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Gendered competitive practices in economics: A multi-layer model of women's underrepresentation

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Gendered Competitive Practices in Economics

A Multi-Layer Model of Women's Underrepresentation

Theresa Hager and Stephan Pühringer

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Abstract

Economics holds a unique position in terms of the severity and persistence of gender imbalances and the underrepresentation of female researchers within the social sciences. There exist various reasons for this fact, as well as a variety of channels through which these imbalances are perpetuated. To this end, there has not been a comprehensive review of the existing and well-researched levels of this underrepresentation. By systematically reviewing the literature on the facts and reasons for the low proportion of women in the profession and structuring them in our multi-level model, we not only make the multitude of channels visible but can also analyze their interplay. Moreover, we argue that efforts to address women's underrepresentation are impeded because economics as a discipline is particularly susceptible to competitive evaluation and selection practices. Men and women perceive, perform in, and make sense of competitive processes in their own ways, so that men, through their socialization as “competitive selves”, are more likely to succeed in an academic system heavily based on competition and rankings; women, in this case, are endowed with an inappropriate set of competitive strategies and interpretations that, nevertheless, ultimately inform their academic practices. Enriching our multi-level model with this perspective on gendered competitive practices in academia, allows us to offer a novel contribution to the debate on the causes of the persistent gender imbalance in the field. Drawing from feminist standpoint theory, we argue that such an endeavor is not only important, and interesting in its own right, but also highly relevant to the reproduction of gender imbalances and gender discrimination in society at large; if a diversity of views and opinions is not represented within its halls, economics runs the risk to inform policy lopsided. More precisely, we argue that our result has some nontrivial implications given the rise of competitive formats in academia and thus is particularly alarming for science policies aiming at gender balances in academia.

1 Introduction: Still the dis(male) science

“Feminist theory raises questions about the adequacy of economic practice not because economics is in general too objective, but because it is not objective enough. Various value-laden and partial – and, in particular, masculine- gendered – perspectives on subject, model, method, and pedagogy have heretofore been mistakenly perceived as value free and impartial in economics, as in other scientific disciplines.” (Nelson, 1995, p. 132)

The male-centricity of economics attested to in the quote not only distorts the scientific knowledge produced by the discipline and thus its policy advice, but also exacerbates the problem of women's underrepresentation. Looking at current statistics on the proportion of female economists in academia, Julie Nelson's lament still seems valid. Quite tellingly, in a recent report by the Committee on the Status of Women in the Economics Profession (2020), part of the American Economics Association (AEA), the authors claim that "in 2019, the proportion of full professors in Ph.D.-granting economics departments who are women reached an all-time high of 14.5 percent" (CSWEP, 2020, p. 728). While there has been some success in efforts to increase the proportion of female economists, from students to faculty, since the CSWEP was founded in 1971 (when the proportion of female economics professors was 2.4% and the proportion of new PhDs awarded to women was 7.6%), the data show that women (and other minority groups) are still severely underrepresented at all levels of the academic ladder in economics. Women make up just over a third of Ph.D. students, about 30% of assistant professors, and about a quarter of associate professors. And despite an increase in the share of female economists, economics is now one of the most male-dominated disciplines, even compared to STEM (science, technology, engineering, mathematics) fields (Ceci et al., 2014), where the share of female students and researchers is now at par or above the average in economics (Bayer & Wilcox, 2019; Singh, 2020). In the social sciences and humanities the share of female students and researchers on all levels has always been higher than in economics, however also the absolute rise in the number of female scholars was higher than in economics. In a much debated comparative study Ceci et al. (2014, fig. 4) show that for instance the share of female tenured assistant professors in economics has risen from about 7% in 1973 to about 28% in 2009, compared to a rise from about 16% to about 48% in the social sciences. Similar studies for the EU have shown that along the academic career path, the share of female economists declines from about 40% of students to about 20% of professors (Hoover & Washington, 2021) - a phenomenon termed the 'leaky pipeline'. Yet, the increasing trend of women entering economics, driven by a general increase in the share of women in academia, has leveled off in the last decade. There are several indications that the leaky pipeline for women's academic careers is becoming even leakier (CSWEP, 2020). Similarly, a recent study by Ginther and Kahn (2021) reports that female economists are 15% less likely to receive tenure than their male counterparts, after controlling for several forms of academic performance indicators. Moreover, this form of direct sexist discrimination was found only in economics and not in any other discipline, from the natural sciences

to the social sciences and humanities. So why is this the case and what could lead to more (gender) diversity¹ in economics?

These questions have not only been at the center of a large and growing number of studies in different academic fields, but have also puzzled people involved in science policy and anti-discrimination policy. Particularly given the general trend of educational expansion bringing more women scientists, and especially economists, into universities. Against the background of these debates, the contribution of this paper is twofold: On the one hand, we aim to provide a structured overview of recent debates by distinguishing three main channels of women's underrepresentation in economics. On the other hand, we argue that the comparatively low success of anti-discrimination policies in academic economics is also related to the specific importance of gendered competitive research practices. More specifically, we argue that the interrelated processes of quantification and metrization of research performance indicators have led to a far-reaching competitization, i.e. the expansion of competitive formats of academic knowledge production in general. While these trends can be observed in several disciplines, economics is particularly sensitive to competition with an exceptional relevance of quantitative evaluation methods and technologies, especially rankings, compared to most other scientific disciplines (Hammarfelt & Rushforth, 2017; Heckman & Moktan, 2020; Reymert, 2020).

The last decades have seen a far-reaching quantification of research evaluation in academia, which has consequently led to an intensification of competition between regional and national knowledge centers, research institutions and, last but not least, individual researchers. Several studies in recent years have documented the rise of competitive formats from the macro to the micro level of knowledge production and the increasing relevance of research performance indicators such as the journal impact factor, citation scores, research output indicators, etc. (Hammarfelt et al., 2017; Hasse & Krücken, 2013; Musselin, 2018). More specifically, these trends include (i) the growing importance of journal impact factors in the distribution of academic prestige and as a quality criterion for individual research; (ii) the regular publication and use of academic rankings, both at the level of individual researchers and at the level of institutions, and the resulting competition among scholars and institutions; and (iii) the use of bibliometric indices in the academic job market and the resulting competition among (especially young) researchers. This rise of the "metric tide" and the negative consequences associated with it have raised several concerns: Critics have emphasized that the focus on purely quantitative metrics in a "publish or perish" research environment has exacerbated the projectification of science or the replication crisis (Felt, 2009; Krücken, 2021; Musselin, 2018; Schweiger, 2023).

¹ This paper focuses on the underrepresentation of women. However, at least since Krenshaw, it has been clear that women's concerns are closely linked to other non-gendered experiences of discrimination. Therefore, intersectionality plays an important role here and should be considered.

That the representation of minorities is also an issue has been demonstrated by the Committee on the Status of Minority Groups in the Economics Profession, established in 1968 as part of the AEA. Tellingly, Hoover and Washington (2021) as well as Bayer and Wilcox (2019) point to a significant gender imbalance affecting women within underrepresented minority groups. Similarly, Schultz and Stansbury (2022) report a lack of socioeconomic diversity in terms of highest parental educational attainment among economics PhDs compared to other disciplines. Kvangraven and Kesar (2022) examine the potential for decolonizing economics and attest that the Eurocentrism of economics and its scholars complicates the task.

Furthermore, it has been criticized that rankings, in particular, incentivize strategic behavior on the part of researchers and academic institutions alike, thus hampering knowledge development, interdisciplinarity, and innovative research paths beyond the mainstream.

While quantitative performance indicators and competitive rankings of research output are a general development in academic organization rather than a specific phenomenon in economics, rankings and competitive formats are particularly important for stratification mechanisms in economics (e.g., Hammarfelt, 2017). Discourses on research excellence and quality dominate in economics. Here, various forms of rankings play a central role. They make "excellence" in research and teaching visible, but they also create hierarchical orders among researchers, institutions, publication outlets, and countries. Rankings work in different directions: on the one hand, rankings evaluate *ex post* the results of research, teaching and media visibility in the past - for example, the Handelsblatt ranking in Germany or the various rankings of economists in widely circulated newspapers; on the other hand, rankings sketch and anticipate *ex ante* what "good research" (and teaching) might be by setting standards based on journal rankings (for example, the Research Excellence Framework - REF - in British universities). Moreover, impact rankings based on publications in a few "top economics journals" - especially the TOP5 - also play a crucial role in the career trajectories of young economists (Aistleitner et al., 2018; Heckman & Moktan, 2020). Furthermore, we argue that economics is particularly sensitive to processes of competition and competitive formats in academic knowledge production because competition serves as a core concept for the ontology, epistemology, and methodology of mainstream economics. Thus, competition and competitiveness not only influence the way economic knowledge production is organized, but also play an important role in the research culture and practices of economics shaping the self-perception of economists as "competitive selves" (Pühringer & Wolfmayr, 2023). This self-perception is further reinforced by the disciplines' theoretical focus on individuals and individual behavior, with reliance on self-responsibility and without social ties. The very fact that economics is assigned to the group of GEEMP (geoscience, engineering, economics, mathematics/computer science, and the physical sciences, including chemistry and physics) disciplines by Ceci et al. (2014) indicates that the organizational structure of knowledge production in economics differs from all other social sciences. In other words, although economics, by its very subject, is concerned with how the economy and the social provisioning process work, the epistemological and methodological approaches shared by contemporary mainstream economists are fundamentally different from those of other social sciences, as evidenced not least by the low level of interdisciplinary interaction, or even ignorance, of empirical findings and methodological advances in other social sciences (Aistleitner et al., 2019; e.g. Fourcade et al., 2015).

We argue that the dominance of a highly competitive research culture and practice in economics has some far-reaching consequences for gender relations in the discipline. Notwithstanding several well-researched channels that perpetuate the underrepresentation of women in economics, the particularly strong influence of quantitative performance indicators, and thus the competitive nature of academic knowledge production in economics, has undermined many of the attempts to establish anti-discriminatory policies aimed at increasing

the proportion of women in this field. In other words, institutional policies aimed at closing the gender gap in economics are counteracted by the effects of certain norms and practices that are particularly relevant in the discipline. In what follows, therefore, we first introduce what we mean by gendered competitive practices. We then sketch our model of the underrepresentation of women in economics and discuss the various channels and their interaction with our concept of gendered competitive practices and competitization thereof. Finally, we conclude and discuss the importance of selection and indoctrination.

2 Gendered competitive practices

What we propose is to add another channel to the literature on the underrepresentation of women in economics. However, while this channel also has a direct impact on the underrepresentation, it enters the discussion by feeding into the phenomenon of competitization, which, as discussed above, is particularly prevalent in economics. Because competition and competitive formats, including rankings, impact factors and generally quantitative evaluation methods, play such an important role in economics, it is particularly important for scholars in the field to be engaged in these competitions and, at the same time, to be able to compete successfully. Simultaneously, due to the quantitative dominance of men in the field, competition plays a really important role not only formally, but also informally as a structuring element of social interaction. In what follows, we argue that because of the gendered socialization of men and women, they differ in how they perceive, act in and make sense of competition; that is, how they percept competitive situations; how they behave in competitive formats; whether they think of themselves as competitive; what strategies they choose and how successful they are; in short, not only is socialization gendered, but so are competitive practices. There is a large body of research that provides evidence for the existence of gendered competitive practices. Generally, scholars argue that while competition and competitiveness are central to male peer culture, they are not key to female peer culture (e.g. Lee et al., 2016).

Most of this research comes from behavioral studies conducted by economists, where it is becoming increasingly interesting to find behavioral differences between men and women (for a comprehensive review see Carpenter et al., 2018, p. 171; and Niederle & Vesterlund, 2011; Sent & van Staveren, 2019). Niederle and Vesterlund (2008) find that women are on average less willing to enter a competition, even after controlling for confidence, feedback aversion and risk. This finding is qualified by Carpenter et al. (2018) who argue that women actually shy away from interpersonal competition compared to intrapersonal competition. Balafoutas and Sutter (2019) report that competition under uncertainty (where both the number of competitors and the number of participants who win the competition are not revealed) favors men in both entry and performance; at the same time, an affirmative action guarantee that ensures equal representation of women among winners leads to an increase in female participation. Men also tend to show an increased propensity to seek challenges after a previous experience of loss (Buser et al., 2022), and are generally more likely to enter competitions, even after controlling for skill level (Datta Gupta et al., 2013). Flory et al. (2015) found that men are more likely to pursue job opportunities that offer competitive compensation structures, which is

consistent with Czibor et al.'s (2020) finding that male students tend to experience an improvement in their exam scores when subjected to ranked grading systems, while female students do not experience such an improvement. Finally, Lee et al. (2016) suggest that women, on average, have a lower propensity to engage in workplace competition than men. Furthermore, they claim that women are more likely to experience negative reactions when they display competitive behavior. More generally, in their review, Sent and van Staveren (2019) highlight the interrelationship between competitiveness/competitive behavior and overconfidence observed in behavioral studies. However, they show that the statistical power of these studies is limited and that they provide mixed results.

As Nelson (1995) famously pointed out, this strand of literature suffers from two fundamental problems. First, gender differences are more interesting than similarities, leading to confirmation bias and publication bias (Nelson, 2014). Second, and perhaps more importantly, this literature repeatedly makes explicit or implicit essentialist claims about gender differences by neglecting context and causal mechanisms (e.g., societal pressures to conform to gender roles) (Nelson, 2014; Sent & van Staveren, 2019), masking competitive behavior as inherently masculine. We do not wish to subscribe to this notion and would like to emphasize that economization, and thus competitization, is experienced not only in academia, but also in society at large. Thus, men and women are equally confronted with competition and competitive formats and have to develop practices for dealing with these formats. To make sense of gendered competitive practices and to avoid the fallacy of essentialist claims, we would like to refer to Sent and van Staveren (2019) and their feminist economics extension of Wood and Eagly's (2012) biosocial constructionist framework. This framework for making sense of gender differences distinguishes between vertical "gender division of labor from biological differences that historically mattered" (Sent & van Staveren, 2019, p. 5) and horizontal gendered processes (where gender roles resulting from the vertical dimension are located). However, while Wood and Eagly (2012) do not distinguish between gender roles and gender beliefs, Sent and van Staveren (2019) do; roles concern behavior and beliefs concern expectations about behavior (how 'real men' or 'real women' should behave), an important distinction as expectations shape economic decisions. This interplay between roles and beliefs is further reinforced by Sent and van Staveren's emphasis on asymmetric institutions that affect men and women differently as a group, with the understanding that these institutions typically favor men on average (Folbre, 1995; van Staveren, 2013):

"Men's agency is likely to include not only an individual benefit from gendered institutions that favor men over women, but also actions that protect and sustain gendered institutions that work to their benefit. Such institutions interact with agency through the internalization of gender norms through men's and women's respective socialization. [...] In other words, gendered institutions are not only constraints on behavior but also affect agency itself through attitudes and decisions in a stereotypical way, affirming communal behavior by women and agentic behavior by men." (Sent & van Staveren, 2019, pp. 5–6)

We would argue that competition is such an asymmetric institution that benefits men as a group more than women as a group. And that this institution is essentially shaped by socialization.

The literature on socialization takes a more nuanced view, aware of the influence of social norms and broader social constraints on gender (thus incorporating a feminist interpretation of the mechanisms), and adopts the common distinction between agentic (stereotypically masculine, such as risk-taking) and communal (stereotypically feminine, such as trust) behavior. The literature asserts that these behavioral traits are associated with competitive practices (Lee et al., 2016)². Agentic behavior is more conducive to hierarchical ranking because male culture values competition, as opposed to the harmony and appearance of equality valued by female peer culture (Maccoby, 1990; Schneider et al., 2011). As women are expected to behave in a more communal manner, "competitiveness is prescribed as part of the masculine gender role" (Lee et al., 2016, p. 5). The socialization process begins in early childhood, where boys' activities often emphasize competition and the pursuit of personal success and recognition, and girls' activities typically prioritize collaboration and mutual support, focusing on communal goals such as helping and encouraging each other (Rose & Asher, 2004). As Goodwin (2000) observed:

"Girls differ from boys not only in terms of the criteria they employ for making comparisons, but also in their attitudes towards the activity of ranking itself. Boys seem to openly encourage statements about relative rank in pastimes (although they of course may argue about them). However, a girl who positively assesses herself or explicitly compares herself with others may be seen as showing character and attitudes that the other girls find offensive." (p. 44)

These gendered practices continue into adulthood: research has shown that adult women tend to prioritize cooperation and minimize conflict in their same-sex relationships, while men's relationships are often characterized by a competitive pursuit of status (Moskowitz et al., 1994). In addition, similar to young girls' focus on maintaining equality, women in professional settings have been observed to engage in conversational rituals that downplay their superiority and promote a sense of egalitarianism (Tannen, 2007).

The differences in peer group structures (hierarchical vs. egalitarian), activities (competitive vs. cooperative) and relational orientation (agentic vs. communal) between the sexes have an impact on how women and men perceive competition and thus on its acceptability. As competition creates ranking hierarchies and thus disregards any equality considerations in its outcomes, it is less accepted by the female peer culture, whereas the opposite is true for the male peer culture, where competitive activities are viewed more positively. Thus, for women, engaging in competitive activities violates normative expectations and is seen as a violation of relational norms - at least in the case of same-sex relationships (Lee et al., 2016, p. 876).

² However, agentic and communal behavior are not dichotomous categories regarding the behavior of men and women. Carothers and Reis (2013) found that psychological variables (such as science inclination for example) are continuous rather than taxonic ("either...or...") dimensions.

The extent to which socialization shapes gender roles and beliefs about competitive practices, and the extent to which competition is in fact an asymmetric institution shaped by these roles and beliefs, becomes clear when behaviors in patriarchal and matrilineal societies are compared. Gneezy et al. (2009) found that in patriarchal societies, women tend to be less competitive on average than men. However, this pattern is reversed in matrilineal societies. Furthermore, the tendency for males to be more competitive is not as evident among younger children (Cárdenas et al., 2012; Dreber et al., 2014; Khachatryan et al., 2015).

The existence and consideration of gendered competitive practices can contribute significantly to the discussion on the under-representation of women in economics: if competitive practices are gendered, as the literature reviewed above shows, and if competition is particularly pronounced in economics, then this has far-reaching implications for the persistence of female representation and for gender discrimination in economics. As mentioned above, economics has been at the forefront of processes of quantification and competition in science in recent decades. The introduction and increasing importance of quantitative evaluation methods and technologies, such as journal impact factors, citation indices, but also individual and institutional rankings and metrics of academic performance, have shaped and individualized competitive pressures in economics. Finally, the development of academic social networks and platforms and the gamification of individual self-presentation have further intensified this process. While this competitive process has been shown to affect different academic disciplines to varying degrees (e.g. Hammarfelt, 2017; Pühringer & Wolfmayr, 2023), there is hardly any systematic research on how the competitive nature of academia affects the research performance of men and women (but see: van den Besselaar & Sandström, 2016). However, several questionnaire studies suggest that there are strong differences in the perception of research practices as competitive (Francke & Hammarfelt, 2022; Pühringer & Wolfmayr, 2023; Utz & Muscanell, 2018). Pühringer and Wolfmayr (2023) study of the subjectification of researchers as competitive selves through the interaction and active engagement in academic platforms and networks, they found evidence of gendered competitive practices in the case of the social sciences. Table 1 shows that women are considerably less likely to report that using Google Scholar makes them perceive other researchers as competitors, see their work more in a competitive context, and compare themselves more often with other researchers.

Table 1: Questionnaire responses to the question “Because of my use of Google Scholar ...”. Figures indicate the percentage of positive responses.

“Because of my use of Google Scholar ...”	male	female
I increase my own visibility	71%	55%
I perceive other researchers as competitors	20%	17%
it seems more important to me to be cited	63%	50%

I see my work more in a competitive context	44%	34%
I compare myself more often with other researchers	52%	37%

3 A multi-layer model of female underrepresentation

In this section, we present our model of the underrepresentation of women, which provides a condensed overview of the mechanisms and their interplay that contribute to the low representation of women in economics. The purpose of our model is not to provide an exhaustive review of the extensive literature on the mechanisms of women's underrepresentation in economics, but rather to serve as a blueprint for an analytical understanding of the problem at hand. This exercise has two important advantages: First, by disentangling the different layers and mechanisms of women's under-representation in the field, it becomes easier to implement and evaluate policies and anti-discrimination measures aimed at reducing gender inequalities. Considering the interaction of different channels can explain and predict countervailing tendencies that need to be duly taken into account. In this respect, it is useful to return to the notion of asymmetric institutions. As van Staveren and Ode Bode (2007) point out, symmetric and asymmetric institutions can operate simultaneously and do not necessarily cancel each other out, but can also legitimize each other; thus, gender equality in one area does not necessarily support gender equality in a context where other mechanisms or institutions continue to support discrimination against women. Most importantly, in an environment marked by competition, which we argue is an essentially asymmetric institution, policies that seek to counteract underrepresentation by creating a level playing field may be fruitless. The second merit of our model, then, is that it allows us to examine the impact of competition and competitization, as mediated by gendered competitive practices, on the various channels already at play. In doing so, we offer an explanation for why economics is so unique in terms of the persistence of the low share of women in the discipline as well as discrimination against women.

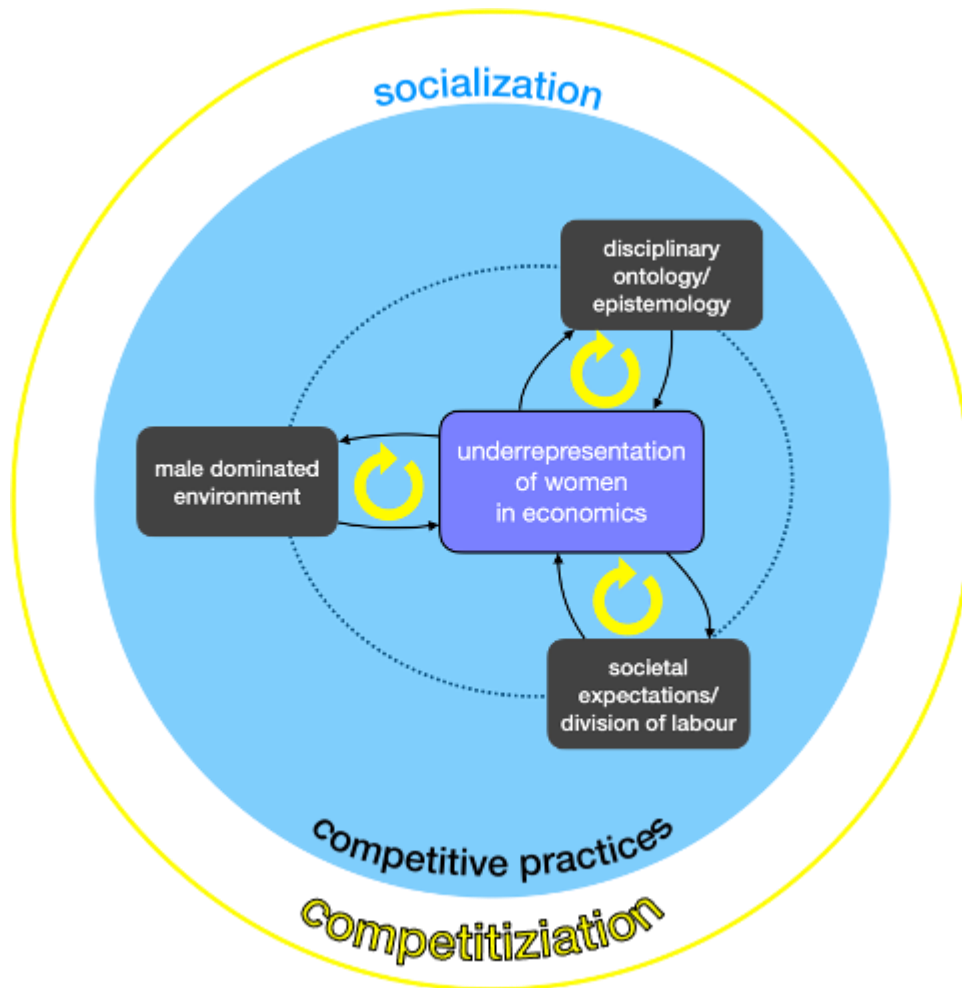


Figure 1: Channels of female underrepresentation in economics

Figure 1 illustrates our model of the underrepresentation of women in economics, where we distinguish three different channels: the male dominated environment, the disciplinary ontology/epistemology, and societal expectations regarding the division of labor. In general, most of the existing literature on women's underrepresentation focuses on one of these three channels and can thus be categorized accordingly. In addition, as shown by the dotted circle between the three channels, they affect each other and are not completely separate. Of course, not all of these channels are exclusive to economics (STEM fields, for example, are also characterized by a male dominated environment, and arguments relating to the societal expectations channel apply equally to all of science), but they do contribute to the low proportion of women in the field, as indicated by the arrows. At the same time, the low representation of women can reinforce the tendencies present in the channels; in the case of the male dominated environment, this feedback is quite obvious. What makes economics unique is the degree of competitization, which is the trend or phenomenon that underlies everything else. The arrows within the feedback of channels and underrepresentation indicate that competitization creates or exacerbates existing escalation tendencies by emphasizing the asymmetrical institution of competition. The detrimental effects are mediated by gendered competitive practices that are part of the different

socialization of men and women, which, by influencing men's and women's gender roles and beliefs, influences all other channels and mechanisms³.

What follows is an explanation of what we mean by the different channels, which should serve as categories into which the existing literature can be sorted. It is important to note that this is not yet an exhaustive review of the existing literature, but rather a selective literature review that should facilitate the main task: at the end of the description of each channel, we provide our intuition on how gendered competitive practices and competition interact with the evidence provided.

3.1 1st channel: Male dominated environment

The first channel describes the self-reinforcing mechanisms of the low share of female economists. As already shown above, despite several attempts to attract more women into studying and advancing their careers in economics, the discipline is still strongly dominated by men and thus male stereotypes. This dominance, however, manifests and perpetuates the male-centeredness of economics. Avilova and Goldin (2018) as well as Porter and Serra (2020) stress that particularly the lack of female role models as teachers, supervisors and faculty members prevents younger female economists from applying for academic positions or graduate programs in economics. Similarly Stevenson and Zlotnick (2018) report that female economists are also severely underrepresented in textbooks. Yet, this lack of female economists leads to several forms of explicit and implicit discrimination against women in economics. First, several studies have reported the persistence of male or “old-boys”-networks, irrespective of affirmative actions Byrne (2021) for instance provides some examples for the different treatment between male and female applicants for a faculty position based on what one respondent called “sponsorship”:

“... we were shortlisting for a faculty member once and actually I was the observer. And I noticed that all of the female candidates did not have what I called sponsorship, whereas many of the male candidates would have sponsorship. What is sponsorship? Sponsorship is where we would say be talking about a particular resume, and one of my colleagues would say something like, "well, I've had a phone call about this candidate from his ex supervisor, his ex-postdoc advisor and this is a really good guy." And men would receive those informal sponsorships and women wouldn't.” (Byrne, 2021)

While these observations are not only true for the field of economics, Williams and Ceci (2015) showed that contrary to many other disciplines male economists tend to favor male over female colleagues when hiring.

³ It is important to note here that it is not only competitive practices that are gendered but of course also other areas of socialization that influence the underrepresentation of women. For example, the stereotype that women are less able than men in mathematics is materialized through the expectation that women will perform poorly (e.g. Correll (2004); Spencer et al. (1999)) and thus leads to actual lower performance. This "stereotype threat" Spencer et al. (1999) is also generally true for men's and women's interest in STEM jobs or careers (Ceci et al. (2014)).

Similar forms of male networks on the one hand and associated explicit forms of sexist discrimination against female economists on the other hand have been reported in several studies (e.g. Backhouse and Cherrier (2019) on Samuelson). Most notably Wu (2017) showed that particularly in the case of job interviews women in economics are much more regularly confronted with sexual harassments, toxic attitudes and comments relating to physical characteristics than their male colleagues. Her study focused on the popular website Job Market Rumors and has led to the release of a new code of conduct for economists by the American Economic Association.

While these forms of explicit discrimination against women in economics still exist and male networks are still used to prevail in the harsh competitive environment, female economists are also confronted with several forms of implicit discrimination, resulting from the male-dominated environment in economics. First, Boring (2017) has shown severe gender biases in student evaluations, resulting in women receiving worse evaluations for their teaching efforts, which quite often reflect gender stereotypes. Collaborative and discursive teaching formats for instance are associated with lower scientific performance compared to typically male, confidently delivered frontal lectures. Second, the work and contribution of female economists as co-authors is valued less, particularly in group works (Sarsons, 2017). She finds that the number of co-authorships does not correlate with the probability of getting tenure for male economists, but is crucial for female economists, especially when publishing with male colleagues. Similarly Lundberg and Stearns (2019) as well as Hengel (2022) report that female economists are generally held to a higher standard in publications and must adhere to higher writing standards in order to receive equal recognition. Third, the male-dominated environment also leads to discriminatory practices in the workplace. Several studies found that female economists are confronted with more and harsher questions in job interviews and during presentations (Dupas et al., 2021; Sarsons et al., 2021). Particularly, this form of harsh and confrontational discussion culture in economics may well be reinforced by the strong influence of competitive research organization and the prevalence of an individualistic epistemology in economics. Thus, male-centered environments in economics are not only self-reinforcing the male dominance in economics, but also provide a supportive atmosphere for the impact of gendered competitive practices. More precisely, the particularly strong presence of formal and informal competitive formats perpetuates a male-centered environment and aggravates initiatives to fight the underrepresentation of women in economics. Not least as a consequence of gendered socialization with respect to competitive behavior and as argued above, female economists either feel uncomfortable or are sanctioned when they act according to these masculine competitive practices.

“The male habitus is constructed and completed only in connection with the space reserved for men, a space in which the serious games of competition are played among men (...) real honor can only make the recognition, which is paid by a man (in contrast to a woman) (Bourdieu, 1998, p. 203, own translation)

3.2 *2nd channel: Economic ontology and epistemology*

The second channel in our model is related to gendered ontological and epistemological differences within the discipline, i.e. how economic processes are viewed and analyzed and which may not appeal to women or simply do not reflect their perspectives of and experiences in life. It is still a prominent stereotype that women perform worse in math and thus shy away from math-intense subjects. In a comprehensive overview Ceci et al., (2014) have shown that differences concerning spatial abilities between boys and girls have been narrowing over the last decades and are now hardly significant any more. Hence, seemingly sex differences are much more caused by gendered stereotypes, for instance, in play behavior (e.g. playing video games or building Legos, etc.) or gendered socialization in general. Ceci et al. (2009) have shown that various interventions to increase spatial processing, even for as little as one semester, have narrowed the sel gap in spatial abilities. Moreover, most of the studies claiming the superiority of males at math-related abilities were based on differences in mean scores but not on the right tail of the distribution within genders. However, since students in math-intensive subjects, such as economics, mostly also have over proportional math-related abilities, comparing mean scores does not explain the male dominance in economics.

To sum up, the evidence is quite clear that differences in math-related abilities are caused by gendered socialization rather than biological sex differences. However, referring to biosocial constructionist theory (Sent & van Staveren, 2019), the still widespread belief in male superiority in mathematics combined with gendered competitive practices in a male dominated environment helps explain female underrepresentation in economics. This prejudice against women may for instance lead to a higher grade sensitivity for women (Arnold, 2020) or the comparably better writing skills of women in economics (Hengel, 2022), but also to a higher math discomfort of women (CSWEP, 2013).

Yet, the math-prejudice potentially also contributes to the unequal distribution of female economists over sub-disciplines in economics. Women have been shown to be more strongly represented in fields such as health, education, social security, and aging (Chari & Goldsmith-Pinkham, 2017) -often referred to as "soft fields"-in both graduate program major choices and research specializations. Conversely, women are even less represented in finance and macroeconomic, the "hard fields" of economics. The latter are typically more math-intense and also commonly perceived as the more powerful core fields within the economic mainstream. Additionally, Chari and Goldsmith-Pinkham (2017) show that submissions of female economists for the prestigious NBER Summer Institute are higher, if there are female economists among the panel organizers. In all, women tend to choose subjects and fields in economics, which are seemingly closer to their real-world lived experiences and are less abstract and math-intense. It is still difficult to disentangle whether this choice is driven primarily by the self-selection of female economists into softer fields or by the particularly male competitive environment in the harder fields (see also channel 1). Nevertheless, it first leads to a lack of female perspectives, views and ontologies, which differ substantially from those of their male colleagues (e.g. May et al., 2018). Second, the female underrepresentation, particularly in fields ranked higher in the internal hierarchy in economics, perpetuates the self-reinforcing male dominance, but also the overall male

worldview in abstract economic models and epistemologies. Here, conceptions of human beings as omniscient, self-serving, completely independent homo oeconomici dominate:

“Traditionally, male activities have taken center stage as subject matter, while models and methods have reflected a historically and psychologically masculine pattern of valuing autonomy and detachment over dependence and connection.” (Nelson, 1995, p. 132)

Similarly, Meyer et al. (2015) have found that women are particularly underrepresented in fields where it is believed that one needs raw brilliance and women are stereotypically believed to possess less of that. This way, gendered competitive practices particularly in the male-dominated “hard fields” in economics not only reinforce the persistence of female underrepresentation but also the lack of diverse ontologies and epistemologies there.

3.3 3rd channel: Societal expectations with respect to the division of labor

The third channel describes the influence of societal expectations about the division of labor between the sexes on the under-representation of women in economics. This channel is, of course, relevant not only to economics, but to science in general and applies to almost all professions in society. It describes the gendered expectation that women are the ones who should take care of activities related to (a) the private sphere, i.e. caring responsibilities, either for young children or elderly people and doing household chores, and (b) communal behavior in general, i.e. women are expected to fulfill caring activities at their universities, such as mentoring and teaching, but also administrative tasks; those, however, prevent them from doing research and, more precisely, from producing the form of quantifiable academic output that then determines their later career trajectories.

The most illustrative evidence in this regard are the findings on publication output during the recent Covid pandemic, when care had to be provided at home rather than by public facilities, and was almost entirely carried out by women. Squazzoni et al. (2021) report that women submitted proportionately fewer papers than men during the first wave of the pandemic; male researchers even increased their productivity in absolute terms, especially compared to female researchers who lost productivity due to caring activities. And although parents display a slightly higher productivity than non-parents, the gender productivity gap in terms of publications, the gender productivity gap is primarily attributed to parenthood, wherein the average short-term productivity of mothers is diminished (Ceci et al., 2014, fig. 16; Morgan et al., 2021) also show evidence that assistant professors in economics publish significantly less than assistant professors who are fathers. Thus even in the absence of a global pandemic, women are expected to be the primary care-givers and thus in a permanent dual role (Byrne, 2021); since the caring role is usually a subordinate one this has implications for how and whether women can achieve leadership in science (Blackmore et al., 2015). Their caring responsibilities also prevent them from attending meetings or seemingly voluntary seminars in the evenings; their working hours tend to be more restricted than those of men; and female economists tend to concentrate their

research efforts mainly in the summer months (Manchester & Barbezat, 2013). In fields where the proportion of female faculty is low, the burden on women is even greater. Ward and Wolf-Wendel (2012) observed that faculty members “were very aware of the extra work that comes with being the only woman, the only scientist, the only mother, and the only one for people to turn to for myriad activities“ (p. 93). In STEM faculties, men spent almost twice as much time on research as women, and their investment in mentoring and service was significantly lower (Misra et al., 2011).

Female scientists experience significantly more family/work conflict than their male counterparts, which affects their work-life balance (Fox et al., 2011). This is also consistent with the findings of Drago et al. (2006) that workplace norms in academia do not support or facilitate family commitments. Due to societal expectations, women are also believed and expected to be less mobile than men, which naturally hampers careers in science, where international mobility is said to be crucial (Sautier, 2021; Ulnicane, 2020; Zippel, 2017).

For example, among academics in the life sciences, married women and women with children face a significant disadvantage in transitioning to tenure-track positions compared to single, childless women (Ginther & Kahn, 2009). At the same time, women with PhDs, no children and no plans to have children achieved similar outcomes to men in seeking and securing tenure-track positions in STEM fields, while women with family plans chose not to pursue tenure-track careers (Nicholas H. Wolfinger et al., 2008; 2009). This led to twice the rate of attrition among female postdocs with child plans compared to male postdocs with child plans (28% vs. 16%) or existing children (31% vs. 19%). In addition, professional women are often in relationships with professional men that allow them to 'opt out' of academia and afford to stay at home (Belkin, 2003).

With the rise of quantitative evaluation methods, however, productivity is measured almost exclusively in terms of countable research output, i.e. in most cases publications. If women spend less time on output-relevant research, this puts them at a disadvantage; by devaluing women's efforts, competitization automatically reduces women's competitiveness, making a career in economics less likely. At the same time, caring responsibilities, either at home or at university, and thus collaborative behavior, stand in contrast to academic output orientation and competitive behavior. Behaving cooperatively in one context and competitively in the other, when the latter is inconsistent with women's gender beliefs, makes the implementation of successful competitive strategies even more difficult. In addition, well-intentioned policies such as quotas and affirmative action in general can backfire when unintended effects and consequences further increase women's non-performance-related workloads in male-dominated fields such as economics.

4 Conclusion

In the face of the anti-discrimination measures taken by the Committee on the Status of Women in the Economics Profession, one of the leading figures in mainstream economics, Milton Friedman, affirmed that “the pendulum has probably swung too far so that men are the ones currently being discriminated against” (Friedman, 1998, p. 198). Given what we have just presented about the proportion of female economists, and the

abundant evidence that if there is a group being discriminated against, it is certainly not men, this quote is representative of the attitude and climate of a discipline whose members seem unable to recognize their own privileges even when they are dangled in front of them. This attitude is problematic not only because of gender equity, but also because science produced exclusively by male, white, cis-men can only incorporate so much diversity and critique, making it biased at best. As advocated by standpoint theory, what is needed for objectively produced scientific knowledge to flourish – and thus provide more than lopsided policy advice – is a diversity of perspectives as well as methodological and epistemological approaches (Harding, 2004; Nelson, 1995). Diversity is enhanced by the inclusion of women. Although, of course, as emphasized in footnote 1, gender is not the only dimension of discrimination; equally important are discrimination based on class, race, ethnicity, socioeconomic background, sexual orientation, etc. Thus, an intersectional perspective on experiences of discrimination in economics is essential (Moore et al., 2018; Schultz & Stansbury, 2022).

Our model provides an opportunity to reflect on the dimensions of discrimination present in economics and helps to disentangle the different layers and channels. Gartner and Schneebaum (2023) recently contributed an overview of mechanism with respect to the underrepresentation of female undergraduate students). This systematization contributes to provide better targeted anti-discrimination policies and also helps to explore the intersection of gender and other dimensions of discrimination in future work. Moreover, the channel of gendered competitive practices and gendered beliefs and roles certainly affects not only women, but also social groups in general that do not identify as much with the masculine peer culture. In light of the biosocial constructionist framework and its implications for competitive practices, the common notion that competition can help promote diversity by evaluating all participants equally can be refuted. Competition may initially help by supposedly making all participants equal, but ultimately the rules of competition are made by those who are currently in power - which in the case of economics is again the stereotypical male researcher. As such, competition becomes an instrument of domination by being an asymmetric institution that again favors men as a group. Not only because it is an explicit instrument of structuring, but also because it is an implicit one. Thus, competition as an asymmetric institution becomes more and more powerful and perpetuates male dominance, as Bourdieu emphasizes with his "serious games of competition". This inequality-enhancing effect of competition is reinforced by the general trend towards competitization in academia, which entails social, economic and epistemological costs (Felt, 2009; Krücken, 2021) and is thus a major problem. In all, the trend of competitization of academia, which is particularly pronounced in the very ranking-affine discipline of economics, counteracts several attempts to fight the underrepresentation of women.

Of course, one central point of criticism remains, namely the role of self-selection into the discipline and the indoctrination experienced during the study and practice of economics. What if only those individuals who are already inclined to be competitive choose to study and pursue a career in economics (see for instance Pereda et al., 2023). Then, we argue, gendered competitive practices are still relevant because of gender

beliefs; even if particular women are inclined to behave competitively, they are likely to be sanctioned because their behavior does not conform to expectations of female gender roles. Thus, engaging in competitive behavior may still be something that women have to work very hard at because of the potential negative consequences. The same would be true if women and men were indoctrinated to behave more competitively through the study of economics. An effect that certainly exists, given the strong doctrinaire nature of mainstream economic theory and the prominence of the concepts of competition and individualism therein (Bauman & Rose, 2011; Pühringer & Bäuerle, 2019). However, the study of the selection and indoctrination effects and their interaction with our channels is central, and unfortunately due to lack of space we could not deal with it here. We certainly intend to investigate these relationships in the future. Our research also did not establish a causal relationship between gendered competitive practices and the underrepresentation of women. Rather, the task was to provide another powerful explanatory channel and thus an additional starting point for anti-discrimination policy, which should be based on the fact that the continued promotion of extensive competitive formats may well have gendered effects (see e.g. Harroche, 2022). Future research should therefore focus on providing empirical validation of our argument – both quantitatively and qualitatively.

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