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American Innovation and the Limits of Patent Law: A Response to William Hubbard, Competitive Patent Law

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AMERICAN INNOVATION AND THE LIMITS OF PATENT LAW: A RESPONSE TO WILLIAM HUBBARD, COMPETITIVE PATENT LAW

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Although it has recently come under fire from both theoretical[1] and empirical[2] perspectives, the promotion of innovation remains the predominant justification for U.S. patent law.[3] In *Competitive Patent Law*,[4] Professor William Hubbard makes a valuable contribution regarding an underexplored aspect of patent law's ability to encourage innovation—namely, "whether U.S. patent law can be tailored to provide U.S. innovators with enhanced incentives to invent" compared to foreign rivals,[5] and thus by extension make American firms more competitive in the global marketplace.[6] Although Professor Hubbard is generally pessimistic regarding patent law's capacity to directly incentivize U.S. innovators relative to their foreign counterparts,[7] he sees more opportunity in its ability to promote a pro-innovation culture that can indirectly enhance American competitiveness.[8]

This response addresses three aspects of Professor Hubbard's thoughtful and well-written article. First, it will critically assess the contention advanced by some commentators—and apparently shared by the article—that the United States is currently facing an "innovation gap."[9]

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[1] *See generally* ROBERT P. MERGES, JUSTIFYING INTELLECTUAL PROPERTY (2011).

[2] *See generally, e.g.,* Michele Boldrin & David K. Levine, *The Case Against Patents*, 27 J. ECON. PERSP. 3 (2013).

[3] *See* U.S. CONST. art. I, § 8, cl. 8 (providing that Congress has the power "[t]o promote the Progress . . . useful Arts, by securing for limited Times to . . . Inventors the exclusive Right to their . . . Discoveries"); Graham v. John Deere Co. of Kansas City, 383 U.S. 1, 9 (1966) (favorably citing the Jeffersonian view that "[t]he patent monopoly . . . was a reward, an inducement, to bring forth new knowledge"); 1 R. CARL MOY, MOY'S WALKER ON PATENTS § 1:12 (4th ed. 2013) (explaining that the patent "system is a useful means for the State to encourage invention").

[4] 65 FLA. L. REV. 341 (2013).

[5] *Id.* at 341.

[6] *Id.*at 347–48.

[7] *See id.* at 363–79, 392 ("[A]djusting U.S. patent law has little capacity to promote domestic competitive advantage by increase American inventors' incentives to invent vis-à-vis the incentives felt by foreign inventors.").

[8] *See id.* at 386–91.

[9] *Id.* at 355.

Second, it will evaluate the claim that patent law can play a meaningful role in enhancing American innovation and competitiveness. Finally, it will briefly discuss several non-patent-law approaches that can help foster the "innovation culture" advocated by Professor Hubbard.

Presently, the United States is the global leader in innovation. The U.S. expended over $400 billion in research and development in 2011.[10] This figure is more than double that of its closest competitor, China,[11] and more than triple Japan's.[12] In addition, American intellectual property is highly valuable. According to data from the International Monetary Fund (IMF), the United States was the leading major economy in compensation received from foreign licensing of its intellectual property in 2012, earning more than double that of its closest competitor, Japan.[13]

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[10] In 2011, the U.S. expended 2.77% of its gross domestic product ("GDP") on research and development ("R&D"). *See Data: Indicators: Research and Development Expenditure (% of GDP)*, THE WORLD BANK, http://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS (last visited Feb. 18, 2014). In light of the U.S.'s estimated $15.53 trillion GDP for that year, *see Data: Indicators: GDP, PPP (Current International $)*, THE WORLD BANK, http://data.worldbank.org/indicator/NY.GDP.MKTP.PP.CD (last visited Feb. 18, 2014), this equates to R&D expenditures of approximately $430 billion. *See also* NAT'L SCI. FOUND., SCIENCE AND ENGINEERING INDICATORS 2012, at 4-4 (2012), http://www.nsf.gov/statistics/seind12/pdf/c04.pdf ("Overall R&D performed in the United States in 2009 totaled an estimated $400 billion . . . .").

[11] In 2011, China's R&D expenditures were 1.84% of its GDP, *see Data: Indicators: Research and Development Expenditure (% of GDP)*, *supra* note 10, which is equivalent to approximately $205 billion. *See Data: Indicators: GDP, PPP (Current International $)*, *supra* note 10 (stating that China's GPD for 2011 was approximately $11.185 trillion).

[12] In 2010, Japan's R&D expenditures were 3.26% of its GDP, *see Data: Indicators: Research and Development Expenditure (% of GDP)*, *supra* note 10, which is equivalent to approximately $140 billion. *See Data: Indicators: GDP, PPP (Current International $)*, *supra* note 10 (stating that Japan's GPD for 2010 was approximately $4.291 trillion).

[13] *See Data: Indicators: Charges for the Use of Intellectual Property, Payments (BoP, Current US$)*, THE WORLD BANK, http://data.worldbank.org/indicator/BM.GSR.ROYL.CD (last visited Feb. 18, 2014) (stating that the U.S. received approximately $39.9 billion in revenue for IP rights in 2012, compared to $19.9 for Japan). Notably, Ireland leads the world in revenue from IP rights, *id.*, but this anomaly is likely due to tax-avoidance strategies by American high technology companies that use Irish-based subsidiaries to avoid higher U.S. corporate tax rates, rather than valuable IP held by Irish firms. *See* Charles Duhigg & David Kocieniewski, *How Apple Sidesteps Billions in Taxes*, N.Y. TIMES, Apr. 28, 2012, at A1, *available at* http://www.nytimes.com/2012/04/29/business/apples-tax-strategy-aims-at-low-tax-states-and-nations.html.

Furthermore, leading American businesses are widely regarded as highly innovative. For example, in a recent survey by Booz & Company, nine of the ten most innovative companies in the world were founded and based in the United States, including Apple, Google, Facebook, and Tesla Motors.[14]

Using issued patents as a proxy for innovation, as Professor Hubbard does,[15] further illustrates the United States's advantage over its closest rivals. In 2012, U.S.-based inventors received nearly 2½ times the number of U.S. patents compared to Japan, the second-ranked country of origin.[16] Inventors in all other countries lagged much farther behind. For example, California-based inventors received more than twice the number of U.S patents as inventors in Germany,[17] Europe's leading economy, even though Germany's population is more than double that of California's.[18] And U.S. inventors led the world in issued *European* patents as well, edging out Germany on its home turf.[19]

Nonetheless, Professor Hubbard is quite right to be concerned about the United States' continued position as the

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[14] Barry Jaruzelski, John Loehr & Richard Holman, *The Global Innovation 1000: Navigating the Digital Future*, STRATEGY & BUS., Winter 2013, at 12 exhibit F, *available at* http://www.booz.com/global/home/what-we-think/reports-white-papers/article-display/2013-global-innovation-1000-study.

[15] *See* Hubbard, *supra* note 4, at 353–55, 354 n. 92 ("[P]atents are only a proxy for innovation, and not a precise measure.").

[16] *See Utility Patents by County, State, and Year (Dec. 2012),* U.S. PATENT & TRADEMARK OFFICE, http://www.uspto.gov/web/offices/ac/ido/oeip/taf/cst_utl.htm (last modified Apr. 1, 2013).

[17] *See id.* Of course, innovation is not geographically uniform throughout the United States; for example, Silicon Valley, the D.C. area, and parts of New England are vibrant high-tech "innovation clusters," while other regions are relatively bereft. *See* Antonio Regalado, *In Innovation Question, Regions Seek Critical Mass*, MIT TECH. REV. (July 1, 2013), *available at* http://www.technologyreview.com/news/516501/in-innovation-quest-regions-seek-critical-mass.

[18] *See Germany,* THE WORLD FACTBOOK, https://www.cia.gov/library/publications/the-world-factbook/geos/gm.html (last updated Feb. 4, 2014); *California*, U.S. CENSUS BUREAU, http://quickfacts.census.gov/qfd/states/06000.html (last updated Jan. 6, 2014, 5:25 PM).

[19] *See Annual Report 2012: Granted Patents,* EUR. PATENT OFFICE (Mar. 2013), http://documents.epo.org/projects/babylon/eponet.nsf/0/4D0C304859450DE8C1257B1D0052A20E/$File/granted_patents_en.pdf (stating that inventors based in the United States received 14,699 patents in 2012, compared to Germany, which received 13,321 patents).

global leader in innovation, which faces numerous challenges. Federal funding for scientific research is threatened by budget cuts.[20] In addition, American students continue to trail much of the developed world in math and science test scores.[21] And the Obama Administration has estimated that the United States needs "approximately 1 million more "STEM" (Science, Technology, Engineering, and Math) graduates "over the next decade if the country is to retain its historical preeminence in science and technology."[22]

Second, while Professor Hubbard is skeptical that U.S. patent law can directly enhance American competitiveness, he expresses qualified optimism about its ability to help create "a culture . . . conducive to innovation."[23] Existing evidence regarding patent law's actual role in facilitating innovation appears mixed, however. For example, the 2008 Berkeley Patent Study, a comprehensive survey of over 1300 early-stage technology companies, found that "startup executives report that patents generally provide relatively weak incentives to conductive innovative activities."[24] However, the same study also reported substantial variations by industry regarding the importance of patents for innovation, and it concluded that "startup companies in all high technology sectors are patenting much more widely, and in greater numbers," than expected.[25] In contrast, a recent study by

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[20] *See, e.g.*, Meredith Wadman, *Science Agencies Prepare for Cuts*, NATURE, Feb. 14, 2013, at 158.

[21] *See* Mokoto Rich, *American 15-Year-Olds Lag, Mainly in Math, on International Standardized Tests*, N.Y. TIMES, Dec. 3, 2012, at A12, *available at* http://www.nytimes.com/2013/12/03/education/american-15-year-olds-lag-mainly-in-math-on-international-standardized-tests.html ("Fifteen-year-olds in the United States score in the middle of the developed world in reading and science while lagging in math . . . .").

[22] PRESIDENT'S COUNCIL OF ADVISORS ON SCI. AND TECH., EXEC. OFFICE OF THE PRESIDENT, ENGAGE TO EXCEL: PRODUCING ONE MILLION ADDITIONAL COLLEGE GRADUATES WITH DEGREES IN SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS, at i (Feb. 2012), *available at* http://www.whitehouse.gov/sites/default/files/microsites/ostp/pcast-engage-to-excel-final_2-25-12.pdf.

[23] Hubbard, *supra* note 4, at 387.

[24] Stuart J.H. Graham, Robert P. Merges, Pam Samuelson & Ted Sichelman, *High Technology Entrepreneurs and the Patent System: Results of the 2008 Berkeley Patent Survey*, 24 BERKELEY TECH. L.J. 1255, 1255 (2010); *see also id.* at 1285 ("[R]espondents told us that on average, patents offer just a 'slight' incentive to engage in invention, R&D, and commercialization . . . .").

[25] *Id.* at 1287.

James Bessen found that the vast majority of publicly-listed software companies did not patent at all, suggesting that patent law provides limited incentives to innovate in that industry.[26] And in other industries like pharmaceuticals, biotechnology, and medical devices, it is widely accepted patent protection provides a strong incentive to innovate.[27] Thus, whether and to what degree U.S. patent law promotes American innovation remains uncertain.

Finally, other policy levers may be employed to help promote and sustain an American "innovation culture," either as a supplement or an alternative to patent law. There is burgeoning literature that prizes can be effective alternatives to patents in promoting innovation, at least in some circumstances.[28] Indeed, the Obama Administration has promoted federally-funded prizes and challenges[29] and has created a website, Challenge.gov, where American inventors and entrepreneurs can compete for prizes awarded by federal agencies.[30] In addition, permanent federal and state corporate tax credits for research and development could play a valuable role in further strengthening American innovation.[31]

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[26] James Bessen, *A Generation of Software Patents*, 18 B.U. J. SCI. & TECH. L. 241, 260–61 (2012).

[27] *See* Graham et al., *supra* note 24, at 1279–80, 1283 ("[V]enture-backed biotechnology and medical device companies are . . . more likely than software and Internet firms to file patent applications . . . ."); Benjamin N. Roin, *Unpatentable Drugs and the Standards of Patentability*, 87 TEX. L. REV. 503, 504 (2009) ("It is widely accepted that patents play an essential role in motivating private investment in pharmaceutical R&D . . . .").

[28] *See, e.g.*, Joseph E. Stiglitz, *Economic Foundations of Intellectual Property Rights*, 57 DUKE L.J. 1693, 1719–24 (2008); Brian D. Wright, *The Economics of Invention Incentives*, 73 AM. ECON. REV. 691, 691 (1983); *see also* Steven Shavell & Tanguy Van Ypersele, *Rewards Versus Intellectual Property Rights*, 44 J.L. & ECON. 525, 526–27 (2001) (reviewing the history of cash prizes as substitutes for patents).

[29] *See* NAT'L ECON. COUNCIL, A STRATEGY FOR AMERICAN INNOVATION: SECURING OUR GROWTH AND PROSPERITY 12 Box 2 (Feb. 2011), *available at* http://www.whitehouse.gov/sites/default/files/uploads/InnovationStrategy.pdf ("President Obama [has] called on all agencies to increase their use of prizes and challenges to mobilize America's ingenuity to solve some of our most pressing challenges.").

[30] U.S. GEN. SERVS. ADMIN., https://challenge.gov (last visited Feb. 18, 2014).

[31] *See* Jessica Lee & Mark Muro, *Cut to Invest: Make the Research and Experimentation Tax Credit Permanent*, BROOKINGS (Nov. 2012), http://www.brookings.edu/~/media/research/files/papers/2012/12/06%20federalism/06%20research%20experimentation%20tax.pdf ("A permanent [Research and Experimentation] Tax Credit will bolster innovation–related

Furthermore, public recognition and support for math and science education can help foster the "inventing norms" described by Professor Hubbard. For instance, the "Educate to Innovate" campaign launched in 2009 has promoted science and math education through a variety of approaches, including science fairs on the White House lawn, educational programming by Discovery Communications for middle school students, and even the use of Sesame Street characters like Elmo and Big Bird to stimulate interest in math and science among young children.[32] Overall, these approaches to promoting a more vibrant pro-innovation culture ultimately may be at least as promising as patent law.

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investment and activity in U.S. metropolitan areas, foster prosperity, and improve the nation's standing in the global economy."); *see also* Daniel J. Hemel & Lisa Larrimore Ouellette, *Beyond the Patents-Prizes Debate*, 92 TEX. L. REV. 303, 321–326 (2013) (explaining existing but temporary federal tax credits for R&D and creating a new taxonomy to directly compare patents, prizes, and tax incentives in innovation policy); Shaun P. Mahaffy, Note, *The Case for Tax: A Comparative Approach to Innovation Policy*, 123 YALE L.J. 812, 812 (2013) (arguing "that tax credits could be used to ameliorate a number of inefficiencies that arise from the failures of patent law").

[32] *See* THE WHITE HOUSE, *Educate to Innovate*, http://www.whitehouse.gov/issues/education/k-12/educate-innovate (last visited Feb. 18, 2014); Kenneth Chang, *White House Pushes Science and Math Education*, N.Y. TIMES, Nov. 23, 2009, at A13, *available at* http://www.nytimes.com/2009/11/23/science/23educ.html; Bonnie Rochman, *Can Elmo Inspire Your Kid to Become a Scientist?*, TIME (Jan. 9, 2012), http://healthland.time.com/2012/01/09/can-elmo-inspire-your-kid-to-become-a-scientist.