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Unregistered Patents and Gender Equality

A Global Perspective

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INTRODUCTION

Women are currently underrepresented among patent holders. Studies show that female inventors, in both industry and academia, hold fewer patents, file fewer patent applications, and have their applications more often rejected by the patent office than men do.[1] As a result, female inventors are less likely to receive patent protection for their innovative efforts or to attract the investment necessary to commercialize their inventions, hindering their success in highly technological fields.[2]

Although a variety of measures are needed fully to resolve the patent gender gap, one possible measure that could help women access protections for their innovations is allowing unregistered patent rights in addition to the existing regime of registered patent rights.[3] The proposed unregistered rights would extend only to

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[1] *See* Waverly W. Ding, Fiona Murray & Toby E. Stuart, *Gender Differences in Patenting in the Academic Life Sciences*, 313 SCIENCE 665, 665 (2006); Kjersten B. Whittington, *Mothers of Invention? Gender, Motherhood, and New Dimensions of Productivity in the Science Profession*, 38 WORK & OCCUPATIONS 417, 418–20 (2011); Kjersten B. Whittington & Laurel Smith-Doerr, *Women Inventors in Context: Disparities in Patenting across Academia and Industry*, 22 GENDER & SOC'Y 194 (2008); Miriam Marcowitz-Bitton, Yotam Kaplan & Emily Michiko Morris, *Unregistered Patents & Gender Equality*, 43 HARV. J.L. & GENDER 47 (2020).

[2] As noted by several scholars, including two of the authors here, gaps in patenting may exist according to race as well as gender. See Miriam Marcowitz-Bitton & Emily Michiko Morris, *The Distributive Effects of IP Registration*, 23 STAN. TECH. L. REV. 306, 333–35 (2020), and sources cited therein. As acknowledged throughout this chapter, the unregistered rights system proposed here may benefit such other disadvantaged inventors as well. *See id.* at 363–69.

[3] "Registered rights" refers to systems that grant patent rights on only a registration-only basis as well as those that require both registration and substantive examination. *See also* text accompanying notes 82–91 (discussing registration-only patent systems).

inventions that meet the standard substantive requirements for patentability but would do so without requiring inventors to go through the expensive, complicated, and time-consuming patent examination process. Such unregistered patents would grant exclusive rights to inventions for a limited period of time and only against direct and knowing copying. They nonetheless would provide much-needed protections for female innovators, who face many obstacles in obtaining registered patent rights for their innovative efforts.

8.1 INEQUALITY IN PATENT PROTECTION WORLDWIDE

Although the numbers vary substantially by country, technology, and sector, the overall percentage of women among patentees and patent applicants remains low worldwide.[4] The comprehensive study of Patent Cooperation Treaty applications from 151 countries conducted by the World Intellectual Property Organization (WIPO) highlights the significant gender gap in patent protection.[5] The study found that less than 30 percent of all patent applications listed female inventors, with less than 5 percent listing women as sole inventors.[6] This gender gap persisted even in fields that otherwise exhibited near-gender parity.[7] For example, biotechnology and academia generally offer women better opportunities[8] than electrical and mechanical engineering and industry,[9] but even in bioscience, women are still underrepresented among patent holders.[10]

Similarly, a study the UK Intellectual Property Office conducted using the Worldwide Patent Statistical Database (PATSTAT) and PatBase found that women have constituted less than 2 percent of inventors for most of the twentieth century, rising only to just over 10 percent by 2015.[11] Importantly, although patents listing female inventors are increasing, this trend has been slow.[12] Variation between

[4] Gema L. Martinez, Julio Raffo & Kaori Saito, *Identifying the Gender of PCT Inventors* 8 (World Intell. Prop. Org., Working Paper No. 33, 2016).

[5] *Id.* at 6–8. The study analyzed all patent applications filed from 1995 through 2015, containing the names of 8,788,617 individual inventors.

[6] *Id.* at 8.

[7] Ding et al., *supra* note 1, at 665.

[8] Susan Eaton, *Surprising Opportunities: Gender and the Structure of Work in Biotechnology Firms*, 869 Annals N.Y. Acad. Sci. 175, 179–82 (1999).

[9] Jennifer Hunt, Jean-Philippe Garant, Hannah Herman & David J. Munroe, *Why Don't Women Patent?* 3 (Nat'l Bureau of Econ. Rsch., Working Paper No. 17888, 2012).

[10] Ding et al., *supra* note 1, at 665.

[11] *Id.*

[12] See, for example, *id.* at 666; Rainer Frietsch, Inna Haller, Melanie Funken-Vrohlings & Hariolf Grupp, *Gender-Specific Patterns in Patenting and Publishing*, 38 Rsch. Pol'y 590, 597 (2009); Taehyun Jung & Olof Ejermo, *Demographic Patterns and Trends in Patenting: Gender, Age, and Education of Inventors*, 86 Tech. Forecasting & Soc. Change 110, 110 (2014).

countries in the percentage of female inventors did not correlate with socio-economic indicators such as GDP or the number of women in the labor market.[13]

Organizational context matters as well. Women in hierarchical firms are less likely to patent, for example.[14] Women are also less likely to work as sole inventors[15] and more likely to work in large research groups,[16] where they often cede their patent rights to colleagues.[17] Patenting patterns among academics reveal similar trends, with women holding fewer patents than men.[18] Women in academia instead seem to focus their efforts more on teaching and publishing[19] and are less likely to pursue commercial opportunities.[20] When female academics do patent their inventions, on the other hand, it is their male coauthors who often drive the patenting process.[21]

The much lower rate at which women file for patents stems mainly from the cost, complexity, and frequently discriminatory nature of the patent registration and examination process. The overall cost for a twenty-year patent term of protection averages tens of thousands of dollars.[22] Investing in a patent is also risky, as the sizable costs of application, examination, and maintenance may never be recouped. The value of a patent depends on its successful commercialization, which in turn depends on highly uncertain economic and technological factors. The resulting financial barriers to patenting are especially daunting for women.[23] Although

[13] Informatics Team, U.K. Intell. Prop. Off., Gender Profiles in Worldwide Patenting: An Analysis of Female Inventorship 16–18 (2016), https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/567518/Gender-profiles-in-worldwide-patenting.pdf; Frietsch et al., *supra* note 12, at 594–95; Fulvio Naldi, Daniela Luzi, Adriana Valente & Ilaria Vannini Parenti, *Scientific and Technological Performance by Gender*, *in* Handbook of Quantitative Science and Technology Research 299, 307 (Henk F. Moed, Wolfgang Glänzel & Ulrich Schmoch eds., 2004).

[14] Whittington & Smith-Doerr, *supra* note 1, at 196.

[15] Naldi et al., *supra* note 13, at 307–08; Jung & Ejermo, *supra* note 12, at 110.

[16] Kordula Kugele, *European Studies on Gender Aspects of Inventions – Statistical Survey and Analysis of Gender Impact on Inventions* 2 (Eur. Stud. on Gender Aspects of Inventions, Work Report No. 1, 2008), www.esgi.de/uploads/media/071112_WorkReport1.pdf; James Moody, *The Structure of a Social Science Collaboration Network: Disciplinary Cohesion from 1963 to 1999*, 69 Am. Soc. Rev. 213, 219, 226 (2004) (analyzing women participation in sociological studies); Naldi et al., *supra* note 13, at 307; Hunt et al., *supra* note 9, at 17–19.

[17] Francesco Lissoni, Fabio Montobbio & Lorenzo Zirulia, *Inventorship and Authorship as Attribution Rights: An Enquiry into the Economics of Scientific Credit*, 95 J. Econ. Behav. & Org. 49, 50 (2013).

[18] Ding et al., *supra* note 1, at 665.

[19] Frietsch et al., *supra* note 12, at 595.

[20] Ding et al., *supra* note 1, at 666.

[21] *Id.*

[22] *See USPTO Fee Schedule*, U.S. Pat. & Trademark Off. (last revised July 1, 2022). www.uspto.gov/learning-and-resources/fees-and-payment/uspto-fee-schedule.

[23] Jessica Milli, Emma Williams-Baron, Meika Berlan, Jenny Xia & Barbara Gault, Inst. for Women's Pol'y Rsch., Equity in Innovation: Women Inventors and Patents 7, 18–19 (2016), https://iwpr.org/wpcontent/uploads/wpallimport/files/iwprexport/publications/C448%20Equity%20in%20Innovation.pdf.

venture capitalists often fund patent filings, men are much more likely to secure such outside investment.[24] This perhaps is due partly to biases among venture capitalists[25] and partly to the fact that men are more likely to apply for patents and, therefore, to attract investors.[26]

Moreover, patenting requires access to expertise on how best to negotiate the complexity of the application and prosecution process.[27] Connections with experts and experienced inventors can prove instrumental in both navigating the process and evaluating its risk and potential profitability.[28] Women typically have fewer of these kinds of social and professional network connections and support.[29]

Furthermore, women are less likely not only to apply for patent protection but also to obtain a patent once they do apply.[30] Some studies have found that patent applications by women are up to 21 percent less likely to be granted than those by men.[31] This stems partly from the fact that women tend to file applications in fields in which patents are generally harder to obtain.[32] Even when controlling for scientific field, however, patent applications by women are still 7 percent less likely to be granted.[33] In the life sciences, for example, all-female inventive teams are 11 percent less likely to have their applications granted than are all-male teams, despite the prominence of women in the field.[34] Even when women are granted patents, they typically have more independent claims disallowed and are more likely

[24] Alicia Robb, *Access to Capital among Young Firms, Minority-Owned Firms, Women-Owned Firms, and High-Tech Firms* 19 (2013), www.sba.gov/sites/default/files/files/rs403tot(2).pdf.

[25] Paula E. Stephan & Asmaa El-Ganainy, *The Entrepreneurial Puzzle: Explaining the Gender Gap*, 32 J. Tech. Transfer 475, 481–84 (2006).

[26] Carolin Häussler, Dietmar Harhoff & Elisabeth Mueller, *To Be Financed or Not . . . – The Role of Patents for Venture Capital-Financing* 2 (ZEW – Centre for Eur. Econ. Rsch., Discussion Paper No. 09-003, 2012), http://ssrn.com/abstract=1393725.

[27] Nat'l Women's Bus. Council, Intellectual Property and Women Entrepreneurs: Qualitative Analysis 15 (2012).

[28] Wenpin Tsai & Sumantra Ghoshal, *Social Capital and Value Creation: The Role of Intrafirm Networks*, 41 Acad. Mgmt. J. 464, 473 (1998); *see also* Atul Nerkar & Srikanth Paruchuri, *Evolution of R&D Capabilities: The Role of Knowledge Networks within a Firm*, 51 Mgmt. Sci. 771, 771 (2005).

[29] Nat'l Women's Bus. Council, *supra* note 27, at 15; Tsai & Ghoshal, *supra* note 28, at 470, 473; Nerkar & Paruchuri, *supra* note 28, at 771.

[30] Dana Kanze, Laura Huang, Mark A. Conley & E. Tory Higgins, *We Ask Men to Win and Women Not to Lose: Closing the Gender Gap in Startup Funding*, 61 Acad. Mgmt. J. 586, 587–88 (2018); Milli et al., *supra* note 23; Martinez et al., *supra* note 4, at 8 (focusing on trends in the industry); Kyle Jensen, Balázs Kovács & Olav Sorenson, *Gender Differences in Obtaining and Maintaining Patent Rights*, 36 Nature Biotech. 307, 308 (2018).

[31] Jensen et al., *supra* note 30, at 308.

[32] *Id.*

[33] *Id.*

[34] *Id.* at 308–09.

to have their remaining claims narrowed.[35] Patent examiners also cite patents granted to women less often.[36]

The lower patent issuance rates among women arise to some extent from the often male-oriented interpretation of patentability doctrines such as the notoriously nebulous PHOSITA (person having ordinary skill in the art) standard, used to measure the equally ambiguous utility and nonobviousness requirements for patentability, among other things.[37] These disparities likewise stem from biases among patent examiners, who have been shown to grant patents at lower rates when applicants had easily recognizable feminine names.[38]

The costs of the gender gap in patenting are significant. Patent protection can be essential in commercialization, and investors are typically reluctant to invest in inventions that are not patent protected.[39] Thus, as a consequence of their lesser patent protections, women are less likely to see their inventions developed and commercialized and to recoup their investments in inventing. This patent gender gap can have implications for economic growth and social equality.

8.2 UNREGISTERED PATENTS

As the previous discussion suggests, truly leveling the playing field for women in technology would necessitate many changes, including changes to the patent system. More consciously, nongendered patentability doctrines and an anonymous application system could help women achieve greater parity and better outcomes. One possible measure that has been overlooked, however, is expanding opportunities for patent protection.

Patent protection is currently unavailable absent registration and examination with a national patent office.[40] In this way, patents differ from most other intellectual property rights, many of which offer protection to both registered and unregistered

[35] *Id.*; *see* ROBERT P. MERGES & JOHN F. DUFFY, PATENT LAW AND POLICY 31–32, 58 (7th ed. 2017) (stating that "prosecutions" are patent office examinations for patentability and "claims" establish patents' exclusive boundaries).

[36] Jensen et al., *supra* note 30, at 308.

[37] Dan L. Burk, *Diversity Levers*, 23 DUKE J. GENDER L. & POL'Y 25, 42 (2015); Dan L. Burk, *Do Patents Have Gender?*, 19 AM. U. J. GENDER SOC. POL'Y & L. 881, 904 (2011); Kara W. Swanson, *Intellectual Property and Gender: Reflections on Accomplishments and Methodology*, 24 AM. U. J. GENDER, SOC. POL'Y & L. 175, 185 (2015).

[38] Jensen et al., *supra* note 30, at 309.

[39] 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, 1287–1309 (2009); Häussler et al., *supra* note 26, at 2; Milli et al., *supra* note 23, at 3–8; Ted Sichelman & Stuart J.H. Graham, *Patenting by Entrepreneurs: An Empirical Study*, 17 MICH. TELECOMM. & TECH. L. REV. 111, 111–12 (2010).

[40] See, for example, 35 U.S.C. § 111. *See also* DAN L. BURK & MARK A. LEMLEY, THE PATENT CRISIS AND HOW THE COURTS CAN SOLVE IT 9 (2009) (describing formal requirements for patent registration).

creations. Trademarks and design rights, for example, often feature a two-tier structure that offers some minimal protection absent registration but also offers stronger protections for right holders who register their creations.[41] Similarly, copyright protections often employ a two-tier structure to protect both registered and unregistered works, although many countries do not have a registration system for copyrighted works.[42]

In the case of copyright, protection typically is available from the moment a copyrightable work is created, whether or not it has been registered.[43] Registration is available in some countries such as the United States, where it creates a presumption of "constructive notice" that a work is copyrighted, thereby assisting in proving infringement.[44] Trademarks likewise can be protected without registration, albeit only in the geographic area where the mark actually is used in commerce.[45] To gain nationwide protection and additional remedies, however, owners have to register their marks.[46] Likewise, both EU and UK law protect unregistered designs against direct copying for a limited duration but are subject to the defense of independent creation;[47] only registered designs are protected against independent creation.[48] Registration also gives designs a longer term of protection.[49]

Our proposal for the patent system follows this general structure of a two-tier intellectual property right, offering narrow protections of limited duration for unregistered inventions while retaining the option of the standard twenty-year term of protection for those who submit their inventions for registration and examination. This proposal also can be applied globally through an existing international agreement such as the Agreement on Trade-Related Aspects of Intellectual Property Rights and used to address the global gender gap in patenting.

8.2.1 *The Proposed Model*

The proposed model would offer inventors a novel form of protection with no need for registration. Inventors who wish to secure full patent protection would still have to register their inventions and undergo an examination process, just as they do

[41] See, for example, 15 U.S.C. § 1127 (trademark rights in the United States); Charles-Henry Massa & Alain Strowel, *Community Design: Cinderella Revamped*, 2003 Eur. Intell. Prop. Rev. 68, 74 (2003) (industrial design rights in the European Union).

[42] Marcowitz-Bitton & Morris, *supra* note 2, at 32.

[43] H.R. Rep. No. 94-1476, at 52–53 (1976); 35 U.S.C. § 102(a); 17 U.S.C. § 401(a).

[44] 17 U.S.C. § 410(c).

[45] 15 U.S.C. § 1127.

[46] *Id.* § 1126; Eastman Kodak Co. v. Bell & Howell Document Mgmt. Prods. Co., 994 F.2d 1569 (Fed. Cir. 1993); Commodore Elecs. Ltd. v. Cbm Kabushiki Kaisha, 26 U.S.P.Q.2d 1503 (T.T.A.B. 1993); 15 U.S.C. §§ 1072, 1507(c).

[47] Copyright, Designs and Patents Act 1988, c. 48 § 213 (U.K.); Council Regulation 6/2002, art. 11, 2002 O.J. (L 3) 1; Massa & Strowel, *supra* note 41.

[48] Council Regulation 6/2002, art. 19(2), 2002 O.J. (L 3) 1.

[49] Massa & Strowel, *supra* note 41.

today. The central difference between the existing form of registered rights and the proposed form of unregistered rights is the scope and duration of protection afforded under each. The proposed unregistered patents would protect subject inventions for only three years and against only knowing and direct copying. Thus, unlike registered patent rights, these unregistered rights would provide relatively short protections and no protection against independent creation.

Note that the distinction in rights between unregistered and registered patents follows naturally from the rationale behind the registration and examination of traditional patents. Registration has long been seen as providing the public with notice of *in rem* rights.[50] Because the proposed unregistered patent system by definition would not make registration and description of patent rights public, it would be inefficient and arguably unfair for potential infringers to be held unknowingly liable for infringement. Those who directly copy an invention, by contrast, obviously would know that it is another's creation and, therefore, would notice that another person could hold unregistered rights in the invention, despite the lack of registration of those rights.

Moreover, inventions eligible for our proposed unregistered rights still would need to meet the existing patentability requirements of subject matter eligibility,[51] novelty,[52] utility,[53] and nonobviousness.[54] Only for inventions meeting these traditional substantive standards would unregistered protections become available. Those protections would then automatically arise as soon as the invention becomes available to the public. Public availability would be measured under the same standards used for novelty under current U.S. patent law, including public availability of a description of the invention, public use of the invention, or the invention becoming otherwise available to the public.[55]

Unlike the twenty-year term for a registered patent, however, the duration of an unregistered patent under our proposal would run for only three years from the date the subject invention first became publicly available. Inventors who wish to extend their rights for more than three years would have the option to do so but would have to undergo the usual registration and examination with the applicable patent office, even if their unregistered patent rights had already been successfully enforced in

[50] *See* Douglas G. Baird & Thomas H. Jackson, *Information, Uncertainty, and the Transfer of Property*, 13 J. Legal Stud. 299, 303–04 (1984) (discussing a "filing system of title claims").

[51] 35 U.S.C. § 101 (stating that subject-matter eligibility means the patent falls under one of the standard categories of utility patent, design patent, or plant patent).

[52] 35 U.S.C. § 102(a); Burk & Lemley, *supra* note 40, at 9.

[53] 35 U.S.C. § 101; Burk & Lemley, *supra* note 40, at 9.

[54] 35 U.S.C. § 103; Burk & Lemley, *supra* note 40, at 9.

[55] 35 U.S.C. § 102(a). Our proposal adopts this standard of public availability rather than an actual-reduction-to-practice or other standard for the same reason the current registered patent system does – to prevent patentees from taking from the public inventions that already have become part of the prior art. See, for example, Atlas Powder Co. v. Ireco, Inc., 190 F.3d 1342, 1356 (Fed. Cir. 1999).

court. Inventors would have to file for such registered rights no more than a year after their unregistered rights attach; inventors who do not file applications for registered rights within a year of acquiring unregistered rights would forfeit registered patent protection altogether, leaving them with only the remaining two years of their unregistered patent rights.

In this way, the proposed unregistered rights regime would comport with what many patent systems already do under their novelty (or statutory bar) provisions. Almost all countries allow inventors to disclose their inventions publicly up to a year before filing their patent applications without anticipating themselves or otherwise being barred from patent eligibility.[56] The law in the United States, for example, establishes a one-year grace period that allows inventors to disclose their invention publicly before filing, in effect measuring novelty and nonobviousness as of the disclosure date rather than the filing dates.[57] Our proposal applies this "first to file or to publicly disclose" approach to both registered and unregistered rights holders.[58] Granted, even under U.S. patent law, patentees cannot sue others for infringement occurring in that first prefiling year the way they would be able to under our proposal. Nonetheless, the effect is that under both systems, an inventor who applies for registered patent rights within a year of publicly disclosing her invention can exclude others until the twenty-first year after that initial prefiling disclosure.

Finally, our proposal would allow inventors only a limited presumption of validity of their unregistered patent rights. In bringing an enforcement action, inventors initially would not need to prove that their inventions meet the standard patentability requirements; instead, the inventors would have to establish only the date their invention became public. They would, however, at all times bear the burden of proving direct copying by the defendant. Once the inventors establish these basic elements of their claim, the defendant would have the right to challenge the validity of the inventors' unregistered rights by showing that their invention fails to meet one or more of the patentability requirements. Importantly, the defendant would need to rebut the presumed validity of an unregistered patent by mere preponderance of the evidence, unlike the clear and convincing evidence required under U.S. law to invalidate a registered patent.[59] The lower preponderance of the evidence standard would reflect the fact that no patent office had yet vetted the invention's patentability and that a court would thus have no need to defer to the patent office's

[56] World Intell. Prop. Org., Certain Aspects of National Regional Patent Laws (2019), www.wipo.int/export/sites/www/scp/en/national_laws/grace_period.pdf.

[57] 35 U.S.C. § 102(b) (allowing inventors who publicly disclose their inventions up to twelve months before filing to avoid use of any other, later disclosed technological references for the purpose of establishing unpatentability).

[58] *See* Merges & Duffy, *supra* note 35, at 390–91 (describing "first to file or first to publicly disclose" under U.S. patent law). A minority of jurisdictions provide grace periods of only six months and apply them to only some types of public disclosures. However, these jurisdictions might have to modify their grace period policies accordingly.

[59] 35 U.S.C. § 282.

expertise.[60] If the proposed unregistered patent rights were found to be valid as well as infringed, the remedies for infringement would include both injunctions and damages.

However, it may seem odd to grant unregistered patents any presumption of validity, given that neither unregistered trademarks nor copyrights enjoy such a presumption. In both trademark and copyright law, owners of unregistered rights bear the burden of proving the validity of their rights.[61] Shifting the burden to alleged infringers may be more efficient in the patent context, however. The exceedingly rigorous standards for patentability make it relatively easy for defendants to identify prior art references that prove unpatentability, even with regard to registered patents previously examined by a patent office.[62] Allowing a defendant to proceed immediately to its invalidity argument may thus lead to faster and less costly disposition of infringement proceedings.

8.2.2 *The Costs and Benefits of Unregistered Patents for Gender Equality*

Two critical questions our proposal presents are whether unregistered patent rights would in fact help female inventors and, if so, whether the benefits would outweigh the costs of creating such a system. As noted earlier, simply decreasing the barriers women face in obtaining patent protections would go far in helping them to capitalize on their innovations and to participate in technological industries generally. While our proposal would increase the number of patent rights overall, the proposed unregistered rights would be carefully cabined to avoid creating excessive drag on future innovation. Our proposal is thus tailored to ease many of the disadvantages women face in protecting their inventions while avoiding undue burdens on technological progress overall.

First, an unregistered patent regime would enable inventors to obtain patent protection without the oft-prohibitive costs of registration, examination, and maintenance. Women would thus have easier access to the patent system despite frequent difficulty in securing funding. Similarly, unregistered patent rights under the

[60] *See id.*; Microsoft Corp. v. I4I Ltd. P'ship, 564 U.S. 91, 97–98 (2011) (confirming clear and convincing evidence to rebut presumption of validity under § 282).

[61] 17 U.S.C. § 411 (allowing enforcement of unregistered works of non-U.S. origin or whose registration application has been refused); 87 C.J.S. Trademarks, Etc. § 309 (2020) (stating that an owner of an unregistered trademark has burden of proving validity).

[62] Shine Tu, *Invalidated Patents and Associated Patent Examiners*, 18 VAND. J. ENT. & TECH. L. 135, 151–52 (2015) (surveying litigated patents); Michael Tierney & William Saindon, *Boardside Chat: New Developments*, U.S. PAT. & TRADEMARK OFF. (June 11, 2020), www.uspto.gov/sites/default/files/documents/PTAB_boardside_chat_new_trial_stats_sas_and_operational_faqs_06_11_2020.pdf (surveying administrative adjudications under the Leahy-Smith America Invents Act). In the vast majority of cases, issued patents were invalidated based on defendant-identified prior art previously unseen by the U.S. Patent and Trademark Office. Stephen Yelderman, *Prior Art in the District Court*, 95 NOTRE DAME L. REV. 837, 883–84 (2019); Tu, *supra*, at 61, 160–61.

proposed regime would be automatic and therefore would not favor those who have access to a network and other support for guidance on the patenting process. This also will help women and others who lack such connections.

Of course, inventors would have to bear the costs of enforcing their patents, including any litigation costs. The policing costs for infringement of unregistered patents would be lower than those for registered patents, however, as monitoring for only purposeful copying is presumably cheaper than monitoring for both knowing and "innocent" infringement, such as independent design. More importantly, enforcement costs would have to be born only *ex post*, after direct copying has been detected, and the value of the invention thereby demonstrated. That value – along with the protection the invention would automatically enjoy under unregistered patent rights – could in turn help attract investors. As with any other invention, venture capital and other investment funds can be used for defending rights in the invention through litigation or other means, filing for registered rights and paying for subsequent maintenance fees, and commercialization and licensing generally.

All the same, investors may be hesitant to invest even in innovations valuable enough to have been copied if they lack registered patent rights. The proposed unregistered rights would not enjoy the cachet of vetting by a patent office or the presumption of validity rebuttable only by clear and convincing evidence that comes with such vetting. The proposed rights also would last for only three years. As a result, unregistered patents might not have the same signaling effect in attracting investment.

Investing in unregistered patents may not be significantly riskier than investing in registered patents, however. Investing in technological innovation is always risky, as even registered patents have only speculative economic value and probabilistic legal validity.[63] Under our proposal, outside investors also would know that even unregistered inventions would have at least some protection, compared to their current lack of protection. Such protection could be converted to registered protection if still within the one-year grace period. Moreover, many technologies do not need the full twenty years of registered protection. The three years of protection under our proposed unregistered rights could be more than enough to recoup investments in industries such as computer software and electronics.[64]

A second and equally important benefit is that automatic, unregistered patent rights would allow women to bypass many of the biases inherent in the patent system. The most obvious are patent examiner biases against patent applicants with recognizably feminine names. Less obvious are workplace biases leading to less

[63] Mark A. Lemley & Carl Shapiro, *Probabilistic Patents*, 19 J. Econ. Perspectives 75, 75 (2005).

[64] Verne A. Luckow & Steven C. Balsarotti, *Statistical Analysis of Federal District Court Cases Seeking Longer Patent Term Adjustments in the Wake of Wyeth v. Kappos*, 10 J. Marshall Rev. Intell. Prop. L. 1, 3 (2010).

support for women in filing for patent rights. Automatic rights would make these biases less important in barring access to patent protection.

That being said, unregistered rights holders seeking to enforce their rights may need to rely on the court system, which itself is subject to bias. Allowing courts to recognize unregistered intellectual property rights nonetheless could be more equitable than forcing inventors to go through the patent registration and examination process or forgo their rights altogether. Like investors, courts may be more apt to recognize the value of an invention once others have affirmatively copied it and therefore be more inclined to protect the invention against appropriation. Courts also may be more inclined to look to broader economic and social values to evaluate patent rights with more focus on equity than a patent office would.[65] Administrative agencies such as patent offices, by contrast, lack many of the procedural justice and due process constraints to which courts are subject.[66] Members of the judiciary may be less subject to the biases affecting the science, technology, engineering, and mathematics (STEM) fields from which patent offices typically draw their examiners.[67] While administrative agency decisions are subject to judicial review, this review often tends to be somewhat deferential.[68] Thus, using courts to recognize unregistered intellectual property rights would at least provide an alternative venue for women and other inventors to protect their interests.[69]

What are the costs and pitfalls of the proposed new regime of unregistered patent rights, however? The fact that no jurisdiction has ever provided unregistered, automatic patent rights reflects a discomfort with the idea. Many have argued that excessive patent rights would impose much greater burdens on future innovation and creation than would similarly excessive grants of copyright, trademark, design, and trade secret rights. The breadth and robustness of patent rights mean that granting patents too lavishly or easily could lead to hold-outs, patent thickets,[70]

[65] *See* Richard J. Pierce, Jr., *Political Control versus Impermissible Bias in Agency Decisionmaking: Lessons from* Chevron *and* Mistretta, 57 U. Chi. L. Rev. 481, 516 (1990).

[66] Ronald J. Krotoszynski, Jr., *Taming the Tail That Wags the Dog: Ex Post and Ex Ante Constraints on Informal Adjudication*, 56 Admin. L. Rev. 1057, 1058 (2004).

[67] Martin H. Redish & Kristin McCall, *Due Process, Free Expression, and the Administrative State*, 94 Notre Dame L. Rev. 297, 298 (2018). *But see* Adrian Vermeule, *Deference and Due Process*, 129 Harv. L. Rev. 1890, 1928–29 (2016) (arguing that agency motivation seldom affects decision-making).

[68] See, for example, Dickinson v. Zurko, 527 U.S. 150, 152 (1999) (holding that the Administrative Procedures Act generally requires judicial deference to agency findings of fact).

[69] Provisions on postgrant proceedings recently enacted in the United States could also be changed to allow review of unregistered patent rights. *See* 35 U.S.C. §§ 301–307 (ex parte reexamination); *id.* §§ 311–319 (*inter partes* review); *id.* §§ 321–329 (postgrant review). While less expensive and time-consuming than litigation, *see* Merges & Duffy, *supra* note 35, at 19, the administrative judges in these proceedings may suffer from the same biases as patent examiners.

[70] Carl Shapiro, *Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard Setting*, 1 Innovation Pol'y & Econ. 119, 121–22 (2000); Miriam Marcowitz-Bitton & Yotam Kaplan, *Recalibrating Patent Protection for COVID-19 Vaccines: A Path to Affordable Access*

patent "trolling,"[71] and other phenomena that wastefully deter other inventors from valuable research. Technologies in which development and commercialization are inherently cumulative and complementary are particularly prone to these issues.[72]

In contrast to other forms of intellectual property right, patent law also has very few safety valves to protect inventors from opportunistic claims of infringement that might over-deter them from building on existing technologies.[73] Unlike copyright and trade secrecy,[74] patent law has no independent creation defense to infringement liability,[75] nor does patent law have the fair use defense seen in copyright and trademark law.[76] Even the experimental use exception available in the patent systems in many countries applies only in limited circumstances, such as regulatory approval of pharmaceuticals or use of medical treatment methods.[77] Although prior user rights also are common in many countries, they are limited to only those using an invention commercially before the patentee filed its patent application.[78]

and Equitable Distribution, 12 U.C. Irvine L. Rev. 423 (2022) (discussing patent thickets in the pharmaceutical industry as a bar to innovation).

[71] John F. Duffy, *Reviving the Paper Patent Doctrine*, 98 Cornell L. Rev. 1359 (2013); Mark A. Lemley & A. Douglas Melamed, *Missing the Forest for the Trolls*, 113 Colum. L. Rev. 2117, 2117 (2013); Miriam Marcowitz-Bitton, Yotam Kaplan & Maayan Perel, *Recoupment Patent*, 98 N.C. L. Rev. 481, 485 (2020) (discussing patent trolls and the costs they impose).

[72] Dan L. Burk & Mark A. Lemley, *Policy Levers in Patent Law*, 89 Va. L. Rev. 1575, 1612–13 (2003); Richard R. Nelson, *The Market Economy, and the Scientific Commons*, 33 Rsch. Pol'y 455, 464 (2004).

[73] Some scholars doubt the effectiveness of such safety valves in buffering against the negative effects of intellectual property rights on others. See, for example, Christopher Sprigman, *Reform(aliz)ing Copyright*, 57 Stan. L. Rev. 485, 487 (2004).

[74] See, for example, Feist Publications, Inc. v. Rural Tel. Serv. Co., 499 U.S. 340, 345 (1991); Procter & Gamble Co. v. Colgate-Palmolive Co., 199 F.3d 74, 77–78 (2d Cir. 1999). Trademark law does not allow an independent creation defense, however. See, for example, Blendco, Inc. v. Conagra Foods, Inc., 132 Fed. App'x 520, 523 (5th Cir. 2005).

[75] Commil USA, LLC v. Cisco Sys., Inc., 135 S. Ct. 1920, 1926 (2015); Kewanee Oil Co. v. Bicron Corp., 416 U.S. 470, 490 (1974).

[76] Gideon Parchomovsky & Alex Stein, *Intellectual Property Defenses*, 113 Colum. L. Rev. 1483, 1505 (2013) (fair use allows descriptive use of another's trademark); Elizabeth L. Rosenblatt, *Intellectual Property's Negative Space: Beyond the Utilitarian*, 40 Fla. St. U. L. Rev. 441, 452 (2013) (fair use as "use-based carve-out areas" from copyright infringement liability). Copyright law in the United States also contains a number of compulsory licenses, and other countries avail themselves of compulsory licensing of patents as well, as allowed under the TRIPS Agreement. In the United States, rights holders have thus far successfully resisted compulsory licensing of trade secrets, trademarks, and patents.

[77] *See* Hans-Rainer Jaenichen & Johann Pitz, *Research Exemption/Experimental Use in the European Union: Patents Do Not Block the Progress of Science*, 5 Cold Spring Harbor Persp. Med. a020941 (2015) (experimental-use exception in EU member states); 35 U.S.C. § 287(c); *see also* Cynthia M. Ho, *Patents, Patients, and Public Policy: An Incomplete Intersection at 35 U.S.C. § 287(c)*, 33 U.C. Davis L. Rev. 601, 641–45 (2000) (§ 287(c) immunity for some patented medical procedures).

[78] U.S. Pat. & Trademark Off., Report on Prior User Rights 2–3, www.uspto.gov/sites/default/files/ip/global/prior_user_rights.pdf (last visited Mar. 31, 2024).

Instead, the patent system relies on its comparatively stringent limitations to reduce both the number of patents and breadth of patent rights.[79] Patent law has far more limited terms than copyright, trademark, design, or trade secret law,[80] as well as novelty and statutory bar provisions that force inventors to file their patent applications or lose their eligibility to patent.[81] These limitations serve to release inventions into the public domain as soon as possible. Unconditional patent rights granted without examination or even registration appear at first glance to completely dismantle patent law's carefully calculated system for cabining patent law's otherwise robust rights of exclusivity.[82]

The unregistered rights proposed here would be very closely limited to avoid unduly burdening overall innovation, however. Unlike registered patent rights, the proposed unregistered rights would be subject to a number of safety valves to protect downstream innovation. In addition to applying all of the standard patentability requirements, the proposed unregistered patent regime would protect only against copying, not independent creation, and for only three years from the date the subject invention first became publicly available. These constraints establish significant safeguards against placing undue burdens on others.

Some might argue that unregistered patent rights would exacerbate the innovation bottlenecks created by "bad" or "weak" patents – that is, patents of suspect validity.[83] As with registered patents, however, the proposed unregistered rights would be subject to judicial review for validity. Our proposal in this way invokes the same efficiencies of various proposed "soft-look" registration approaches. Under these latter proposals, patent applications would undergo only minimal administrative examination prior to issuance, and only those that were important enough to give rise later to litigation would then face more substantive judicial examination.[84] Such judicial review *ex post*, only when needed, is more resource-efficient than the current system of administratively examining all patent applications *ex ante*. In addition, judicial review *ex post* would have the benefit of not only the defendants' field-related expertise and motivation to invalidate patents but also a

[79] William M. Landes & Richard A. Posner, The Economic Structure of Intellectual Property Law 302–08 (2003); Burk & Lemley, *supra* note 72, at 1575–76, 1612–13.

[80] Landes & Posner, *supra* note 79, at 295; Gregory N. Mandel, *The Public Perception of Intellectual Property*, 66 Fla. L. Rev. 261, 267 (2014).

[81] *See* Merges & Duffy, *supra* note 35, at 509–10.

[82] *Cf.* Burk & Lemley, *supra* note 72, at 1575–76, 1612–13 (describing checks and balances in registered patent system).

[83] See, for example, Christopher A. Cotropia, *The Folly of Early Filing in Patent Law*, 61 Hastings L.J. 65, 69–71 (2009); David Fagundes & Jonathan S. Masur, *Costly Intellectual Property*, 65 Vand. L. Rev. 677, 679, 726–28 (2012).

[84] For example, F. Scott Kieff, *The Case for Registering Patents and the Law and Economics of Present Patent-Obtaining Rules*, 45 B.C. L. Rev. 55 (2003) (proposing that these registration-only patents also enjoy a presumption of validity rebuttable by preponderance of the evidence); *see also* Mark A. Lemley, *Rational Ignorance at the Patent Office*, 95 Nw. U. L. Rev. 1495, 1526–27 (2001) (discussing such proposals).

presumption of validity rebuttable by a mere preponderance of the evidence.[85] Registration-only patents rest on the idea that the high costs of eliminating bad patents administratively *ex ante* outweigh the social costs of waiting to eliminate those patents judicially *ex post*.[86] Similarly, the unregistered patent regime proposed here rests on the idea that the cost of patent registration and examination and how it sidelines women and other inventors outweighs the cost of potentially bad unregistered patents.[87]

Regardless of whether patents are "good" or "bad," simply adding to the overall volume of patent rights still could impose a drag on innovation. Technology may be more incremental, cumulative, or complementary than expressive works, trademarks, or trade secrets,[88] and inventive concepts are often more difficult to design around.[89] The fear of litigation and the uncertainty of proving invalidity therefore often causes competitors to fear innovating in heavily patented technologies.[90] This *in terrorem* effect can over-deter competitors from innovating near or around others' patents, particularly given the patent system's lack of independent creation, fair use, and other defenses available in other forms of intellectual property right.[91] In this way excessive patent rights may be more likely than other intellectual property rights to over-deter future innovation.

The proposed unregistered patent regime would provide a number of safe harbors to address this problem, the most obvious of which would be for independent creation. Cumulative or complementary innovation might still be unduly deterred from copying needed components, however. So unlike the current patent regime in the United States, the proposed regime would therefore not impose treble damages for knowing infringement, especially if only for experimental use. Perhaps most importantly, the proposed unregistered rights would be very limited in duration; other innovators could thus just wait three years to copy an invention with impunity.

[85] Kieff, *supra* note 84, at 73–76.

[86] Lemley, *supra* note 84, at 1508–11.

[87] Allowing patent protections on a registration-only basis resembles the utility model or "petty" patents that many countries issue to protect technological improvements. Utility model patents vary a great deal but typically require less technological merit, provide less protection, and expire more quickly than "regular" patents. *See* J.H. Reichman, *Legal Hybrids between the Patent and Copyright Paradigms*, 94 COLUM. L. REV. 2432, 2456–59 (1994); Richard H. Stern, *A Sui Generis Utility Model Law as an Alternative Legal Model for Protecting Software*, 1 U. BALT. INTELL. PROP. L.J. 108, 112–13 (1993). While a registration-only or utility model patent system could be much less expensive and therefore more accessible for women and other similarly disadvantaged inventors, an automatic, unregistered patent system would be even more accessible, particularly for inventors who lack the networks and other support necessary to know how to navigate such patent systems.

[88] John Shepard Wiley Jr., *Copyright at the School of Patent*, 58 U. CHI. L. REV. 119, 146, 167, 182 (1991).

[89] *See* Fagundes & Masur, *supra* note 83, at 712–14.

[90] Christopher R. Leslie, *The Anticompetitive Effects of Unenforced Invalid Patents*, 91 MINN. L. REV. 101, 117–18 (2006).

[91] *See* Fagundes & Masur, *supra* note 83, at 713–15.

The limited duration and scope of these unregistered rights would greatly lower the risk of patent trolling, nuisance suits, patent thickets, and holdouts. The proposed unregistered rights would thus broaden access to patent protection without either increasing or prolonging them.

As an unregistered regime, our proposed patent rights could undermine the public-notice function of patent registration, however, thereby increasing the informational costs of establishing freedom to operate within a particular technological space. The breadth of patent rights and the relatively limited defenses to patent infringement call for clear public notice of what constitutes such infringement. Indeed, this is one of the foremost values of registering patent rights and perhaps the primary reason that, in contrast to copyright, trademark, and trade secret law, unregistered rights in patent law never emerged. The patent registration system already falls short of this public-notice ideal, as the clearance costs of identifying and interpreting all the patents potentially relevant to one's project are often astronomical.[92] Injecting unregistered, unrecorded rights into the existing system could exacerbate these costs exponentially. Under the proposed unregistered rights system, by contrast, infringers would have demonstrated actual notice of the protected invention by virtue of copying it. Public notice, therefore, would not be an issue. Downstream inventors would have to determine the date the invention became publicly available, of course, which could be costly, but this cost is already part of the existing registered rights system.[93]

One final objection could be that the proposed unregistered regime would undermine the peripheral-claiming system.[94] In the United States, peripheral-claiming mandates that registered patents include claims "particularly pointing out and distinctly claiming" the subject invention.[95] Peripheral claiming is designed to delineate a patent's boundaries as precisely as possible to give the public detailed notice. An unregistered patent system, by contrast, would give the public only the inventions themselves as indicators of their patent boundaries in a way resembling the now-obsolete central-claiming system. Under the central-claiming system in the United States, courts could only compare an allegedly infringing device with the patented invention, without the benefit of claims or other express boundaries, often leading to surprise and uncertainty.[96] Reversion to a central-claiming-like system may thus seem inefficient,[97] but in practice the modern-day peripheral-claiming

[92] *See generally* Christina Mulligan & Timothy B. Lee, *Scaling the Patent System*, 68 N.Y.U. Ann. Surv. Am. L. 289 (2012).

[93] *See supra* text accompanying note 55 (discussing public availability and novelty and statutory bar requirements).

[94] 35 U.S.C. § 112(b).

[95] *Id.*

[96] *See* Merges & Duffy, *supra* note 35, at 651, 711; Martin J. Adelman, *Patent Claiming in the United States: Central, Peripheral, or Mongrel?*, 1 IP Theory 71, 72–75 (2010).

[97] Dan L. Burk & Mark A. Lemley, *Fence Posts or Sign Posts? Rethinking Patent Claim Construction*, 157 U. Pa. L. Rev. 1743, 1747 (2009).

system introduces its own inefficiencies.[98] Peripheral claiming has led to the notoriously difficult problems of construing patent claims and widespread complaints about the uncertainty to which they lead.[99] Indeed, some commentators have even called for a return to the central-claiming system as a more equitable and flexible approach to patenting.[100]

Lastly, none of what is proposed here should be taken as urging the abolition of existing registered patent systems. Without a doubt, registration and examination of patents yield many benefits, including greater public notice and independently vetted patentability. Registration and examination come at a high cost for inventors, but for many inventors – and their employers or investors – this cost will not pose an obstacle to patenting inventions perceived to be worthwhile.[101]

For all its benefits, however, the high cost of the patent application and examination process falls disparately on women and other disadvantaged inventors. Predicting the commercial value of an invention is immensely difficult, and deciding whether to invest in the process of applying for patent protection, even if only provisionally, is a gamble.[102] To assume that investors and employers evaluate inventions from a purely rational, rent-maximizing perspective is undoubtedly inaccurate, especially for inventions by female inventors. As a result, a disproportionately large number of female inventors are disenfranchised by the costs and complexities of patent registration and examination and their inherent biases.[103] Adding an unregistered regime such as the one proposed here would help ameliorate the gender gap in patent rights without creating undue burdens on innovation.[104] The benefits of unregistered patent protection, even if for a relatively brief period, could be quite significant and thus outweigh the potential risks of such a regime.

CONCLUSION

The stark gender gap in patenting is unlikely to disappear in the near future due partly to the *ex ante* registration currently required for patent protection. The patent registration and examination process is risky, expensive, time-consuming, and

[98] *Id.* at 1751–61.

[99] Janet Freilich, *Patent Clutter*, 103 Iowa L. Rev. 925, 925 (2018) (describing the different issues that make patents difficult to read and understand).

[100] Burk & Lemley, *supra* note 97, at 1747; Jeanne C. Fromer, *Claiming Intellectual Property*, 76 U. Chi. L. Rev. 719 (2009).

[101] Fagundes & Masur, *supra* note 83, at 701.

[102] Provisional patent applications are typically less expensive to file because they do not undergo examination and simply preserve the applicants' filing date. 35 U.S.C. § 111(b)(4). These applications, however, must be converted to nonprovisional status within a year, so applicants must eventually assume the full cost of prosecuting their applications. 35 U.S.C. § 111(b)(5).

[103] Kanze et al., *supra* note 30, at 588; Milli et al., *supra* note 23; Martinez et al., *supra* note 4, at 6–8.

[104] *See* 17 U.S.C. at § 302(a); H.R. Rep. No. 94-1476, *supra* note 43, at 133–36; Zechariah Chafee, *Reflections on the Law of Copyright*, 45 Colum. L. Rev. 503, 719–21, 725–27, 729–30 (1945).

complex and poses significant barriers for many inventors, particularly women. Excluding women and other similarly disadvantaged inventors from patent protections is detrimental to both equality and economic growth and stifles overall innovation.

A novel regime offering inventors automatic, unregistered patent rights for even a limited period of time could help make the patent system more inclusive and egalitarian by avoiding the cost and risk of the patent registration and examination process. The version of unregistered patent rights proposed here would be carefully narrowed to allow protection only against knowing and direct copying to maintain the appropriate balance between inventors and the public and between the need to protect existing inventions and the need to allow future innovation. Naturally, this proposal cannot achieve perfect gender equality on its own but would be a meaningful step in the right direction.