (arguing that “openness” contributes to innovation); KAO, *supra* note 12, at 23, 59, 156 (same). *But see* Kaasa & Vadi, *supra* note 296, at 592 (reporting that “individualism appears to have a much weaker or nonexistent relationship with patenting intensity”).

306. Shane, *Invent*, *supra* note 294, at 30. These correlations remain statistically significant even when adjusted for wealth. *Id.* at 39. In a later study, Shane also considered whether individualism and tolerance of power distance correlated with per capita trademarking rates. Shane, *Innovation*, *supra* note 294, at 64, 65.

between these cultural characteristics and innovation, these correlations suggest that encouraging individuality and limiting power distance may support innovation. Indeed, these results are consistent with other scholarship arguing that autonomy, independence, and freedom facilitate innovation³⁰⁷ and that hierarchy, inequality, and lack of communication between superiors and subordinates slow innovation.³⁰⁸

C. Patent Law and Innovation Culture

Like other types of law, patent law can affect culture. In particular, its effects on social meaning and salience can impact the cultural features identified in the previous Section that correlate with competitive advantage and innovation: national passions, inventing norms, and innovation values.

For example, the expressive aspects of patent law may affect which activities are considered national priorities. As discussed above, under the new America Invents Act, the Director of the U.S. Patent and Trademark Office has the power to declare that certain “products, processes, or technologies . . . are important to the national economy or national competitiveness.”³⁰⁹ Within these technological areas, the Director may accelerate the processing of patent applications.³¹⁰ By declaring that certain areas of technology are national priorities, the U.S. Patent and Trademark Office may improve the social meaning of working within those industries and also increase the salience of those positive social meanings. Even if the magnitude of these effects is not large, the U.S. Patent and Trademark Office may be able to create marginal improvements in the social meaning and salience of an industry, thereby marginally improving the incentives to invent within that industry.³¹¹

Patent law also may affect social norms that favor and encourage inventing. In an earlier article, I described in detail many ways that patent law can influence these norms.³¹² Although I will not repeat those arguments here, the recent changes to U.S. patent law in the America Invents Act illustrate some of the ways that patent law may affect cultural incentives to invent. To start, the signing of a law with a title that explicitly

307. ESTRIN, *supra* note 4, at 104 (“To take root, innovation requires flexible, open, less hierarchical processes . . .”); Kaasa & Vadi, *supra* note 296, at 585–87; Shane, *Innovation*, *supra* note 294, at 61 (collecting sources); Shane, *Invent*, *supra* note 294, at 33–35 (same).

308. Shane, *Innovation*, *supra* note 294, at 61 (collecting sources); Shane, *Invent*, *supra* note 294, at 31–33 (same).

309. Leahy–Smith America Invents Act, Pub. L. No. 112-29, § 25, 125 Stat. 338 (2011).

310. *Id.* For a critique of this approach, see *supra* notes 243–248 and accompanying text.

311. See *supra* notes 277–283 and accompanying text (discussing the competitive advantages associated with national passions). *But see infra* notes 320–330 and accompanying text (discussing concerns regarding the magnitude of the impact of U.S. patent law on U.S. culture).

312. See generally Hubbard, *supra* note 165. For example, awarding patents helps to enforce inventing norms because a patent signals to a broad audience that the patent recipient has discovered a new invention. *Id.* at 398–403.

associates America with invention may increase the salience of invention in American society, particularly given the current rarity of bipartisan agreement.³¹³

Furthermore, the Act may have also helped to give invention a positive social meaning. This is because politicians have used the Act to connect invention to economic prosperity, which possesses positive social meaning and exceptionally high salience in the current economic downturn. When the Act was introduced in the Senate, Senator Patrick Leahy asserted that the Act is “a measure that will help create jobs, energize the economy, and promote innovation.”³¹⁴ Likewise, when the Act was introduced in the House of Representatives, Representative Lamar Smith stated that “[t]his legislation is crucial for American economic growth, jobs, and the future of U.S. competitiveness.”³¹⁵ After the Act passed both the House and the Senate, President Obama quickly signed it, declaring that the Act will “help give entrepreneurs the protection and the confidence they need to attract investment, to grow their businesses, and to hire more workers.”³¹⁶ News agencies widely repeated the asserted connection between the America Invents Act and economic prosperity.³¹⁷ The passage of the Act, together with the statements of politicians regarding the economic goals of the legislation, may help to give invention a positive social meaning, thereby fostering a culture in the United States that is conducive to innovation.

313. Peter Nicholas, *Obama Signs Patent-Approval Law*, L.A. TIMES (Sept. 16, 2011), <http://articles.latimes.com/2011/sep/16/nation/la-na-obama-patents-20110917>. In the House of Representatives, the Act passed with 304 supporting votes and only 117 opposing votes. Press Release, U.S. House of Representatives Committee on the Judiciary, House Passes Smith’s Patent Reform Bill (June 23, 2011), <http://judiciary.house.gov/news/Patent%20Reform%20Passes.html>. In the Senate, the bill passed by an even larger majority, with 89 votes in favor of the Act and only 9 votes opposing it. Edward Wyatt, *Fighting Backlog in Patents, Senate Approves Overhaul*, N.Y. TIMES (Sept. 8, 2011), <http://www.nytimes.com/2011/09/09/business/senate-approves-overhaul-of-patent-system.html>.

314. 157 CONG. REC. S948 (daily ed. Feb. 28, 2011) (statement of Sen. Leahy). Senator Orrin Hatch similarly asserted that the legislation would “help strengthen our economy.” 157 CONG. REC. S951 (daily ed. Feb. 28, 2011) (statement of Sen. Hatch).

315. 157 CONG. REC. H4421 (daily ed. June 22, 2011) (statement of Rep. Smith).

316. President Obama, *supra* note 39. In a press release issued the same day, President Obama further asserted that the Act will “support job creation and strengthen America’s competitiveness in the global economy.” Press Release, Office of the Press Secretary, President Obama Signs America Invents Act, Overhauling the Patent System to Stimulate Economic Growth, and Announces New Steps to Help Entrepreneurs Create Jobs (Sept. 16, 2011), <http://www.whitehouse.gov/the-press-office/2011/09/16/president-obama-signs-america-invents-act-overhauling-patent-system-stim>.

317. See, e.g., Michael A. Memoli & Peter Nicholas, *Obama Signs Patent Overhaul Law, Pushes Jobs Act*, L.A. TIMES (Sept. 16, 2011), <http://articles.latimes.com/2011/sep/16/news/la-pn-obama-patent-20110916> (noting that President Obama asserted that patent reform is “a common-sense step to boost the economy”); Darlene Superville, *Obama Signs 1st Major Patent Law Change Since 1952*, Associated Press, Sept. 16, 2011 (reporting that the Act “has been hailed as a milestone that will spur innovation and create jobs”).

Finally, patent law can also support broad cultural values that correlate with high rates of innovation, such as individualism and low tolerance of power distance. For example, the treatment of independent inventors under U.S. patent law supports these values. As noted above, U.S. patent law provides independent inventors with significant assistance in obtaining patents, and the America Invents Act increases this support.³¹⁸ By singling out and supporting certain inventors because of their independence, U.S. patent law financially encourages “independence” and also expresses broad public support for it. Similarly, these same provisions of patent law express support for low tolerance of power distance because independent inventors seek to prosper through the quality of their ideas, not through advantages based on social hierarchy.³¹⁹

D. *The Magnitude of Cultural Effects of Patent Law*

The impact of U.S. patent law on culture is likely larger in the United States than in other countries for two reasons. First, U.S. law and the actions of U.S. politicians provide more information regarding the opinions of American voters than the beliefs of citizens of a foreign country because democratic elections, to a certain extent, encourage politicians to conform their behavior to their constituents’ beliefs.³²⁰ As a result, U.S. laws and statements by U.S. politicians promoting invention signal that many American citizens believe that invention is highly salient and imbued with positive social meaning. A person in the United States therefore may be encouraged to try to discover a new invention by the increased expectation of praise for her efforts. In contrast, a U.S. law favoring invention would be less likely to cause a person in China to expect praise from Chinese citizens.

A second reason that the expressive impact of U.S. patent law is larger in the United States than in other countries is that American citizens are more likely than foreigners to learn U.S. law or scrutinize the actions of U.S. politicians.³²¹ U.S. citizens can more easily follow developments in U.S. law through popular media and without the need for translation. Moreover, the benefits from monitoring U.S. law (or costs from ignoring it) are frequently greater for American citizens than foreign citizens because much U.S. law has little extraterritorial impact and because only U.S. citizens can vote disfavored U.S. politicians out of office.³²² Citizens

318. See *supra* notes 227–30 and accompanying text.

319. See Shane, *Innovation*, *supra* note 294, at 61; Shane, *Invent*, *supra* note 294, at 31.

320. U.S. politicians may be concerned about other actions by foreign countries and their citizens, including economic and military reactions to U.S. laws.

321. Many foreigners closely monitor U.S. politics, and increasing the salience of an issue in the United States might raise the salience of the issue in another country, particularly if that country enacts new laws in response to U.S. legislation.

322. It is a felony for a noncitizen to vote in a federal election in the United States. See 18

of foreign countries may benefit less from efforts to understand U.S. law because they are unaffected by those laws or unable to change them.

One group of foreign citizens nevertheless may be highly responsive to the expressive impact of U.S. patent law: foreign applicants for U.S. patents. These foreign citizens may closely monitor U.S. patent law and may benefit from certain value-laden portions of the patent act, such as the provisions favoring independent inventors. Indeed, the patenting behavior of foreign inventors suggests that they often pay close attention to U.S. patent law. One way for foreign inventors to obtain U.S. patents is by filing U.S. patent applications directly with the U.S. Patent and Trademark Office. Alternatively, a foreign inventor can apply for a patent in a foreign country and then use that foreign patent application to file a so-called Patent Cooperation Treaty (PCT) application in the United States. Interestingly, the vast majority of foreign inventors do not obtain U.S. patents by leveraging applications from their home countries into PCT applications in the United States. Instead, most foreign inventors file patent applications directly with the U.S. Patent and Trademark Office. For example, in 2011, nonresident inventors filed 227,907 patent applications directly with the U.S. Patent and Trademark Office³²³ and only 81,441 PCT applications.³²⁴

Even if foreign applicants for U.S. patents closely track U.S. patent law and politics, however, the expressive impact of U.S. patent law likely will be largest in the United States because the expressive impact of U.S. patent law in the United States extends to non-inventors. For example, even people who have never applied for a patent may laud a successful innovator. The reaction to the death of Steve Jobs in mainstream media demonstrates the extent to which even technophobes may respect innovators.³²⁵ Furthermore, the social meaning of invention can affect whether people strive to become inventors in the first place. Improving the social meaning of invention among children and students may encourage some of them to pursue inventive careers. The benefits of using U.S. patent law to shape culture are thus larger in the United States than in any other country.³²⁶

U.S.C. §§ 911, 1015(f) (2006); 42 U.S.C. §§ 1973gg-3(c)(2)(C), 1973gg-5(a)(6)(A)(i), 1973gg-7(b)(2) (2006).

323. *IP Statistics Data Center*, WORLD INTELLECTUAL PROP. ORG., <http://ipstatsdb.wipo.org/ipstats/patentsSearch> (select “1a- Direct applications” as the “Indicator,” select “Resident & non-resident count by filing office” as the “Report Type,” select “2011” for both values in the “Year Range,” and select “United States of America” as the “Office”) (last visited Mar. 2, 2013).

324. *Id.* (select “1b- PCT national phase entries” as the “Indicator,” select “Resident & non-resident count by filing office” as the “Report Type,” select “2011” for both values in the “Year Range,” and select “United States of America” as the “Office”) (last visited Mar. 2, 2013).

325. See Markoff, *supra* note 290; Mossberg, *supra* note 291; Sullivan, *supra* note 291.

326. Some foreign countries are actively trying to shape their culture related to innovation. For example, in 2010 Malaysia established the Malaysia Innovation Agency, which is a governmental

Nevertheless, it is difficult to measure the extent to which U.S. patent law can affect culture in a way that promotes domestic competitive advantage. “Values and norms are powerful forces for controlling and directing human behavior,”³²⁷ but it is not clear to what extent U.S. patent law can shape these values and norms rather than merely reflect them.³²⁸ Moreover, the cultural impact of certain aspects of patent law likely diminishes over time. Today, the America Invents Act and the high-publicity attention that politicians have given the Act probably have worked together to increase the salience of inventing in American society and to ensure that the social meaning of invention is positive. However, Congress cannot credibly pass a major patent reform bill ever year; when laws are perceived as lacking legitimacy, they may have little impact on culture.³²⁹ Furthermore, the America Invents Act changed U.S. patent law

entity whose responsibilities include “[p]romoting the culture of innovation in the public and private and education sectors in Malaysia” Lee Tatt Boon, *Attaining High Income Through Innovation*, 25 WORLD INTELLECTUAL PROP. REPORT 40 (2011).

327. Mueller & Thomas, *supra* note 249, at 58; accord SHENK, *supra* note 252, at 151 (“Our cultural landscape directly affects whether and how people challenge themselves and others to achieve.”).

328. Indeed, some expressive effects of law could undermine innovation. For example, some scholars have argued that granting patents for academic discoveries undermines social norms that encourage scientists to collaborate with each other. See Margo A. Bagley, *Academic Discourse and Proprietary Rights: Putting Patents in Their Proper Place*, 47 B.C. L. REV. 217, 239 (2006) (arguing that there is a correlation between the rise in patent law and the continual decline in the quantity and quality of scientific discourse); Rebecca S. Eisenberg, *Proprietary Rights and the Norms of Science in Biotechnology Research*, 97 YALE L.J. 177, 216 (1987) (recognizing the disincentive for researchers guided by scientific norms to publish prior to patent protection); Jeremy M. Grushcow, *Measuring Secrecy: A Cost of the Patent System Revealed*, 33 J. LEGAL STUD. 59, 78 (2004) (attributing the increased secrecy by professors not seeking patents to a shift in normative attitudes toward reciprocity and collegiality). The results of these studies are inconclusive. See Katherine J. Strandburg, *User Innovator Community Norms: At the Boundary Between Academic and Industry Research*, 77 FORDHAM L. REV. 2237, 2239 (2009) (“[S]cholars may have been overly concerned about the potential erosion of academic sharing norms”). The National Research Council recently issued a report that concluded that “the expansion of faculty entrepreneurial activity and institutional technology transfer activity at U.S. research universities has not seriously undermined the core missions of knowledge generation and dissemination.” NAT’L RESEARCH COUNCIL, *MANAGING UNIVERSITY INTELLECTUAL PROPERTY IN THE PUBLIC INTEREST* 40 (2011).

329. See, e.g., POSNER, *supra* note 255, at 99 (discussing the relationship between the distrust of the government and the internalization of the values of a law in the context of shaming punishments); Geisinger, *supra* note 253, at 68 (describing the process of norm internalization associated with popular understandings of wearing a motorcycle helmet); Holbrook, *supra* note 255, at 592 (noting the impact laws can have on individual perceptions of societal norms); McAdams, *Attitudinal Theory*, *supra* note 255, at 358–59 (discussing the importance of “legitimacy” in the expressive theory of law); see also Ben Depoorter & Sven Vanneste, *Norms and Enforcement: The Case Against Copyright Litigation*, 84 OR. L. REV. 1127, 1139–40 (2005) (discussing law, norms, and legitimacy in the copyright context); Lucas Osborn, *Instrumentalism at the Federal Circuit*, 56 ST. LOUIS U. L.J. 419, 425 (2012) (discussing judicial decisions and legitimacy).

to be more consistent with the patent laws of other countries. As the patent laws of more countries align, their cultural effects may do the same.³³⁰ In the long run, the cultural impact of U.S. patent law therefore may not provide enhanced incentives to invent in the United States if the patent laws of other countries provide their citizens with similar advantages.

CONCLUSION

Innovation is critical to the success of American businesses in global markets. Because patent law is an important mechanism for promoting innovation, changes to U.S. patent law might create competitive advantages for American innovators. Because both foreign and domestic innovators use the U.S. patent system, one potential mechanism for boosting domestic innovation is to favor American inventors explicitly through protectionist patent laws. Though the United States has a long history of embracing protectionist patent law, the costs of such protectionism outweigh the expected benefits. Protectionism generally reduces domestic welfare by raising prices for domestic consumers and by insulating American businesses from the competitive pressures that drive innovation.³³¹ In addition, if the United States were to enact protectionist patent law, the United States would violate international treaties, risking retaliatory action by its trade partners.

Another potential mechanism for using U.S. patent law to create domestic competitive advantage focuses on traditional approaches to improving the processes of the U.S. Patent and Trademark Office: making these processes faster, cheaper, and more accurate. U.S. political leaders implicitly contend that the recent America Invents Act creates competitive advantage in this fashion.³³² Typical approaches to improving the U.S. Patent and Trademark Office, however, likely will not provide American entities with enhanced incentives to invent vis-à-vis foreign inventors because more foreign inventors utilize the U.S. patent system than American inventors. Most of the benefits to improving the U.S. patent system would therefore be enjoyed by our competitors. Moreover, foreign inventors may be more responsive to improvements at the U.S. Patent and Trademark Office than American inventors.

U.S. patent law might nevertheless be able to increase relative incentives for Americans to invent in the United States by selectively improving the processing of patent applications for U.S. patents in

330. Some countries arguably have gone further than the United States in using law to promote values related to innovation. For example, Finland has “enshrine[d] in law Internet access as a basic human right” BEYOND E-READINESS, *supra* note 81, at 8.

331. PORTER, *supra* note 12, at 68 (“Nations succeed in industries where pressures are created that overcome inertia and promote ongoing improvement and innovation instead of an easy life. Nations fail in industries where firms stop the upgrading process.”).

332. See *supra* note 238 and accompanying text.

technological areas in which American businesses and inventors already enjoy competitive advantages. Such selective improvements could magnify those existing advantages. However, implementing selective improvements will not be easy. For example, it may be difficult to identify reliably which areas of technology to target for improvements. Moreover, foreign countries may retaliate by enacting similar measures, thereby disadvantaging U.S. interests in global markets.

Because traditional improvements to the U.S. Patent and Trademark Office may equally affect foreign and domestic inventors, policy makers seeking to boost U.S. competitiveness should also consider nontraditional approaches to U.S. patent law, such as the effect of U.S. patent law on U.S. culture. This aspect of U.S. patent law likely affects U.S. businesses and inventors more than their foreign rivals. In this way, changes to U.S. patent law and related statements by U.S. politicians can help to foster a culture in the United States that facilitates innovation. For instance, in signing the new America Invents Act and declaring innovation to be a national priority, President Obama may actually have helped to achieve that goal. Unfortunately, however, verifying and quantifying the effect of U.S. patent law on the values and beliefs of the American people—and thus on American competitiveness—is exceedingly difficult if not impossible.

In short, adjusting U.S. patent law has little capacity to promote domestic competitive advantage by increasing American inventors' incentives to invent vis-à-vis the incentives felt by foreign inventors. Protectionist U.S. patent law is likely futile. Traditional improvements to the U.S. Patent and Trademark Office benefit both foreign and domestic innovators, so American businesses and inventors often gain little, if any, relative advantage over foreign rivals. The cultural impact of U.S. patent law is well-suited to favoring U.S. interests, but the magnitude of such effects is unclear.

Given these limits, the United States should continue to explore nontraditional approaches to U.S. patent law that can create domestic competitive advantage. In addition, the United States should consider generating domestic competitive advantage through adjustments to other areas of law that also affect innovation, including immigration,³³³ tax,³³⁴

333. See INNOVATE AMERICA, *supra* note 11, at 11 (arguing that the United States must “[r]eform immigration to attract the best and brightest [science and engineering] students from around the world and provide work permits to foreign [science and engineering] graduates of U.S. institutions”); GATHERING STORM, REVISITED, *supra* note 12, at 53–54. The Washington Post reports that “[i]mmigrants founded a quarter of all U.S. engineering and technology companies started between 1995 and 2005” Vivek Wadhwa, *They’re Taking Their Brains and Going Home*, WASHINGTON POST, Mar. 8, 2009. Despite this contribution, “the lumbering U.S. immigration bureaucracy helps push [immigrants] away” from the United States. *Id.*; see also AUGUSTINE, *supra* note 12, at 50 (“In fact, it can be responsibly argued that America’s scientific enterprise would virtually cease to function without the foreign-born talent that makes up such a crucial part of it.”).

334. AUGUSTINE, *supra* note 12, at 62 (“In the early 1990s, the United States ranked first

education,³³⁵ and government expenditures.³³⁶ These areas of law are important topics for future research on innovation and competitive advantage. These areas of law, however, face an important challenge that is often absent from patent law. Changes to the U.S. Patent and Trademark Office do not require increases in federal spending because the U.S. Patent and Trademark Office is funded solely through “user fees,” including fees paid by patent applicants.³³⁷ In contrast, changes to tax, education, and government expenditures likely will require increased federal funding. In an era of deep cuts to the federal budget, political leaders are reluctant to increase any expenditures.³³⁸ On the other hand, because innovation is vital to the U.S. economy, avoiding these expenditures may be risky. As one innovation commentator has noted, “Our competitors have not been standing still.”³³⁹ By the time the U.S. economy catches its breath, it may find that it has fallen behind in the global race for economic prosperity.

among OECD nations offering tax incentives for R&D; but by 2004, it had fallen to 17th place.”); INNOVATE AMERICA, *supra* note 11, at 58–59 (arguing that the United States must “[e]nact a permanent, restructured [research] tax credit”); KAO, *supra* note 12, at 37 (discussing tax credits for research and development). Many states have enacted tax laws to promote innovation; *see, e.g., State Enacts Credit for Life Sciences Businesses That Increase Tax Revenue*, BIOTECH WATCH (BNA) (Apr. 25, 2011) (discussing tax incentives for innovation in Utah); *State Enacts Job Incentive Program for Life Sciences in Redevelopment District*, BIOTECH WATCH (BNA) (Aug. 16, 2011) (discussing tax incentives for innovation in Rhode Island); *Wisconsin Enacts Legislation Expanding, Creating Biofuel Production, Sales Incentives*, BIOTECH WATCH (BNA) (June 11, 2010) (discussing tax incentives for innovation in Wisconsin).

335. *See* Lechleiter, *supra* note 4; Zakaria, *supra* note 4 (arguing that “if we are to get the U.S. back to work, we need . . . to rebuild American education”). Certain parts of the U.S. educational system appear to be ineffective. For example, in 2007, one-third of high school students in California failed to graduate. KAO, *supra* note 12, at 34; *see also* CSIKSZENTMIHALYI, *supra* note 154, at 330 (“Clearly, the availability of training is crucial for developing any kind of talent.”).

336. INNOVATE AMERICA, *supra* note 11, at 11; Press Release, U.S. Patent and Trademark Office, USPTO Launches Small Business Innovation Research Pilot Program (Oct. 28, 2011), <http://www.uspto.gov/news/pr/2011/11-61.jsp> (describing a pilot program by the U.S. Patent Office providing additional resources to certain innovative small businesses); *see also* 35 U.S.C. §§ 200–12 (describing the ownership of patents on inventions discovered using federal funding). According to one commentator, when adjusted for inflation, “US federal support of research in the physical sciences, mathematics, and engineering . . . has been stagnant for 2 decades.” AUGUSTINE, *supra* note 12, at 58.

337. H.R. Rep. 109-372, at 5 (2005).

338. GATHERING STORM, REVISITED, *supra* note 12, at 26; *see* Eric Lipton, *Lawmakers Trade Blame as Deficit Talks Crumble*, N.Y. TIMES (Nov. 20, 2011), <http://www.nytimes.com/2011/11/21/us/politics/lawmakers-concede-budget-talks-are-close-to-failure.html?pagewanted=all> (noting that the federal budget will decrease 1.2 trillion dollars over ten years beginning in 2013).

339. AUGUSTINE, *supra* note 12, at 3, 10; *see* GATHERING STORM, REVISITED, *supra* note 12, at 4, 33–34.

Appendix A: Global Patent Applications, Patents, and Populations in Absolute Numbers and Per Capita by Inventor's Country in 2011

Country ³⁴⁰	Population ³⁴¹ (millions)	Patent Applications Filed Worldwide ³⁴²	Patents Granted Worldwide ³⁴³	Per Million Capita Patent Applications	Per Million Capita Patents
Japan	128	472,417	304,604	3,696	2,383
U.S.	312	432,298	201,158	1,387	646
China	1,344	435,608	118,158	324	88
Republic of Korea	50	187,454	97,714	3,766	1,963
Germany	82	172,764	72,346	2,114	885
France	65	65,349	34,766	999	531
Russian Federation	142	31,433	22,177	221	156
U.K.	63	49,938	18,275	797	292
Switzerland	8	37,477	17,564	4,740	2,221
Italy	61	27,679	16,212	455	267
Netherlands	17	32,376	14,924	1,939	894
Sweden	9	21,480	10,905	2,272	1,154
Finland	5	11,516	5,827	2,138	1,082
Denmark	6	11,565	4,260	2,075	764
Israel	8	10,821	4,237	1,393	546

340 The World Intellectual Property Office uses the country of residence for the first inventor listed on a patent or patent application to approximate inventor nationalities. *Methodological Information*, WORLD INTELLECTUAL PROP. ORG., http://www.wipo.int/export/sites/www/ipstats/en/statistics/patents/pdf/patent_stats_methodology.pdf (last visited Feb. 4, 2013). Strictly speaking, the country of residence for an inventor is not the same as the inventor's nationality and multiple inventors with different nationalities often collaborate to discover new inventions. Nevertheless, the country of residence for the first inventor likely serves as a reliable proxy for inventor nationality because discrepancies between residences and nationalities and among multiple inventors will generally offset one another.

341. *Data: Indicators: Population, total*, THE WORLD BANK, <http://data.worldbank.org/indicator/SP.POP.TOTL> (last visited Mar. 2, 2013).

342. *IP Statistics Data Center*, WORLD INTELLECTUAL PROP. ORG., <http://ipstatsdb.wipo.org/ipstats/patentsSearch> (select "1 - Total patent applications (direct and PCT national phase entries)" as the "Indicator," select "Total Count by Applicant's Origin" as the "Report Type," select "2011" for both values in the "Year Range," and select the countries listed above for the values under "Select Origin") (last visited Feb. 4, 2013).

343. *IP Statistics Data Center*, WORLD INTELLECTUAL PROP. ORG., <http://ipstatsdb.wipo.org/ipstats/patentsSearch> (select "2 - Total patent grants (direct and PCT national phase entries)" as the "Indicator," select "Total Count by Applicant's Origin" as the "Report Type," select "2011" for both values in the "Year Range," and select the countries listed above for the values under "Select Origin") (last visited Feb. 4, 2013).