9^{th} International Conference on Computational Social Science IC^2S^2
July 17-20, 2023, Copenhagen, Denmark

Academic Mobility as a Driver of Productivity: A Gender-centric Approach

Keywords: Academic Mobility, Science of Science, Gender inequality, Network Science, Complex Systems.

Extended Abstract

Academic mobility (the change of affiliations by academics) is usually positive in the career of researchers as it expands the collaboration networks and information flow between research groups [1–5]. However, under similar mobility circumstances, are the benefits equal amongst men and women? Do they exhibit similar impact factor via citations? Being a caregiver, for instance, may impact on the likelihood of moving, women being usually the one struggling to balance family and academic responsibilities, especially in senior positions [6, 7]. Therefore, we highlight that even under similar mobility circumstances, gender norms play an important role.

We analysed the patterns in the career of researchers in the dataset of publications from ACM Digital Library (1980–2012). We have a total of 91,777 researches who 16% are women, and 809,397 publications in which around 22% women are at least one of the authors. Using network analyses, we found that the gender differences between the patterns found in the co-authorship networks tend to have similar characteristics across genders and career movements; the differences in the number of co-authors that men and women gain over their careers indicate that changing affiliations nationally and internationally benefits productivity. The increase in social ties can impact productivity, as writing papers collaboratively can speed up the process and lead to better quality work. However, we see that the small differences between the number of co-authors for women do not impact their productivity to make them more productive than men. Moreover, as men are the majority in our data, gender homophily benefits the high productivity levels more for men than for women.

We plot the relationship between productivity and citations in Fig. 1; the distribution of `women`/`men` and their fraction in the four quadrants of the plots. The smallest fractions for both genders are for `non-movers` (top-right quadrant: 0.16% `women` and 0.23% `men`), and the largest fraction of both genders are also for `non-movers` (bottom-left quadrant: 98.52% `women` and 97.85% `men`). The highest difference between the movement categories is for researchers in the quadrant of high productivity-low citations, with national and international `movers` having, on average, 10 and 8 times more than `non-movers`. Regarding citations, `women` in both quadrants of high and low productivity get no differences when moving nationally (3.35%) or internationally (3.34%). In contrast, the fraction of `men` slightly increases when moving internationally (5.02%) compared to nationally(4.3%). We also found that the gender differences in productivity between `non-movers` researchers are smaller than for `movers`. Needless to say that our analyses come from assumptions and definitions limited by the data and methods we have available. Yet, our work sheds a light on where gender differences might be found in academic careers in Computer Science.

Changing affiliations might be a case of the rich-getting-richer or selection bias, potentially making men more prone to being hired in high-ranked institutions than women. There is a need to investigate the gender gap in women's representation in high-ranked institutions within and across countries. For instance, what is the relationship between moving from a developing nation to a developed one compared to moving across developed nations?

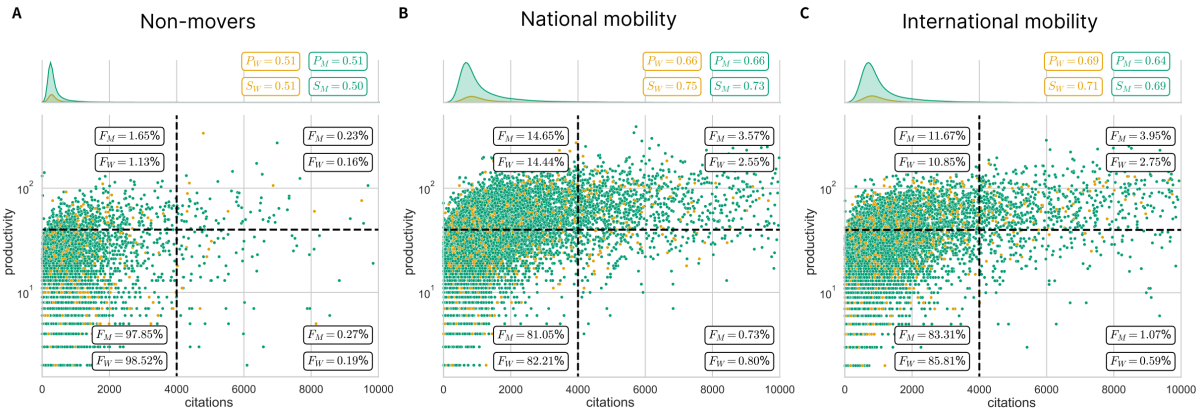

Figure 1: Productivity versus citations across career movements: **(A)** Non-movers **(B)** National mobility **(C)** International mobility. Mobility has a role in how distributed `women` (yellow) and `men` (green) are in the plot, making the kurtosis smaller and increasing the number of productive and highly-cited researchers. The plot indicates the fraction of `women` (F_W) and `men` (F_M) for each quadrant, and it shows the Pearson ($P_{M|W}$) and Spearman correlations ($S_{M|W}$) between the productivity and citations for each gender.

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