Gender and equity in research evaluation

Dag W. Aksnes

Nordic Institute for Studies in Innovation, Research & Education (NIFU), Norway

Seminar on research evaluation, Rome 09.05.24

Background

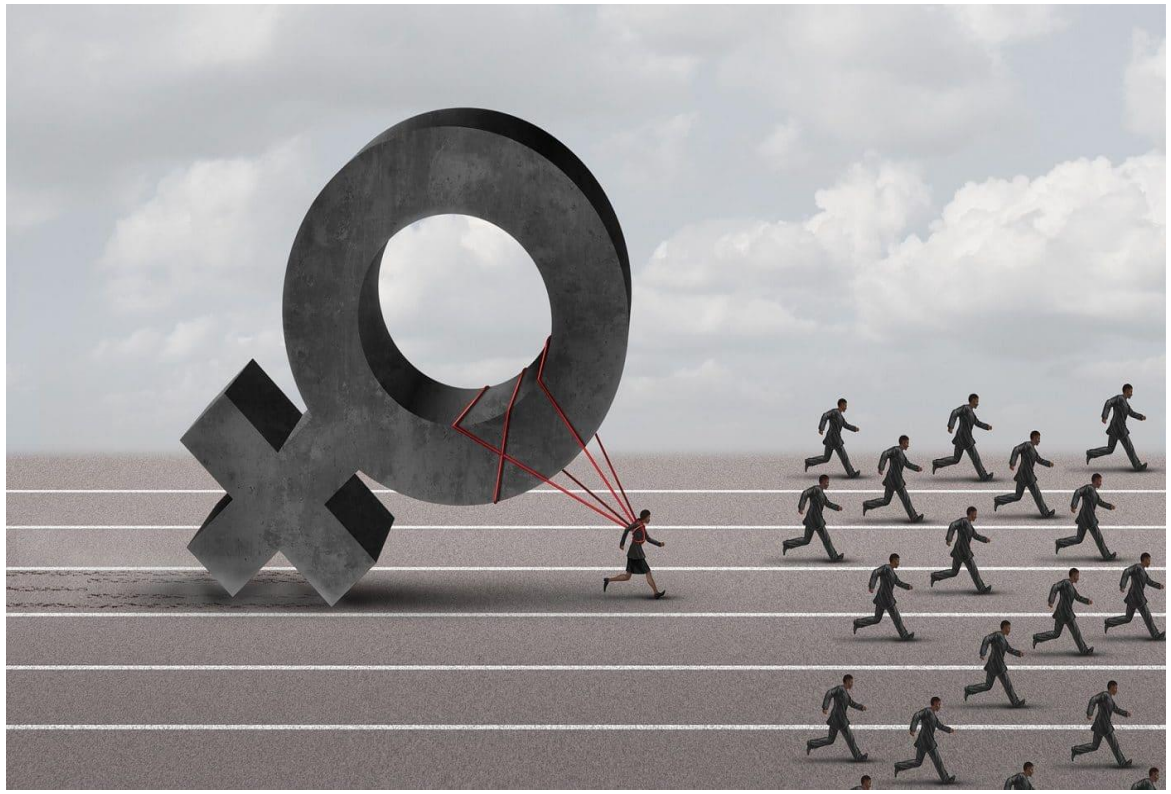
- *"Despite EU legal and policy commitments, a range of gender inequalities persist, not least in R&I.*
- *These include*
  - *segregation of women and men PhD graduates across different fields of study,*
  - *the under-representation of women in Science and Technology occupations,*
  - *gender differences in researchers' working conditions,*
  - *gender inequalities in career advancement*
  - *and decision-making, and more."*

Claims* about gender bias

- “Researchers in recent years have found that women are less likely than men to be hired and promoted, and face greater barriers to getting their work published.” (Casselman, 2021, *The New York Times*)

- “Women in academia contribute more labour for less credit on publications … [Publications] led by women take longer to publish and are cited less often [and] are accepted more frequently when reviewers are unaware of authors’ identities.” (Witteman et al., 2019, *The Lancet*)

- “Implicit bias is pervasive. Men are preferred to women even if they have the same accomplishments” (Witze, 2020 *Nature*)



- “A vast literature . . . shows time after time, women in science are deemed to be inferior to men and are evaluated as less capable when performing similar or even identical work…. Th[e] systemic devaluation of women results in an array of real consequences: shorter, less praise-worthy letters of recommendation; fewer research grants, awards, and invitations to speak at conferences; and lower citation rates for their research. Such wide-ranging devaluation of women’s work makes it harder for them to progress in the field” (Coil, 2017, *Wired)*

*) Examples from Ceci, Kahn & Williams 2023: Exploring Gender Bias in Six Key Domains of Academic Science: An Adversarial Collaboration, APS

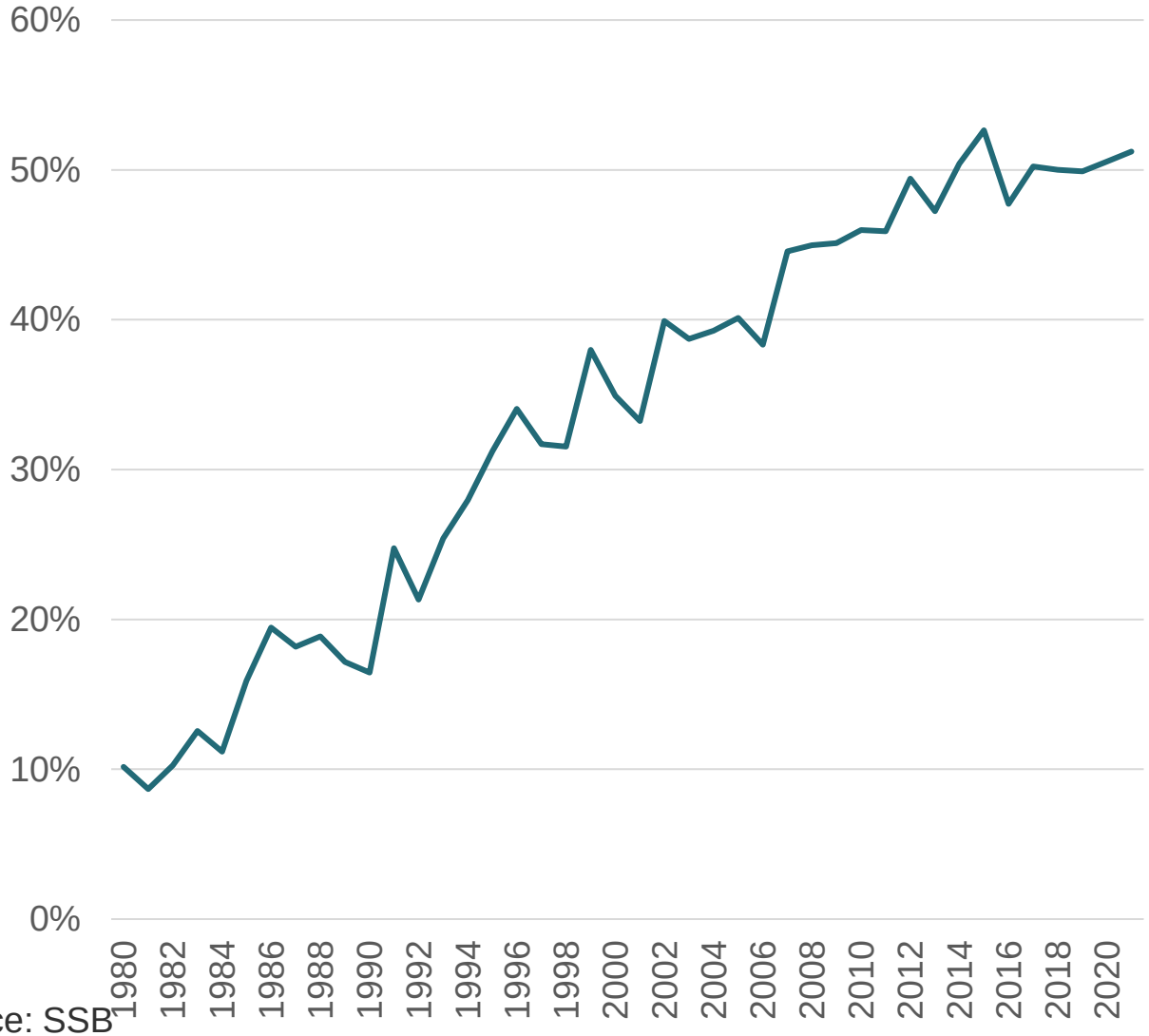
Gender bias

- However
  - On many issues, previous studies show mixed results, with some finding gender bias and others no bias – and some bias against men
  - What was true in the past may no longer be true
  - What is true in one case, context or situation may not be true in another

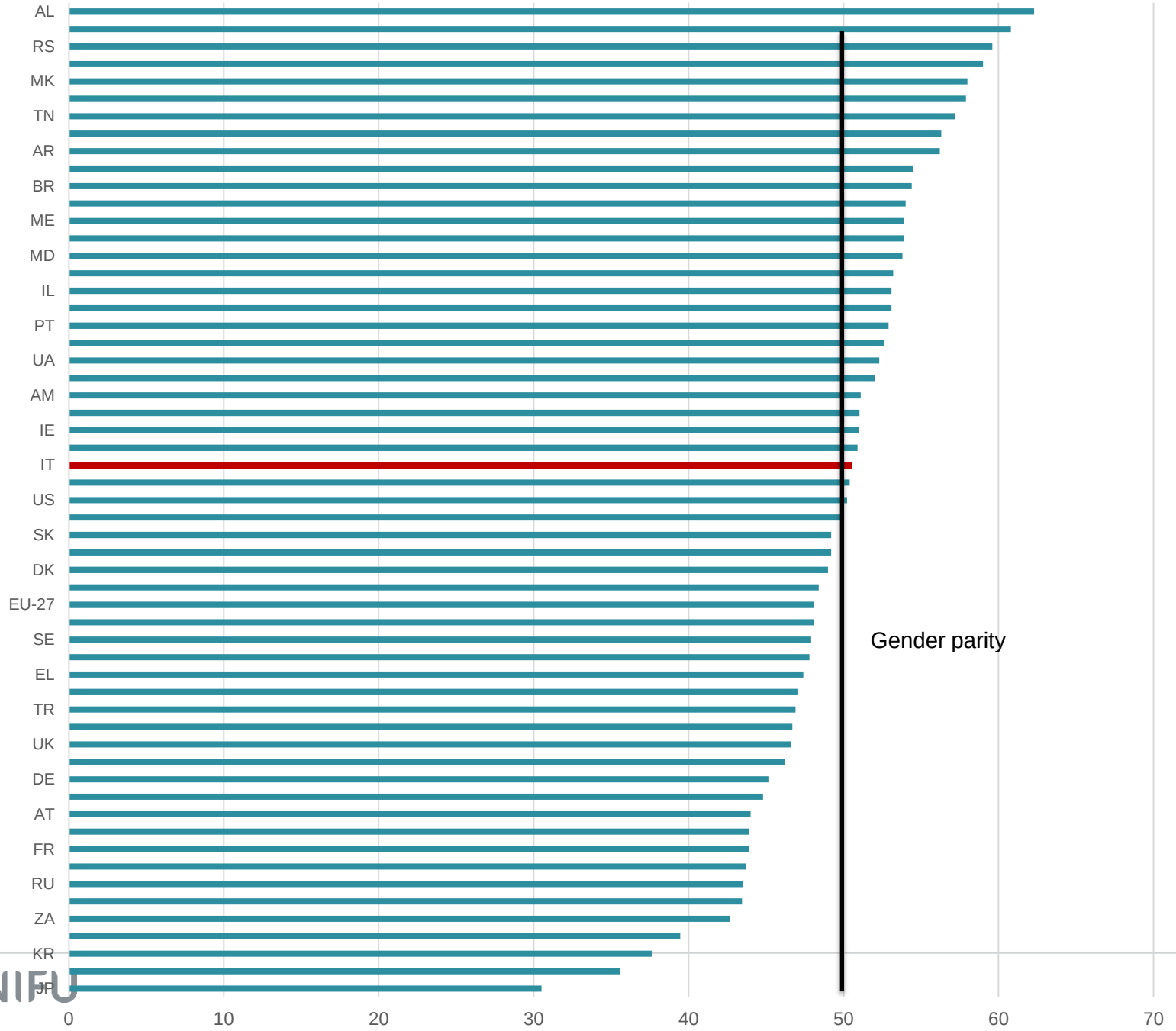
- Some problems for women in science remain, but the situation has fortunately improved along many dimensions

Academic career

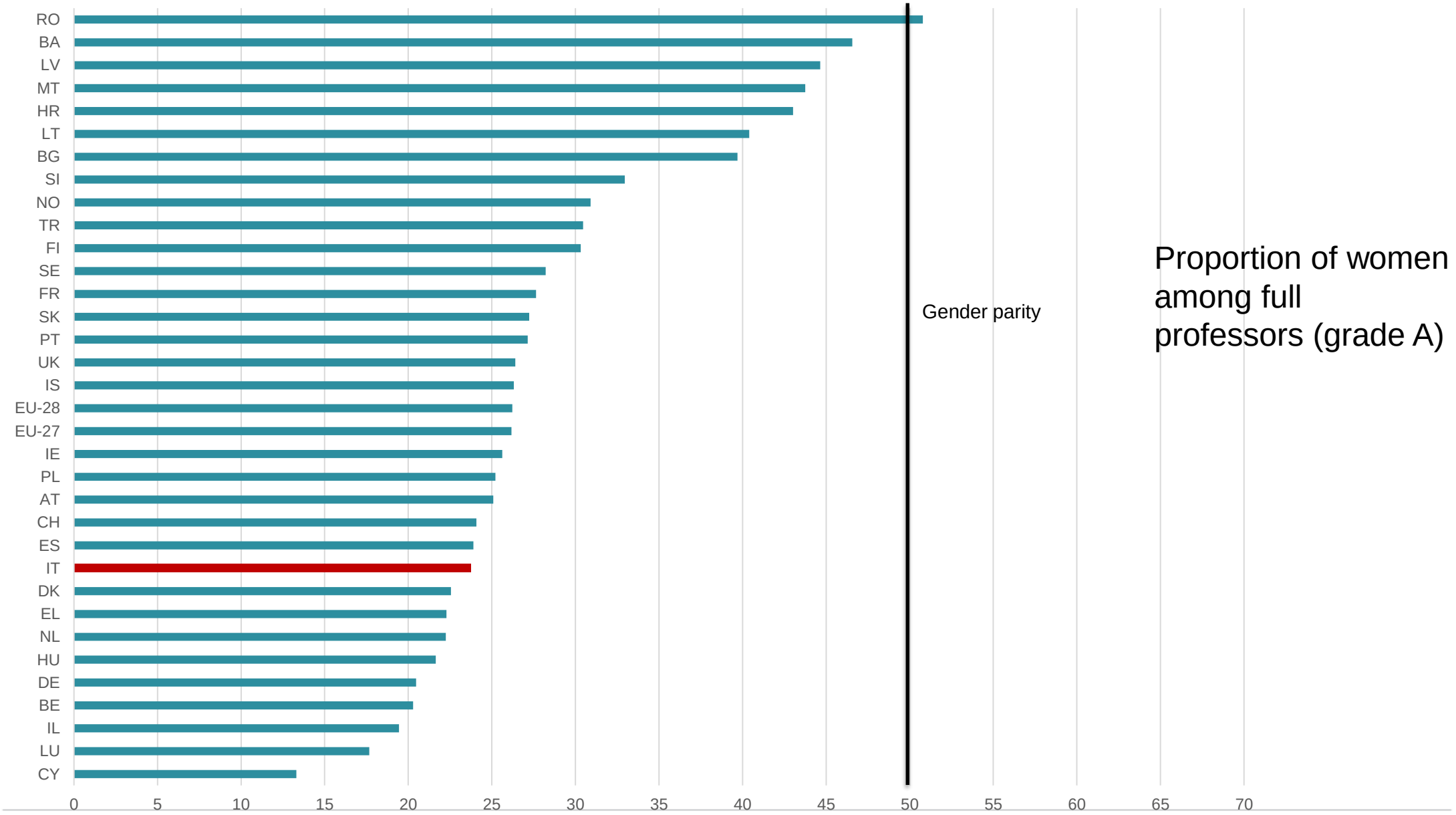
Proportion of women among doctoral graduates – Norway



Source: SSB

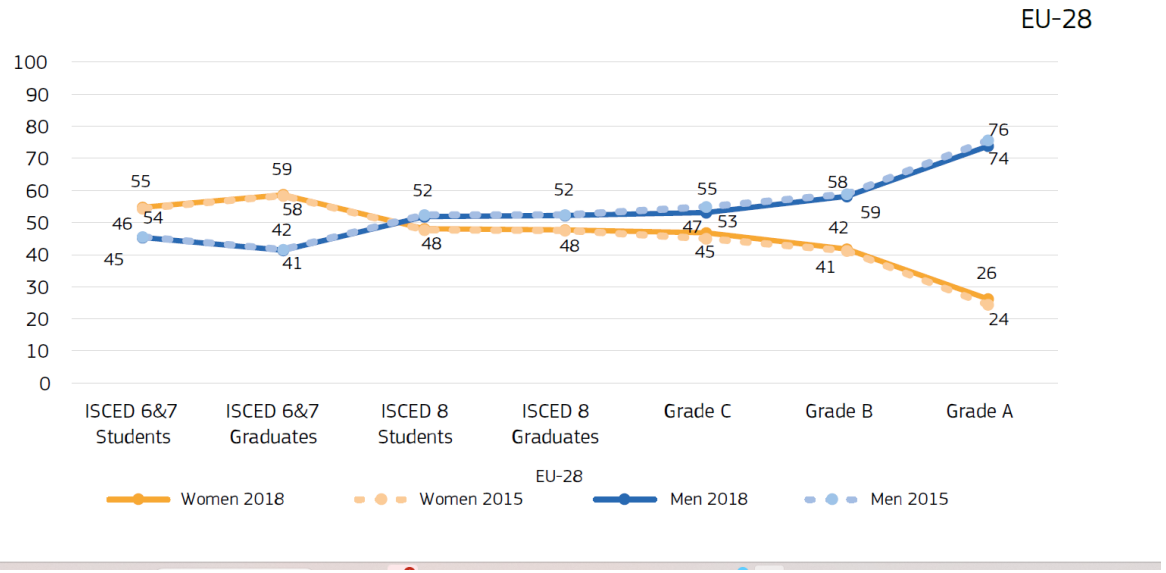


Proportion of women among doctoral graduates

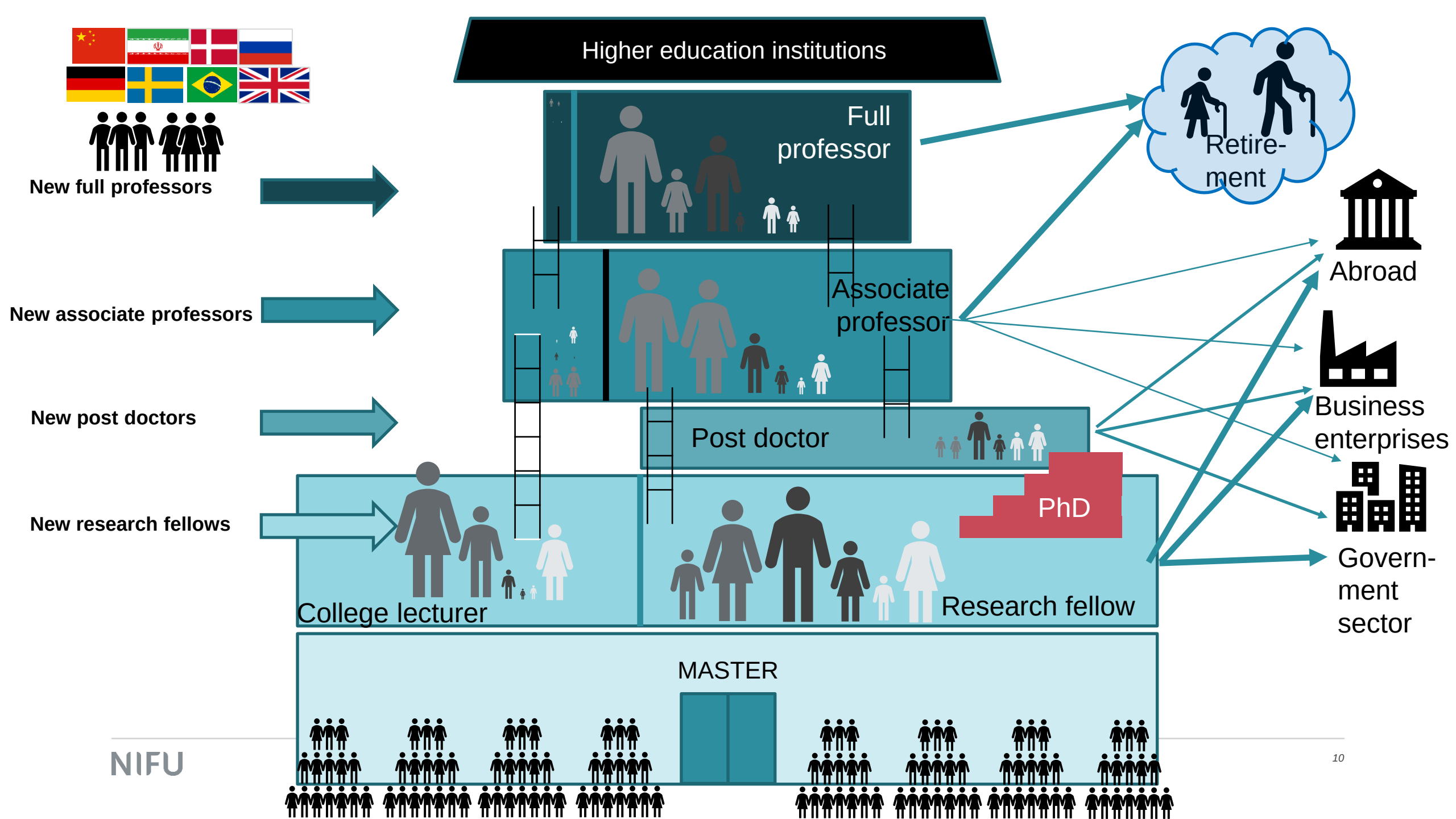

RO
BA
LV
MT
HR
LT
BG
SI
NO
TR
FI
SE
FR
SK
PT
UK
IS
EU-28
EU-27
IE
PL
AT
CH
ES
IT
DK
EL
NL
HU
DE
BE
IL
LU
CY
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Gender parity
Proportion of women among full professors (grade A)

NIFU

The scissors



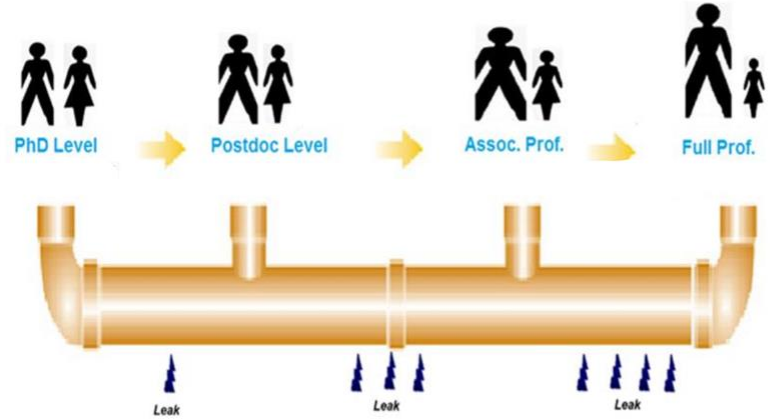
- Decreasing proportion of women over the career
  - Leaky pipeline: women leak out
  - Glass ceiling: barriers preventing women from advancing
  - Historical-demographic factors
- Non-comparable data
  - Cross-sectional data cannot provide evidence of a leaky pipeline
  - The majority of the full professors obtained their PhD long time ago, when the share of female doctoral graduates was considerably lower


Higher education institutions
Full professor
Associate professor
Post doctor
PhD
College lecturer
Research fellow
MASTER
New full professors
New associate professors
New post doctors
New research fellows
Retire-ment
Abroad
Business enterprises
Govern-ment sector

Differences across countries

- A Norwegian study* showed that historical and demographic factors can explain the entire gender gap among today's full professors

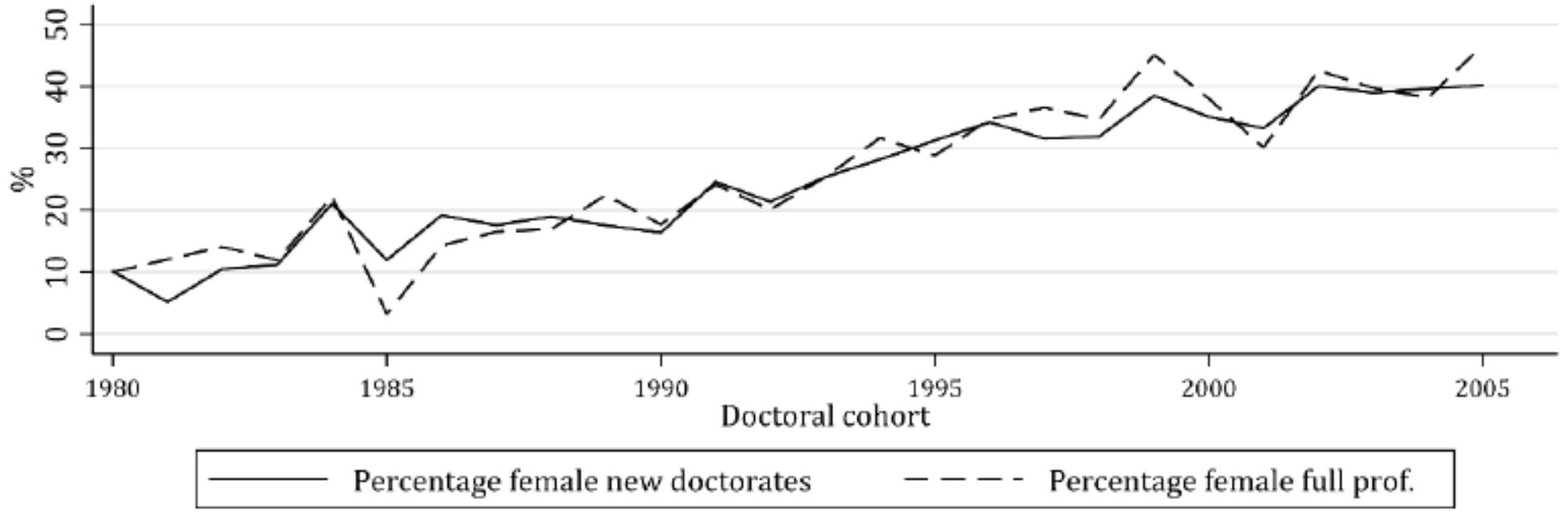
- In US, women leaked more than men



*) Aksnes, D. W., Kahn, S., Reiling, R. B., & Ulvestad, M. E. S. Longitudinal evidence on Norwegian PhDs suggests slower progression for women academics but not a leaky pipeline. doi.org/10.31235/osf.io/pvx8q

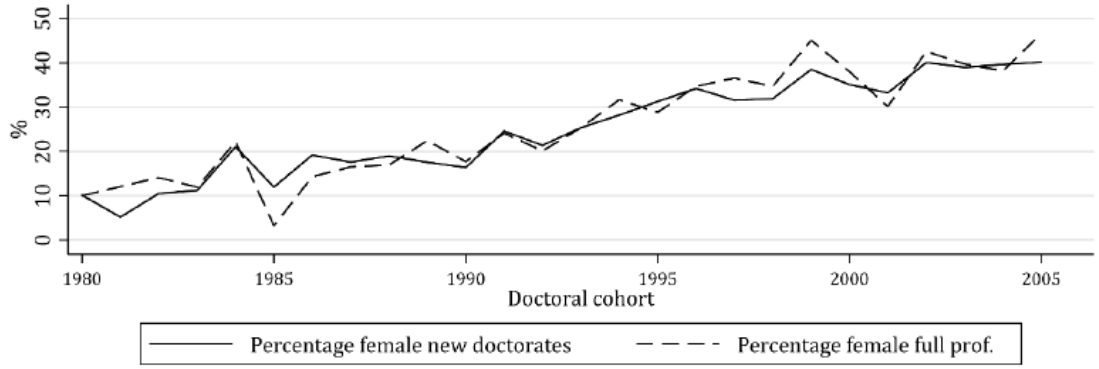
The Norwegian study

- Female proportion of new PhDs, 1980-2005
- Female proportion of full professors: Measured by year of PhD graduation



The Norwegian study

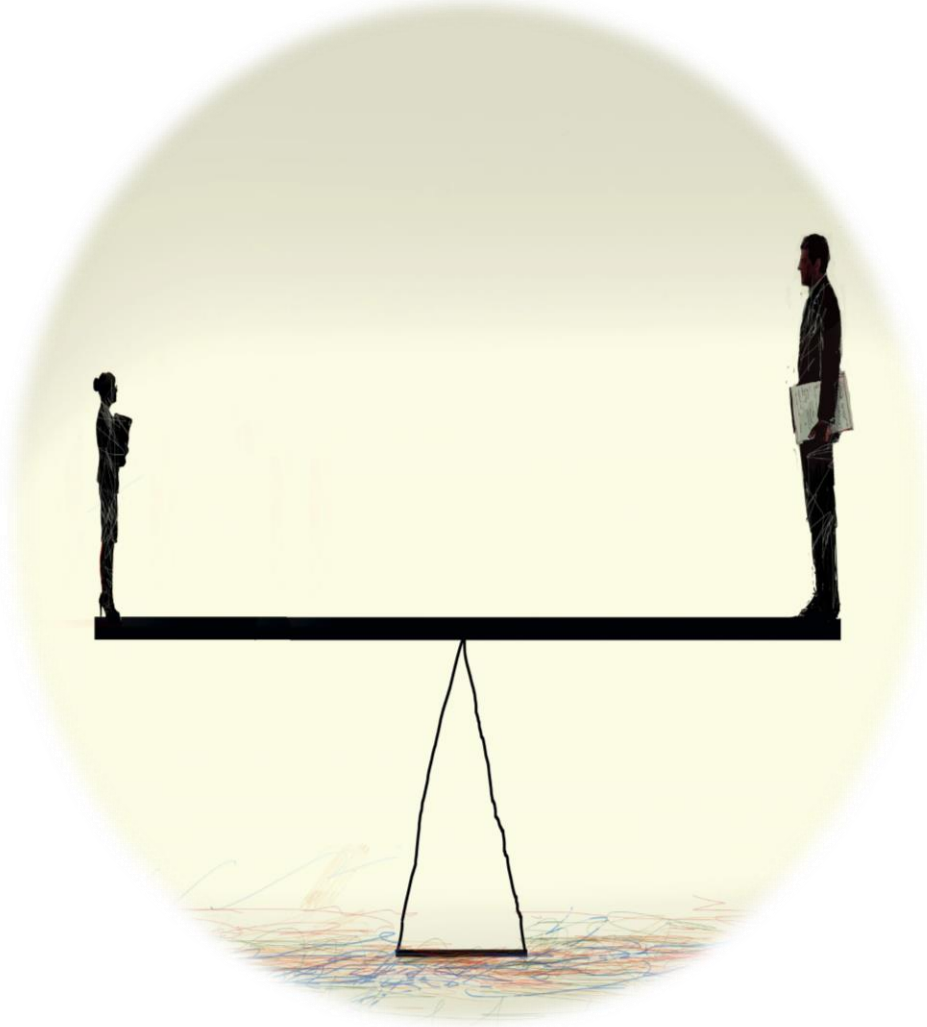
- However, women needed more time than men to become full professor
- Clogged pipeline



Grant peer review

Gender bias and grant peer review

- Numerous studies
- Findings differ
- How should bias be assessed given that:
  - Male applicants are older than female applicants
  - Men have higher productivity of publications
  - Female scientists publish less than men in the same field and cohort (due to career breaks, time spent at work etc.)



Seminal study

- Found gender bias at the Swedish Medical Research Council for postdoc fellowships in 1995
- Applications from women less likely to be funded

nature

Explore content | About the journal | Publish with us | Subscribe

nature > commentary > article

Commentary | Published: 22 May 1997

Nepotism and sexism in peer-review

Christine Wennerås & Agnes Wold

Nature **387**, 341–343 (1997) | Cite this article

19k Accesses | **815** Citations | **411** Altmetric | Metrics

In the first-ever analysis of peer-review scores for postdoctoral fellowship applications, the system is revealed as being riddled with prejudice. The policy of secrecy in evaluation must be abandoned.

Meta study 2009

- For peer reviews of grant applications there were no significant gender differences at all

Review of Educational Research
September 2009, Vol. 79, No. 3, pp. 1290–1326
DOI: 10.3102/0034654309334143

Gender Effects in the Peer Reviews of Grant Proposals: A Comprehensive Meta-Analysis Comparing Traditional and Multilevel Approaches

Herbert W. Marsh
University of Oxford
Lutz Bornmann and Rüdiger Mutz
ETH Zurich
Hans-Dieter Daniel
ETH Zurich
University of Zurich
Alison O'Mara
University of Oxford

Peer review is valued in higher education, but also widely criticized in terms of potential biases, particularly gender. We evaluate gender differences in peer reviews of grant applications, extending Bornmann, Mutz, and Daniel's meta-analyses that reported small gender differences in favor of men (d = .04), but a substantial heterogeneity in effect sizes that compromised the robustness of their results. We contrast these findings with the most comprehensive single primary study (Marsh, Jayasinghe, and Bond) that found no gender differences for grant proposals. We juxtapose traditional (fixed- and random-effects) and multilevel models, demonstrating important advantages to the multilevel approach. Consistent with Marsh et al.'s primary study, there were no gender differences for the 40 (of 66) effect sizes from Bornmann et al. that were based on grant proposals. This lack of a gender effect for grant proposals was very robust, generalizing over country, discipline, and publication year

Meta study 2023

- Tenure-track women are at parity with tenure-track men in grant funding

aps ASSOCIATION FOR PSYCHOLOGICAL SCIENCE

Psychological Science in the Public Interest
2023, Vol. 24(1) 15–73

Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/15291006231163179
www.psychologicalscience.org/PSPI
SAGE

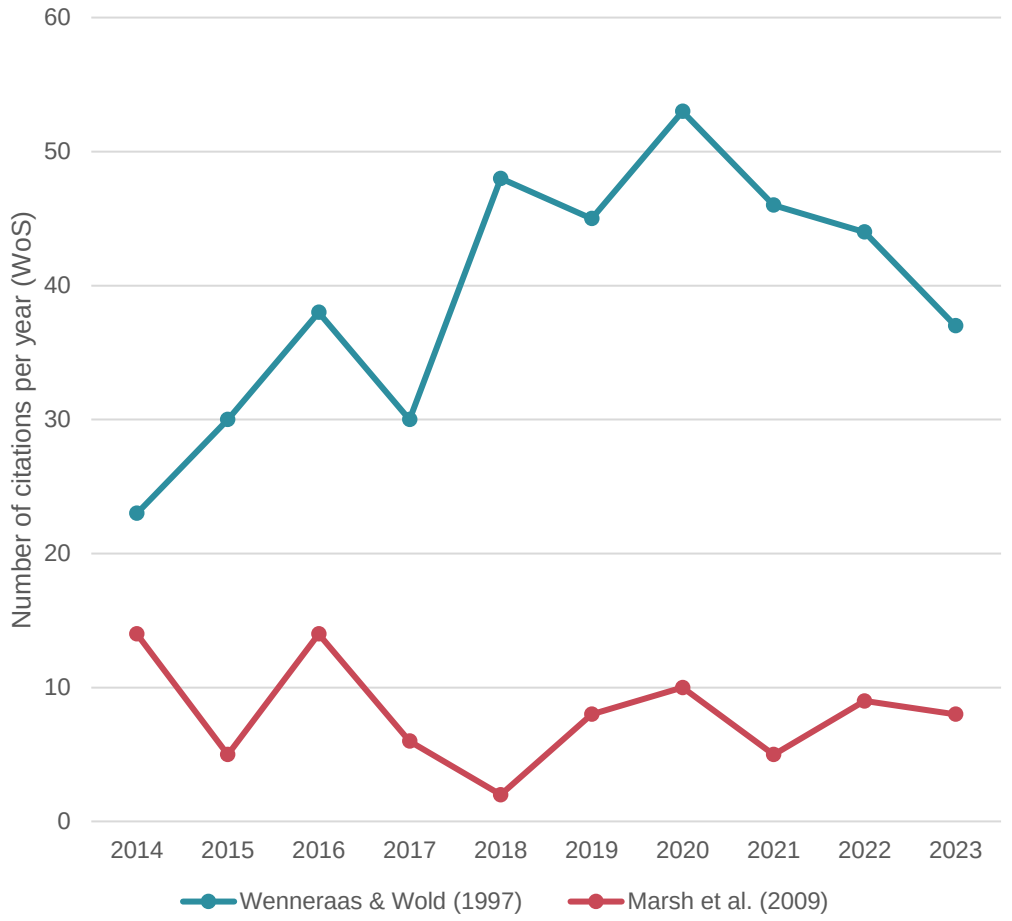
Exploring Gender Bias in Six Key Domains of Academic Science: An Adversarial Collaboration

Stephen J. Ceci[1], Shulamit Kahn[2], and Wendy M. Williams[1]
[1]Department of Psychology, Cornell University, and [2]Department of Markets, Public Policy and Law, Questrom School of Business, Boston University

Abstract
We synthesized the vast, contradictory scholarly literature on gender bias in academic science from 2000 to 2020. In the most prestigious journals and media outlets, which influence many people's opinions about sexism, bias is frequently portrayed as an omnipresent factor limiting women's progress in the tenure-track academy. Claims and counterclaims regarding the presence or absence of sexism span a range of evaluation contexts. Our approach relied on a combination of meta-analysis and analytic dissection. We evaluated the empirical evidence for gender bias in six key contexts in the tenure-track academy: (a) tenure-track hiring, (b) grant funding, (c) teaching ratings, (d) journal acceptances, (e) salaries, and (f) recommendation letters. We also explored the gender gap in a seventh area, journal productivity, because it can moderate bias in other contexts. We focused on these specific domains, in which sexism has most often been alleged to be pervasive, because they represent important types of evaluation, and the extensive research corpus within these domains provides sufficient quantitative data for comprehensive analysis. Contrary to the omnipresent claims of sexism in these domains appearing in top journals and the media, our findings show that tenure-track women are at parity with tenure-track men in three domains (grant funding, journal acceptances, and recommendation letters) and are advantaged over men in a fourth domain (hiring). For teaching ratings and salaries, we found evidence of bias against women; although gender gaps in salary were much smaller than often claimed, they were nevertheless concerning. Even in the four domains in which we failed to find evidence of sexism disadvantaging women, we nevertheless acknowledge that broad societal structural factors may still impede women's advancement in academic science. Given the substantial resources directed toward reducing gender bias in academic science, it is imperative to develop a clear understanding of when and where such efforts are justified and of how resources can best be directed to mitigate sexism when and where it exists.

Selective citations

- According to Ceci et al (2023) studies showing gender bias are much more cited than publications showing no bias
- Wennerås and Wold (1997) is even cited more than large metastudies that came to the opposite conclusion
- Beliefs about gender bias are sustained



*) Ceci, Kahn & Williams 2023: Exploring Gender Bias in Six Key Domains of Academic Science: An Adversarial Collaboration, APS

Changes in policy and practice

- A shift in policy has led to gender biases being taken more seriously.
- Practices among Swedish and other research councils have changed
- Conscious of the need to avoid any gender bias
- Grant application gap
  - A larger problem remains that women apply for grants less than men

Research productivity

Research productivity

- Numerous studies have shown that men and women perform differently on various indicators of scientific publishing

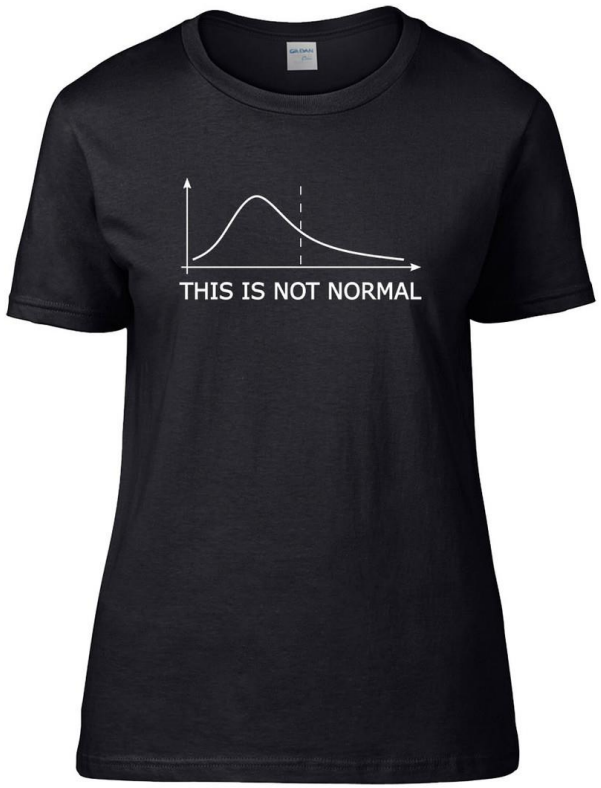
- In particular, female researchers on average are less productive and publish fewer publications than male researchers

Research productivity

- However, women and men are spread unevenly throughout the academy both
  - horizontally (e.g. scientific field)
  - vertically (e.g. academic position)
- Research productivity increases by academic rank
- Aggregate figures can exaggerate gender disparities

Research productivity

- Research productivity is very skewed at the level of individuals



Comparative analysis Italy vs Norway

Contents lists available at ScienceDirect

Journal of Informetrics

journal homepage: www.elsevier.com/locate/joi

Gender differences in research performance within and between countries: Italy vs Norway

Giovanni Abramo[a,*,1], Dag W. Aksnes[b,1], Ciriaco Andrea D'Angelo[a,c,1]

[a] Laboratory for Studies in Research Evaluation, Institute for System Analysis and Computer Science (IASI-CNR), National Research Council, Rome, Italy
[b] Nordic Institute for Studies in Innovation, Research and Education, Oslo, Norway
[c] University of Rome 'Tor Vergata', Dept of Engineering and Management, Rome, Italy

ARTICLE INFO

Article history:
Received 16 September 2020
Received in revised form 16 February 2021
Accepted 24 February 2021

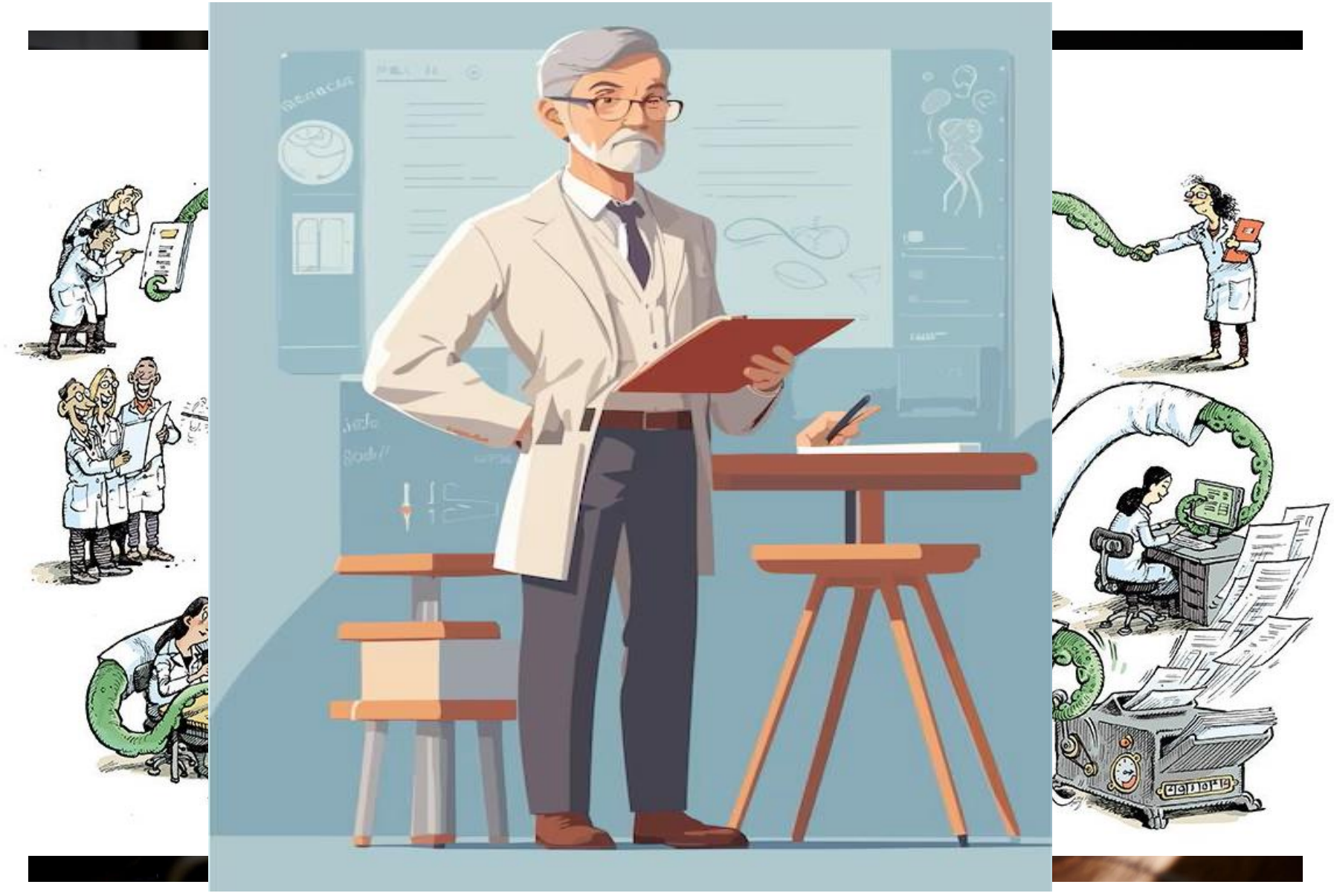
Keywords:
Italy
Productivity
Norway

ABSTRACT

In this study, the scientific performance of Italian and Norwegian university professors is analysed using bibliometric indicators. The study is based on over 36,000 individuals and their publication output during the period 2011–2015. Applying a multidimensional indicator in which several aspects of the research performance are captured, we find large differences in the performance of men and women. These gender differences are evident across all analysed levels, such as country, field, and academic position. However, most of the gender differences can be explained by the tails of the distributions—in particular, there is a much higher proportion of men among the top 10 % performing scientists. For the

- Large differences in the performance of men and women in both countries
- Much of the gender differences could be explained by the tails of the distributions

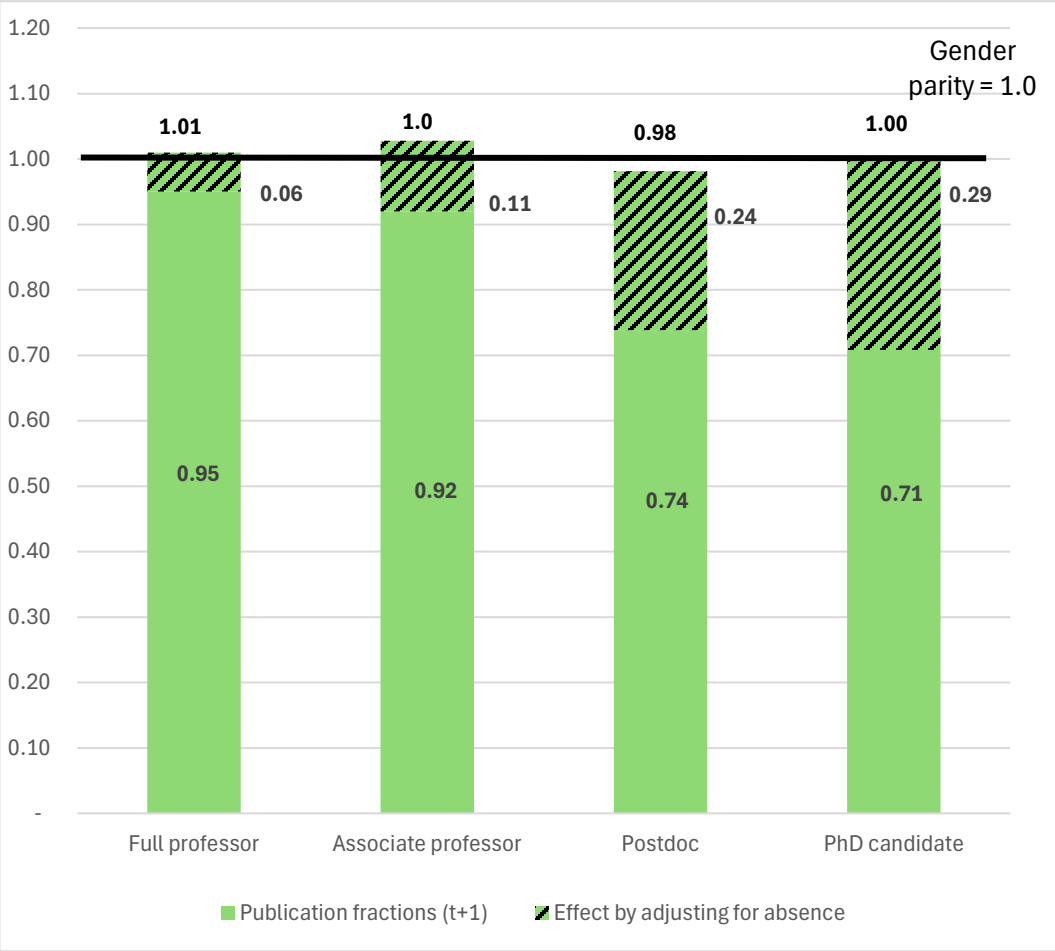
What characterize the extremly productive scientists?

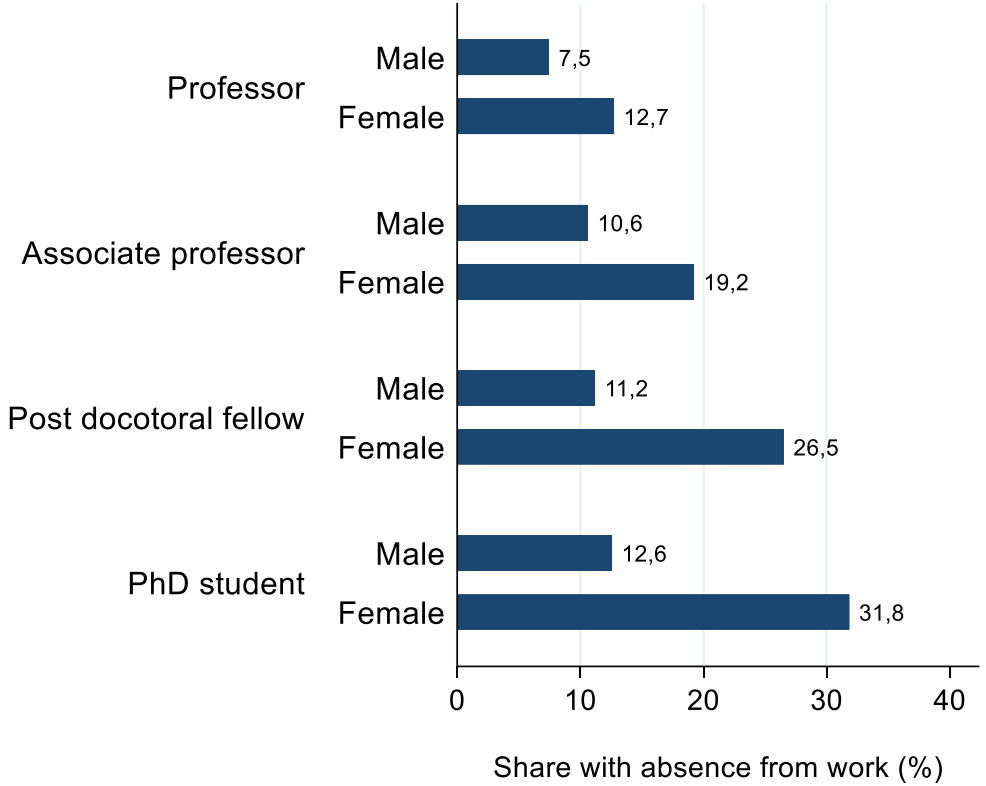


Research productivity

- Another factor explaining gender differences is absence from work
  - Parental and sick leave

Accounting for absence – and the gender productivity gap*

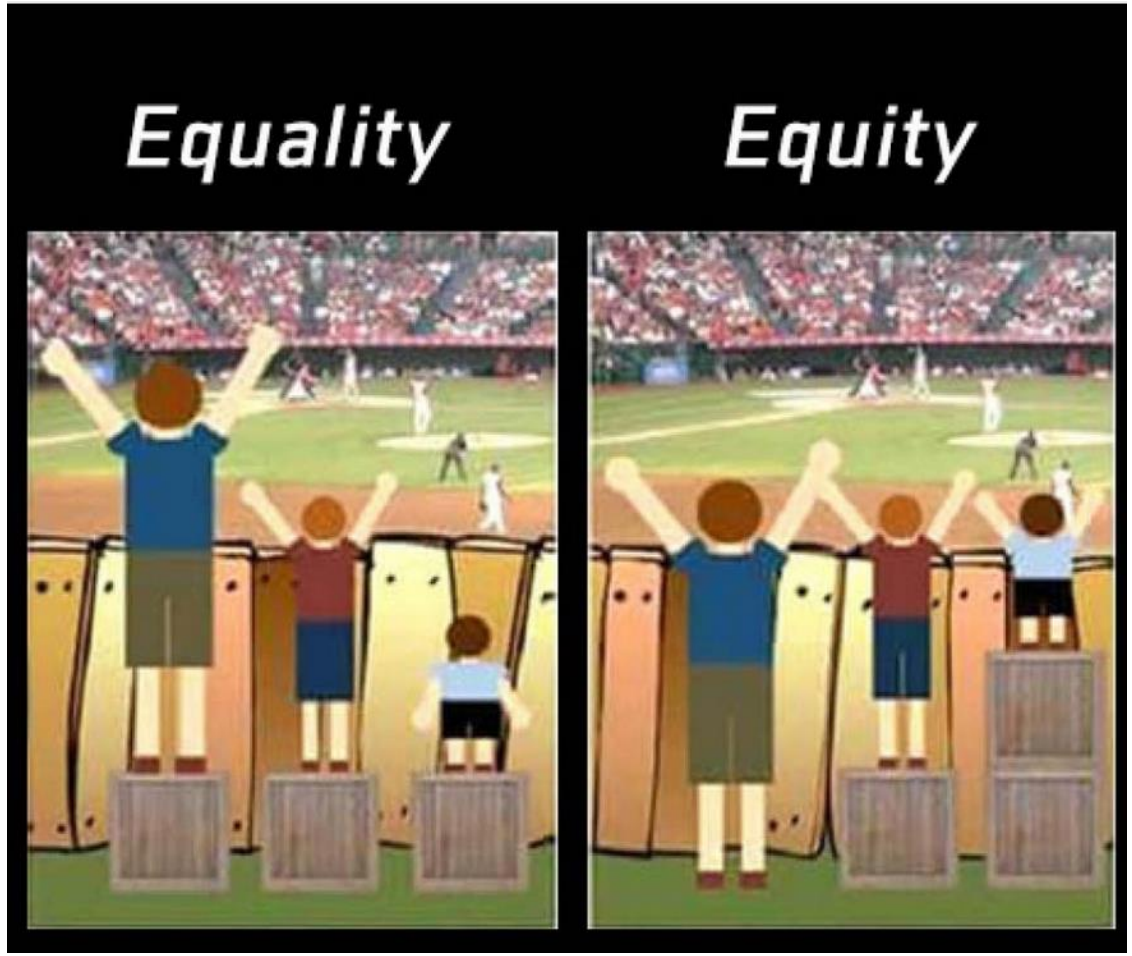




*) Aksnes, D.W. Reiling, R.B & Nygaard, L.P (2024). A matter of time: Accounting for absence eliminates gender disparities in research productivity in Norway

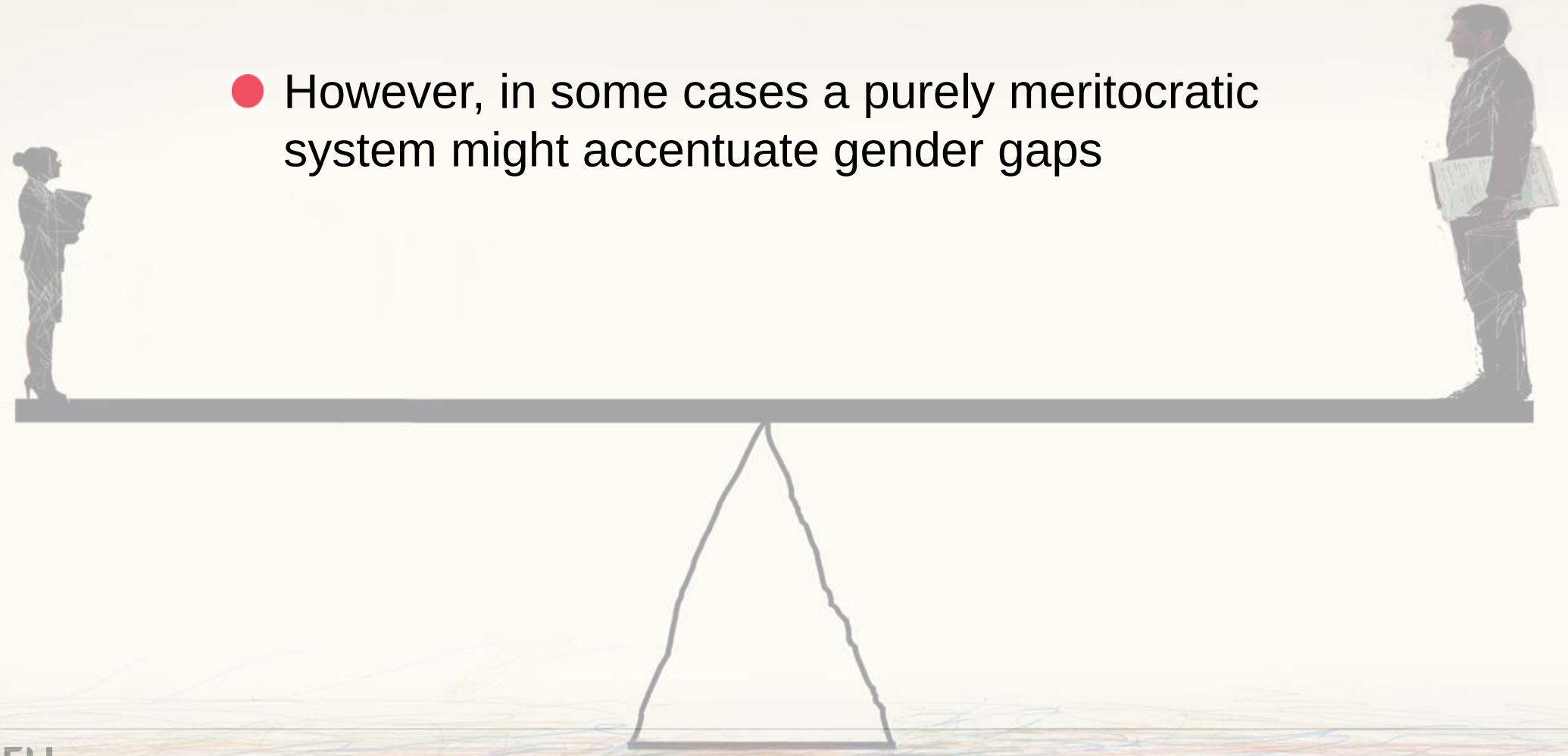
Equality versus equity

- Equality means everyone is treated the same exact way, regardless of need
- Equity means everyone is provided with what they need to succeed
- Different groups of people may need different resources

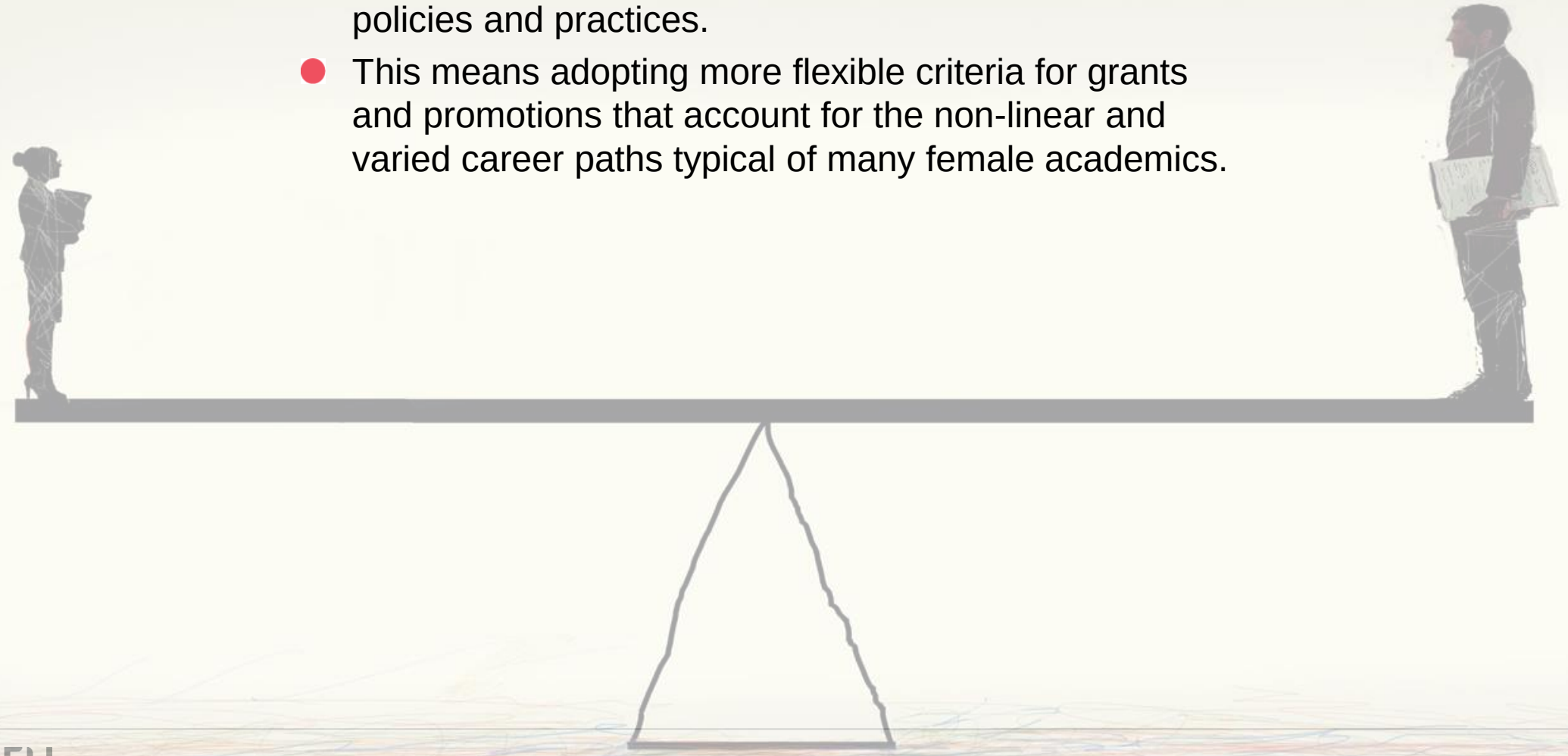


- Evaluating and rewarding researchers based on merit may seem fair and legitimate

- However, in some cases a purely meritocratic system might accentuate gender gaps



- As we move forward, it is crucial that our academic institutions and funding agencies continue to refine their policies and practices.
- This means adopting more flexible criteria for grants and promotions that account for the non-linear and varied career paths typical of many female academics.



- Thank you for your attention!