



Underrepresentation of women in the economics profession more pronounced in the United States compared to heterogeneous Europe

Emmanuelle Auriol^a, Guido Friebel^b, Alisa Weinberger^{b,1}, and Sascha Wilhelm^b

Edited by Douglas Massey, Princeton University, Princeton, NJ; received October 14, 2021; accepted February 14, 2022

Based on a dataset that we collected from the top research institutions in economics around the globe (including universities, business schools, and other organizations, such as central banks), we document the underrepresentation of women in economics. For the 238 universities and business schools in the sample, women hold 25% of senior-level positions (full professor or associate professor) and 37% of junior-level positions. In the 82 US universities and business schools, the figures are 20% on the senior level and 32% on the entry level, while in the 122 European institutions, the numbers are 27% and 38%, respectively, with some heterogeneity across countries. The numbers also show that the highest-ranking institutions (in terms of research output) have fewer women in senior positions. Moreover, in the United States, this effect is even present on the junior level. The “leaky pipeline” may hence begin earlier than oftentimes assumed and is even more of an issue in the highly integrated market of the United States. In Europe, an institution ranked 100 places higher has 3 percentage points fewer women in senior positions, but in the United States, it is almost 5 percentage points.

gender equality | academic hierarchies | leaky pipeline

In many realms of society, and, in particular, in key positions such as top management, politics, and science, women are underrepresented. One of these professions—that has recently received a fair amount of interest—is the one of academic economists. We present and discuss data on women in the economics profession around the globe, provide an in-depth view of the top research institutions, and investigate differences between countries.

Most of the extant research is on the United States. Here, the share of women increased in the 20th century (1), but in the last decades, the progress has stalled, a fact that cannot be explained by exogenous differences in taste between genders. The share of women in undergraduate economics is around 30% (2)—compared to 56% across all fields—but today, conditional on studying economics, more women than men start an economics PhD, and they complete their PhD more often.* Despite the fact that over the last decade, between 30% and 35% of PhDs in economics in the United States have been earned by women (4), in 2019, only 14.5% of full professors were women (5), a phenomenon labeled as the “leaky pipeline”: Over the stages of a career, women’s attrition is higher than men’s. For instance, in 2019 in the United States, new doctorates in economics were 32.2% female, 30.3% for assistant professors, and 35.8% for tenured associate professors, but falling to 14.5% for full professors (5). The puzzling persistence of the leaky pipeline in the United States and the United Kingdom has attracted research and media attention lately.†

For reasons such as taste, norms, or more female-friendly policies, the situation could be quite different in other countries. One common a priori with respect to Europe is that in the Nordic countries and maybe the Benelux countries, there are more women in academic careers because of different norms and different social policies. Whether this is true or not is an empirical issue for which our data are designed and allow us to explore.‡

When looking at the top 300 research institutions worldwide (according to RePEc: Research Papers in Economics), we find that half of them are located in Europe. Hence, the European market for economists is of similar importance as the North American one. Our data deepen the knowledge about the situation of women beyond a US/Canada/UK perspective. Moreover, our data stem from a different method than the survey method used by the Committee on the Status of Women

Significance

In economics, as in many high-skilled professions, women are underrepresented. Web-scraped data provide information on the situation of women in economics around the globe. We document the underrepresentation of women for a large set of countries using the same objective method. We find differences between countries and regions, which might reflect cultural aspects and norms. Europe is more gender-equal than the United States; institutions that are higher ranked in terms of research output have fewer women in senior positions than lower-ranked institutions. In the United States, this also holds for junior positions. The paper thus further informs the debate and shows how female ratios differ on a global scale.

Author affiliations: ^aToulouse School of Economics, University of Toulouse I, F-31000 Toulouse, France; and ^bDepartment of Management and Applied Microeconomics, Goethe University Frankfurt, D-60323 Frankfurt am Main, Germany

Author contributions: E.A., G.F., and S.W. designed research; E.A., G.F., A.W., and S.W. performed research; G.F., A.W., and S.W. analyzed data; and E.A., G.F., A.W., and S.W. wrote the paper.

The authors declare no competing interest.

This article is a PNAS Direct Submission.

Copyright © 2022 the Author(s). Published by PNAS. This article is distributed under [Creative Commons Attribution-NonCommercial-NoDerivatives License 4.0 \(CC BY-NC-ND\)](https://creativecommons.org/licenses/by-nc-nd/4.0/).

¹To whom correspondence may be addressed. Email: weinberger@econ.uni-frankfurt.de.

This article contains supporting information online at <https://www.pnas.org/lookup/suppl/doi:10.1073/pnas.2118853119/-DCSupplemental>.

Published April 4, 2022.

*Similarly, in the United Kingdom, undergraduate women in economics get better grades than their male classmates (3).

†There have been published numerous articles in, for instance, *The New York Times*, *Financial Times*, and the *Economist* (6–10).

‡For a few countries in Europe, the phenomenon of a leaky pipeline leading to female underrepresentation in tenured positions has been identified in Sweden (11), Italy (12), Germany (13), and the United Kingdom (14, 15).

in the Economics Profession (CSWEP) for the United States. The advantage is that all information is collected from the institutions' websites, but is also verified by the institutions. We hence use the same standardized approach for all institutions over the world, combining the advantage of a research method based on web-scraping with information obtained from the departments themselves.

In *Method and Data*, we present detailed information about our approach. We designed a web-scraping algorithm to monitor URLs of institutions contributing to research in economics using RePEc. This mostly covers universities and business schools, but also central banks or other research organizations. These data hence also allow for more institutional variation than other methods.⁵ Indeed, many economists work in noneconomics departments (e.g., strategy or organizational and business economics in business schools), but do publish in economics journals. Another example is economists working in public policy schools or in finance departments.

The algorithm identifies the individuals listed on the websites and records the position titles that these individuals hold. Gender is identified through first names and a gender-identification software program analyzing pictures of the individuals. For the top 300 institutions (in terms of research output), we complement these algorithms by additionally classifying the obtained position titles (more than 1,000) into a generally accepted hierarchy of positions to make comparability across countries as good as possible: (Full) Professor, Associate Professor, Assistant Professor, Lecturer, Research Fellow, and Research Associate. For each country individually, we use a text-mining method to extract the hierarchical level from position descriptions and name titles. Next, we create a mapping between keywords of the position descriptions and a representative level. Finally, we contact the departments (297 in total) to verify the results of our work and provide us with feedback—in a way similar to what surveys would do. Using the same methodology for all institutions and equipped with our standardized position levels, we compare the situation for different countries. Furthermore, female underrepresentation may not only differ across countries, but may also depend on the research output of institutions, which we measure by their ranking in RePEc.

Before presenting data and results, it is useful to briefly review the literature on gender in the economics profession. This is mainly focused on documenting and explaining the leaky pipeline between junior and senior ranks. Studies usually find that part of the wage or promotion gap can be explained when controlling for observed characteristics, unobserved heterogeneity, and self-selection. Nevertheless, a substantial part of the gender differences remains unexplained (17–22).

One could think that the gender gap in promotion to tenure is not specific to economics and applies to all fields, but the gap is much greater in economics than in other social sciences (23). Since economics relies on analytical skills and the mastering of mathematics and statistics, the gender gap could reflect some general bias in science. However, even after accounting for differences in productivity and the effect of children on promotion, women in economics are substantially less likely to get tenure and take longer to achieve it compared to men and women in other disciplines (23). As ref. 24 concludes: "Economics is an outlier, with a persistent sex gap in promotion that cannot be readily explained by productivity differences." Moreover, ref. 24 finds that female full-professor salaries in economics as a proportion of male

salaries dropped from 95% in 1995 to less than 75% in 2010. Unsurprisingly, women in economics are less happy than the men they work with and less happy than women working in other disciplines. The gap is quite big and growing larger over time (24). What are the possible reasons for the gender gap?

The literature identifies a number of determinants, mostly on the labor demand, but also on the supply side, and many reflecting an unproductive and unfriendly culture. Discrimination may occur through biased behavior (25) in general, inappropriate behavior in professional occasions (26, 27), and social stereotyping in nonprofessional occasions (28–32), leading to a feeling of being less valued in the profession, as revealed by the American Economic Association (AEA) Professional Climate Survey 2019 (32). Differential treatment also occurs in the publishing process: Women are held against higher editorial standards or are evaluated more critically (33–37) and are also given less credit for their publications and in coauthorships with men (38–40). There is also evidence for differential treatment in biased hiring policies (41–45). These demand effects may result in biased supply: a smaller tendency of women to apply for a job—but to have a higher probability of being chosen conditional on applying (46, 47). Differential experiences at the workplace and career aspirations have an impact as well (48, 49), and different mobility patterns by gender emerge (50). Role model effects, encouragement, and mentoring play important roles (51–55). Some institutions have implemented policies to work against female underrepresentation (2, 56), but not all of them are effective, and some even have unintended effects (57).

One could be tempted to ask why we should care about discrimination against women beyond fairness concerns. We see many such reasons. First, if positions are mainly filled from the male ability distribution, more able women are neglected, and universities forego the opportunity to hire or retain more able employees. This is exacerbated because networks are crucial for hiring (58), and women are underrepresented in these networks. Second, and related, role models matter for people's decisions on what field to choose (59, 60). More successful women would draw more capable women into the field. Third, women choose different research topics than men; women are doing more research in health and education than in macroeconomics (39). In the United States, women research more in labor and public economics and less in macroeconomics and finance (1), a difference that is stable over the period 1990–2017. The weak representation of women in the most prestigious and powerful positions implies less means dedicated to these topics and less publicity around the results. This would mean that economics systematically underinvests in some topics that are relevant to society.[¶]

Results

A Global View on Women in Economics in Academic Departments. As of December 21, 2020, the algorithm had collected 186,243 positions in 2,032 institutions. Restricting the data to individuals for which we have information on both gender and position, we end up with 96,044 individuals in 1,383 institutions—our "full database." Out of these identified positions, we then have a dataset on the global top 300 research institutions for which the data have been manually checked several times by us and verified by the departments.

In our analysis, we first present an overview over all institutions in our database before focusing on the top 300 for a deeper

⁵CSWEP, for instance, collects data on economics departments primarily. See ref. 16 for further information on their approach.

[¶]In line with this argument, ref. 61 finds that male and female economists have different views on economic outcomes and policies.

Table 1. Overview over main dataset by type of institution

Type of institution	Top 300	Main dataset
Universities	198	196
Business schools	44	42
Central banks or federal banks	27	—
Research networks or organizations	31	—
Total	300	238

Three universities and business schools decided to opt out of our study. One university does not provide a comprehensive overview over its researchers on the website and is hence also excluded.

analysis. We focus on universities and business schools, in which the main responsibilities are research and teaching. In most of our paper, we exclude from our database of the global top 300 research institutions, according to RePEc, research departments of central banks or federal banks, as well as research networks and organizations, such as the National Bureau of Economic Research (NBER) or the Centre for Economic and Policy Research (CEPR), which have different goals and are organized differently. A total of 238 institutions remain (Table 1), in what we refer to as the “main dataset.”

Looking at geographical location (Table 2), within the top 300, there are 117 North American and 157 European institutions; after only focusing on universities and business schools, our dataset consists of 122 in Europe and 92 in North America.

Table 3 lists the share of women across the globe by hierarchical levels: first, for our full database and second, for our main dataset. We observe that the share of women is around 32% on all positions. While 40% of the positions are filled with women at the research associate (mostly PhD students) level and the entry level (assistant professors and lecturers), the share of women falls to 27% at the senior level. We find higher representation of women (roughly 2 percentage points more) in the larger sample with all 1,383 institutions compared to our main dataset, which seems to indicate that more research-oriented institutions hire fewer women. We will later investigate this in more detail.

Table 4 unpacks the results on our main dataset for world regions. In Australia and New Zealand, the share of women is around 35%, in Europe as a whole around 32%, and in North America only 26%. Differences between the overall share of women in our full database is visualized in Fig. 1, and the share of women in senior positions is visualized in Fig. 2. They clearly show the heterogeneity across countries and regions: Europe seems to be more gender-equal compared to North America.

A Closer Look at Europe and the United States. Comparing Europe with the United States in more detail (Table 5) shows the following picture: Overall, US-American research institutions have almost 7 percentage points fewer women compared to Europe. Looking at all levels individually, the share of women is lower in the United States, especially at the senior level, where 27.3% are women in Europe, but only 20.3% are in the United States. These differences in means are also statistically significant. The fact that

Table 2. Overview over main dataset by geographical location

Region	Top 300	Main dataset
Europe	157	122
North America	117	92
Rest of the world	26	24
Total	300	238

the more integrated market in the United States is associated with a smaller proportion of women in academic jobs in economics comes as a surprise and seems to contradict the famous argument made in ref. 62 that competition should drive out discrimination.[#]

While Europe and the United States have large differences at the aggregate level, the question is whether there are also differences within these two regions. For a classification of European countries into regions, we use the geographical subregions of Europe defined by the EuroVoc of the publications office of the European Union (we provide a table with the exact list of countries belonging to these regions in *SI Appendix, Table S4*). Table 6 shows that Southern Europe has about 35% women, Western Europe 31%, Northern Europe 31%, and Central and Eastern Europe 46% women. Romanian institutions have the highest share of women (more than 50% at the senior level); Spain, Portugal, and Italy all have more than 30% and are therefore above the European average. France and Denmark are close to 30%; Greece, Germany, and Netherlands are scoring particularly low, around 20%. We provide country overviews over our full database and main dataset in *SI Appendix, Tables S2 and S3*.

Comparing the United States with Canada, shows the following: The share of women among all positions is comparable (26% and 29%, respectively), but Canadian institutions have an almost 11-percentage-point higher share of women at the senior level than the United States (20% vs. 31%). The high percentage of women in senior positions at Canadian institutions is mostly driven by universities in the French-speaking region of Canada and particularly by one large institution. (Removing this institution lowers the percentage to 25% for all positions and 26% for the senior level and hence makes Canada more similar to the United States.)

Following the definition of the US Census Bureau, we split the United States into four regions (Table 6). We provide a table with an overview of which states belong to which region in *SI Appendix, Table S5*. We do observe that the lowest percentages of women are in the West, a region where many of the top institutions are located. We also find that the share of women is particularly low at private universities in the United States (*SI Appendix, Table S11*). However, comparing the regions with the overall US average shows that the differences in means are not significant (except for the South). Overall, the regions are quite comparable in terms of their share of women. Breaking down the United States further at the state level yields similar results. The share of women on all positions, the senior level, and the entry level are very similar across states (*SI Appendix, Fig. S2*). This is a sharp contrast to the European market, which is very heterogeneous region-wise and also country-wise. The US-American market is more homogeneous compared to Europe.

Research Output of Institutions and Percentage of Women.

The substantial heterogeneity across countries and regions in Europe (and between Canada and the United States) may be driven by gender norms or policies or other country-specific

[#] Labor mobility, and thus market integration, is higher in the United States than in Europe, despite some convergence (63). Numerous factors make academic labor mobility easier in the United States than in Europe. First, in all US departments, English is the official language, while in Europe, courses are usually taught in the respective official language. Administrative tasks are, however, almost always carried out in the respective official language. Second, despite the Bologna reforms, course programs differ to a substantial extent across countries. Third, pension schemes are still not fully portable, and neither are other benefits constituting an obstacle to migration (64). Fourth, labor markets have traditionally operated in a very segmented way, and only recently a European job market has been created. The academic job market for economics at the Allied Social Sciences Association has a long tradition, is organized very well, and has hence succeeded in attracting many international PhDs (65).

Table 3. Share of women in all institutions and main dataset

Level	All institutions, %	Positions	Women	Main dataset, %	Positions	Women
Senior level	26.76	35,513	9,503	25.22	13,334	3,363
Entry level	39.52	22,525	8,903	36.69	8,135	2,985
Research fellow	30.35	25,259	7,665	26.56	5,971	1,586
Research associate	39.81	12,747	5,074	36.89	6,928	2,556
Total	32.43	96,044	31,145	30.52	34,368	10,490

Main dataset refers to 238 universities and business schools globally. All institutions refers to all 1,383 institutions for which we have information on position and gender for the respective position. Senior level refers to full professors and associate professors; entry level refers to assistant professors and lecturers.

institutions. We will inquire about such country specifics, but it is first useful to fix some expectations about how the research rank of universities and business schools should be associated with the proportion of women at the junior vs. senior level. The common explanation for the underrepresentation of women on the senior level is the leaky pipeline hypothesis—women may drop out from research careers because of the burdens associated with parenthood. Institutions where faculty are publishing more on average might have fewer women at the senior level because women do not achieve the high publication record needed. On the junior level, though, we would not expect this because, here, the research potential of a person should be the main thing that matters, and there is no reason to believe that women have lower potential than men.¹¹ Hence, in line with the leaky pipeline hypothesis, we would expect women and men to start their career paths off equally (i.e., being hired at the same rate by the institutions), but over the stages of the careers, women then have a higher attrition compared to men, leading to a lower share of women at the senior level.

Expectation 1. *Higher-ranked research institutions should hire women at the entry level at the same rate as lower-ranked institutions.*

Expectation 2. *Higher-ranked research institutions should have a smaller proportion of women on the senior level.*

To investigate these expectations, we use RePEc's ranking of institutions; ref. 67 describes the methodology of how institutions' research output is measured and ranked using widely accepted journal rankings. In *SI Appendix, Table S1*, we provide a list of the top 300 institutions.

First, we plot kernel-density graphs for a sample split of these data in Fig. 3. The first graph plots the senior level only, the second all nonsenior positions, and the third the entry level. The mode for the lower-ranked half is much higher than for the higher-ranked

Table 4. Share of women in different world regions (main dataset)

Region	All levels, %	Positions	Senior level, %	Positions
Europe	32.46	18,215	27.27	7,261
North America (United States and Canada)	26.53	12,716	22.09	4,956
Australia and New Zealand	35.31	2,651	26.97	801
Rest of the World	34.10	786	22.78	316

Main dataset refers to 238 universities and business schools globally. Senior level refers to full professors and associate professors.

¹¹This reasoning would be challenged if top-ranked universities—in anticipating the problems women face with parenthood—would underhire women for junior positions because, on average, they are less likely to meet tenure requirements. By doing so, these institutions would be engaging in statistical discrimination, which is illegal in many countries. Ref. 66 suggests a model of gendered careers in an internal labor market, but we would not believe that universities would follow such a strategy because it would expose them to massive criticisms.

half at the senior level. Surprisingly, this also seems to be true for the entry level.

Hence, it seems that there are significant differences between the top universities and business schools and the lower-ranked half. We explore this further by running simple regressions. We regress the share of women at all academic levels, the senior level, and the entry level on the research ranking of an institution. “Senior level” refers to full professors and associate professors, and “entry level” denotes assistant professors and lecturers. In order to have meaningful regressions, we exclude institutions that do not have at least five positions on each level. (The restriction on the minimum number of researchers is necessary, as SEs increase when including institutions with a very low number of positions. Institutions with one person at the level, for example, can only have a female proportion of 0% and 100% and cause a high SD.) Two remarks: 1) In the regressions, *Ranking* is reverse-coded, which means that the lower the rank number, the better-ranked the institution: Hence, the best rank is 1, and lower-ranked institutions have the ranks 2 up to 238. For the institutions in our main dataset, we adjusted the original rankings and created new ranks from 1 to 238 following their order in the original top 300. 2) The regression is purely descriptive: What we find is correlation, not causation.

In Table 7, the positive coefficient on *Ranking* implies that an institution with a lower rank number (and, thus, better-ranked) has a lower share of female researchers compared to a higher-ranked one. In particular, an institution with, say, rank 1 has an about 4-percentage-points lower share of women at the senior level compared to an institution ranked 100 places lower (in this case, rank 101). It is also noteworthy that under the inclusion of 28 to 33 country fixed effects, the effects remain stable. (The number of country fixed effects changes throughout the specifications, as not all institutions, hence, not all represented countries, in our sample have at least five positions at the respective level.) Our second expectation—higher-ranked research institutions have fewer women in senior positions—is therefore met by the data.

Our first expectation, however, does not seem to be confirmed. Notice first the positive coefficient for the entry level in Table 7, which, although not statistically significant, seems to indicate that higher-ranked institutions also have fewer women at the entry level.^{**} Actually, when conditioning on institutions having at least 20 positions at the junior level, the entry-level effect is stable (around 3 percentage points) and becomes statistically significant. We will explore this result further in forthcoming sections. Our results (senior level and all academic levels) remain stable when

^{**}The negative adjusted R^2 s for the entry level regressions indicate that this does not explain much in terms of the relation between the percentage of women among junior faculty and an institution's ranking. Large heterogeneity across countries might also play a role here since there are many outliers (e.g., institutions having a very high number of women, for instance, in Romania). Moreover, the effect becomes significant for the entire top 400 research institutions (*SI Appendix, Table S8*) and the top 300 European research institutions (*SI Appendix, Table S9*).

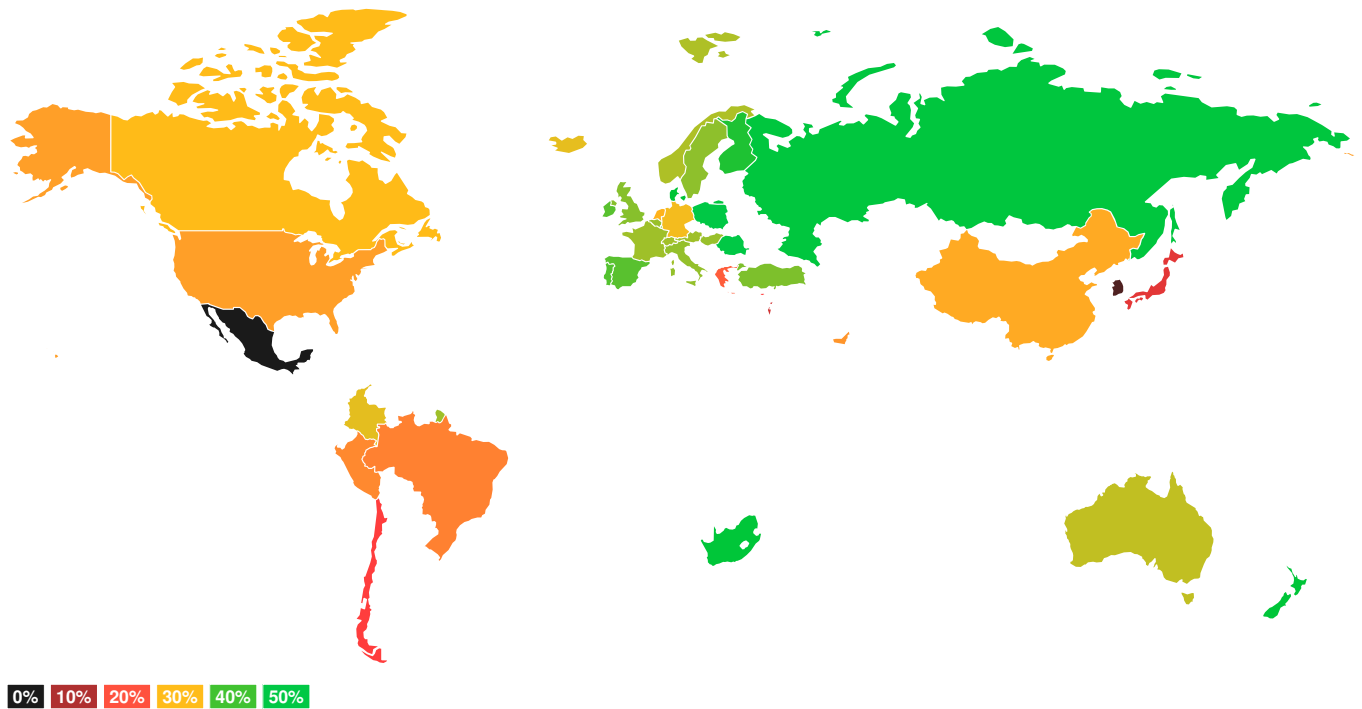


Fig. 1. Proportion of women in all academic positions (full database). This figure plots information on all positions in the full database as of December 2020. Countries for which we have no observations in our database are left blank. For the following countries, we have only observations on one institution in the database: Colombia, Cyprus, Liechtenstein, Mexico, and United Arab Emirates.

removing the top 25 institutions, the lowest 20 institutions, taking the entire population, and imposing at least 3 identified positions for the respective level and persist when imposing at least 20 identified positions.

Ranking Effect: Europe vs. United States. European institutions score higher in terms of gender equality than the United States. Comparing the estimates for the senior level shows that an

institution ranked 100 places higher has about 3 percentage points fewer women in Europe (column 4 in Table 8)—interestingly, it increases to almost 5 percentage points in the United States (column 4 in Table 9). We include country fixed effects for Europe and state fixed effects in the United States in the regressions. Higher-ranked institutions have fewer women in all academic positions (and especially at the senior level), and the point estimates are higher in the United States.

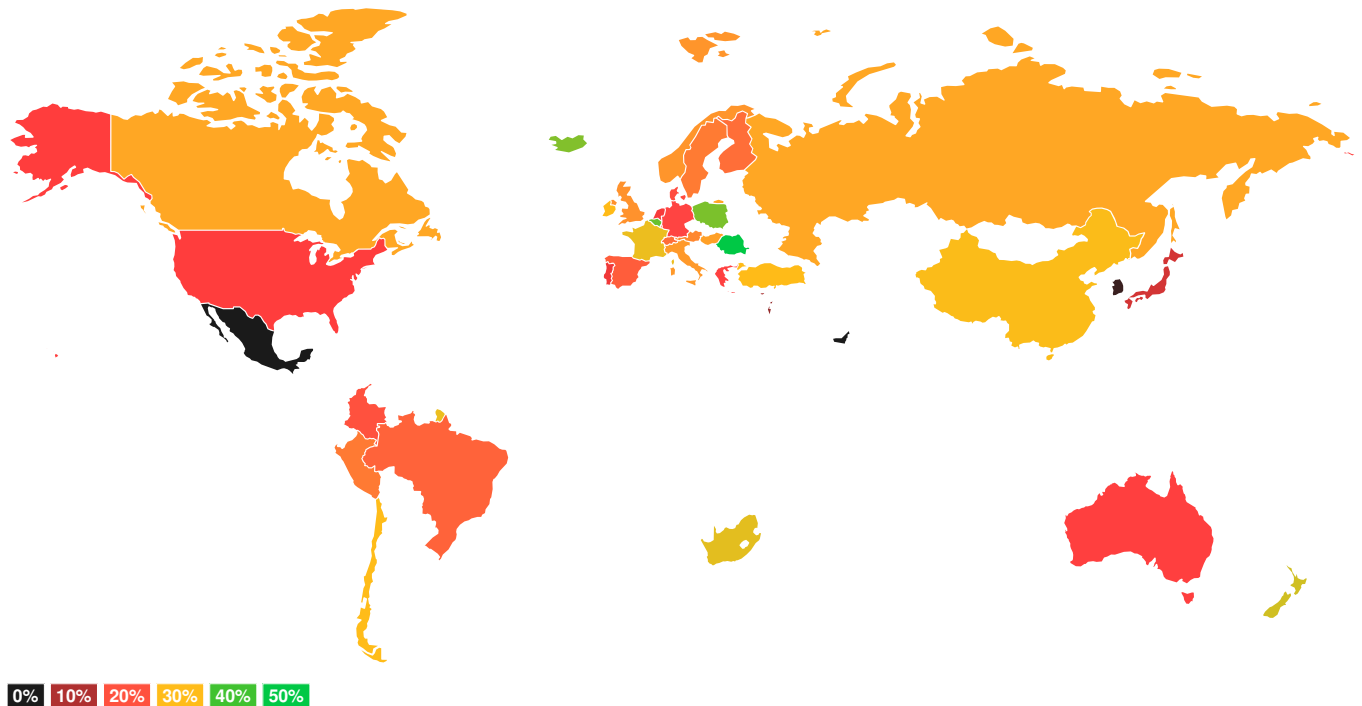


Fig. 2. Proportion of women, full professors only (full database). This figure plots information on full professors in the full database as of December 2020. Countries for which we have no observations in our database are left blank. For the following countries, we have only observations on one institution in the database: Colombia, Cyprus, Liechtenstein, Mexico, and United Arab Emirates.

Table 5. Share of women, Europe vs. United States (main dataset)

Level	Europe, %	Positions	Women	United States, %	Positions	Women
Senior level	27.27	7,261	1,980	20.29	4,130	838
Entry level	38.46	3,864	1,486	32.09	2,739	879
Research fellow	30.92	3,053	944	21.66	2,202	477
Research associate	37.21	4,037	1,502	34.78	2,194	763
Total	32.46	18,215	5,912	26.25	11,265	2,957

Main dataset refers to 238 universities and business schools globally. Out of these institutions, there are 122 in Europe and 82 in the United States. Senior level refers to full professors and associate professors; entry level refers to assistant professors and lecturers.

At the junior level in the United States, the results in column 6 of Table 9 are highly significant, indicating a 3-percentage-point decrease in the share of women if an institution is ranked 100 places higher. The junior entry-level effect does not occur in Europe,^{††} as retrieved from column 6 in Table 8.

The results are also robust to more restrictive specifications. They remain stable when removing the top 25 and top 15 institutions, conditioning on at least 20 identified positions and also when not imposing any restrictions on the minimum number of observations of positions.

It seems to be the case that the top institutions in the United States put the higher standards on their female faculty not only at the senior level, but already at the entry level. This might be owing to cultural differences, also in terms of hiring and the academic job market. Some microevidence points toward disadvantages in women's mobility patterns. As shown by ref. 50, women are, in fact, less likely than men to move from a non-top-30 department to a top-30 one when they have not completed their PhD at such a top university. Hence, women's mobility is more downward-oriented than upward.

Is It the United States, or Is It Excellence? We have established that the ranking effects are stronger in the United States compared

Table 6. Share of women: Europe and North America (main dataset)

Region	All levels, %	Positions	Senior level, %	Positions
Southern Europe	34.66	4,169	32.46	2,098
Northern Europe	30.64	2,794	26.02	1,126
Western Europe	31.22	10,593	23.71	3,750
Central and Eastern Europe	46.13	659	40.77	287
United States—Northeast	26.05	4,825	21.13	1,813
United States—West	24.92	2,167	18.40	848
United States—Midwest	25.84	2,879	18.10	906
United States—South	29.84	1,394	23.98	563
Canada	28.74	1,451	31.11	826

^{††}For the top 300 European institutions we investigated in our study on "Women in European Economics" (68), we find a different point estimate at the entry level that is closer to the one in the United States. However, this is not comparable since the top 300 European institutions clearly differ from the top 112 European institutions in the world's top 300. Therefore, we believe that the effects found here better represent the situation since many of the lower-ranked top 300 European institutions do not appear in the global 300 after all and are therefore very different compared to the European ones, which are indeed also part in the global 300.

to Europe. This raises the question of whether these results are reflecting the fact that some of the best institutions are in the United States (and not cultural or regional differences). Notice first that the European institutions are well-represented among the top universities (Table 10).

To explore this further, we run pooled regressions in which we control for regions (Europe or the United States) and interact regions with the research ranking. Table 11 shows that the ranking coefficient remains significant when controlling for the region. On average, institutions in the United States have 5 percentage points fewer women on all levels (column 1), 4 percentage points at the senior level (column 3), and 5 percentage points at the entry level (column 5), compared to institutions in Europe. In columns 2, 4, and 6, we estimate an individual ranking slope for Europe and for the United States.

The coefficient for the region remains significant when including interaction effects between the ranking and the region. For all academic levels and the entry level, the coefficient increases in size, implying that the United States has, on average, almost 8 percentage points fewer women in these positions in comparison to Europe. For the senior level, however, the increase is, at 5%, not as large. The interaction effects in column 4 show that in the United States, an institution ranked 100 places higher than another one in the United States has 4 percentage points fewer women on the senior level, while in Europe, the figure is 3 percentage points. When comparing the percentage of women in Europe and in the United States with respect to institutions' ranking, not only does the United States have, on average, fewer women at all levels, but also the gender gap is widening more in the United States than in Europe with ranking (i.e., the slope is steeper). From these observations, we infer that, indeed, regional effects play an important role, rather than the research ranking of an institution per se.

Central Banks and Organizations. Women could leave universities and business schools and instead pursue a career at a central bank or an international organization. Therefore, we investigate the gender composition at institutions excluded from our main dataset (central banks, federal banks, and international organizations). At these institutions, there does not exist a tenure-track system (and aspects such as publication records should not be as important). *SI Appendix, Table S10* provides an overview over the gender composition on different levels. Interestingly, the percentages of women across different hierarchy levels in central banks and federal banks also point toward a leaky pipeline. The literature also documents differences in career progression between men and women in central banking (46). Moreover, ref. 69 finds that women have a higher likelihood of being appointed to the board of a central bank when the board member leaving is a woman.

Discussion

Barriers to Entry at the Junior Level. Besides regional differences, we observe that the share of women differs between the

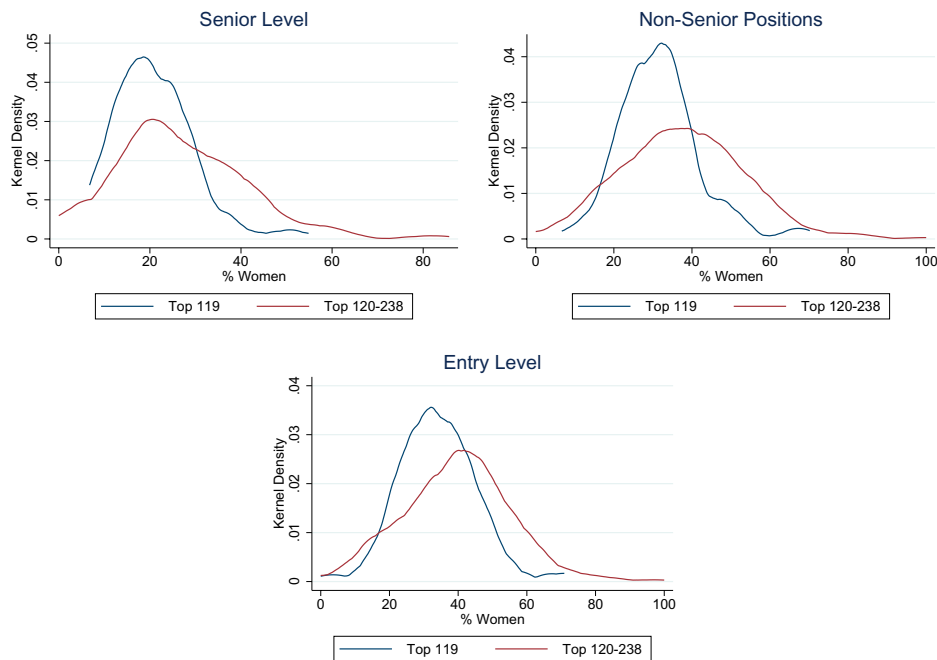


Fig. 3. Kernel density estimates by level (main dataset) for institutions having at least five positions on each level.

higher-ranked and lower-ranked institutions. Attrition of women hence occurs not just prior to reaching senior positions, but already right after the completion of the PhD. Thus, it may be relevant to think deeper about the matching process between job-market candidates and employers. Considering Europe, only a small number of particularly research-oriented institutions hire through the international job market, which uses very specific and, arguably, stressful mechanisms that may keep women from applying or obstruct their performance. (The European Economic Association [EEA] has organized its own job market, which, to date, has attracted less than one-third of women, despite its efforts in coaching and mentoring job candidates.) The lower-ranked institutions hire through different mechanisms, for instance, nationwide competitions like in France, referral-based, or internal hiring. Furthermore, the fact that the lower percentages of women on the entry level seem to be driven by the United States (and even stronger for private institutions there) could be an indicator of a sorting effect—women applying and succeeding in less good places.

Women might refrain from applying for the best academic positions because they lack confidence or placement officers' and advisors' encouragement. Top research institutions, which

are likely to put higher standards on the applicants in terms of letters of recommendation, might inadvertently encourage (self-) selection of male researchers, perpetuating discrimination and prejudices against women. In fact, letters of recommendation in the academic hiring process use different adjectives to describe men and women, and those used to describe women are viewed more negatively in hiring decisions (30, 31). To find out whether this is generally the case in economics, we would need data from the hiring committees of as many research institutions as possible, a hard, but not impossible, task.

Cohort-Effects Hypothesis. A common argument to explain the low number of tenured female faculty in academia builds on the fact that the number of female academic job-market entrants was rather low over many decades. Then, the previous (mostly male) entrants are still occupying the professorships. This argument could imply that interventions are not necessary since the observed inequality will fade away automatically as time progresses and cohorts of women get promoted. We scrutinized that argument, performing back-of-the-envelope calculations (provided in *SI Appendix*) on the necessary ratio of women with PhDs in the past, such that the cohort explanation was able to rationalize the

Table 7. Percentage of women on research ranking (main dataset)

Variables	% of Women					
	(1)	(2)	(3)	(4)	(5)	(6)
Ranking	All levels	All levels	Senior level	Senior level	Entry level	Entry level
Constant	0.0296*** (0.00799)	0.0300*** (0.00746)	0.0401*** (0.00935)	0.0374*** (0.00470)	0.0118 (0.0128)	0.00638 (0.0125)
Observations	25.14*** (1.056)	25.09*** (0.895)	18.05*** (1.083)	18.37*** (0.560)	33.36*** (1.585)	33.99*** (1.468)
Individual positions	235	235	231	231	201	201
Adjusted R^2	34,368	34,368	13,331	13,331	8,096	8,096
Country FE	0.042	0.067	0.073	0.095	-0.001	-0.004
		33		32		28

The observations number denotes the number of institutions in our main dataset (i.e., 238 universities and business schools globally). There are at least five identified positions per institution. Senior level refers to full professors and associate professors; entry level refers to assistant professors and lecturers. Robust SEs are in parentheses. FE, fixed effects. *** $P < 0.01$.

Table 8. Percentage of women on research ranking (Europe only)

Variables	% of Women					
	(1)	(2)	(3)	(4)	(5)	(6)
	All levels	All levels	Senior level	Senior level	Entry level	Entry level
Ranking	0.0149 (0.0126)	0.0184* (0.00919)	0.0303** (0.0150)	0.0304*** (0.00753)	-0.00218 (0.0191)	-0.0107 (0.0176)
Constant	29.02*** (1.782)	28.57*** (1.172)	20.78*** (1.960)	20.77*** (0.959)	37.35*** (2.733)	38.45*** (2.262)
Observations	119	119	117	117	95	95
Individual positions	18,215	18,215	7,261	7,261	3,833	3,833
Adjusted R^2	0.001	0.011	0.025	0.046	-0.011	-0.008
Country FE		20		20		18

The observations number denotes the number of European institutions within our main dataset (i.e., 238 universities and business schools globally). There are at least five identified positions per institution. Senior level refers to full professors and associate professors; entry level refers to assistant professors and lecturers. Robust SEs are in parentheses. FE, fixed effects. * $P < 0.1$; ** $P < 0.05$; *** $P < 0.01$.

current women's ratio for professors. This number would be much lower (around 10%) than the actual number of PhD graduates (24%). Hence, the cohort explanation is not able to explain the low share of women in the economics profession. Therefore, the leaky pipeline hypothesis has appeal, consistent with our data.

Gender Equality Indices and Representation of Women. Across all countries, the proportion of female researchers on all levels is much higher than at the senior level. However, we also observe large heterogeneity: Europe overall seems to be more gender-equal than the United States. Within Europe, the Nordic countries and France score much higher on gender equality than, for instance, Germany and Netherlands. Therefore, the question arises: What could be possible explanations for these observations?

The observed heterogeneity is likely to correlate with broader measures of gender equality in the respective country. For this purpose, we use the "Global Gender Gap Index" by the World Economic Forum, which contains information on 153 countries. We rank all countries in our main dataset in terms of 1) the share of women across all academic positions and 2) the share of women at the senior level (full and associate professors) and correlate it with the ranking in the Global Gender Gap Report 2020 (70; we provide an overview over these rankings in *SI Appendix, Table S7*). We find a 41% correlation between the index and the ranking on the share of women on all positions and a 58% correlation between the index and the ranking on the share of women at the senior level (as visualized in Fig. 4).

Combining these findings with results from the latest waves of the "World Values Survey" shows deeply rooted perceptions

of gender roles and gender equality nowadays. For instance, way below 5% in Sweden, Norway, Finland, and Denmark (strongly) agree with the statement "University is more important for a boy than for a girl." Looking at other countries, this also only accounts for 6% in France and around 4% in the United Kingdom, but almost 10% in the United States.^{‡‡} From these observations, we could conclude that the different share of women, in particular in senior positions, reflects general heterogeneity and values in these countries.

In many countries, there is rising scholarly attention to the status of women in the economics profession. We hope our data help to advance the debate about women in economics, as they provide further evidence on the existence of a leaky pipeline on a global scale. The underrepresentation of women could be driven by different factors: partly owing to historical and institutional reasons and partly other factors, such as recruitment policies related to the ranking of the research institution, which we measure through research output from RePEc. Besides deeply rooted cultural aspects, experiences along the career path, in the hiring

^{‡‡} It should be noted that there are some outliers. In particular, Eastern European countries, such as Romania or Russia, have a high share of women in their research institutions, but do not score high in the "Global Gender Gap Index." The "World Values Survey" also reveals that around 28% in Romania and almost 60% in Russia (strongly) agree on the statement that men make better political leaders than women, which does not point toward a high perception of gender equality. Although these countries have high shares of women, it does not reflect gender equality, but may rather show the opposite with the high share of women possibly owing to the historical past of the country, when economics was regarded as a minor subject in former Soviet countries.

Table 9. Percentage of women on research ranking (United States only)

Variables	% of Women					
	(1)	(2)	(3)	(4)	(5)	(6)
	All levels	All levels	Senior level	Senior level	Entry level	Entry level
Ranking	0.0419*** (0.00851)	0.0420*** (0.00975)	0.0395*** (0.0119)	0.0499*** (0.0159)	0.0242 (0.0184)	0.0271*** (0.00781)
Constant	21.17*** (1.032)	21.16*** (0.975)	15.78*** (1.189)	14.75*** (1.591)	29.66*** (1.863)	29.37*** (0.780)
Observations	82	82	82	82	80	80
Individual positions	11,265	11,265	4,130	4,130	2,735	2,735
Adjusted R^2	0.193	0.213	0.129	0.221	0.010	0.026
State FE		27		27		26

The observations number denotes the number of US-American institutions within our main dataset (i.e., 238 universities and business schools globally). In the specification with state fixed effects (FE), we control for states in the United States. There are at least five identified positions per institution. Senior level refers to full professors and associate professors; entry level refers to assistant professors and lecturers. Robust SEs are in parentheses. *** $P < 0.01$.

Table 10. Number of institutions among top universities and business schools

Category	Europe	United States
Top 50	16	30
Top 100	46	43
Top 150	72	60
Top 200	104	70
Top 238	122	82

process, or different perceptions on own possibilities of success shaped by experiences of others might play an important role.

Many institutions, including many economic associations,^{§§} have taken explicit measures to promote the careers of female economists, undertaking efforts to reach more gender-balanced hiring and promotion decisions. We are not yet in the position to judge all these alternatives comprehensively and would hope that collecting more data, potentially through job-market organizations, to better understand hiring procedures could help evaluate these measures. Another possibility is that women do apply to, but do not get selected by, the good research institutions or drop out quickly after being hired and potentially move to less good institutions, which, again, could be tested with such data.

There is unfortunately evidence that policies that are seemingly in support of women's careers may not result in desired outcomes (57). Thus, we may need to continue analyzing and looking carefully at more microlevel data to get the full picture. But there is also increasing evidence that women tend to be evaluated more negatively on subjective performance dimensions: Women get less credit for research teamwork (38), receive more critical questions in seminars (27), and get merit-based scholarships less often, but excel if they do (71). In management, given the same objective performance, they get lower ratings about their potential (72),

^{§§}There are several committees of economic associations around the globe focusing on the representation of women and minorities in the economics profession and neighboring disciplines such as finance: The Academic Female Finance Committee of the American Finance Association, the Committee on the Status of Minority Groups in the Economics Profession of the AEA, CSWEP (inaugurated by the AEA in 1972), the Canadian Women Economists Network/Réseau de Femmes Économistes, the Women in Economics Committee of the EEA, the Women's Committee of the Royal Economic Society in Great Britain, and many more. These committees aim in documenting the status of women in the profession and offer networking events or mentoring projects to fight the underrepresentation of women in tenured positions.

Table 11. Percentage of women on research ranking and regions (main dataset)

Variables	% of Women					
	(1)	(2)	(3)	(4)	(5)	(6)
	All levels	All levels	Senior level	Senior level	Entry level	Entry level
Ranking	0.0275*** (0.0079)		0.0346*** (0.00976)		0.0117 (0.0133)	
United States	-4.797*** (1.141)	-7.844*** (2.06)	-3.957*** (1.278)	-4.997* (2.294)	-4.653** (2.054)	-7.694* (3.309)
Rank × United States		0.0419*** (0.00849)		0.0395*** (0.0119)		0.0242 (0.0184)
Rank × Europe		0.0149 (0.0126)		0.0303** (0.0151)		-0.00218 (0.0191)
Constant	27.41*** (1.301)	29.02*** (1.785)	20.23*** (1.441)	20.78*** (1.963)	35.56*** (2.189)	37.35*** (2.736)
Observations	201	201	199	199	175	175
Individual positions	29,480	29,480	11,391	11,391	6,568	6,568
Adjusted R ²	0.122	0.128	0.108	0.105	0.027	0.026

The observations number denotes the number of institutions in our main dataset (i.e., 238 universities and business schools globally). There are at least five identified positions per institution. For the regions, Europe is the omitted category. Senior level refers to full professors and associate professors; entry level refers to assistant professors and lecturers. Robust SEs are in parentheses. *P < 0.1; **P < 0.05; ***P < 0.01.

and get discouraged by their managers in applying for promotions (73).

In general, the main purpose of this paper is a positive one. Still, the normative implication of these and our findings are clear: Research institutions should do their utmost to establish fairness in the evaluation of candidates. Similarly, initiatives like mentoring programs of the EEA and the AEA and gender parity in seminars and conferences may increase visibility and reduce selection bias. Because our web-scraping algorithm collects data on these institutions, the resulting panel dataset will, in the long run, allow us to track progress over time. It thereby helps to identify possible reasons for female underrepresentation and how the status of women in the economics profession evolves. To increase transparency, we believe that it would be useful to give research institutions incentives to monitor and publicize their situation.

Method and Data

Web-Scraping Algorithm. The dataset and the underlying technicalities are described in detail in ref. 74. Our algorithm daily monitors URLs of institutions contributing to research in economics. We used a list of institutions collected by RePEc, which are mostly universities, but also business schools, central banks, and governmental or multinational institutions. After manually identifying the respective institutions' websites that post information about affiliated researchers, the algorithm then identifies the individuals listed on these websites and, where available, records the individuals' position titles. Based on the information found, we classified gender in two categories (female and male) via first names and a gender-identification software program analyzing pictures of the individuals. This was done provided that the uncertainty given these two pieces of information was sufficiently low (74). Otherwise, we considered the person's gender as unidentified.

After collecting the data, we carefully separated academic from nonacademic staff. Since our sample contains a large variety of countries, the titles and position descriptions the individuals have differ substantially, not only between countries, but also within countries. To make positions comparable, we classified and translated our obtained titles (more than 1,000) into a general hierarchy of academic positions: (Full) Professor, Associate Professor, Assistant Professor, Lecturer, Research Fellow, and Research Associate. Since this classification resembles the academic title structure in the United States or Canada, for the North American institutions, this classification is relatively straightforward. However, for other regions of the world, especially Europe, it is quite difficult: first, owing to different languages, and second, to many different titles in different countries

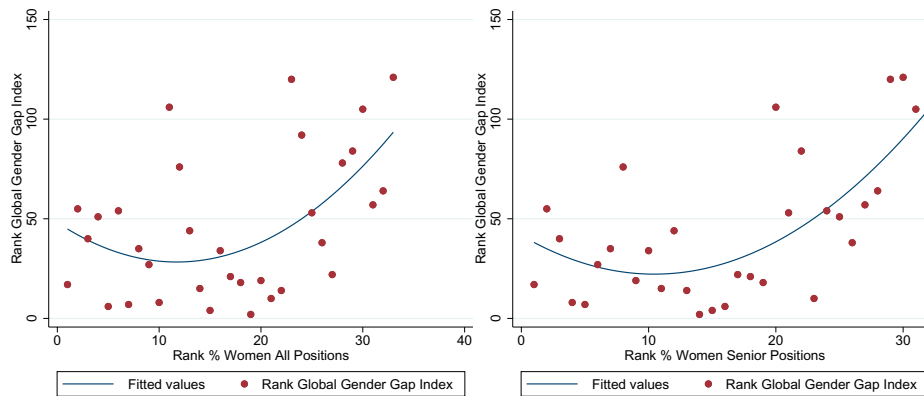


Fig. 4. Correlation between gender gap index and share of women.

and even within countries between different institutions. These distinctions are sometimes blurred, which gives rise to some ambiguity. A few examples may be useful.

The position “Maître de Conférences” in France is a tenured position at the entry level, hence comparable to an assistant professor or lecturer. Some researchers, however, translate the title into associate professor. In turn, lecturers can be members of faculty or be adjunct faculty. Research fellows represent researchers who are full-time active, for instance, in the French Centre National de la Recherche Scientifique, or represent emeritus or part-time researchers. Further, while associate professors are very common in some regions of the world—for instance, the United States—this title is not very prevalent in some European countries—for instance, Germany.

To circumvent these issues and enhance comparability, in our data analyses, we grouped assistant professors and lecturers together as entry level. Full professors and associate professors were grouped as senior level. Research associates are at the beginning of their academic career; the largest proportion on this level are PhD students. Research fellows, a very broad category, are, for instance, honorary, adjunct, or visiting faculty and emeriti, as well as professors of practice. Postdoctoral researchers were also categorized as research fellows since in some cases, their postdoctoral appointment is aiming at continuing the academic career path, while in other cases, it is not directly linked with this goal. The translation of the multitude of different titles into our position categories almost inevitably leads to imperfect compatibility, but we have done our best to bring down measurement errors wherever possible.

Finally, and importantly, for the top 300 institutions, we contacted the persons responsible for managing the institutions and websites to verify the results of this work and provide us with feedback on positions and gender, and we also asked them to update our list concerning people who entered and those who left. They received an easy-to-use, web-based list of the positions and persons we identified. We monitored visits of these lists and sent reminders.^{¶¶} Hence, while the data may be subject to some remaining measurement error, we are confident that the big picture is quite accurate.

Importantly, we relied on RePEc’s definition of “institutions contributing to the field of economics.” Therefore, in the dataset, we do not only have institutions that primarily contribute to economics, but also to neighboring research areas like finance, management, marketing, or psychology. While this leads to some measurement error, the standard classification approach using economics departments only would exclude a large group of economists as previously described. Since this also includes institutions that are not research-oriented and there is large heterogeneity between the institutions, we focused on the top 300

institutions in our analysis. We determined the top 300 global institutions in terms of research output, as measured by RePEc as of January 2020 (75).^{##}

Description of Our Dataset. Our entire database consisting of all positions collected by the algorithm sums up to 186,243 individual positions in 2,032 institutions as of December 21, 2020. This might include nonacademic staff or individuals, for which information on gender and/or position is missing. Hence, for our full database, we only included individuals for which we have information on both gender and position, which are 96,044 individuals in 1,383 institutions. Out of these positions, we have data on the top 300 research institutions. After excluding research departments of central banks or federal banks, as well as research networks and organizations, such as NBER or CEPR, our main dataset then consists of 238 universities and business schools.

Data Availability. Some study data are available (restrictions apply to data at the individual level, such as names, photos, job titles, and institution affiliations). Due to data protection law (General Data Protection Regulation [GDPR]), individual-level data cannot be publicly disclosed. Aggregate data at the institutional level, which do not contain any restricted data, are provided as [Datasets S1–S3](#). These data allow one to replicate the main results of the research paper. Data on the individual level can be made available in compliance with the GDPR on request to the authors of the paper.

ACKNOWLEDGMENTS. We thank the Women in Economics Committee of the European Economic Association for financially supporting the collection of data and its members for many insightful discussions; and seminar and conference participants, in particular at the Annual Meeting of the Verein für Socialpolitik 2019 in Leipzig, the Joint Bank of England, Federal Reserve Board and European Central Bank Conference on Gender and Career Progression at the European Central Bank in Frankfurt, the EEA Annual Meeting 2017, a meeting of the Royal Dutch Economic Association, the Center for Leadership and Behavior in Organizations Workshop on Big Data, and the University of Tilburg. Moreover, we also thank Christian Zimmermann for providing data from RePEc’s database and Graziella Bertocchi. Furthermore, we thank Tugyan Cengic, Isabel Münch, Pascal Scheu, and Tristan Stahl for excellent research assistance. E.A. acknowledges financial support from Toulouse School of Economics–Institute for Advanced Study in Toulouse funding from the French National Research Agency under the Investments for the Future (Investissements d’Avenir) Program Grant ANR-17-EURE-0010. G.F. acknowledges support from the Goethe Fellowship of the Forschungskolleg Humanwissenschaften. Finally, we express our gratitude to hundreds of dean’s offices for verifying and correcting our data work.

^{¶¶} A total of 166 institutions visited the website at least once, carrying out a total of 838 position-removal requests, 448 requests to correct the gender the algorithm identified, and 1,941 requests to change the hierarchical definition of positions we found. While in particular, the last number looks substantial, it is mainly driven by a few institutions that communicated a large number of corrected positions (maximum reported number 165), which were not present on their websites (74 institutions reported changes in positions, with an average of 6.6 remarks per institution and a median of 16.5).

^{##} Because the list is updated monthly, the ranking of institutions and whether they are within the top 300 or not are subject to change. Therefore, we chose the list as of January 2020 and fixed it, as we also contacted the departments to confirm our gathered data. For consistency, we also checked the list as of March 30, 2020. Roughly 10 institutions changed (some became part of the top 300 while others are no longer in it), mostly institutions having the lower ranks, which shows that our picture of top research institutions is quite accurate.

1. S. Lundberg, J. Stearns, Women in economics: Stalled progress. *J. Econ. Perspect.* **33**, 3–22 (2019).
2. K. Buckles, Fixing the leaky pipeline: Strategies for making economics work for women at every stage. *J. Econ. Perspect.* **33**, 43–60 (2019).
3. S. Keynes, Women and economics. *Economist*, 19 December 2017. <https://www.economist.com/christmas-specials/2017/12/19/women-and-economics>. Accessed 10 May 2019.
4. CSWEP, "The 2017 report on the status of women in the economics profession" (Annu. Rep., Committee on the Status of Women in the Economics Profession, American Economic Association, Pittsburgh, 2017).
5. CSWEP, "The 2019 report on the status of women in the economics profession" (Annu. Rep., Committee on the Status of Women in the Economics Profession, American Economic Association, Pittsburgh, 2019).
6. B. Casselman, J. Tankersley, J. Smialek, A year after a #MeToo reckoning, economists still grapple with it. *NY Times*, 7 January 2020. <https://www.nytimes.com/2020/01/07/business/economy/economics-race-gender.html>. Accessed 5 May 2021.
7. B. Casselman, J. Tankersley, Female economists push their field toward a #MeToo reckoning. *NY Times*, 10 January 2019. <https://www.nytimes.com/2019/01/10/business/economics-sexual-harassment-metoo.html>. Accessed 5 May 2021.
8. J. Wolfers, Why women's voices are scarce in economics. *NY Times*, 2 February 2018. <https://www.nytimes.com/2018/02/02/business/why-womens-voices-are-scarce-in-economics.html>. Accessed 5 May 2021.
9. G. Tetlow, Where are all the female economists? *Financial Times*, 11 April 2018. <https://www.ft.com/content/0e5d27ba-2b61-11e8-9b4b-bc4b9f08f381>. Accessed 5 May 2021.
10. Economist, Economics is uncovering its gender problem. *Economist*, 23 March 2019. <https://www.economist.com/leaders/2019/03/21/economics-is-uncovering-its-gender-problem>. Accessed 5 May 2021.
11. I. Persson, "Genre et économie en suède" in *Le Travail du Genre: Les Sciences Sociales du Travail à l'Épreuve des Différences de Sexe*, J. Lauffer, C. Marry, M. Maruani, Eds. (Éditions La Découverte, Paris, 2003), pp. 259–273.
12. M. Corsi, C. D'Ippoliti and G. Zaccchia, Gendered careers: women economists in Italy. <https://diprot.ulb.ac.be/dspace/bitstream/2013/244040/3/wp17003.pdf>. Accessed 5 May 2021.
13. G. Friebel, N. Fuchs-Schündeln, A. Weinberger, Statusbericht zum Frauenanteil in der Volkswirtschaftslehre an deutschen Universitäten. *Perspektiven Wirtschaftspolitik* **22**, 142–155 (2021).
14. D. Blackaby, A. L. Booth, J. Frank, Outside offers and the gender pay gap: Empirical evidence from the UK academic labour market. *Econ. J. (Lond.)* **115**, F81–F107 (2005).
15. D. D. K. Gamage, A. Sevilla, S. Smith, Women in economics: A UK perspective. *Oxf. Rev. Econ. Policy* **36**, 962–982 (2021).
16. American Economic Association, CSWEP: Annual survey. <https://www.aeaweb.org/about-aea/committees/cswep/survey/annual-survey>. Accessed 4 October 2021.
17. S. Khan, Women in the economics profession. *J. Econ. Perspect.* **9**, 193–206 (1995).
18. I. E. Broder, Professional achievements and gender differences among academic economists. *Econ. Inq.* **31**, 116–127 (1993).
19. J. M. McDowell, L. D. Singell, J. P. Ziliak, Cracks in the glass ceiling: Gender and promotion in the economics profession. *Am. Econ. Rev.* **89**, 392–396 (1999).
20. J. M. McDowell, L. D. Singell, J. P. Ziliak, Gender and promotion in the economics profession. *Ind. Labor Relat. Rev.* **54**, 224–244 (2001).
21. M. Ward, The gender salary gap in British academia. *J. Appl. Econ.* **33**, 1669–1681 (2001).
22. O. Bandiera, "The gender and ethnicity earnings gap at LSE" (Tech. Rep., London School of Economics, London, 2016).
23. D. Ginther, S. Khan, Women in economics: Moving up or falling off the academic career ladder? *J. Econ. Perspect.* **18**, 193–213 (2014).
24. S. J. Ceci, D. K. Ginther, S. Kahn, W. M. Williams, Women in academic science: A changing landscape. *Psychol. Sci. Public Interest* **15**, 75–141 (2014).
25. A. H. Wu, Gendered language on the economics job market rumors forum. *AEA Pap. Proc.* **108**, 175–179 (2018).
26. J. B. Shinall, Dealing with sexual harassment. CSWEP News, 2018. <https://www.aeaweb.org/content/file?id=6769>. Accessed 5 May 2021.
27. P. Dupas, A. Sasser Modestino, M. Niederle, J. Wolfers; The Seminar Dynamics Collective, Gender and the dynamics of economics seminars. National Bureau for Economic Research [Preprint] (2021). <https://www.doi.org/10.3386/w28494> (Accessed 14 October 2021).
28. L. MacNell, A. Driscoll, A. N. Hunt, What's in a name: Exposing gender bias in student ratings of teaching. *Innovative High. Educ.* **40**, 291–303 (2015).
29. K. L. Milkman, M. Akinola, D. Chugh, What happens before? A field experiment exploring how pay and representation differentially shape bias on the pathway into organizations. *J. Appl. Psychol.* **100**, 1678–1712 (2015).
30. J. M. Madera, M. R. Hebl, R. C. Martin, Gender and letters of recommendation for academia: Agentic and communal differences. *J. Appl. Psychol.* **94**, 1591–1599 (2009).
31. T. Schmader, J. Whitehead, V. H. Wysocki, A linguistic comparison of letters of recommendation for male and female chemistry and biochemistry job applicants. *Sex Roles* **57**, 509–514 (2007).
32. S. Allgood et al., "AEA professional climate survey: Final report" (Rep., American Economic Association Committee on Equity, Diversity, and Professional Conduct, Pittsburgh, 2019).
33. E. Hengel, Publishing while female. Are women held to higher standards? Evidence from peer review". <https://www.econ.cam.ac.uk/research-files/repec/cam/pdf/cwpe1753.pdf>. Accessed 14 October 2021.
34. M. Krawczyk, M. Smyk, Author's gender affects rating of academic articles: Evidence from an incentivized, deception-free laboratory experiment. *Eur. Econ. Rev.* **90**, 326–335 (2016).
35. S. Grossbard, T. Yilmazer, L. Zhang, The gender gap in citations of articles published in two demographic economics journals. *Rev. Econ. Househ.* **19**, 677–697 (2021).
36. D. Card, S. DellaVigna, P. Funk, N. Iriberry, Are referees and editors in economics gender neutral? *Q. J. Econ.* **135**, 269–327 (2020).
37. L. Hospido, C. Sanz, Gender gaps in the evaluation of research: Evidence from submissions to economics conferences. *Oxf. Bull. Econ. Stat.* **83**, 590–618 (2021).
38. H. Sarsons, Recognition for group work: Gender differences in academia. *Am. Econ. Rev.* **107**, 141–145 (2017).
39. A. Boschini, A. Sjögren, Is team formation gender neutral? Evidence from coauthorship patterns. *J. Labor Econ.* **25**, 325–365 (2007).
40. J. M. McDowell, L. D. Singell, M. Stater, Two to tango? Gender differences in the decisions to publish and coauthor. *Econ. Inq.* **44**, 153–168 (2006).
41. W. M. Williams, S. J. Ceci, National hiring experiments reveal 2:1 faculty preference for women on STEM tenure track. *Proc. Natl. Acad. Sci. U.S.A.* **112**, 5360–5365 (2015).
42. E. Reuben, P. Sapienza, L. Zingales, How stereotypes impair women's careers in science. *Proc. Natl. Acad. Sci. U.S.A.* **111**, 4403–4408 (2014).
43. L. A. Rivera, When two bodies are (not) a problem: Gender and relationship status discrimination in academic hiring. *Am. Sociol. Rev.* **82**, 1111–1138 (2017).
44. M. Bagues, M. Sylos-Labini, N. Zinovyeva, Does the gender composition of scientific committees matter? *Am. Econ. Rev.* **107**, 1207–1238 (2017).
45. L. Hipp, Do hiring practices penalize women and benefit men for having children? Experimental evidence from Germany. *Eur. Sociol. Rev.* **36**, 250–264 (2020).
46. L. Hospido, L. Laeven, A. Lamo, The gender promotion gap: Evidence from central banking. *Rev. Econ. Stat.* (2020).
47. S. J. Ceci, W. M. Williams, Women have substantial advantage in STEM faculty hiring, except when competing against more-accomplished men. *Front. Psychol.* **6**, 1532 (2015).
48. G. Azmat, V. Cuiñat, E. Henry, Gender promotion gaps: Career aspirations and workplace discrimination. https://cepr.org/active/publications/discussion_papers/dp.php?dpno=14311. Accessed 14 October 2021.
49. G. Azmat, R. Ferrer, Gender gaps in performance: Evidence from young lawyers. *J. Polit. Econ.* **125**, 1306–1355 (2017).
50. C. Hilmer, M. Hilmer, Are there gender differences in the job mobility patterns of academic economists? *Am. Econ. Rev.* **100**, 353–357 (2010).
51. K. N. Rask, E. M. Bailey, Are faculty role models? Evidence from major choice in an undergraduate institution. *J. Econ. Educ.* **33**, 99–124 (2002).
52. F. D. Blau, J. M. Currie, R. T. Croson, D. K. Ginther, Can mentoring help female assistant professors? Interim results from a randomized trial. *Am. Econ. Rev.* **100**, 348–342 (2010).
53. D. K. Ginther, J. M. Currie, F. D. Blau, R. T. A. Croson, Can mentoring help female assistant professors in economics? An evaluation by randomized trial. *AEA Pap. Proc.* **110**, 205–209 (2020).
54. E. P. Bettinger, B. T. Long, Do faculty serve as role models? The impact of instructor gender on female students. *Am. Econ. Rev.* **95**, 152–157 (2005).
55. C. Hilmer, M. Hilmer, Women helping women, men helping women? Same-gender mentoring, initial job placements, and early career publishing success for economics PhDs. *Am. Econ. Rev.* **97**, 422–426 (2007).
56. Z. H. Jurajulova, J. J. McCluskey, R. C. Mittelhammer, Work-life policies and female faculty representation in US doctoral-granting economics departments. *Ind. Relat. J.* **50**, 168–196 (2019).
57. H. Antecol, K. Bedard, J. Stearns, Equal but inequitable: Who benefits from gender-neutral tenure clock stopping policies? *Am. Econ. Rev.* **108**, 2420–2441 (2018).
58. N. Zinovyeva, M. Bagues, The role of connections in academic promotions. *Am. Econ. J. Appl. Econ.* **7**, 264–292 (2015).
59. C. Porter, D. Serra, Gender differences in the choice of major: The importance of female role models. *Am. Econ. J. Appl. Econ.* **12**, 226–254 (2020).
60. L. Del Carpio, M. Guadalupe, More women in tech? Evidence from a field experiment addressing social identity. *Manage. Sci.*, 10.1287/mnsc.2021.4035 (2021).
61. A. M. May, M. G. McGarvey, R. Whaples, Are disagreements among male and female economists marginal at best? A survey of AEA members and their views on economics and economic policy. *Contemp. Econ. Policy* **32**, 111–132 (2013).
62. G. S. Becker, *The Economics of Discrimination* (University of Chicago Press, Chicago, 2010).
63. R. C. M. Beyer, F. Smets, Labour market adjustments and migration in Europe and the United States: How different? *Econ. Policy* **30**, 643–682 (2015).
64. A. C. d'Addio, M. C. Cavalleri, Labour mobility and the portability of social rights in the EU. *CEifo Econ. Stud.* **61**, 346–376 (2015).
65. K. A. Bryan, Young "stars" in economics: What they do and where they go. *Econ. Inq.* **57**, 1392–1407 (2019).
66. E. P. Lazear, S. Rosen, Male-female wage differentials in job ladders. *J. Labor Econ.* **8**, S106–S123 (1990).
67. C. Zimmermann, Academic rankings with RePEc. *Economics* **1**, 249–280 (2013).
68. E. Auriol, G. Friebel, S. Wilhelm, "Women in European economics" in *Women in Economics*, S. Lundberg, Ed. (CEPR Press, London, 2020), pp. 26–30.
69. P. Charléty, D. Romelli, E. Santacreu-Vasut, Appointments to central bank boards: Does gender matter? *Econ. Lett.* **155**, 59–61 (2017).
70. World Economic Forum, "Global gender gap report 2020" (Tech. Rep., World Economic Forum, Geneva, 2019); <https://www.weforum.org/reports/gender-gap-2020-report-100-years-pay-equality>.
71. E. Nano, U. Panizza, M. Viarengo, A generation of Italian economists. <https://docs.iza.org/dp14368.pdf>. Accessed 7 January 2022.
72. A. Benson, D. Li, K. Shue, <https://danielle-li.github.io/assets/docs/PotentialAndTheGenderPromotionGap.pdf>. Accessed 7 January 2022.
73. I. Haeghele, Talent hoarding in organization. SSRN [Preprint] (2022). <http://dx.doi.org/10.2139/ssrn.3977728> (Accessed 7 January 2022).
74. G. Friebel, S. Wilhelm, The women in European economics monitoring tool: Technical description. <https://women-economics.com/download/Friebel.Wilhelm.2019.Women.in.Economics.Technical.Paper.pdf>. Accessed 14 October 2021.
75. RePEc, Data from "Top 10% economic institutions (last 10 years publications), as of January 2020." IDEAS. <https://ideas.repec.org/top/top.inst.all10.html>. Accessed 1 January 2020.