

## Gender gap in patenting

Jobs in science, technology, engineering, and mathematics (STEM) are often thought of as drivers of innovation in a nation's economy, and the lack of female representation in STEM occupations has recently made headlines. The Obama Administration has focused on the issue, saying that increasing the participation of women in STEM occupations and scholarship is an "essential part of America's strategy to out-innovate, out-educate, and out-build the rest of the world." But would having more women in STEM occupations actually have a statistically significant effect on the U.S. economy?

Economists Jennifer Hunt, Jean-Philippe Garant, Hannah Herman, and David J. Munroe make an interesting contribution to the discussion by investigating women's underrepresentation among holders of commercialized patents in a recent National Bureau of Economic Research study entitled "Why don't women patent?" (National Bureau of Economic Research, working paper no. 17888, March 2012, <http://www.nber.org/papers/w17888>). The data in the study show that 7.5 percent of all patents are granted to women and 5.5 percent of commercialized or licensed patents are granted to women. A majority (74 percent) of patent holders have degrees in science and engineering, so a natural conclusion might be that increasing the number of women in STEM occupations would lead to more female-owned patents. Yet the authors find that only 7 percent of the gender gap is attributable to the lower probability of women to hold science or engineering degree.

Women who currently work in STEM occupations patent little more than women in other industries, so it is not likely that the number of patents held by women would increase with a larger share of women in STEM occupations. The explanation is that many women who hold science and engineering degrees have those degrees in life sciences, and respondents who report a highest degree in life sciences have 0.06 patents on average, compared with 0.28 patents for respondents whose highest degree is in electrical engineering and 0.18 patents for those with mechanical engineering degrees. (Also contributing to the patent gender gap is women's lower share of doctorates.)

The authors suggest that to increase female-owned patents, women need to fill more jobs in specific STEM fields. Women are underrepresented in the most patent-intensive fields, which are electrical engineering and mechanical engineering, and in the most patent-intensive jobs, which are in the design and development occupations in these fields. Further, the authors find that "the gender patenting gap is of economic significance: eliminating the patenting shortfall of female holders of science and engineering degrees would increase GDP per capita by 2.7 percent."

However, based on current trends, closing this gap is a complex task. For the sample used in the study, the authors found that the number of women with bachelor's degrees in engineering increased at a rate of only 0.9 percentage point per decade (and the rate of increase has been slowing). Additionally, women are more likely than men to leave engineering because of wage discrimination and wrongfully denied promotions than

to leave other fields. The authors recommend improving the mentoring and networks of female engineers and addressing discrimination by managers and coworkers within the industries. They also advocate further research on when and why people decide to enter science and engineering fields.

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## Do women avoid salary negotiations?

Women are somewhat more likely than their male counterparts to negotiate for higher pay if a job has a flexible salary offer.

New research has found that when the salary in a job offer was described as "negotiable," 24 percent of women attempted to negotiate salaries, compared with 22 percent of men. In the study, "Do women avoid salary negotiations? Evidence from a large scale natural field experiment" (National Bureau of Economic Research, working paper no. 18511, November 2012, <http://www.nber.org/papers/w18511>), which used a field experiment to measure the response to a job ad for an administrative assistant position whose salary was advertised as being fixed compared with the response to one with a negotiable salary, authors Andreas Leibbrandt and John A. List provide evidence suggesting that women approach salary negotiations differently than men.

According to the report, "when there is no explicit statement that wages are negotiable, men are more likely to negotiate than women. However, when we explicitly mention the possibility that wages are negotiable, this difference disappears, and even tends to reverse." Thus, a one-word difference, such as

adding the word “negotiable” to a job description, can affect how women approach negotiating their salary.

A further finding is that “simple manipulations of the contract environment can significantly shift the gender composition of the applicant pool,” said economist List. “By merely adding the information that wage is ‘negotiable,’ we successfully reduced the gender gap in applications by approximately 45 percent.”

The study found that women were three times more likely to apply for jobs with negotiable salaries than were men and to pursue negotiations once they applied. Among those responding to an explicit salary offer, 8 percent of women and 11 percent of men initiated salary negotiations. When the salary was described as negotiable, as noted earlier, 24 percent of women and 22 percent of men started salary discussions. This study finds that given an invitation, women are a bit more willing than men to negotiate for more pay.

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## **U.S. working women— are they falling behind in the labor force race?**

Is a smaller proportion of U.S. women in the workforce than women in other countries? The data seem to indicate that this is the case. Compared with the labor force participation rate of women from 21 other countries at a similar economic development level, the participation rate of women in the United States has fallen from 6th to 17th place over the 20-year period

from 1990 to 2010. You may be asking yourself why this has happened. Are U.S. women really working less? Are they choosing to stay home with their children?

Francine D. Blau and Lawrence M. Kahn point out in their paper, “Female labor supply: Why is the U.S. falling behind?” (National Bureau of Economic Research, working paper no. 18702, <http://www.nber.org/papers/w18702>), that researchers have discussed the possibility that women are choosing to stay home, calling it an “opt-out revolution.” However, because the U.S. women’s participation rate slowed considerably in the mid-90s with little change since, Blau and Kahn also state that other researchers have disregarded this idea. So then, what has caused women of nearly 21 other countries to surge ahead in the labor force, leaving U.S. women behind in 17th place?

To answer this important question, Blau and Kahn analyzed data from several angles. They looked at men’s and women’s participation rates across 22 countries, the gender gap, and “family-friendly policies” (parental leave, at-work childcare, part-time work, etc.) over 10 years and examined how each of these may have affected the overall rate differences among the women. Looking at men’s participation rates from 1990 to 2010, the authors found that only two of the countries had rates that increased marginally; the others’ rates either decreased or stayed the same. The women’s rates, on the other hand, increased considerably in

most of the countries. Only five either decreased or increased marginally, with the United States increasing slightly. On these bases, Blau and Kahn pointed out that with the men’s rates staying nearly the same and women’s increasing dramatically, the gap between the number of men and women in the workforce narrowed—a definite plus, according to the authors.

However, Blau and Kahn’s most compelling findings dealt with the family-friendly policies. They found that several of the countries expanded their policies by offering parents longer leave, part-time work, and even “public childcare” expenses. The family leave benefits in the United States, however, increased only slightly compared with most of the other countries. Blau and Kahn also found that because of these expanded policies, more of the women in the other countries are working part time, although the jobs are low level and the women aren’t moving into mid- or high-level jobs.

So yes, the participation rates for the other countries are higher. However, Blau and Kahn emphasize that women in the other countries are working more, including in part-time positions, but with little or no movement upward or into full-time work, whereas in the United States, relatively more women are working in professional and upper-level jobs. When it comes to labor participation rates, U.S. women may be running behind; however, they are ahead in the labor force race for top-level, full-time positions. □