

THE GENDER GAP IN STUDYING SCIENCE: New evidence from university choices in Ireland

New research by **Judith Delaney** and **Paul Devereux** finds a substantial gender gap of 22 percentage points between male and female students listing a STEM (science, technology, engineering and mathematics) course as their first preference for college in Ireland. The gender gap is concentrated in the areas of engineering, technology and mathematics – boys and girls are about equally likely to list science.

The study, to be presented at the annual congress of the European Economic Association in Manchester in August 2019, finds a negligible role for overall achievement in explaining the STEM gender gap. It finds a larger role for comparative advantage, as measured by differential achievement across subjects, particularly English and mathematics. These grade differences across gender need not be innate and may represent different interests and investments across subject areas throughout schooling.

The researchers find that subject choices in secondary school are the most important determinant of the portion of the gender gap that can be explained. While this may partly reflect the differing subjects that are available in girls' versus boys' schools, there are similar subject choice differences in mixed-gender schools, which suggest that availability of subjects is not an important consideration.

Boys are much more likely to do physics, design graphics, engineering, building construction and applied mathematics in secondary school. These are subjects that are strongly predictive of later doing STEM in college.

So even two years before college entry, there are systematic gender differences in decision-making that lead to boys being more likely to choose STEM subjects.

More...

While education levels of women have increased dramatically relative to men in recent decades (Goldin et al, 2006), women are still greatly underrepresented in STEM college programmes and occupations. Card and Payne (2017) show that in the United States and Canada, the gender gap in the likelihood of graduating with a STEM-related degree explains about 20% of the wage gap between younger college-educated men and women. This suggests that the gender gap in STEM is important to understanding gender gaps in earnings.

This issue is also important in terms of aggregate productivity: much evidence suggests that qualified STEM workers play an important role in increasing productivity and driving economic growth (Peri et al, 2015).

The new study examines this question by using unique data from Ireland. Ireland's centralised college admissions system provides an ideal laboratory because students provide a preference ranking of college programmes, making it possible to observe the course preferences of all college applicants.

Overall, there exists a large gender gap in the fraction of applicants listing a STEM course as their first preference with just over 40% of boys listing a STEM course compared with roughly 19% of girls.

Figure 1 shows the proportion of each gender choosing STEM courses as first choice (broken down by science, technology, engineering and mathematics). Clearly, the large STEM gap is driven by choices of engineering and technology courses rather than science and mathematics courses, with girls being slightly more likely to list science courses as first preference than boys.

The researchers find that there remains a gender gap of 9 percentage points even for young people who have identical preparation at the end of secondary schooling (in terms of both subjects studied and grades achieved).

They find similar results looking at gender differences in accepted courses (rather than first preference).

They also find that gender gaps are smaller among high-achieving students and for students who go to school in more affluent areas.

Finally, the researchers note that there is a much smaller gender gap when nursing degrees are included in STEM, showing that the definition of STEM used is an important determinant of the conclusions reached.

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Judith M. Delaney, and Paul J. Devereux 'Understanding Gender Differences in STEM: Evidence from College Applications', *Economics of Education Review* 72 (October 2019): 2019-232.

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Figure 1: The proportion ranking a STEM college course as first preference

