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Are Men and Women Creating Equal?

Contextualizing Copyright and Gender in the United States

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INTRODUCTION

In 1790, Mercy Otis Warren registered her collection of patriotic poems with the District Court for the District of Massachusetts, becoming one of the first women to register a copyright in the United States.[1] When copyright functions were centralized in the Library of Congress in 1870, several women songwriters were among the first to protect their original works by registering their music compositions.[2] Decades later, in 1905, Clare Kummer became the first woman to solely author and register a musical work with the United States Copyright Office ("USCO").[3] Despite these early milestones in women's authorship, women today remain underrepresented as copyright authors. An analysis of copyright registration data between 1978 and 2012 reveals that two-thirds of registered authors are men.[4] The gap between authorship by men and women varies by type of work, but the existence of a gap in every work category raises questions about who is benefiting from our copyright system and why women create and register works at lower rates than men do.

Although copyright registration became voluntary in 1978, the USCO has generally continued to process more than 300,000, and often 400,000, registrations each year. Registration is not required for copyright protection, but it entails several advantages. It is a necessary prerequisite for bringing an infringement action for a

[1] Federal Copyright Records 1790–1800, at 74 (James Gilreath ed., 1987).

[2] *See* Alison Hall, *Celebrating Women's History Month: Female Songwriters*, U.S. Copyright Off. (Mar. 2018), www.copyright.gov/history/lore/pdfs/201803%20CLore_March2018.pdf.

[3] *See* Alison Hall, *Early Female Musical Writers Discovered through Copyright Records*, U.S. Copyright Off. (Nov. 2018), www.copyright.gov/history/lore/pdfs/201811%20CLore_November2018.pdf.

[4] *See* Robert Brauneis & Dotan Oliar, *An Empirical Study of the Race, Ethnicity, Gender, and Age of Copyright Registrants*, 86 Geo. Wash. L. Rev. 46, 73 (2018).

U.S. work and for receiving statutory damages and attorney's fees.[5] It makes it easier for copyright owners to prevent the importation of infringing copies and, if the work is registered within five years of publication, the registration constitutes prima facie evidence of copyright validity and authorship in litigation.[6] In addition, registration reduces transaction costs and makes it easier for copyright holders to financially benefit from selling or licensing their works.[7] This is particularly helpful for entrepreneurs seeking legitimacy or an increase in their young company's selling potential.[8] These benefits are intended to encourage registration and reward creativity.[9] But if women are not registering copyrights as frequently as men, do the benefits of registration appeal less to women? Or are there structural, systemic, industry-specific, or other barriers to women's participation in the copyright system?

These questions are difficult to answer fully, but it is possible that rather than women failing to appreciate the benefits of registration, the gender gap in copyright registrations is in part reflective of more general social realities, including inequitable patterns of property ownership by women as well as persistent inequality within creative industries. Notably, women are underrepresented in ownership of copyrights, trademarks, and patents compared to their share of the U.S. workforce. In 2010, women made up 46.7 percent of the U.S. workforce but received only 33.31 percent of granted trademarks.[10] Likewise, in 2015, women represented 28 percent of the STEM (science, technology, engineering, and mathematics) workforce, but only 12 percent of the inventors listed on granted patents.[11] Some creative fields, such as the music industry, have been plagued by allegations of gender bias and accompanying low levels of women participation, underscoring the finding that women registered only 24.02 percent of music copyrights between 1978 and 2012.[12]

[5] 17 U.S.C. §§ 411(a), 412.

[6] 17 U.S.C. § 410(c); 19 C.F.R. §§ 133.31–.37 (2020).

[7] *See* Dotan Oliar, Nathaniel Pattinson & K. Ross Powell, *Copyright Registrations: Who, What, When, Where, and Why*, 92 Tex. L. Rev. 2211, 2217 (2012).

[8] *See* 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 15–16 (2016) (discussing the impact of women-held patents on the economy and how intellectual property rights increase the value of businesses).

[9] Oliar et al., *supra* note 7, at 2212–13.

[10] *See* U.S. Dep't of Lab., Women in the Labor Force, www.dol.gov/agencies/wb/data/facts-over-time/women-in-the-labor-force#civilian-labor-force-by-sex (last visited May 20, 2020) (providing data on the gender composition of the labor force by job category); Delixus & Nat'l Women's Bus. Council, Intellectual Property and Women Entrepreneurs: Quantitative Analysis 83 tbl.A.5, 84 tbl.A.6, 93 tbl.A.16 (2012) (providing data concerning the rate of granted trademark applications by gender and year).

[11] *See* U.S. Pat. & Trademark Off., Progress and Potential: A Profile of Women Inventors on U.S. Patents 3 (2019), www.uspto.gov/ip-policy/economic-research/publications/reports/progress-potential [hereinafter Progress and Potential]; U.S. Dep't of Lab., *supra* note 10.

[12] Brauneis & Oliar, *supra* note 4, at 76. See, for example, Becky Prior, Erin Barra & Sharon Kramer, Women in the U.S. Music Industry: Obstacles and Opportunities 7 (2019)

One may think that the disparity in intellectual property rights ownership only affects a limited number of artists, entrepreneurs, and scientists. However, intellectual property–intensive industries – industries whose growth is fueled by effective protection of intellectual property rights – accounted for 27.9 million U.S. jobs in 2014 and 38.2 percent of U.S. GDP.[13] A great deal of economic value is added by effectively protecting intellectual property rights and by promoting creativity and innovation among as many people as possible.

The USCO does not ask registration applicants for their demographic information. While this does not necessarily mean that gender bias could not sometimes play a role when applications are reviewed, it is at least consistent with its mission to promote creativity "for the benefit of all."[14] It should be uncontroversial to point out that the quality and breadth of works produced would be better with a diverse and more inclusive set of authors and when barriers to entry are removed.[15] However, it is clear that either women do not respond to the current copyright system's set of incentives or, more likely, that the incentives operate in conjunction with social and psychological factors[16] to motivate women to create and register certain types of work but not others, and at rates that generally fall below those at which men create and register works.[17] If the USCO is to properly carry out Congress' constitutional charge to "promote the Progress of Science and useful Arts,"[18] then we must understand what is underlying lower rates of creative authorship and subsequent registration by women.

We will seek to address some of these factors by considering the extent to which the gender disparity is or is not merely reflective of gender dynamics in other types of intellectual property holdings. Through a further discussion of patterns of inequality in other forms of property ownership, it will be possible to contextualize gender

(reporting that three-quarters of surveyed women experienced gender bias while working in the music industry).

[13] Econ. & Stat. Admin. & U.S. Pat. & Trademark Off., Intellectual Property and the U.S. Economy: 2016 Update, at ii (2016) (reporting on the economic impact of intellectual property rights and companies that frequently rely on them on the U.S. economy).

[14] *See* Overview of the Copyright Office, U.S. Copyright Off., www.copyright.gov/about/ (last visited May 29, 2020).

[15] *See* Brauneis & Oliar, *supra* note 4, at 91–92 (discussing in greater detail some of the benefits of diverse authorship).

[16] *Id.* at 90.

[17] One study has found that women publish academic papers in STEM at similar rates as men despite being much less likely to apply for patents. Papers written by women in this study were also cited more frequently than papers written by men, suggesting that the gap in women's ownership of intellectual property rights is not due to a lack of creativity or capability compared with men. See, for example, Waverly W. Ding, Fiona Murray & Toby E. Stuart, *Gender Differences in Patenting in the American Life Sciences*, 313 Science 665, 666 (2006).

[18] U.S. Const. art. I, § 8, cl. 8; Dotan Oliar, *Making Sense of the Intellectual Property Clause: Promotion of Progress as a Limitation on Congress's Power*, 94 Geo. L.J. 1771 (2006) (suggesting that "Promot[ion of] Progress" is not only part of the constitutional grant of power to Congress but also an independently enforceable limitation on it).

inequality in intellectual property. This will be further supplemented by a discussion of gender dynamics across different types of creative professions in the hopes of understanding some of the reasons why women may be less likely to author and register creative works in certain industries.[19]

The first section reviews recent data and demonstrates patterns of copyright authorship by men and women that vary over time by work type. The second section reviews recent studies on gendered trends in patent and trademark ownership. Available data suggest that women are underrepresented in every category of intellectual property rights ownership. The third section discusses similar gender-linked differences in other forms of property, such as home and corporate ownership. These data suggest that the gender-based trends in copyright ownership reflect some more general trends of property ownership. The fourth section considers the extent to which copyright registration gender differences by type-of-work category are reflective of gender inequality within creative professions. The fifth section identifies explanations and factors that may contribute to lower rates of authorship by women. We ultimately conclude that it is impossible to rule out, based on available data, the possibility that our copyright system, in conjunction with its related industries, may have a discriminatory effect on women's incentives to create.

6.1 THE COPYRIGHT GENDER GAP

Drawing on data from the USCO Electronic Catalog ("Catalog"), a study coauthored by one of us ("Study") was the first to identify demographic patterns of copyright authors.[20] It reveals a striking degree of imbalance between population demographics and rates of authorship, particularly concerning rates of authorship among men and women. In the surveyed data, men authored an estimated two-thirds of registered works. The degree and nature of the differences between men and women went beyond mere rates of authorship, and have varied over time and across work types, showing that what seems like a gender-neutral system may produce a disparate incentive effect on men and women.[21]

6.1.1 *The Data Set and Methodology*

The Study analyzed the over 14 million copyrighted works registered with the USCO between 1978 and 2012.[22] Registration records contain information about

[19] While this chapter will focus on dynamics between men and women, that is not to say that the relationships described later apply uniformly across different racial or ethnic groups or to LGBTQ individuals. These and other distinctions warrant further study. *See also infra* note 27.

[20] Brauneis & Oliar, *supra* note 4.

[21] *Id.* at 73.

[22] *Id.* at 51. The study focused on original and valid registrations. "Original" means that supplementary and renewal registrations were excluded from the data set because they were primarily

the work, such as its title, date of application, publication status, and creative category.[23] Usefully, the Study converted all work types into six basic categories: text, music, art, movies, drama, and software.[24]

In analyzing gender demographics, the Study focused on works by known, named individual authors.[25] Registrants are not asked to self-report demographic information in their copyright registration applications. Using gender-related data extracted from the 1990 Census, the Study could assign to authors a probabilistic gender based on their first names.[26] First names are highly indicative of gender: 82 percent of the authors had a 99 percent or higher likelihood of being either a man or a woman.[27] Works created by business associations and anonymous and pseudonymous works were excluded from the gender statistics because the author's gender could not be determined probabilistically.[28]

6.1.2 *Key Findings*

This study revealed a wide variation in gender parity across time, type of work, and publication rates, among other aspects. Strikingly, in 2012, 64 percent of authors were men.[29] While this was a decrease from 1978, when 70 percent of the authors were men, it was still well above their labor market share in 2012.[30] The percentage

used to extend the length or scope of copyright protection and were not practically useful for measuring trends in authorship. "Valid" means that the registrations have not been canceled by the USCO and can thus form the basis for a legal claim. The data set did not include "serials," that is, works that are published in a series with multiple authors, because it was often difficult to determine authorship and properly classify the "work" within a certain work type category. *Id.* at 53.

[23] Out of the isolated 14,598,621 registrations, 7,863,069 (or roughly 54 percent) were published at the time of registration. *Id.* at 56 n.31. *See generally* Oliar et al., *supra* note 7, at 2224 (stating that a work is considered "published" if it has been "distributed to the public by sale, transfer, lease, rental, loan, or has been offered to be distributed").

[24] Brauneis & Oliar, *supra* note 4, at 56.

[25] *See id.* at 52–54.

[26] In this study, 982,234 registrations reported at least one author whose first name was not included in the 1990 U.S. Census list of first names and these names were excluded from the study. *Id.* at 72–73; *see also* Shervin Malmasi & Mark Dras, *A Data-Driven Approach to Studying Given Names and Their Gender and Ethnicity Associations*, *in* Proceedings of Australasian Language Technology Association Workshop 145, 146 (2014) (discussing the connection between first names and predicting likely gender).

[27] While there are multiple categories of gender expression, the statistics linking gender to first names reflect the 1990 U.S. Census Office's decision to allow only these two options and on respondents' self-selection into these categories.

[28] An estimated 28 percent of registrations did not have any authors who were identified individuals and were thus excluded from the data set for gender analytics. This excluded, for example, authors of works made for hire, as assigning gender to employers or corporate authors was impossible. *See* Brauneis & Oliar, *supra* note 4, at 73 n.76, 74.

[29] The gender of registrations was determined by averaging the gender of its individual authors. *Id.* at 73 n.76.

[30] In 2012, men made up 53.1 percent of the labor force. *Id.* at 73.

of women in the labor market increased from 41.7 percent in 1978 to 46.9 percent in 2012, while the share of women authors has only increased from 30 percent in 1978 to 36 percent in 2012.[31]

6.1.2.1 Gender Variation across Work Types

The disparity between authorship rates among men and women has varied across type-of-work categories. Between 1978 and 2012, men registered 88.22 percent of software copyrights and 78.16 percent of movie copyrights.[32] Both categories have experienced a relative increase in authorship by women over time, but when combined, these categories represent only 2.5 percent of registrations by individuals.[33] The most significant gains toward gender parity have been made in the text category, which makes up over a third of the individual registrations.[34] While men were listed as authors for 57.45 percent of all text registrations, the share of women authors increased from 33.98 percent to 45.83 percent between 1978 and 2012. The drama and music categories, which account for 5 percent and 44 percent of individual registrations, respectively, did not experience a significant change in gender parity between 1978 and 2012. Overall, men authored 66.99 percent of all drama registrations and 75.98 percent of all music registrations.[35] The art category experienced the greatest fluidity between 1978 and 2012, with the percentage of authorship by men decreasing between 1978 and 1984 and rising again by 2012. Art represents 11 percent of individual registrations, with men authoring 54.34 percent of total art registrations and 59.1 percent of art registrations in 2012.[36]

6.1.2.2 Gender Variation in Publication Status

The data suggest that women are more likely to create and register copyrights in categories of work where the work has typically already been published at the time of registration.[37] In the study, 39 percent of registrations authored by men were published at the time of registration, compared with 44 percent of works authored by women.[38] However, these statistics are affected partly by the different types of work men and women tend to register. For example, half of all registrations authored by women were in the text category, and within that category, 61 percent of women had published their work by the time it was registered. While men

[31] *Id.*
[32] *Id.* at 76.
[33] In 2012, the percentage of authors who were women was 10.49 percent for movies and 11.85 percent for software. *Id.*
[34] *Id.* at 76.
[35] *Id.*
[36] *Id.*
[37] *Id.* at 77.
[38] *Id.* at 76.

demonstrated a similar propensity to publish textual work before registering it for copyright, text registrations represented only 33 percent of registrations authored by men.[39] On the other hand, music registrations represented half of the registrations authored by men, and this category only had a 22 percent prior-publication rate for men. Women, in contrast, had a 15 percent prior-publication rate for music registrations, but music registrations only made up 29 percent of women-authored registrations.[40] In the software and art categories, women were more likely to publish their work before registration than men, but in the drama category, men and women had equal publication rates.[41]

6.1.2.3 Gender Variation in Age and Coauthorship

The Study concluded by examining coauthorship patterns and author age differences by gender and work type. First, in comparing registrations with more than one author listed, the Study found that authors generally worked with coauthors of the same gender. Conditional on one of the authors being a man, there was about an 80 percent chance that the other author was also a man. Conditional on one of the authors being a woman, there was about a 50 percent chance that the other author was also a woman. If authors had picked their coauthors randomly and neutrally, we would expect these statistics to have been about 71 percent and 29 percent.[42] Men and women, therefore, show a clear tendency to collaborate with same-gendered coauthors.

While there was some variation in age demographics between men and women, the difference in size was dependent on the type of work registered.[43] For example, women authors of registered works were on average one year older than men in the movie category, two years older in the music category, and three years older in the software category. On the other hand, women were generally a year or less younger than men in the text, drama, and art categories.[44]

6.2 PATENT AND TRADEMARK OWNERSHIP

The gender disparity in copyright registration is mirrored in both patent and trademark ownership. The degree of disparity varies for patents and trademarks,

[39] Sixty-six percent of registrations for textual work written by men were published at the time of registration. *Id.* at 77.
[40] *Id.*
[41] *Id.*
[42] The sample size for this analysis was 1,708,442 data points and the percentage of authors who were women was 29 percent. *Id.* at 75.
[43] *Id.* at 77.
[44] *Id.*

but in both cases, women are underrepresented compared with men. Women submit fewer applications than men and have fewer patents granted.[45] Focusing strictly on metrics drawn from the intellectual property system obscures the factors and events that precede a patent or trademark application. Rather than indicating a lack of ability, creativity, or interest, lower numbers of applications and grants are likely indicative of barriers to full access to and participation in the system by women. The existence of such barriers, particularly among women applying for patents, has been confirmed by researchers seeking to understand the behavior of women prior to and after securing intellectual property rights. Considered in conjunction with copyright registration, there may be systemic barriers within the intellectual property system hindering women.

Similar to copyright registration data, studies have indicated that gender disparity in patent and trademark ownership varies widely by the subcategory, or class, into which the particular patent or trademark falls. Some of these distinctions can be justified by gendered patterns of educational attainment, but additional factors suggest something other than education is disincentivizing or preventing women from seeking intellectual property rights ownership within their fields. As with copyrights, some studies on patent ownership have also indicated that women have different collaboration patterns than men and are very unlikely to patent an invention as a sole inventor.

Like the USCO, the U.S. Patent and Trademark Office (USPTO) does not record demographic information for its applicants. Therefore, the data provided later in the chapter is based on studies that used a similar procedure of matching the first names of listed owners with their likely gender using U.S. Census data.

6.2.1 *The Patent Gender Gap*

In 1977, only 2.6 percent of granted U.S. patents listed at least one woman as an inventor.[46] More recently, in 2016, women were listed on 21 percent of granted patents.[47] However, this remains below women's share of the STEM labor force.[48] Furthermore, the total inventor rate – that is, the percentage of all inventors listed on

[45] *See* Delixus & Nat'l Women's Bus. Council, *supra* note 10, at 83 tbl.A.5, 84 tbl.A.6 (showing the number of patent applications filed by men and women by year from 1975 to 2010); *id.* at 89 tbl.A.11, 90 tbl.A.12 (showing the number of trademark applications filed by men and women by year from 1980 to 2010); *see also* Kyle Jensen, Balázs Kovács & Olav Sorenson, *Gender Differences in Obtaining and Maintaining Patent Rights*, 36 Nature Biotechnology 307, 309 (2018) (finding that applications submitted by all-women teams are rejected at higher rates than applications submitted by all-men teams).

[46] U.S. Dep't of Com., Buttons to Biotech: 1996 Update Report with Supplemental Data through 1998, at 8 (1999) (reporting on the inclusion of women in U.S. patent applications and granted patents).

[47] Progress and Potential, *supra* note 11, at 4 (containing data about the women inventor rate for patents over time).

[48] The share of women in STEM has increased from 25 percent in 2000 to 28 percent in 2015. This measure combines the percentage of women in life and physical sciences, engineering,

granted patents who are women – has only increased from 10 percent in 2000 to 12 percent in 2015.[49] If we disaggregate some of these patent statistics, we find that the degree of gender disparity varies widely over time and by scientific field. For example, while some fields, such as life sciences, have achieved near gender parity, other fields, such as engineering, have remained vastly disproportionate.[50] This trend is reflected in STEM educational data, labor force makeup, and patent statistics.

Unlike trademarks and copyrights, the expertise required to invent something patentable would often necessitate some formal education or expertise in STEM, a high level of education, or at least a background in STEM.[51] As a result, gender disparities in a degree program at both the undergraduate and graduate levels may explain part of the gender disparity in patent rates.[52] For example, one study has argued that individuals with mechanical and electrical engineering degrees produce more patents than most other STEM degrees, but women have historically received less than 10 percent of the mechanical and electrical engineering degrees awarded to men. Because individuals with these STEM degrees have a high likelihood of patenting compared to other degree programs, a lack of women in the degree program could affect the disparity in overall patent rates between men and women.[53]

and computer occupations. *See id.* at 5 (showing the women inventor rate and gender composition of STEM fields).

[49] *Id.*

[50] The share of women in life and physical sciences has grown consistently since 1970. By 2010, women were 39 percent of this workforce, and by 2018, the number had risen to 45 percent. In contrast, the share of women in engineering has experienced minimal and largely stagnant growth. By 1990, women made up 12 percent of the engineering workforce, which increased to only 14 percent by 2010. In 2018, women made up 16 percent of the engineering workforce. These broad categories can be further subdivided by job type and industry. *See* U.S. Dep't of Lab., *supra* note 10 (providing information about the share of women in the labor force); W. DuBow & J.J. Gonzalez, Nat'l Ctr. for Women & Info. Tech., *NCWIT Scorecard: The Status of Women in Technology* (2020), www.ncwit.org/bythenumbers (providing data on the gender composition of STEM industries and educational programs).

[51] *See* Milli et al., *supra* note 8, at 8 (discussing how an increase in STEM degrees awarded to women corresponds with an increase in patenting activity among women).

[52] Jennifer Hunt, Jean-Philippe Garant, Hannah Herman & David J. Munroe, *Why Are Women Underrepresented amongst Patentees?* 42 Rsch. Pol'y 831, 834 (2013) (explaining how disparity in STEM degree programs by gender explains part of the disparity between men and women patent rates).

[53] The educational statistics are reflected in the percentage of women employed as electrical and mechanical engineers. In 2018, 9.4 percent of electrical engineers and 10.9 percent of mechanical engineers were women. Bureau of Lab. Stat., Women in the Labor Force: A Databook 49 tbl.11 (2019); Hunt et al., *supra* note 52, at 832, 834–35 (finding that electrical and mechanical engineering are two of the most patent-heavy fields of study in STEM, and the scarcity of women in electrical and mechanical engineering, as well as their lack of representation in design or development roles within those fields, explains an estimated 40 percent of the gap in men and women patent rates); Nat'l Sci. Found., Employed Scientists and Engineers, by Occupation, Highest Degree Level, and Sex: 2006 tbl.9-5 (2006) (containing degree information by gender and occupation in STEM fields).

On the other hand, women have been more proportionally represented in biological and physical science degree programs, and in 2015, women represented 48 percent of biological and life scientists. These STEM degrees are much less likely than mechanical and electrical engineering to lead to patent activity, but while men and women are nearly equally employed as biological and life scientists, in 2015, only 25 percent of the inventors for biotechnology patents and 23 percent of inventors for pharmaceutical patents were women, suggesting educational attainment alone does not determine patent rates.[54]

6.2.1.1 Level of Gender Equality Varies by Workplace Type

Granted patents are often assigned to an employer, and by looking at assignment data, it is possible to draw conclusions about the types of work environments that either attract more women or perhaps place greater emphasis on gender equality. Between 2007 and 2016, nearly 20 percent of the inventors listed on patents assigned to universities or hospitals were women. This was followed closely by public research organizations, where 15 percent of listed patent inventors were women. These two sectors have shown the largest and most continued improvement in the share of female inventors. Between 2007 and 2016, among individual-owned patents, just under 15 percent of inventors were women.[55] Only 12 percent of the inventors listed on patents assigned to private companies were women.[56]

These data support a couple of propositions. First, these statistics suggest that women are much less likely than men to individually develop and patent a new invention.[57] Second, these data support studies that concluded that women might be more likely to patent while working for academic institutions or public companies than for private companies.[58] This could be tied to the organizational

[54] *See* Progress and Potential, *supra* note 11, at 5–6 (containing data for the percentage of women in STEM by field as well as inventor rate for biotechnology and pharmaceutical patents); Hunt et al., *supra* note 52, at 835 (finding that women are in the majority of life science degree holders but that individuals with a life sciences degree have a relatively low likelihood of patenting compared with other STEM fields).

[55] *Id.* at 9.

[56] *Id.*

[57] Women are also less likely to have the same financial resources and connections to the patent industry as men do. Delixus & Nat'l Women's Bus. Council, *supra* note 10, 15 (discussing the findings of a study that involved interviews with women entrepreneurs who reported a lack of connections to the patent industry as well as the high cost of patenting as two reasons why they have not pursued patents in the past); Emma Williams-Baron, Jessica Milli & Barbara Gault, Inst. for Women's Pol'y Rsch., Innovation and Intellectual Property among Women Entrepreneurs 12 (2018), https://iwpr.org/publications/innovation-intellectual-property-women-entrepreneurs/ (containing data on the likelihood of women entrepreneurs to own intellectual property rights compared with men).

[58] See, for example, Cassidy R. Sugimoto, Chaoqun Ni, Jevin D. West & Vincent Larivière, *The Academic Advantage: Gender Disparities in Patenting*, 10 PLoS One 1, 6 (2015), https://journals

structure of most private companies[59] or could be reflective of the private sector's difficulties in retaining women in STEM roles.[60]

6.2.1.2 Patterns of Coauthorship

Several studies have found that women are more likely to work with coinventors than to apply for patents by themselves. Most often, patent teams with women have two to five total inventors. While larger teams are becoming more common overall, teams with women on them are much more likely to include four or more inventors than teams of only men.[61]

While women are more likely than men to collaborate with coinventors, they are unlikely to work as part of an all-women team. Between 2007 and 2016, only 4 percent of patents had only women listed as inventors.[62] Furthermore, patents with only women listed as inventors are cited less frequently than mixed-gender and men-only patent inventor teams.[63] However, mixed-gender teams are cited more frequently in later patent applications than men-only and women-only teams, which may be indicative of either the relative value of average patents produced by diverse, mixed-gender teams or the added value of large teams of inventors.[64]

6.2.1.3 Gender-Linked Behavioral Differences in Patent Applications

There are several differences between men and women during and immediately after the patent application process. First, all-women teams may be subject to gender

.plos.org/plosone/article/file?id=10.1371/journal.pone.0128000&type=printable (finding that women around the world are most likely to patent within academic institutions).

[59] *See* Kjersten Bunker Whittington & Laurel Smith-Doerr, *Women Inventors in Context: Disparities in Patenting across Academia and Industry*, 22 Gender & Soc'y 194, 197–99 (2008) (discussing differences in women's participation in STEM fields, as well as patenting activity, on the basis of different fields relying on different organizational dynamics with some fields attracting more women by being more collaborative and flexible).

[60] About one-fifth of women with STEM degrees end up leaving the workforce, and around half end up leaving the private sector for a start-up, public-sector, or self-employed role. Sylvia Ann Hewlett, Carolyn Buck Luce, Lisa J. Servon, Laura Sherbin, Peggy Shiller, Eytan Sosnovich & Karen Sumberg, The Athena Factor: Reversing the Brain Drain in Science, Engineering, and Technology 50 (2008).

[61] Progress and Potential, *supra* note 11, at 11 (containing information about the percentage of women who work with coinventors by the number of coinventors).

[62] *Id.* at 12.

[63] Jessica Milli, Barbara Gault, Emma Williams-Baron & Meika Berlan, Inst. for Women's Pol'y Rsch., The Gender Patenting Gap 6 (2016), https://iwpr.org/publications/the-gender-patenting-gap/ (discussing the number of citations women-only invented patents receive).

[64] *Id.*; Catherine Ashcraft & Anthony Breitzman, Nat'l Ctr. for Women & Info. Tech., Who Invents IT?: Women's Participation in Information Technology Patenting 4 (2012) (suggesting that mixed-gender teams receive more citations due to the size of the inventor team or its value).

bias or discrimination by patent examiners. One study found that for all-women teams of inventors that submitted patent applications, inventors with "common" names for women were 8.2 percent less likely to have their patent applications approved than all-men teams.[65] The magnitude of this effect decreased when women inventors had "rare" names that might not be socially connected to either gender.[66] All-women teams are also less likely to appeal rejected patent applications and less likely to have their patents maintained by their assignee than mixed-gender or all-men teams.[67] Second, women are less likely to commercialize their patents, resulting in less monetary gain from their patenting activity.[68] This is a reflection of both having women as inventors and some of the fields they specialize in. For example, while women are well-represented in life sciences, only 39 percent of life sciences patents are commercialized.[69]

6.2.1.4 Explanations

Ultimately, only part of the patent gap is likely linked to the absence of women in STEM.[70] The lack of gender equality in patent-intensive fields such as engineering may disproportionately affect the patent gender gap.[71] However, even in areas of STEM where women are well-represented, they still do not patent at the same rates as men. This is particularly clear in academia, where men and women have been shown to publish similar-quality papers at similar rates. Still, men remain much more likely to patent than women.[72]

Another potential problem could be the cost and complexity of the patent application process. Applying for and maintaining a patent could cost upwards of tens of thousands of dollars, and due to historical exclusion from STEM, women may not have the connections to the patent industry that men have.[73] These connections both with the patent industry and within STEM fields may be

[65] Jensen et al., *supra* note 45, at 309.

[66] All-women teams with "rare" names were 2.8 percent less likely to have their applications approved than teams of men. *Id.*

[67] *Id.* at 308.

[68] Milli et al., *supra* note 8, at 20 (discussing differences in patenting activity by men and women including commercialization).

[69] Hunt et al., *supra* note 52, at 834 (discussing the connection between STEM fields where women are prominent and the likelihood of patent commercialization in those fields).

[70] *Id.* at 832 (arguing that other factors must contribute to lower patent rates among women because women with STEM degrees do not patent at significantly higher rates than women without STEM degrees).

[71] *Id.* at 840 (suggesting that women are less likely than men to work in design or development roles that lend themselves to patent activity).

[72] *See* Ding et al., *supra* note 17, at 665–66 (discussing patenting rates by men and women in academia compared with paper publication rates and the average number of citations for papers published by men and women).

[73] Milli et al., *supra* note 8, at 18–19 (discussing possible explanations why fewer women than men apply for patents); Delixus & Nat'l Women's Bus. Council, *supra* note 10, at 15, 19–20

important resources for individuals to gain valuable expertise and insight into whether or not they should apply for a patent and what that process entails.[74]

There are also several ways in which women applying for a patent may face some degree of discrimination. While progress has been made in recent decades, some women still report encountering either implicit bias or sexist behavior in STEM workplaces. While it is unclear how widespread these kinds of experiences may be, they may lead women to leave their jobs in STEM more frequently than men and steer women away from patent activity.[75] Even in academia, researchers have found that some science faculty may be implicitly biased against women. In a study where researchers submitted identical resumés for a lab manager position, both men and women STEM faculty members rated the resumé with a common name for a man as more qualified and offered a higher starting salary than the resumé with a common name for a woman.[76] In addition, data suggest that examiners at the USPTO show gender bias in processing applications.[77]

(containing information from interviews with women entrepreneurs who cited the high cost of patenting and a lack of connections as two reasons why they have not applied for patents).

[74] See, for example, Ding et al., *supra* note 17, at 666–67 (suggesting that women are less likely than men to have connections, or prior experience, with commercial science, which are particularly important in the early stages of patent development but that this gendered difference is not as pronounced among younger scientists); Milli et al., *supra* note 8, at 22–23, 26 (discussing the importance of networks for women who patent and discussing the role of socialization, particularly in academia, as an important source of incentives or disincentives for women who patent based on the messages that they receive from their peers); Hewlett et al., *supra* note 60, at 14–15 (arguing that women in some private companies in STEM face a lack of mentors and "sponsors" and that this resulting isolation leads women to leave STEM jobs at higher rates than men); Yu Meng, *Collaboration Patterns and Patenting: Exploring Gender Distinctions*, 45 Rsch. Pol'y 56, 64 (2016) (finding that women in academia are more likely to patent if they have ties to other academics ["collaboration ties"] and that a lack of knowledge of the patent industry and a lack of connections to patenting make women less likely to patent than men).

[75] See, for example, Hunt et al., *supra* note 52, at 834 (finding that women are more likely than men to work in fields unrelated to their STEM degrees, thereby lowering their likelihood of patenting); Milli et al., *supra* note 8, at 27 (discussing some examples of women being deterred or discouraged from patenting after not being taken seriously as inventors as a result of their gender); Hewlett et al., *supra* note 60, at 7–11 (describing "macho" and at-times predatory behavior in some private sector STEM workplaces); Cary Funk & Kim Parker, *Women and Men in STEM Often at Odds over Workplace Equity*, Pew Rsch. Ctr. (Jan. 9, 2018), www.pewsocialtrends.org/2018/01/09/women-and-men-in-stem-often-at-odds-over-workplace-equity/ (discussing the results of a survey among men and women in STEM that found that 44 percent of women in gender-balanced STEM workplaces had experienced gender discrimination and 78 percent of women in majority-men private sector STEM workplaces had experienced gender discrimination).

[76] Corinne A. Moss-Racusin, John F. Dovidio, Victoria L. Brescoll, Mark J. Graham & Jo Handelsman, *Science Faculty's Subtle Gender Biases Favor Male Students*, 109 Procs. Nat'l. Acad. Sci. U.S. 16474, 16475–76 (2012) (finding that all else being equal, STEM faculty members have an implicit or explicit bias in favor of students who are men).

[77] Jensen et al., *supra* note 45, at 309 (suggesting that patent applications submitted by women with names commonly associated with women are rejected at higher rates than women with uncommon names due to patent examiner gender bias); *see also* Dan L. Burk, *Do Patents Have*

6.2.2 *The Trademark Gender Gap*

Unlike patents, there has been relatively little research done on women's trademark ownership. Still, available data suggest a similar gap exists between the number of men and women who own trademarks, although there are signs of greater equality over time. In 1980, women received 16.7 percent of trademarks granted, and by 2010 they still received only 33.31 percent.[78] Unlike patents, no set of educational indicators is associated with people who will apply for a trademark. Trademarks have occasionally been connected to entrepreneurial activity, but a 2015 survey conducted by the U.S. Census Bureau found only a marginal difference in the share of women-owned businesses with a trademark compared with men-owned businesses.[79] That being said, women as a whole are less likely to become entrepreneurs, and in that study, only 20.8 percent of the surveyed businesses were women-owned.[80]

Like copyright and patent rates, women appear to specialize in different areas than men. In 2010, women were granted the most trademarks in the following classes: advertising and business, clothing, education and entertainment, and paper goods and printed matter.[81] While these categories were among the most frequently used trademark classes between 2004 and 2013, notably missing are the electrical and scientific apparatus and computer and scientific classes, the first and fourth most-used classes in that period.[82]

Gender?, 19 Am. U. J. Gender Soc. Pol'y & L. 881, 886 (2011) (discussing how gender-based effects and differences can make the patent system "gendered" despite the system lacking intentional and explicit gender preferences).

[78] This figure represents the share of trademarks granted to women as individuals. Trademarks granted to businesses were excluded from the data set, but in 2010, only an estimated 4.8 percent of granted trademarks were awarded to businesses. Delixus & Nat'l Women's Bus. Council, *supra* note 10, at 83 tbl.A.5, 84 tbl.A.6, 93 tbl.A.16 (containing data for the number of trademark applications submitted by men and women and the percentage of applications that were approved for both genders).

[79] *See* U.S. Census Bureau, Annual Survey of Entrepreneurs, www.census.gov/data/developers/data-sets/ase.html?# (last visited May 20, 2020) (containing surveys for the years 2014–16, and showing that in 2015, 6.1 percent of women-owned businesses had at least one trademark compared with 7.0 percent of men-owned businesses); Williams-Baron et al., *supra* note 57, at 12 (summarizing and providing a visual representation of the results of the 2015 Annual Survey of Entrepreneurs).

[80] *See* Williams-Baron et al., *supra* note 57, at 3 (containing data reflecting the number of women-owned, men-owned, and equally owned firms between 1997 and 2015); *see also* Candida G. Brush, Patricia G. Greene, Lakshmi Balachandra & Amy E. Davis, Diana Project, Women Entrepreneurs 2014: Bridging the Gender Gap in Venture Capital 5–6 (2014) (linking the lower number of women-owned and operated businesses to lower amounts of venture capital available to women).

[81] Delixus & Nat'l Women's Bus. Council, *supra* note 10, at 45 (containing data on the most frequently used trademark classes for trademark applications submitted by women).

[82] Econ. & Stat. Admin. & U.S. Pat. & Trademark Off., *supra* note 13, at 59 tbl.A-8 (containing information about the most frequently used trademark classes in the United States).

Interestingly, women's trademark applications were accepted more frequently than applications by men between 1988 and 2000. However, the ratio of successful trademark applications made by women and men has been nearly equal since 2000.[83] Therefore, women are likely underrepresented as trademark owners due to a lack of applications compared with men. There has not been much research done on why women file fewer applications than men. But one study has suggested that women may be hesitant to apply for trademarks due to a lack of knowledge about how they work and uncertainty about the financial value of obtaining a trademark.[84]

6.3 GENDER TRENDS ACROSS PROPERTY OWNERSHIP

While some factors and explanations are specific to intellectual property rights ownership, the disparity between men and women in the intellectual property rights context is consistent with more general inequities in other forms of property ownership and corporate power. Therefore, to fully understand lower rates of intellectual property rights ownership by women, it is necessary to contextualize our findings within the broader scheme of property ownership and wealth accumulation. In their lifetimes, women are more likely to experience poverty,[85] receive social welfare benefits,[86] and retire with few if any retirement savings compared with men.[87] Women on average make less than men for the same job, even in industries where women predominate, perpetuating both a wage and a wealth gap between men and women.[88] Despite making up half of the U.S. labor force, women

[83] While the ratio of acceptance rates for men and women has remained roughly equal, the overall acceptance rate for trademark applications filed by women has decreased over time from 88.28 percent in 1985 to 49.6 percent in 2010. DELIXUS & NAT'L WOMEN'S BUS. COUNCIL, *supra* note 10, at 40–41 (containing data reflecting the ratio of successful trademark applications made by men and women over time).

[84] *Id.* at 14–15 (summarizing the findings of a series of interviews with women entrepreneurs who were asked why they did not apply for trademarks or patents).

[85] *See* JESSICA SEMEGA, MELISSA KOLLAR, JOHN CREAMER & ABINASH MOHANTY, U.S. CENSUS BUREAU, INCOME AND POVERTY IN THE UNITED STATES: 2018, at 15 (2019) (reporting that women have a higher likelihood of experiencing poverty in their lifetime than men – 12.9 percent compared with 10.6 percent).

[86] *See* SHELLEY K. IRVING & TRACY A. LOVELESS, U.S. CENSUS BUREAU, DYNAMICS OF ECONOMIC WELL-BEING PARTICIPATION IN GOVERNMENT PROGRAMS, 2009–2012: WHO GETS ASSISTANCE? 16 tbl.1 (2015) (discussing the demographics of individuals who receive government program assistance).

[87] *See* CATHERINE COLLINSON, TRANSAMERICA CTR. FOR RETIREMENT STUD., HERE AND NOW: HOW WOMEN CAN TAKE CONTROL OF THEIR RETIREMENT 9–10 (2018), www.transamericacenter.org/docs/default-source/women-and-retirement/tcrs2018_sr_women_take_control_of_retirement.pdf (explaining that women are much more likely than men to have low, if any, retirement savings).

[88] *See* INST. FOR WOMEN'S POL'Y RSCH., THE GENDER WAGE GAP BY OCCUPATION AND BY RACE AND ETHNICITY 3 tbl.1, 4 tbl.2 (2019), https://iwpr.org/publications/the-gender-wage-gap-by-occupation-2019/ (containing data for the average wages for men and women in the most common occupations for men and women, respectively).

represent only 5.8 percent of its CEOs.[89] A thorough exploration of gender inequality is beyond the scope of this chapter, but understanding some of the forms of inequality that affect property ownership and wealth accumulation will allow us to contextualize and explain some of the gender differences in the copyright registration data.

6.3.1 *Gender Disparity in Property Ownership and Wealth Accumulation*

6.3.1.1 Wage Gap and Wealth Gap

Women across the country are compensated less than men for their labor, and this disparity ultimately contributes to a lifetime wealth gap. In 2019, women on average earned 81.5 cents for every dollar earned by a man with the same job.[90] This gap has been more pronounced in occupations commonly held by men. For example, several professions with men in the majority have paid women only 70–75 percent of what they pay men for the same job.[91] In addition to varying across professions, the wage gap has also varied by geography, with women in 2013 earning between 67.3 percent and 87.6 percent of what men made based on their state.[92] One estimate suggests that the gender wage gap will not be closed in some states until after 2100.[93]

The perpetuation of this wage gap contributes to women experiencing higher levels of poverty than men and is one large contributor to the wealth gap between men and women. In addition to base wage differences, women are twice as likely to be part-time workers, constitute the majority of minimum-wage and low-wage workers, and typically have more caregiving responsibilities than men, all of which can limit their ability to save for the future and accumulate wealth at the same rate as men.[94] Some studies have also found that women are more risk-averse in terms of

[89] *List: Women CEOs of the S&P 500*, Catalyst (May 1, 2020), www.catalyst.org/research/women-ceos-of-the-sp-500/ (containing a list of women CEOs of S&P 500 companies as of May 1, 2020).

[90] *See* Inst. for Women's Pol'y Rsch., *supra* note 88, at 3 tbl.1 (containing information about the overall wage gap between men and women); Cynthia Hess, Jessica Milli, Jeff Hayes & Ariane Hegewisch, Inst. for Women's Pol'y Rsch., The Status of Women in the States: 2015, at 48 tbl.2.2 (2015) (finding that women earn less than men within racial groups as well, but when compared with white men, women in some racial/ethnic groups earn only a little more than 50 percent of what white men are paid for the same job).

[91] *See* Inst. for Women's Pol'y Rsch., *supra* note 88, at 4 tbl.2 (containing average wage information for the twenty most common occupations for men in 2019).

[92] *See* Hess et al., *supra* note 90, at 39 tbl.2.1 (containing data for the ratio of men to women's salaries by state).

[93] *See id.* at 45 tbl.2 (containing estimates of the year every state will close the gender wage gap if wage disparity continues to decrease at the same rate).

[94] *See* Heather McCulloch, Closing the Women's Wealth Gap, Closing the Women's Wealth Gap What It Is, Why It Matters, and What Can Be Done about It 7 (2017), https://womenswealthgap.org/report/ (suggesting that women often have more caregiving

taking financial risks, which may contribute to lower rates of wealth accumulation.[95] As a result of all of these factors, women are disproportionately unprepared for retirement compared with men.[96]

6.3.1.2 Welfare Benefits

Correlated with the wage and wealth gap, women are more likely to receive welfare benefits than men. In 2018, women were more likely to experience poverty than men in every age category after turning eighteen.[97] In 2012, 23.3 percent of women in the United States received some form of welfare benefits compared with 19.3 percent of men. The statistics were starker for single mothers. In 2012, 58 percent of "female-householder families" received welfare benefits compared with 37.2 percent of "male-householder families" and 19.9 percent of married couples.[98] These statistics have varied by education level and geography, but women in the South and parts of the Western United States with less than a college-level education as a whole have had a high likelihood of experiencing poverty.[99] A variety of factors contribute to these bleak statistics the wage gap, and increased likelihood for women to be in low-paying or part-time jobs compared with men are among the most prominent.[100]

6.3.1.3 Home Ownership

Home equity is the largest source of wealth for U.S. households, followed by business ownership, and this is one of the few areas in which women outperform men by some measures.[101] Since the 1990s, single women have owned more homes than single men.[102] In 2017, single women owned 22 percent of available homes in the United States, while single men owned only 13 percent.[103] However, most

burdens than men, are more often part-time or lower-wage workers, and are more financially risk averse than men, all of which may add to the wealth gap).

[95] *Id.* at 8.

[96] *See* Collinson, *supra* note 87, at 9–10 (reporting differences in retirement savings between men and women).

[97] Semega et al., *supra* note 85, at 15 (containing data about poverty rates among men and women by age).

[98] A "female-householder family" ("male-householder family") is a family that is led by a woman (man) with no spouse reported. Irving & Loveless, *supra* note 86, at 10 (discussing the demographics of individuals who receive government program assistance).

[99] *Id.* at 13 (containing data about poverty rates by gender and educational attainment); Hess et al., *supra* note 90, at 125 tbl.4.1 (containing data about poverty rates among women by state).

[100] *See* Hess et al., *supra* note 90, at 137, 143 (suggesting that if the wage gap were eliminated, the poverty rate for working women would be half of what it currently is).

[101] *See* McCulloch, *supra* note 94, at 9 (discussing the role of home ownership among women as a tool for wealth-building).

[102] *Id.*

[103] Tendayi Kapfidze, Lendingtree a Different Kind of Gender Gap: Homeownership Is More Common among Single Women than Single Men (2019), www.lendingtree.com/

homes are still owned by married couples, and as soon as additional family members are added to the household, home-ownership rates by single women rapidly decrease compared with men.[104] Furthermore, despite owning more homes as a group, a recent study has suggested that women can still end up worse off than men because, on average, they buy their home for 2 percent more and sell it for 2 percent less than similarly positioned men.[105] As the dominant form of savings for many households, the disparity in purchasing and selling prices over time likely contributes to the wealth gap between men and women.[106]

6.3.2 *Entrepreneurial Success and Corporate Power*

6.3.2.1 Women's Entrepreneurship

Entrepreneurial activity among women and various forms of corporate ownership are related, contributing factors to property ownership and wealth accumulation. In 2012, women-owned businesses accounted for only 36 percent of U.S. businesses and earned, on average, only 22.5 percent of what men-owned businesses made.[107] Revenue differences varied widely by sector. In some industries such as arts/entertainment and scientific services, women-owned businesses made under 40 percent of the revenue of men-owned businesses. Notably, 93.7 percent of women-owned businesses were in either a service or retail industry. But the combined revenue of women-owned businesses in retail made only 13.5 percent of the revenue earned by men-owned retail businesses.[108]

Part of the financial disparity between entrepreneurship by men and women is tied to a lack of funding for women-owned businesses. Men are much more likely to

home/mortgage/homeownership-gender-gap-study/ (containing rates of home ownership for single men and women around the United States).

[104] Woman-headed household (no spouse of live-in partner reported) with two or more people living in the house have lower rates of home ownership than male-headed households of two or more people. *Id.*; U.S. Census Bureau, Household Estimates for the United States, by Age of Householder, by Family Status: 2000 to Present (2019), www.census.gov/housing/hvs/data/histtabs.html.

[105] *See* Paul Goldsmith-Pinkham & Kelly Shue, *The Gender Gap in Housing Returns* 16–18 (Nat'l Bureau of Econ. Rsch., Working Paper No. 26914, 2020) (discussing the results of a study that looked at returns on real estate investments by gender).

[106] *Id.* at 24–25 (suggesting that this gap in housing returns could explain 30 percent of the gender gap in wealth accumulation by the time women reach retirement).

[107] In 2012, women-owned businesses, on average, made US$144,000, compared with US$638,000 for businesses owned by men. Inst. for Women's Pol'y Rsch., Women-Owned Businesses Have Increased in Number, but Still Face Obstacles to Growth 4 (2020), https://iwpr.org/wp-content/uploads/2020/02/Kauffman-Fact-Sheet-for-layout-2-7-2020-1.pdf (containing data about the proportion of businesses in the United States owned by men and women and average profits of both).

[108] *Id.* at 5 (containing data about the revenue ratio between men- and women-owned businesses and the share of women-owned businesses in the service and retail industries).

receive venture capital than women, and even when women receive venture capital, they receive smaller investments than men.[109] Some studies have found that this may be caused at least in part by investors evaluating women-proposed projects differently than projects proposed by men. In a study of a top venture capital pitching competition, researchers found that women were more likely to be asked how they would avoid business failure while men were more likely to be asked how they expected to maximize profits.[110] While this may seem just a difference in semantics, this type of failure-avoidance questioning was associated with projects receiving less or no funding compared with comparably positioned companies that were asked about profit maximization.[111] Another part of the funding problem is a lack of women in top venture capital firms, as only 8 percent of global venture capital partners are women. Venture capital firms with women partners have been shown to be more likely to invest in women-owned companies than firms without women partners.[112] Still, to a lesser extent, the gap in venture capital funding may also be connected to women being less likely to own intellectual property rights than men, as some studies have found that new companies with a patent receive venture capital much more quickly than others.[113]

Women, however, may be less inclined than men to start their own businesses. One study found that in 2013, 11 percent of working women were running or starting their own business compared with 16 percent of men, but it is difficult to say whether this is indicative of a preference among women or a consequence of other barriers to women's entrepreneurship.[114] For example, in a survey of successful men and women entrepreneurs, women were much more likely to believe that having a robust professional network and prior experience as an entrepreneur is crucial for entrepreneurial success and securing outside funding.[115]

[109] See, for example, U.S. Senate Comm. on Small Bus. & Entrepreneurship, Tackling the Gender Gap What Women Entrepreneurs Need to Thrive 31 (2017), www.sbc.senate.gov/public/_cache/files/2/5/25bd7ee9-a37b-4d2b-a91a-8b1ad6f5bd58/536DC6E705BBAD3B555BFA4B60DEA025.sbc-tackling-the-gender-gap.december-2017-final.pdf (reporting that in 2016, women received only around 2 percent of venture capital funding; women as a whole apply for loans at lower rates and for less funding than men).

[110] *See* Dana Kanza, Laura Huang, Mark A. Conley & E. Tory Higgins, *We Ask Men to Win and Women Not to Lose: Closing the Gender Gap in Start-Up Funding*, 61 Acad. Mgmt. J. 586, 603–04 (2018) (reporting the results of a study on the success and patterns of men and women in a venture capital pitch competition).

[111] *Id.* at 601–02.

[112] *See* U.S. Senate Comm. on Small Bus. & Entrepreneurship, *supra* note 109, at 32–33 (linking the gender composition of venture capital firms to their support of women-owned businesses).

[113] *See* Milli et al., *supra* note 8, at 15–16 (suggesting that patents are useful for securing venture capital as well as other sources of funding such as commercial banks and investment banks).

[114] Brush et al., *supra* note 80, at 5 (containing data for the percentage of women compared with men starting their own businesses).

[115] *See* J. McGrath Cohoon, Vivek Wadhwa & Lesla Mitchell, Kauffman, Are Successful Women Entrepreneurs Different from Men? 5–6 (2010), www.kauffman

6.3.2.2 Corporate Ownership and Positions of Power

In December 2019, out of the S&P 500 companies, only twenty-nine (5.8 percent) company CEOs were women.[116] In a study of equity ownership in companies and C-suite executives, women on average owned forty-nine cents in equity for every dollar owned by a man.[117] While these dynamics are often reflective of individuals at the very top percentiles of income and success, they reinforce the conclusion that gendered wealth disparity permeates every income bracket. At a high level, of the companies surveyed, women represented 34 percent of the employees but held only 20 percent of the companies' combined equity value. Part of the problem is that there are not as many women involved in the early stages of start-ups when it is more likely for the company to grow immensely and for early employees to be awarded considerable equity.[118]

Another problem is the lack of women in C-suite positions. As people are promoted, firms that start with relatively equal numbers of men and women shift to become majority men. By the time people are promoted to a C-suite position, men predominate.[119] These dynamics are also reflected in company board demographics. Among Fortune 500 companies, only 22.5 percent of board positions were filled by women in 2018,[120] representing an improvement from 2004 when it was only 15.7 percent.[121]

6.4 GENDER DISPARITY IN CREATIVE PROFESSIONS

While professional participation in a creative industry is not a prerequisite for creating or registering copyrightable material, gender-based inequities and discrimination within creative industries may contribute to lower rates of creation and registration of works by women. As a general rule, creating a copyrighted work of

.org/wp-content/uploads/2009/07/successful_women_entrepreneurs_510.pdf (containing findings from interviews with successful men and women entrepreneurs that found in part that women are more likely to believe that prior experience "is crucial" and that professional networks are incredibly important as well).

[116] *List: Women CEOs of the S&P 500*, *supra* note 89 (containing a list of women CEOs as of May 1, 2020).

[117] *See* Emily Kramer, Carta, Table Stakes Study Analyzing the Gender Equity Gap (2019), https://tablestakes.com/study/ (summarizing findings from a study of equity holdings and C-suite positions among women).

[118] *Id.*

[119] *Id.*

[120] *See* Deloitte, Missing Pieces Report: The 2018 Board Diversity Census of Women and Minorities on Fortune 500 Boards 17 (2019), https://www2.deloitte.com/us/en/pages/center-for-board-effectiveness/articles/missing-pieces-fortune-500-board-diversity-study-2018.html (containing data for the gender and racial composition of boards and additionally finding that only 4.6 percent of board positions in surveyed companies were held by minority women).

[121] *Id.* at 18.

authorship does not necessitate a formal, educational, technical, or professional skill or training at the level that creating a patented invention often does. With a lower barrier to entry than STEM fields, one may expect creative industries to be more equally representative of both men and women, and in some ways, they are. However, many creative industries still struggle with a lack of women in positions of leadership, as well as allegations of implicit gender bias or outright gender-based discrimination. If these conditions create additional professional and social barriers to entry for women, then that may explain some of the gender disparity in the rates of copyright registration.

Available studies are overly dependent on understanding gender by looking at finished work products, such as released movies, top-played songs, and plays selected for performance. Therefore, it is difficult to gauge gender disparities at levels below the tip of the success iceberg or at supporting roles – such as editors in the book publishing industry or artists who are not yet prominent enough to be featured in a museum. That being said, broadly discussing gender dynamics within creative professions provides useful perspectives for understanding why some women may be disinclined or unable to create in certain fields.

6.4.1 *Book Industry*

Women have traditionally been in the majority at every stage of book publishing.[122] In 2012, roughly 55.6 percent of self-reported writers or authors were women.[123] That same year, 52.3 percent of periodical, book, and directory publishers were women as well.[124] Nevertheless, despite authors being majority women, the majority of authors (54.17 percent) of registered textual works in 2012 were men.[125]

While women for all purposes appear to be in the majority representation-wise, there are a set of gendered patterns that may discourage women authors or otherwise act to decrease the representation of women within the industry. First, although women are overrepresented in the publishing industry, some of the largest

[122] *See* Laura M. Jimenz & Betsy Beckert, *Where Is the Diversity in Publishing? The 2019 Diversity Baseline Survey Results*, Lee & Low Books (Jan. 28, 2020), https://blog.leeandlow.com/2020/01/28/2019diversitybaselinesurvey/ (finding that the publishing industry is 75 percent female and 60 percent of book publishing executives are women).

[123] There was also a category for news analysts/reporters/correspondents, but it is unclear whether journalists or writers for a "serial" publication would label themselves as writers and authors. Bureau of Lab. Stat., Women in the Labor Force: A Databook 36 tbl.11 (2014) (containing data for the percentage of women in each field for 2012).

[124] *Id.* at 52 tbl.14.

[125] While a degree is not necessary to become an author, women have received more creative writing MFA degrees than men since the 1990s. Rosie Cina, *Bias, She Wrote: The Gender Balance of The* New York Times *Best Seller List*, Pudding (June 2017), https://pudding.cool/2017/06/best-sellers/ (containing data on gender representation by genre over time on *The New York Times* best seller list).

publishing houses do not publish books written by women at the same rate as they publish books written by men.[126] One study found that out of thirteen publishing houses, only two had more than 30 percent of their published books authored by women.[127] With over 50 percent of self-reported authors being women, it is difficult to argue that this unequal representation in publishing houses is due to women's lack of interest or ability.

Even when women's books are published, on average, they sell for less, and their publishers invest less in their promotion compared with books written by men.[128] As a result, women profit less from their textual creativity than men. Furthermore, books written by women are comparatively less likely to be reviewed in magazines.[129] Men also have historically had a greater likelihood of having their books appear on *The New York Times*' bestseller list.[130] While these statistics could be tied to lower numbers of books written by women being published in the first place, book reviewers have also predominantly been men.[131] With this background, it is perhaps unsurprising that women may not be encouraged to write and register their work as much as men.

6.4.2 *Music Industry*

The music industry has long struggled with a lack of women both as performers and in music production. In 2018, 35 percent of self-reported musicians and singers and only 12.4 percent of broadcast and sound engineers were women.[132] This represented an improvement for the industry from 2010 when only 31.9 percent of musicians and singers and 9.9 percent of broadcast and sound engineers were women.[133] However,

[126] *See* Jimenz & Beckert, *supra* note 122; Ruth Franklin, *A Literary Glass Ceiling?*, New Republic (Feb. 6, 2011), https://newrepublic.com/article/82930/vida-women-writers-magazines-book-reviews (containing data from the 2010 catalogs of thirteen publishing houses to determine what percentage of books published by major publishers are women).

[127] The two publishers who had better representation said 45 percent and 37 percent of their published authors were women. Franklin, *supra* note 126.

[128] *See* Dana B. Weinberg & Adam Kapelner, *Comparing Gender Discrimination and Inequality in Indie and Traditional Publishing*, 13 PLoS One 1, 13–15 (2018) (arguing that books written by women are sold for less in both traditional publishing and self-publishing, but that the difference between average prices for books written by men and women is lower when authors self-publish).

[129] See, for example, Amy King, VIDA, The 2010 VIDA Count (2010), www.vidaweb.org/vida-count/the-count-2010/ (reporting that in some newspapers, books written by women were only 15–25 percent of the books reviewed that year).

[130] Cina, *supra* note 125 (containing data on gender representation on *The New York Times Best Seller List*).

[131] *See* Franklin, *supra* note 126 (discussing the demographics of book reviewers and the gender composition of authors published by thirteen major book publishers).

[132] Bureau of Lab. Stat., *supra* note 53, at 51 tbl.11 (reporting gender composition statistics for industries in the United States in 2018).

[133] Bureau of Lab. Stat., Women in the Labor Force: A Databook 31 tbl.11 (2011) (reporting gender composition statistics for industries in the United States in 2010).

despite these improvements, women remain underrepresented as musical artists and in music production. In a study of representation on the Billboard Hot 100 Year-End Charts between 2012 and 2019, only 21.7 percent of artists, 12.5 percent of songwriters, and 2.6 percent of producers were women.[134] This disparity varies by genre, with women in pop representing 32.6 percent of artists but only 11 percent of artists in alternative music.[135] This lack of representation is reinforced in awards show nominations. Between 2013 and 2020, 88.3 percent of Grammy Award nominees were men, though the number of women nominees has been trending upward over time.[136]

While it is unclear whether this is a cause or an effect, the music industry has been plagued by allegations of gender-based discrimination.[137] In one study that surveyed women in different parts of the music industry, 78 percent of respondents reported that they had been treated differently due to their gender.[138] In another study, women reported that their colleagues did not take them seriously and that their contributions both as producers and performers were not seen by their colleagues as important or valuable.[139] While these barriers would not necessarily prevent a self-recording artist from creating and registering new work, they may be part of why men authored 75.98 percent of copyright registrations in the music category.[140]

[134] *See* Stacy L. Smith, Katherine Pieper, Marc Choueiti, Karla Hernandez & Kevin Yao, USC Annenberg Inclusion Initiative, Inclusion in the Recording Studio? Gender and Race/Ethnicity of Artists, Songwriters & Producers across 800 Popular Songs from 2012–2019, at 2 (2020) (containing data on the race and gender composition of the songwriters, producers, and artists of the Billboard Top 100 songs for the year between 2012 and 2019).

[135] *Id.* at 11.

[136] *Id.* at 3.

[137] In recent years, the #MeToo movement has highlighted some examples of gender-based violence and harassment in the music industry. See, for example, Hanif Abdurraqib, *Year in Music: The Slow Road to Music's #MeToo Moment*, Billboard (Dec. 13, 2018), www.billboard.com/articles/events/year-in-music-2018/8489958/metoo-movement-music-industry-year-in-music-2018 (discussing some of the early moments in the #MeToo movement in the music industry); Shanon Lee, *When Will the Music Industry Have Its #MeToo Moment?*, Forbes (Jan. 22, 2020), www.forbes.com/sites/shanonlee/2020/01/22/when-will-the-music-industry-have-its-metoo-moment/#748ee6107803 (discussing recent allegations of sexual harassment and assault within the music industry and arguing that the music industry should receive more attention for these allegations); Associated Press, *When Music Producers Are Accused of Being Predators* (Mar. 1, 2019), www.billboard.com/articles/news/8500693/music-producers-accused-predators (discussing some of the #MeToo allegations against pop music producers and describes how pervasive similar behavior has been in the music industry).

[138] *See* Prior et al., *supra* note 12, at 16 (containing data from a survey among women in the music industry about whether they have experienced gender bias and organizes the results by age, employment type, and specific occupation).

[139] These observations and others like them have suggested the music industry has particularly high barriers to women in the form of gender stereotypes and biases. *Id.* at 16–17.

[140] This statistic includes music copyright registrations between 1978 and 2012. *See* Brauneis & Oliar, *supra* note 4, at 76.

6.4.3 *Film Industry*

Men hold the vast majority of roles in the film industry. In 2010, women represented only 7 percent of directors, 2 percent of cinematographers, and 15 percent of executive producers for the top 250 grossing films of the year.[141] By 2019, these numbers have improved, though there is still a way to go. Of the top 250 grossing films of 2019, women represented 13 percent of directors, 5 percent of cinematographers, and 23 percent of executive producers.[142] This inequality is mirrored among film actors and actresses as well. In 2010, only 30 of the top 100 movies for the year featured a woman as a lead or colead. By 2019, this had increased to 43 out of the top 100 movies.[143] However, for actresses, this inequality does not appear to be tied to a lack of interest. One of the most popular college majors for professional actors and actresses is visual and performing arts, and in 2017, women received 60.1 percent of visual and performing arts bachelor's degrees.[144] The lack of gender representation goes all the way up to the top of movie studio leadership, with one study finding that 82 percent of chief executives for some of the country's largest movie studios are men.[145]

While it is unclear whether some women choose to steer clear of the film industry or whether the industry as a whole creates additional barriers to entry for women, the film industry has faced allegations of gender-based discrimination for years.[146]

[141] *See* Martha M. Lauzen, The Celluloid Ceiling: Behind-the-Scenes Employment of Women on the Top 250 Films of 2010, at 1–2 (2011), https://womenintvfilm.sdsu.edu/files/2010_Celluloid_Ceiling.pdf (containing data on the percentage of women in behind-the-scenes roles in the top 250 films of 2010).

[142] *See* Martha M. Lauzen, The Celluloid Ceiling: Behind-the-Scenes Employment of Women on the Top 250 Films of 2019, at 3 (2020), https://womenintvfilm.sdsu.edu/wp-content/uploads/2020/01/2019_Celluloid_Ceiling_Report.pdf (containing data on the percentage of women in behind-the-scenes roles in the top 250 films of 2010).

[143] *See* Stacy L. Smith, Annenberg Inclusion Initiative, Inequality across 1,300 Popular Films: Examining Gender and Race/Ethnicity of Leads/Co Leads from 2007 to 2019, at 1 (2020), http://assets.uscannenberg.org/docs/aii-inequality-leads-co-leads-20200103.pdf (containing data on the percentage of women in behind-the-scenes roles in top movies in 2019).

[144] Data USA: Actors, https://datausa.io/profile/soc/actors#education (last visited June 28, 2020) (containing data on the diversity, average salary, and popular majors among actors in the United States); Data USA: Visual & Performing Arts, https://datausa.io/profile/cip/50#demographics (last visited June 28, 2020) (detailing the gender composition among visual and performing arts majors).

[145] *See* Elizabeth A. Harris, *How #MeToo Is Smashing the Casting Couch*, N.Y. Times (Jan. 30, 2020), www.nytimes.com/2020/01/30/arts/metoo-hollywood.html (discussing changes that have occurred in the film industry connected with the #MeToo movement as well as modern gender dynamics).

[146] See, for example, *id.*; Tom Teodorczuk, *How the #MeToo Movement Is Changing Hollywood*, MarketWatch (June 28, 2018), www.marketwatch.com/story/how-the-metoo-movement-economically-and-culturally-transformed-hollywood-2018-06-27 (discussing the ways in which the #MeToo movement has shed a light on gender dynamics within the film industry); Derek Thompson, *The Brutal Math of Gender Inequality in Hollywood*, Atlantic (Jan. 11, 2018), www.theatlantic.com/business/archive/2018/01/the-brutal-math-of-gender-inequality-in-hollywood/

Actresses have often been paid less for their creative labor than their costars, underscoring the finding that in a list of the top ten highest-paid actors and actresses for 2019, only two out of the top ten were women.[147] In addition, stories about men refusing to work with women directors and women's contributions behind the scenes being challenged by their coworkers suggest that there may be social barriers that could discourage women from entering or remaining in the film industry.[148]

6.4.4 *Theatre Industry*

Like the film industry, men predominate in almost every role, both on stage and behind the scenes for theatrical works. In a study of theatrical productions on Broadway between 2018 and 2019, 13 percent of directors, 24 percent of choreographers, 13 percent of writers, and 32 percent of named characters were women.[149] However, women are in the majority or close to the majority as costume designers (52 percent), stage managers (47 percent), and company managers (57 percent).[150] These trends have been mirrored in Off-Broadway productions as well. In 2010, 25 percent of directors and 31 percent of playwrights were women.[151] Notably, some theaters have had years where they did not feature a single play written by a woman, and in the 2013–14 season, women wrote only 29 percent of the plays produced in Off-Broadway theaters.[152]

5 (commenting on the results of the Celluloid Ceiling report and highlighting the need for greater representation of women in the industry).

[147] *See* Farah Andrews, *Forbes Reveals the World's Highest Paid Actors and Actresses*, NATIONAL (Feb. 13, 2020), www.thenational.ae/arts-culture/film/forbes-reveals-the-world-s-highest-paid-actors-and-actresses-1.978476 (commenting on the list of the highest paid actors and actresses in 2019 and pointing out that women in film are paid much less than men); *see also* Madeline Berg, *Everything You Need to Know about the Hollywood Pay Gap*, FORBES (Nov. 12, 2015), www.forbes.com/sites/maddieberg/2015/11/12/everything-you-need-to-know-about-the-hollywood-pay-gap/#3e4b02dc5cf1 (discussing the various facets of pay inequality in the film industry, including some actors receiving back-end pay while actresses do not, and some actresses receiving as little as 10 percent of what their costars are paid if their costars are men).

[148] See, for example, Elizabeth Day, Liz Hoggard & Kathryn Bromwich, *99% of Women Working in the Film and TV Industries Have Experienced Sexism*, GUARDIAN (Sept. 27, 2015), www.theguardian.com/film/2015/sep/27/sexism-film-industry-stories (reporting results from interviews with women in the film industry with some women reporting experiences where men refused to work with them and did not take their feedback seriously, among other expressions of biases).

[149] *See* BROADWAY BY THE NUMBERS 2019, https://production.pro/broadway-by-the-numbers (last visited June 29, 2020) (containing data about the gender composition of Broadway plays by role type).

[150] *Id.*

[151] *See* MARTHA WADE STEKETEE, LEAGUE OF PRO. THEATRE WOMEN, WOMEN COUNT: WOMEN HIRED OFF-BROADWAY 2010–2017, at 5 tbl.3 (2018), http://theatrewomen.org/women-count/ (containing data about the gender composition of directors and playwrights of Off-Broadway plays).

[152] *Id.* at 6 tbl.4.

Women playwrights may be particularly discouraged from writing because their lack of exposure and access to theaters is a nationwide problem.[153] Between 2011 and 2014, a study of 153 theaters across the United States found that women wrote only 22 percent of the plays produced despite making up around two-thirds of theater audiences.[154] While some of this disparity may be tied to theaters relying on a certain number of revived productions year to year, men also hold an estimated 80 percent of artistic director positions in regional theater companies, and these individuals often have the greatest influence on the plays that are selected.[155] The data may however suggest a relative female inclination toward originality: While men wrote 84 percent of the revivals produced in 2016–17, women wrote 35 percent of the "new" plays produced that year.[156]

6.4.5 *Other Copyright-Related Industries: Art, Dance, and Architecture*

Despite making up roughly 46 percent of artists in the United States between 2012 and 2016, women in the arts are not given the same opportunities as men and are compensated less for their work.[157] While this statistic suggests that men and women have a roughly equal interest in the arts, works produced by men constituted 87 percent of U.S. museum collections in 2018.[158] While 51 percent of visual artists in recent years have been women, women have received only 27 percent of solo exhibitions between 2013 and 2020.[159] This lack of exposure in museums is effected partly by women being underrepresented in art markets and fairs around the world, as well as by potential bias within museum leadership.[160]

[153] *See* Julia Jordan, Dramatists Guild, The Count 2.0 Who's Getting Produced in the US? 8–9 (2017), www.dramatistsguild.com/advocacy/the-count (containing data about the percentage of women playwrights produced in 153 theaters around the country).

[154] *See* Karen McConarty & Heidi Rose, *Beyond the 22%: Gender Inequity in Regional Theatres' Show Selections*, 40 Women's Stud. Commc'n 212, 212 (2017) (proposing some explanations for why women playwrights are underrepresented in regional theaters including the need to appeal to audiences and an unwillingness to take risks on new playwrights).

[155] *Id.* at 215.

[156] *See* Jordan, *supra* note 153, at 6 (containing data about the percentage of new plays and revivals selected by regional theaters that were written by women).

[157] *See* Nat'l Endowment for the Arts, Artists and Other Cultural Workers: A Statistical Portrait 8 (2018), www.arts.gov/publications/artists-and-other-cultural-workers-statistical-portrait (discussing in part the demographics of artists).

[158] Rebecca Wilson, *How the $760 Billion Art Industry Could Change If Women Were Given Equal Exposure*, Observer (Feb. 10, 2020), https://observer.com/2020/02/women-artists-market-art-industry-worth/ (containing data about the representation of women in the arts in galleries and arguing that this exclusion results in lost economic value in the international art market).

[159] *Id.*

[160] *See* Julia Halperin & Charlotte Burns, *Female Artists Represent Just 2 Percent of the Market. Here's Why – and How That Can Change*, Artnet (Sept. 19, 2019), https://news.artnet.com/womens-place-in-the-art-world/female-artists-represent-just-2-percent-market-heres-can-change-1654954 (containing data about the percentage of women featured in international art galleries

Part of the earnings gap may be tied to differences in occupation selection. For example, between 2012 and 2016, women represented 81.4 percent of dancers and choreographers but only 25 percent of architects.[161] While architects in this period made, on average, US$76,680 per year, dancers and choreographers made only US$31,150.[162] Even within the same field, women are still paid less than men. One study found that women across art professions make around US$20,000 less per year than men in the same field.[163] In addition to their undercompensated labor, women's art is not valued as highly as art produced by men. In the fine art industry, one study found that, on average, women's artwork sells at auction for 47.6 percent less than artwork created by men.[164] To put this into perspective, between 2008 and the first half of 2019, US$196.6 billion was spent at international art auctions, and only 2 percent of this figure, US$4 billion, was spent on works created by women.[165] Works by just five women accounted for US$1.6 billion of the total US$4 billion spent on women artists.[166] Part of the problem with women's art valuation is that rather than comparing works by women with art produced by both men and women, it may be common in the industry to compare art prices only to works created by other women artists, which may lead to lower price growth and valuation over time.[167]

6.5 TAKING STOCK

Gender inequality is pervasive across different sectors and industries, but while some explanations for inequality are fact-, sector-, or industry-specific, there are several takeaways from inequality in intellectual property, property, and creative professions that may inform our understanding of why more men than women register copyrights. These explanations, in turn, can form the basis for a broader examination of

and auctions and arguing that the lack of representation may be tied in part to lower valuation of their work, as well as to prejudice among men and women in the industry).

[161] NAT'L ENDOWMENT FOR THE ARTS, *supra* note 157, at 11 tbl.2b (containing data about the gender composition and average salary for various art professions between 2012 and 2016).

[162] *Id.* at 25 tbl.4a.

[163] Isaac Kaplan, *Nearly $20,000 Wage Gap between Men and Women Working in the Arts, Study Finds*, ARTSY (Nov. 21, 2016), www.artsy.net/article/artsy-editorial-new-study-finds-women-in-arts-make-almost-20-000-less-than-men (reporting on the results of a study looking at average wages for artists by gender).

[164] *See* Anny Shaw, *Female Artists Really Do Earn Less than Men, Survey Finds*, ART NEWSPAPER (Dec. 14, 2017), www.theartnewspaper.com/news/female-artists-really-do-earn-less-than-men-survey-finds (reporting the difference in auction prices for men and women artists and reports that men buyers may find artwork created by women inferior compared with artwork created by men).

[165] Halperin & Burns, *supra* note 160 (containing data for the amount spent at international art auctions for women-created artwork).

[166] *Id.*

[167] *Id.* (containing data for the amount spent at international art auctions for women-created artwork and proposing possible explanations for the disparity).

the U.S. copyright system and ultimately support a conclusion that the copyright system and related industries might be associated with a discriminatory effect on women.

As a wealth of intellectual property scholarship demonstrates, women are underrepresented across patent, trademark, and copyright ownership. This disparity may be due partly to a lack of institutional support, and higher barriers to entry for women.[168] While trademark ownership remains under-researched, researchers have found that the concentration of women in STEM fields is correlated in part with the number of patents granted to women inventors.[169] This suggests that a lack of women in a given field impacts the percentage of intellectual property rights awarded to women. Furthermore, while patentable material may sometimes necessitate larger team sizes than copyrightable material, research has suggested that women are much more likely to work with coinventors than men and often work with one to four coinventors.[170] Finally, some studies have indicated that patent examiners may be biased against women applicants if the applicant has a name that is socially construed as a woman's name.[171]

On a broader level, women are less likely than men to engage in entrepreneurial activity, which may affect the likelihood of women investing the time and resources necessary to secure intellectual property rights.[172] This trend is partly driven by women generally having less access than men to venture capital funding.[173] It may also be partially explained by either risk aversion among women or higher perceived barriers to entry, such as lacking prior experience or robust professional networks.[174]

[168] See, for example, Moss-Racusin et al., *supra* note 76 (finding that all else being equal, STEM faculty members have an implicit or explicit bias in favor of students who are men); Jensen et al., *supra* note 45, at 309 (arguing in part that women are more likely to have their patent applications denied due to bias from patent examiners).

[169] *See* Hunt et al., *supra* note 52, at 834 (arguing in part that the gap in STEM representation between men and women accounts for part of the gap in patenting rates between men and women).

[170] *See* Progress and Potential, *supra* note 11, at 11 (containing data on average numbers of coinventors for women and for both men and women to find, in part, that women are more likely to work with coinventors than are men).

[171] *See* Jensen et al., *supra* note 45, at 309 (reporting that all-women inventor teams are less likely to have their patent applications approved in part due to bias from patent examiners).

[172] *See* Inst. for Women's Pol'y Rsch., *supra* note 107, at 4 (containing data about the gender composition of entrepreneurs in the United States).

[173] *See* U.S. Senate Comm. on Small Bus. & Entrepreneurship, *supra* note 109, at 32–33 (reporting that in 2016, women received only around 2 percent of venture capital funding).

[174] *See* McGrath Cohoon et al., *supra* note 115, at 5–6 (reporting findings from interviews with successful men and women entrepreneurs that found, in part, that women are more likely to believe that prior experience "is crucial" and that professional networks are incredibly important as well before undertaking an entrepreneurial venture); McCulloch, *supra* note 94, at 8 (suggesting that women often have more caregiving burdens than men, are more often part-time or lower-wage workers, and are more financially risk-averse than men).

In addition, with women on average experiencing higher poverty rates than men[175] and earning less for their labor, women are likely rewarded less for their creative labor than men if they are working as full-time artists or creatives.[176] Furthermore, as studies on the gender makeup of venture capital firms have indicated, when there are women in leadership positions, firms are more likely to support women-owned start-ups.[177] This may indicate that a lack of women in positions of power in creative industries could, in some cases, lead to fewer opportunities for women within those industries.

Finally, our exploration of gender dynamics within several creative industries revealed widespread inequality between men and women as well as potential gender-based discrimination. While copyright registrants may not all work professionally in a creative field, the extent to which their creativity is encouraged by the larger industry may affect how much a registrant can expect to profit from their work and whether they continue to create new works.

6.5.1 *Inequality or Discrimination?*

Given the undeniable disparity between authorship rates among men and women, the question remains whether this difference is tied to existing forms of inequality between men and women or whether women register works at lower rates than men due to gender-based discrimination.

6.5.1.1 Inequality

As suggested in the preceding sections, gender inequality is pervasive and touches almost every component of participation in creative industries. With a wealth gap between men and women and higher poverty rates among women, the gap in women's ownership of copyright registrations is consistent with more general social patterns of inequality in property ownership by women. While registering a copyright is not as large of a financial burden as applying for a patent, some women may lack networks that promote knowledge or encourage or promote the value of obtaining copyrights, which studies have found to be important for trademarks and patents as well.[178] Part of the gap in registration rates is also likely a reflection of existing inequality within creative professions, which would be consistent with

[175] *See* Semega et al., *supra* note 85, at 15 (containing data about the demographic information of individuals receiving federal program assistance).

[176] *See* Inst. for Women's Pol'y Rsch., *supra* note 88, at 3 tbl.1 (reporting salary differences between men and women by state).

[177] *See* U.S. Senate Comm. on Small Bus. & Entrepreneurship, *supra* note 109, at 32–33 (reporting the gender composition of leadership of top venture capital firms and arguing that firms with women in positions of leadership are more likely to support women entrepreneurs).

[178] Delixus & Nat'l Women's Bus. Council, *supra* note 10, at 14 (reporting the results of interviews with women entrepreneurs who did not pursue trademarks and patents).

studies on patent frequency that have suggested that the number of women inventors increases as the proportion of women in STEM fields increases.[179] Even though several creative industries are achieving greater levels of gender parity, in some cases, women still have to overcome past inequality that may continue to discourage their creativity.[180]

Women also may be disinclined to create and register their works because they continue to be compensated less for their work than men. This may even deter some women from pursuing a creative profession, knowing they have a smaller likelihood of success in some industries. And even if they become successful, they may not be compensated as much as similarly positioned men.[181]

6.5.1.2 Discrimination

While an unknown portion of the disparity in registration rates between men and women is likely tied to existing forms of inequality, women face additional barriers to full participation in the copyright system both within their fields as well as within the copyright system itself. Some portion of the gender imbalance in creative professions may be tied to women self-selecting certain fields in greater numbers than men. However, when women do not have the same opportunities to be published authors,[182] have their plays produced,[183] or have their artwork shown in a gallery,[184] it is difficult to argue that creative professions are free from some degree of gender-based discrimination that may discourage some women from creative authorship.

[179] Hunt et al., *supra* note 52, at 832 (arguing in part that the gap in STEM representation between men and women accounts for part of the gap in patenting rates between men and women).

[180] For example, while women are featured more frequently when new plays are selected, men have authored the vast majority of "revivals" selected by theater companies, which may be due in part to lower numbers of women playwrights in the past. JORDAN, *supra* note 153, at 6.

[181] For example, in the fine art industry, works by five women constituted nearly 40 percent of the total amount of money spent on artwork created by women, and works by women represented only 13 percent of artwork in museum collections in the United States in 2018. *See* Wilson, *supra* note 158 (containing data about the representation of women in the arts in galleries and arguing that this exclusion results in lost economic value in the international art market); Halperin & Burns, *supra* note 160 (containing data about the percentage of women featured in international art galleries and auctions and arguing that the lack of representation may be tied in part to lower valuation of their work as well as prejudice among men and women in the industry).

[182] *See* Franklin, *supra* note 126 (reporting women are less likely to be selected for publications by publishers than men).

[183] See, for example, McConarty & Rose, *supra* note 154, at 212 (reporting that women are less likely to have their plays produced than men in regional theaters and offering some possible explanations as to why that may be).

[184] Wilson, *supra* note 158 (containing data about the representation of women in the arts in galleries around the world).

Despite purporting to incentivize original works of authorship by all, regardless of gender, the current copyright system does not protect forms of creative expression that have traditionally been associated with women. For example, recipes, fashion designs, and sewing and knitting patterns have traditionally received little or no copyright protection.[185] Women traditionally dominated these industries, and many had a communal aspect whereby multiple women would collaborate and build off of each other's creativity.[186] Their exclusion may suggest that women's creative expression is not valued as highly as men's in terms of being perceived as a form of creativity that needs, and is worth, incentivizing. At the same time, including these fields and forms of creativity may either change the communal aspect of these industries by enforcing individual claims of authorship or entail substantial changes to the law of copyright, such as a revision of the nature of the originality requirement.[187]

The copyright system may have a discriminatory effect on women due to its requirement that to become a coauthor, one must make an independently copyrightable contribution to the joint work. This standard is reflected in case law,[188] as well as in the USCO's definition of coauthorship.[189] This requirement for coauthorship may have a disparate impact on women who prefer to work collaboratively or operate in fields that involve communal creativity because multiple individuals may make important contributions that are nevertheless not independently copyrightable. Creative expression does "not occur in splendid isolation," yet the creative contributions of individuals go unrewarded when their contributions do not qualify them as "authors."[190] Between 1976 and 2012, only 14.2 percent of copyright registrations had multiple authors.[191] Yet, from research on patent behavior among

[185] *See* Ann Bartow, *Fair Use and the Fairer Sex: Gender, Feminism, and Copyright Law*, 14 Am. U. J. Gender Soc. Pol'y & L. 551, 557 (2006) (arguing in part that clothing and cooking are traditional forms of creativity for women and that neither are protected by copyright law); Kara W. Swanson, *Cat Ladies, Quilters, and Creativity*, 10 Landslide 47, 48 (2018) (pointing out that sewing and knitting patterns, among others, are forms of creativity for women that are not protected under copyright law).

[186] *See* Debora Halbert, *Feminist Interpretations of Intellectual Property*, 14 Am. U. J. Gender Soc. Pol'y & L. 431, 442 (2006) (arguing in part that for some women, creativity is a communal experience that is different from the creativity protected by the copyright system).

[187] *See* Bartow, *supra* note 185, at 557–58 (arguing that the U.S. copyright system protects creativity by men because men have defined what "authorship" entails and what forms of creative expression warrant protection and that this may impede creativity by women).

[188] See, for example, Aalmuhammed v. Lee, 202 F.3d 1227 (9th Cir. 2000).

[189] 17 U.S.C. § 101.

[190] *See* Dan L. Burk, *Feminism and Dualism in Intellectual Property*, 15 Am. U. J. Gender Soc. Pol'y & L. 183, 193–94 (2007) (arguing that sole authorship is not often an accurate reflection of creative production and that unrecognized contributors are more likely to be women than men).

[191] Brauneis & Oliar, *supra* note 4, at 74.

women[192] as well as an understanding of traditional forms of creativity among women, we know that some women may be inclined toward collaborative creative expression.[193] While the "independently copyrightable contribution" standard emerged from Professor Paul Goldstein and was subsequently adopted by case law, it is possible that Professor David Nimmer's alternative standard for coauthorship – one that merely requires each coauthor's contribution to be more than de-minimis – would better incentivize women's creativity.[194] Finally, at least one study has indicated that officers within the patent system may be biased against applicants with names commonly associated with women; it might not be unfounded to surmise that there could be a similar effect within the copyright system.[195]

CONCLUSION

When women make up roughly 50 percent of the U.S. population but only one-third of the authors of registered works, it is necessary to understand why women do not create and register works at the same rates as men. Unfortunately, this gender disparity is not unique to copyright registrants. Women are less likely to own trademarks and are less likely to apply for patents than men. This is consistent with larger and more general trends in property ownership. Women as a whole are much less likely to achieve the same level of financial success as men due in part to persistent wealth and wage gaps. This disparity in the financial payoff is just one aspect of existing forms of gender-based inequality in many creative industries.

It is likely not feasible for the copyright system to fully mitigate the impact of gender disparity within creative professions. However, understanding some of the factors that may discourage creativity, participation, and copyright registration among women is a crucial first step for determining how to encourage creativity moving forward. Despite encountering additional barriers inside and outside the copyright system, women have persisted as successful authors, playwrights, musicians, and artists. But if all or even some of the additional barriers were removed, the increased creative output among women could be even more remarkable and work to society's benefit.

[192] *See* PROGRESS AND POTENTIAL, *supra* note 11, at 11 (containing data on average number of coinventors for women and for both men and women to find in part that women are more likely to work with coinventors than men).

[193] *See* Halbert, *supra* note 186, at 441 (arguing that women's creativity has long been communally centered).

[194] For a discussion of Nimmer's "de-minimis" standard for coauthorship, and its comparison to Goldstein's "independently copyrightable contribution" standard, see Erickson v. Trinity Theatre 13 F.3d 1061, 1069–70 (7th Cir. 1994).

[195] *See* Jensen et al., *supra* note 45, at 309 (discussing the possibility of gender bias among patent examiners after a study found that all-women inventor teams with common names for women had their patent applications rejected at higher rates than all-women inventor teams with less-common names).