

Multidimensional Diversity and Research Impact in Political Science: What 50 Years of Bibliometric Data Tell Us

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We examine the changing patterns of knowledge production and diffusion in political science over the past five decades using a dataset of over 200,000 SSCI-indexed research articles from 1970 to 2020. We analyze how author identity and team diversity influence research outputs and outcomes. The results show that historically excluded groups of scholars have gradually improved their representation and expanded their collaboration networks over time. Although the publication gaps are narrowing, obscured gaps in evaluation and citation practices persist. Research specialties with higher proportions of minority researchers tend to have lower average citation impacts. The least cited research specialties are largely studied by women and racial/ethnic minority scholars. Papers written by racial/ethnic minorities and Global South scholars are significantly less cited. However, collaborating with outgroup scholars can effectively overcome this citation gap. We also find that papers written by women receive more citations than those written by men, after controlling for journal prestige and research topics. Furthermore, when we limit our investigation to leading universities, citation gaps diminish. However, scholars of African descent continue to experience entrenched citation disadvantages even if they are affiliated with highly prestigious universities. This study provides multidimensional measurements to advance diversity debates and adds nuances to our understanding of opportunity structures in political science.

Diversity is a merit widely embraced in modern societies. Many scholars assert that diverse scholarship is crucial for an academic discipline to maintain political relevance in a rapidly globalizing world (AlShebli, Rahwan, and Woon 2018; Alter et al. 2020; American Political Science Review Editors 2020; Gurin et al. 2003; Sinclair-Chapman and Johnson 2015). Increased efforts have been made to scrutinize professional diversity across academic fields. However, diversity is a complex construct encompassing various dimensions, such as gender, race, ethnicity, and geographic representation. While these dimensions are likely mingled together, they are often studied in isolation during

diversity audits. Little attention has been paid to understanding how disparities arise at the intersection of social categories and whether all forms of diversity are equally beneficial for the production, reception, and reproduction of knowledge.

To fill this gap, we adopt an intersectional approach to exploring how categories of gender, race, and region can impact research outputs in the political science discipline. We compile a comprehensive collection of 211,425 articles indexed by Social Science Citation Index (SSCI) from 1970 to 2020. By analyzing this dataset, we aim to offer a thorough account of longitudinal trends in gender,

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racial/ethnic, and regional diversity. We also examine in depth the publication, citation, and evaluation gaps faced by 11 demographic groups, drawing on Petersen and Saporta's (2004) theoretical framework of opportunity structure. Finally, multiple regression models are implemented to determine how citations, as an indicator of research impact, can be predicted as a function of author identity and team diversity, while controlling for a series of covariates, such as journal prestige, author reputation, research topics, team size, and year of publication. These integrated models can effectively disaggregate the intertwined relationships between diversity and research impact, ascertaining the effect of each type of diversity. Our study elucidates the nuances of knowledge production as a socially grounded process and provides empirical evidence to inform future discussions about disciplinary diversity and equality.

Structural Inequality in Political Science

Opportunity Structure for Discrimination

Petersen and Saporta's (2004) theoretical framework of the opportunity structure for discrimination (OSFD) provides a critical lens through which we can better understand the intricate relationship between resource distribution, reward allocation, and the pervasive presence of structural inequality in a social system. The central arguments of OSFD posit that occupational inequality is mainly manifested through three discriminatory mechanisms: *allocative*, *within-job wage*, and *valuative* mechanisms (Petersen and Saporta 2004). The allocative mechanism involves discrimination that has placed historically excluded people into lower-ranking jobs. The within-job wage mechanism, also known as reward gap, subjects historically excluded people to lower wages when performing the same job as their majority counterparts. The valuative mechanism devalues occupations where historically excluded people are most represented (Barnett, Baron, and Stuart 2000; Castilla 2005). In spite of its origins in the occupational realm, OSFD can be seamlessly integrated into the academic setting because of the numerous parallels between academic and occupational systems.

Resembling the roles played by job and wage in the occupational realm, publication and citation constitute two primary pillars of the academic system. The desire to make one's scholarly contribution known to others (through publication) and recognized by others (through inward citation) is a constant theme underlying the routine work of academics (Small 2004). As pointed out by Merton (1988), a distinct characteristic of science is that it establishes the "private property" of knowledge by "having its substance freely given to others who might want to make use of it." Publication is a critical means for individual scientists to claim knowledge ownership and

build symbolic capital. Nevertheless, publications are not weighted equally. Some publications receive more recognition than others, contributing to an uneven distribution of academic impact (Bourdieu 1988) and an expanding divide between the symbolically rich and poor (Kristensen 2018), as illustrated by the "Matthew Effect" (Merton 1957, 1968, 1988).

Situated within the context of academic publishing, this study will focus on the research article as its key unit of analysis, examine citations as the primary reward obtained by articles, and identify journals as the primary venue for acquiring citation rewards. This structure parallels the occupational context depicted in the OSFD, where the individual employee is the unit of analysis, wage is the primary reward, and job is the primary venue for earning wage rewards. Table 1 provides additional clarity on this analogy.

Given their functional equivalence, we utilize the concept of allocative mechanism to explore the *publication gap* and adapt the concept of within-job wage mechanism to elucidate the *within-journal citation gap*. Finally, as a discipline evolves, multiple lines of inquiry emerge, and scholars cluster into different topic areas to form their own niches. Men and women, as well as racial/ethnic majorities and minorities, often specialize in different subfields (Grant and Ward 1991; Kozlowski et al. 2022; Maliniak, Powers, and Walter 2013; Teele and Thelen 2017). The affinity between social categories and topic selection compounds the issue of inequality, giving rise to the *evaluation gap*, which is similar to valuative mechanism in OSFD.¹

In sum, this study will examine 1) *publication gap*: the degree to which articles authored by historically excluded scholars are disproportionately sorted into lower-tier journals; 2) *within-journal citation gap*: the disparity in citation counts between historically excluded authors and their majority counterparts when their works are published in the same journals, and 3) *evaluation gap*: the degree to which minority-concentrated specialties/topics receive fewer citations than majority-concentrated specialties/topics.

Publication Gap

In recent years, increasing attention has been given to the publication gap in the political science discipline. Research conducted by Patterson and Smithy (1991) and Breuning and Sanders (2007) has evidenced that female scholars are less likely than their male counterparts to be named on articles in prestigious political science journals.² Reviews of *American Political Science Review*, *Comparative Political Studies*, and *Journal of Peace Research* further explicate that articles written by female authors or all-female teams only account for 15–23% of publications (König and Ropers 2018; Østby et al. 2013; Samuels 2018).

In contrast to the extensive research conducted on the gender gap, there has been relatively limited

Table 1
Comparison of OSFD's constituents within two contexts

Context	Unit	Reward	Venue to Pursue Reward
Academic Publishing	Article	Citation	Journal
Workplace	Employee	Wage	Job

investigation into the publication gaps among different racial/ethnic groups. Two exceptions are the cross-disciplinary investigations conducted by Hopkins et al. (2013) and Freeman and Huang (2014, 2015). The former found that both whites and Asians are overrepresented in academia, but the degree of Asian overrepresentation is less pronounced in social sciences than in natural sciences. The latter revealed that scholars with Anglo-Saxon/English names contribute 49.32% of research articles, while Asian and European scholars contribute nearly a quarter and 12.04%, respectively. According to Hopkins et al. (2013), scholars from other racial/ethnic minority groups including Blacks, Hispanics, and Native Americans, contribute to a very small fraction of published works. While these studies have provided valuable insights, it is essential to recognize that their probe extends far beyond the confines of political science. Consequently, it remains largely uncertain whether the mentioned findings apply to the specific field of political science.

Evaluation Gap

With regard to the evaluation gap, a recent article reveals that scholars of the same ethnicity and gender tend to gravitate towards the same research areas (Kozłowski et al. 2022). Notably, Asian scholars display the highest specialization, focusing primarily on topics such as economics and logistics. Black and Latinx scholars are more inclined to study racial discrimination and migration. White scholars, in contrast, exhibit the least specialization and are commonly found across research areas. Kozłowski et al. (2019) have further corroborated that research topics that are disproportionately studied by minorities receive significantly fewer citations than others. Relatedly, the work of Hoppe et al. (2019) shows that NIH applications from African American scientists tend to concentrate in topic areas that receive less attention and less funding. The evaluation gap arising from the identity-topic affinity has reinforced the between-group disparities in research support.

Jackson (2008) coined the term “brown-on-brown research syndrome” to explain the prevalence of the

evaluation gap. He contended that while “white-on-white research” (white scholars studying white-typed issues) is commonly considered legitimate, “brown-on-brown research” (brown scholars studying brown-typed issues) is met with skepticism and under-recognition. Supporting this notion, Knobloch-Westerwick, Glynn, and Huge (2013) conducted a randomized experiment to prove that when female authors study male-typed topics, they obtain even fewer citations than they do for female-typed topics. Dion, Sumner, and Mitchell (2018) examine the cited references of articles in *American Political Science Review*, *Political Analysis*, and *Politics & Gender*. Their findings re-affirm that the gender citation gap is wider in male-dominated subfields and narrower in gender diverse subfields.

Citation Gap

Research findings remain largely inconclusive in terms of citation gaps (Garcia et al. 2022). Østby et al. (2013) find that articles in the *Journal of Peace Research* written by women were more frequently cited than those written by men. This finding is congruent with the evidence from other disciplines such as information science, psychology, and economics (Peñas and Willett 2006; van den Besselaar and Sandström 2016). In these disciplines, while male authors publish more articles, female authors receive more citations per article. Disputing this assertion, Maliniak, Powers, and Walter (2013) examined international relations studies in 12 political science journals and found that articles authored by men garnered an average of 4.8 more citations than those authored by women. Leveraging the same dataset, Roberts, Stewart, and Nielsen (2020) devise a novel method to gauge the gender citation gap, adjusting for the confounding effect of research topics. According to their estimation, the gender gap is even larger—women receive 6.5 fewer citations than men.

That said, extant studies in the field of political science tend to focus on a limited number of prestigious journals within a restricted timeframe, without adequately considering the racial/ethnic and institutional backgrounds of authors. Findings derived from top journals may not be representative of the entire field, and short-term snapshots may overlook longitudinal changes. Moreover, a sole focus on gender identity disregards the intricate interplay of gender, race/ethnicity, and region. To fill in this gap, we endeavor to provide a comprehensive review of a broad range of literature over an extended period, with a more inclusive examination of gender, race/ethnicity, and region.

Data and Measures

We retrieved all research articles³ published in SSCI-indexed political science journals between 1970 and 2020 from the Web of Science (WoS) database. A total

of 211,425 articles from 286 journals⁴ were archived on November 21, 2021.

A quick inspection of the data revealed that a few journals were devoted to publishing short commentaries; moreover, the commentaries published in these commentary-oriented journals were mostly classified as “articles” rather than “letters” or “discussions.” To remove these anomalous cases, we calculated the average page length and the average number of references cited per article for all journals based on the assumption that commentaries are shorter and cite fewer references than original research. We identified 21 commentary-oriented journals, including *The Nation*, *The New Republic*, and *Economic and Political Weekly*, whose articles on average have only 4.05 pages and cite only 2.53 references. For details, please refer to [online appendix note S1](#). After removing these outliers, 265 journals and 163,621 articles were retained. Unless stated otherwise, the findings discussed here are derived from the sample without these outliers.

Author Identity

To capture the demographic characteristics of an article’s authorship, we formulate two types of measures: first author-based (FA-based) and team-based measures. FA-based measures only consider the identity of the first author of a given paper, whereas team-based measures account for the identities of all authors listed in the byline. In computing team-based measures, we assume that the authorship of an article is evenly distributed among contributors, with each author receiving equal fractional credit. This approach is instrumental in avoiding distortion caused by articles with extremely long author lists.

Gender:⁵ 1) FA-based *Gender_i* is equal to 1 if the first author of article *i* is female and equal to 0 if the first author is male; 2) Team-based *Gender_i* measures the percentages of female authors named in the byline of article *i*. In line with previous research (AlShebli, Rahwan, and Woon 2018; Dion, Sumner, and Mitchell 2018; Hofstra et al. 2020; Teele and Thelen 2017), we employ Genderize.io and Forebears.io APIs to estimate the gender of a given author based on the forename. Genderize.io and Forebears.io are two genealogical archives that have recorded the gender and racial/ethnic characteristics of more than 15 million and 28 million names across countries, respectively. According to AlShebli, Rahwan, and Woon (2018), Hofstra et al. (2020), and Teele and Thelen (2017), Genderize.io has a low error rate of 5%–7% when predicting authors’ genders across all fields, and a further reduced error rate of 2% in political science. Given that forename analysis is less sensitive in detecting Asians’ gender and Genderize.io tends to over-guess women (Teale and Thelen 2017), we manually check the top 300 most productive Asian scholars who were predicted

to be female by the two archives ([online appendix note S6](#)) and rectify misclassified gender labels. Since WoS did not consistently document authors’ first names before 2007, the gender-related analyses are confined to data from 2007 onward.

Race/Ethnicity: 1) FA-based *Race/Ethnicity_i* refers to the racial/ethnic identity of the first author of article *i*; 2) Team-based *Race/Ethnicity_i* measures the shares of article *i*’s authors identified with a certain racial/ethnic group. Consulting the World Value Survey’s Cultural Map (Inglehart and Welzel 2005) and Huntington’s (1993) taxonomy of civilizations, we construct a classification scheme with eight distinct racial/ethnic groups: Anglo-Saxon, European, Slavic, Asian, African/African American, Hispanic/Latino, Jewish, and Others (refer to [online appendix notes S2 and S6](#)).

We combine surnames and geolocations to predict the race/ethnicity of scholars (refer to [online appendix note S3](#)). Surnames have long been recognized as an effective indicator of race/ethnicity and an enduring symbol of ancestry (Hanks 2003). A wide array of studies published in esteemed academic journals, such as AlShebli, Rahwan, and Woon (2018), Kozłowski et al. (2022), and Hofstra et al. (2020), have opted to infer race/ethnicity based on surnames. However, previous studies have provided evidence that surname analysis can encounter notable challenges when attempting to distinguish individuals of African descent from those of Anglo descent (Lauderdale and Kestenbaum 2000; Mateos 2007). The presence of African/African American individuals who have Anglo-sounding surnames might be undesirably underestimated.

To address this limitation, we join a nascent body of studies that enhance surname analysis by incorporating geolocation information using the Bayes theorem (Elliott et al. 2008; Fiscella and Fremont 2006; Haas et al. 2019; Jackman 2004; Imai and Khanna 2016). Under Bayesian models, the probability that a person falls into a certain racial/ethnic category is constrained by the surnames that they bear as well as the neighborhood where they live. If an author resides in an ethnically heterogeneous neighborhood, the model’s uncertainty will increase, resulting in a more cautious and less confident estimation of race/ethnicity. To validate Bayesian estimates, we trained two human coders to annotate races/ethnicities of a random sample of 1,000 authors (refer to [online appendix note S6](#)). The validation results confirm that the Bayesian model outperforms the surname-only model by a large margin, achieving accuracy rates of over 90% in all racial/ethnic groups (Gill and Lee 2005). Nevertheless, when breaking down the validation metrics by racial/ethnic groups, we observe a tendency to *overestimate* the representation of African/African American individuals. Considering this, we take an additional step to manually examine the races/ethnicities of the top 300 system-identified African/African American scholars

who have published the largest number of articles. This manual verification process allows us to rectify misclassified cases and to ensure greater accuracy.

Region. 1) FA-based $Region_i$ equals 1 if the first author of article i is affiliated with an institution in the Global South⁶; 2) Team-based $Region_i$ denotes the percentage of authors affiliated with institutions in the Global South.

Team Diversity

As suggested by Dion, Sumner, and Mitchell (2018), diverse scholarship might contribute to decreasing structural inequality in academic publishing. Between-group gaps might be narrowed if an increasing number of minority scholars could participate in cross-identity collaboration and could get involved in demographically diverse teams. Therefore, we are interested in testing the effectiveness of team diversity in alleviating alleged publication and citation gaps. To this end, we formulate a series of diversity-related factors that might affect publication and citation gaps.

Mixed-Gender_i is a dummy variable that equals 1 if the research team comprises both men and women and 0 if the team comprises entirely women or men.

Cross-Racial/Ethnic_i is also a dummy variable that equals 1 if the research team comprises scholars of different races/ethnicities and 0 if the team solely comprises scholars of the same race/ethnicity.

Cross-National_i denotes whether article i is produced by an international research team. It takes a value of 1 when the team includes scholars from different countries. It is worth noting that the “country” here refers to the country of affiliation rather than the country of origin.

Cross-Regional_i equals 1 if the research team comprises scholars from both Global North and South institutions and 0 if the research only involves scholars from either Global North or South institutions.

Since team collaboration is a prerequisite for team diversity, it is impossible for single-authored papers where teamwork is absent to demonstrate team diversity. Therefore, for single-authored articles, *Mixed-Gender_i*, *Cross-Racial/Ethnic_i*, *Cross-Regional_i*, and *Cross-National_i* consistently have a value of 0.

%Outgroup References_i is a proxy for reference diversity. To gauge its magnitude, we consider references cited by article i and measure the percentage of outgroup references.⁷ We also develop two types of measures: 1) FA-based *%Outgroup References_i* measures the percentage of prorated references written by racial/ethnic outgroups for the first author. For coauthored references, authorship is equally distributed among cited authors. 2) Team-based *%Outgroup References_i* measures the percentage of prorated references written by racial/ethnic outgroups for all authors.

Dependent Variables

#Citations_i denotes the total number of citations that article i obtained at the time of data collection.

Control Variables

Team Size_i evaluates the number of authors named in the byline of article i .

Author Reputation_i is an indicator of an author’s academic status obtained prior to the publication of article i . 1) FA-based *Author Reputation_i* measures the average number of citations per article that the first author obtained before article i . 2) Team-based *Author Reputation_i* measures the average number of citations per person per article that all authors in the byline obtained before article i .

Author Publication_i is an indicator of an author’s past visibility and productivity. 1) FA-based *Author Publication_i* measures the average number of articles that the first author published in SSCI-indexed political science journals before article i . 2) Team-based *Author Publication_i* measures the average number of articles per person that all authors in the byline published before article i .

Journal Prestige_i is gauged by the average number of citations per article the journal received in the two years before article i .

Affiliation Prestige_i is an indicator of the reputation, status, or perceived quality associated with an author’s institutional affiliation. 1) FA-based *Affiliation Prestige_i* measures the percentage of articles contributed by the institution that the first author is affiliated with. 2) Team-based *Affiliation Prestige_i* measures the average percentage of articles contributed by the institutions that all authors are affiliated with.

Article Age_i evaluates the number of years since publication for article i .

#Cited References_i indicates the scholarliness of article i , which is measured by the number of references cited by article i .

Topics_i is represented by a 50-dimensional vector returned from a Latent Dirichlet Allocation (LDA) topic model, which was trained to predict the topic distribution of all articles given their abstracts and titles. Each entry in the 50-dimensional vector is a decimal number between 0 and 1, representing the probability that article i is associated with a certain topic, and the sum of the vector always amounts to 1.

Publication Gap

To gain insight into publication gaps, we examine the gender, race/ethnicity, and regional distribution of authors in SSCI-indexed political science journals. As indicated by figure 1, the largest publication gap surfaces between scholars from the Global South and Global North

scholars. Only 9% of articles are authored by Global South researchers. This gap is even wider among the top-quartile (Q1) journals, where Global South authors account for 4% of publications.

While gender and racial/ethnic disparities also exist, we find that they are constant across all quartiles of journals and are generally reflective of the demographic composition of professional society. Female scholars contribute 31% of articles, while male scholars contribute 69%. In terms of the racial/ethnic gap, Anglo-Saxons and Europeans collectively author over two-thirds of publications, surpassing the third-place Slavic-origin scholars by a sizeable margin of 28%.⁸ Compared to other disciplines (Freeman and Huang 2014, 2015; Hopkins et al. 2013; Kozłowski et al. 2022), political science is characterized by a more significant presence of Europeans and a considerably weaker presence of Asians. Nevertheless, there is no significant widening of gender and racial/ethnic gaps in the upper echelon of journal rankings. Minority scholars are not disproportionately sorted into lower-ranked journals.

Moreover, by comparing the gender and racial/ethnic composition of SSCI authors and American Political Science Association (APSA) members (figure 1, lower panel), we find that the representation of minority scholars in academic journals is generally in line with their representation in the APSA member pool. If APSA member composition is considered a baseline measure for the demographic makeup of the discipline, this result implies that the publication gap can be attributed to the imbalanced population structure in the field. With that said, the most significant disparity is observed along gender lines. Female scholars' publication in academic journals is 5% less than their presence in the APSA. This disparity highlights the distinct challenges encountered by different groups. While the primary challenge for racial/ethnic minority groups is to increase the entry of quality candidates into the academic world, female researchers face more obstacles in maintaining their presence during the publication process and avoiding attrition as they progress through career paths.

Figure 2 further visualizes the trends of group representations. According to subplot A, as women incrementally expanded their presence in political science journals, the disparity between top-tier and lower-tier journals diminished. Both Q1 and non-Q1 journals have dedicated an equal share of 34% of publications to women's works in recent years. The visibility of Global South scholars also increased. However, their representation in Q1 journals did not improve proportionately. They have remained consistently low-profile in top-tier journals in the past two decades.

In terms of the racial/ethnic gap, the representation of Anglo-Saxons dwindled drastically from 46% in 1981 to 27% in 2020, while the presence of Europeans increased moderately from 33% to 38%. When these two groups are

combined, their total representation declines by 14%, implying a general trend toward de-Westernization and greater racial/ethnic inclusiveness in the political science discipline. Against this backdrop, scholars with racial/ethnic minority background generally improved their representation over the past five decades, with the exception of Jewish scholars. Scholars of African descent demonstrated a sharp increase in the late 1990s, in tandem with the rapid democratic transitions across sub-Saharan Africa. The *Journal of Democracy* (JoD) contributed the most to this abrupt shift, which devoted 24 articles to African politics between 1997 and 1999, half of which were authored by African/African American individuals.

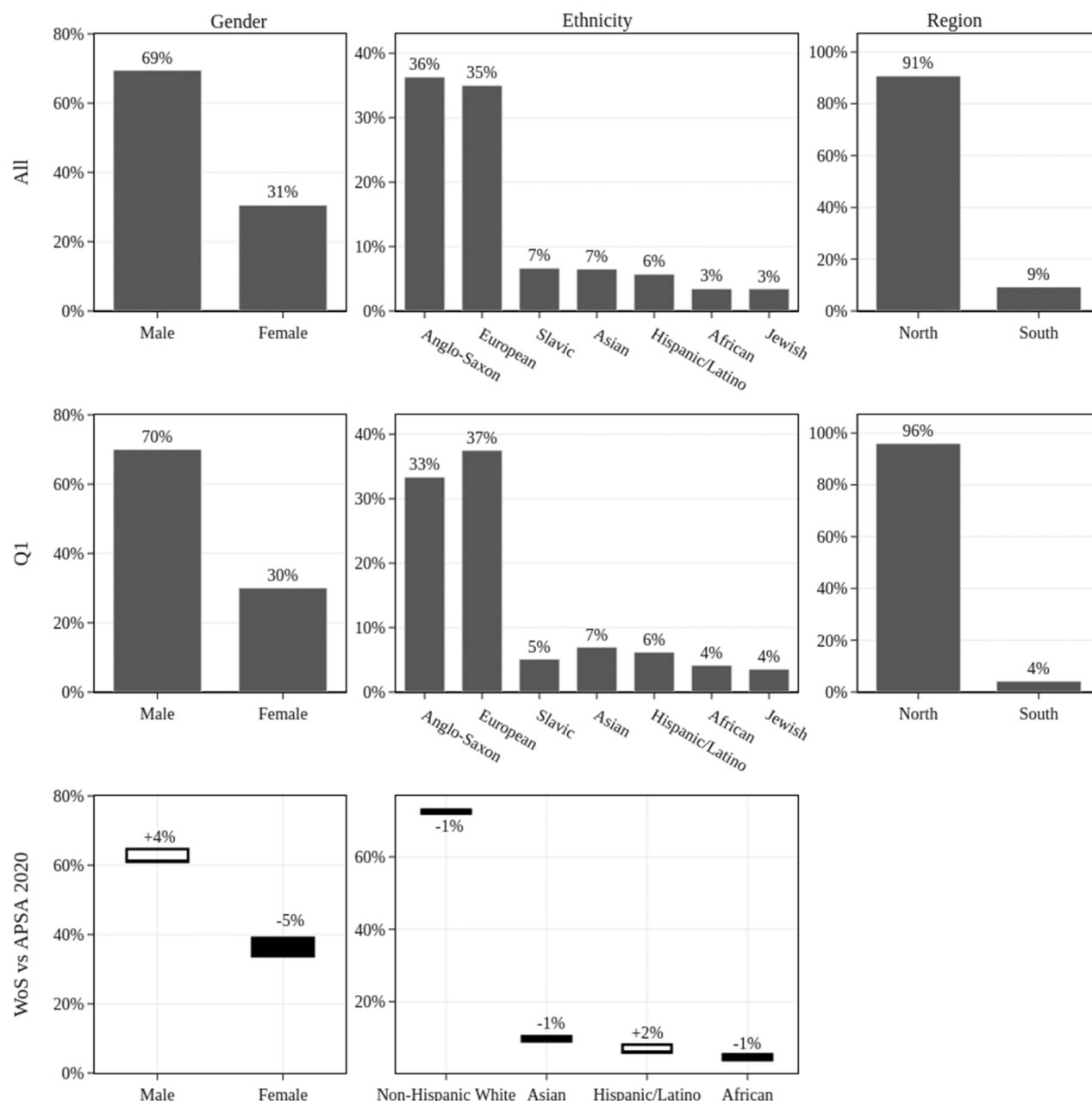
Furthermore, the red and blue trendlines are closely intertwined for most racial/ethnic groups, indicating that a group's representation in Q1 journals is on par with its overall presence in the field. Notwithstanding, the Slavic group stands out as an exception, significantly underrepresented in top-tier journals despite growing visibility (subplot E). A closer look at the data reveals that 54.3% of articles authored by Slavic-origin scholars were published in lower-tier journals specializing in Eastern European studies, such as *Politická Ekonomie* and *Osteuropa*, which had a narrower audience and received fewer citations than generalist journals.⁹ This homophily between identity and topic/outlet selection probably penalizes Slavic researchers, relegating Eastern European studies to a less rewarding subfield.

Works by Hispanic/Latino scholars are also seen more frequently in lower-tier journals, yet the disparity is not as strong as it is for Slavic scholars. As shown in subplot G, the difference between the red and blue lines, which was relatively minor during 1997–2006, increased from 2007 to 2012. However, starting in 2013, the gap began to narrow until the two lines intersected in 2020. Among articles written by Hispanic/Latino scholars, 25.9% are published in specialized journals that focus on Latin American studies. While the ratio is only half that of Slavic scholars and has been decreasing recently, it still suggests that Hispanic/Latino scholars might face a certain level of marginalization.

Scholarly Collaboration and Team Diversity

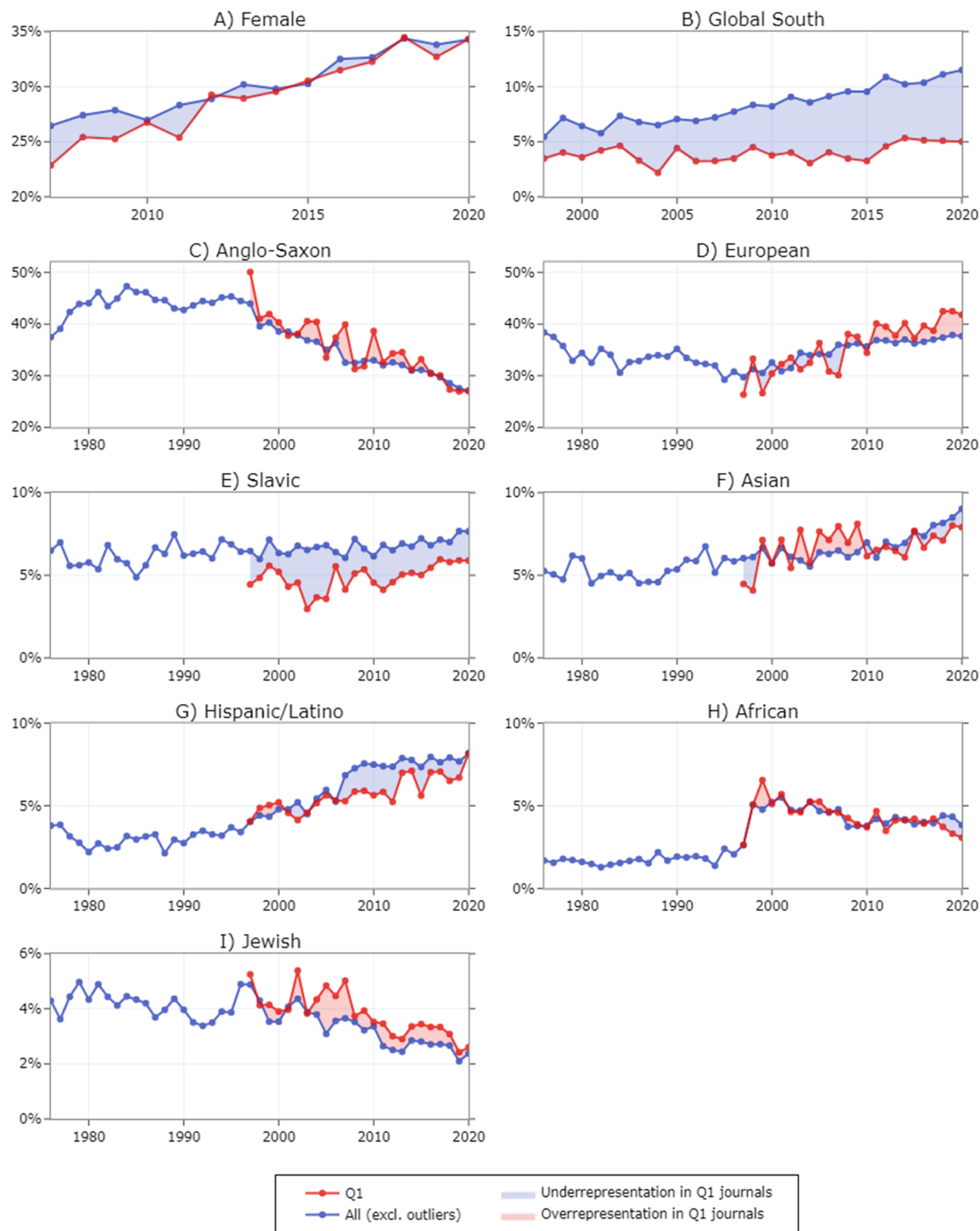
The growing diversity in journal publications is closely linked to the rise of a collaborative culture. As depicted by subplot A of figure 3, collaborative papers have continuously increased in the past five decades. The uptrend is even more prominent among Q1 journals. The red line is always higher than the blue line, and the gap between them becomes wider over time. This finding suggests that top-tier journals have led the process of collaborative knowledge building by publishing more multiauthored papers than other journals.

Figure 1
Prorated team-based authorship by demographic groups



Notes: The upper panel demonstrates the publication gaps between groups in SSCI-indexed political science journals, excluding commentary-oriented outliers (#Articles=163,374). The middle panel demonstrates the publication gaps in Q1 journals (#Articles=28,204). The lower panel demonstrates the difference between the gender/ethnic composition of SSCI journal authors and APSA members during the year 2020. To align the racial/ethnic typologies, we combine the categories of “Anglo-Saxon,” “European,” and “Slavic” to approximate the APSA’s “Non-Hispanic White and European American” category while grouping the APSA’s “South Asian or Indian American” and “East Asian or Asian American” categories to approximate our “Asian” category. Due to space limitations, the “Others” category is not displayed. The white bars demonstrate groups that are overrepresented in academic journals compared to their representation within the APSA while the black bars demonstrate underrepresented groups.

Figure 2
Time trends of prorated team-based authorship by demographic groups



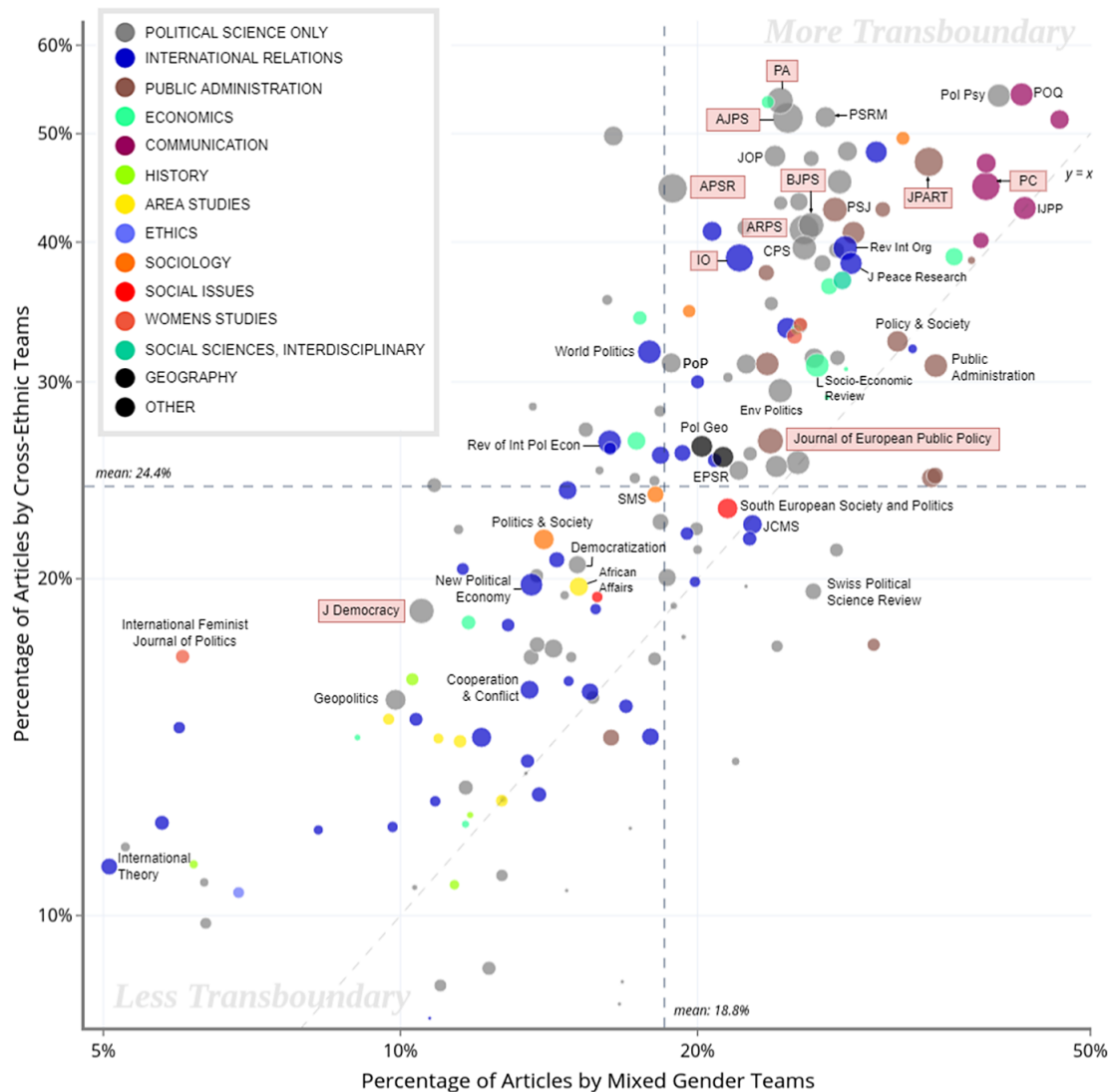
Notes: Subplots on the same row have shared y-axes. The filled areas between trendlines are indicative of between-journal publication gaps. Racial/ethnic group data before 1976, gender data before 2007, and regional data before 1998 are not displayed since they are too sparse to indicate reliable and consistent temporal patterns.

Figure 3
Time trends of scholarly collaboration in political science



Notes: Subplot A displays the percentages of collaborative articles in political science journals in general. Subplots B-E illustrate the percentages of cross-identity collaborative articles out of all collaborative articles. Collaborative articles refer to articles authored by at least two scholars, while cross-identity collaboration refers to research work that involves scholars from at least two distinct demographic groups.

Figure 4
Scatter plot of SSCI-indexed political science journals (2007–2020)



Notes: Journals are positioned according to the percentage of articles written by mixed gender teams (horizontal axis, log scale) and cross-ethnic teams (vertical axis, log scale). Dot size is determined by journals' 5-Year Impact Factors in 2020. The top 10 journals with the highest mean values of 5-Year Impact Factors over time are highlighted in red. Journals that are no longer indexed by SSCI are shown in the minimum size. Colors are determined by WoS discipline categories. The horizontal and vertical dashed lines denote the average proportions of articles contributed by cross-racial/ethnic and mixed-gender teams, respectively, while the slant dashed line denotes the diagonal where cross-ethnic collaboration rate is equal to mixed-gender collaboration rate.

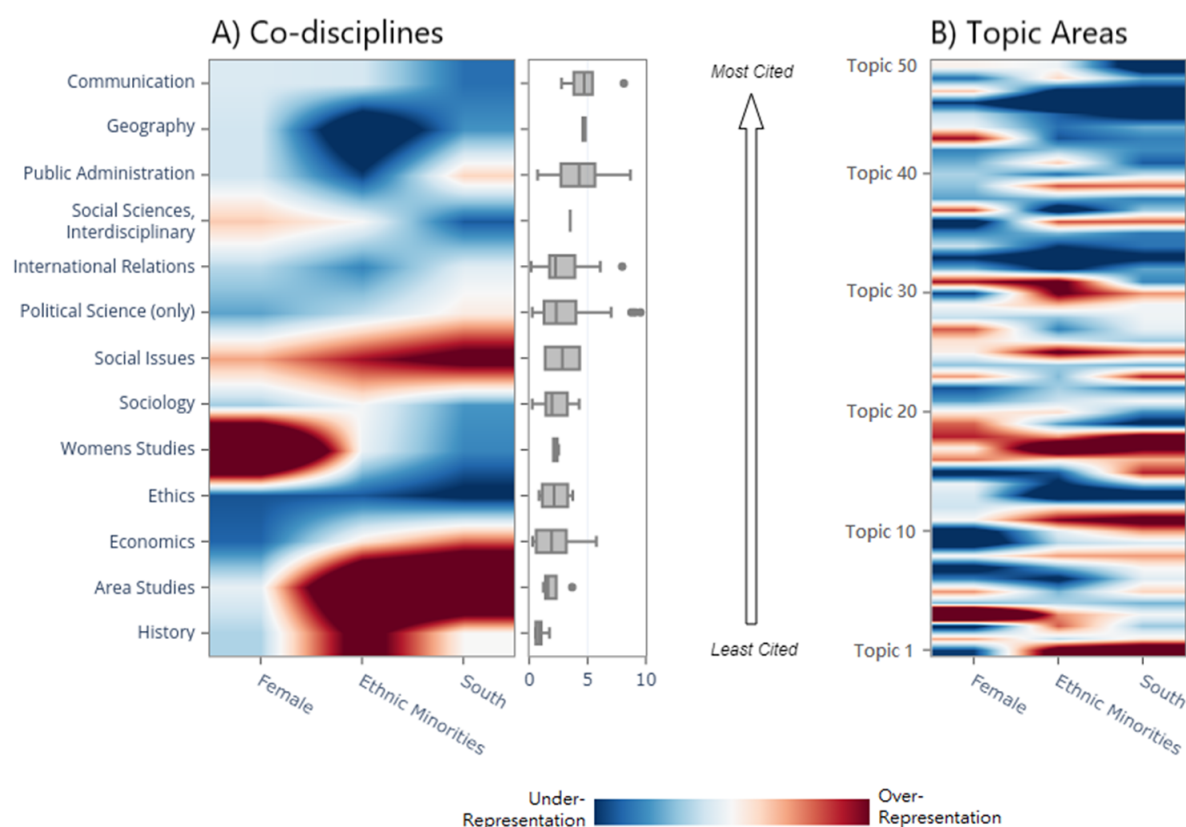
Team diversity is also increasing. Subplots B, C, and D show that a growing percentage of scholars participate in cross-identity collaboration. Mixed-gender collaboration grew by 12%, accounting for approximately half of the collaborative papers in 2020 in both top-tier and lower-tier journals. However, in top-tier journals, articles by same-gender teams are still more prevalent. This disparity has been reduced recently but has not yet been reversed.

In terms of race/ethnicity, cross-racial/ethnic collaboration also demonstrates an upward trend. As indicated by

the red-filled area in subplot C, cross-racial/ethnic teams enjoy a publication premium in top-tier journals. International collaboration is also becoming increasingly pervasive and conducive to publication in top-tier journals.

However, North–South collaboration does not exhibit a similar rising trend. Throughout the studied period, North–South collaboration only accounts for 21–30% of collaborative works in top-tier journals, overshadowed by North-only or South-only collaboration. This finding underscores the difficulty in facilitating effective collaboration between the Global North and South.

Figure 5
Citation impact and relative representation of women and minority scholars by co-disciplines and topic areas



Notes: Color indicates the degree of over- and underrepresentation of groups relative to their average proportions in all fields and topic areas. Details of topic composition can be found in online [appendix table S6](#).

Between-Journal Variation

The visibility of collaborative works varies across journals. As indicated by [figure 4](#), political science journals on average have dedicated 24.4% of articles to research conducted by cross-racial/ethnic teams (including Anglo-European teams) and 18.8% to mixed-gender teams. Most (78.6%) journals are located above the diagonal line, implying that cross-racial/ethnic collaboration is more prevalent than cross-gender collaboration. Dot colors represent the co-disciplines. All journals co-listed in Communication and Public Administration categories appear in the top-right quadrant, being more accepting of cross-identity collaboration.

Furthermore, almost all top journals have published higher-than-average percentages of cross-identity collaborative works. This includes leading general journals such as the *American Journal of Political Science*, *Journal of Politics*, *British Journal of Political Science*, and the *American Political Science Review*. In addition, top-tier specialized journals accommodate larger proportions of cross-identity collaboration than lower-tier specialized journals. For instance,

Political Analysis has dedicated 54% of multi-authored publications to papers written by mixed-ethnic teams, even though the most prominent cross-racial/ethnic collaboration type in PA is Anglo-European collaboration followed by Anglo-Asian collaboration. This tendency is also observed in *Political Science Research and Methods*. It is worth noting that JoD is the most inclusive journal for authors with racial/ethnic minority backgrounds. However, its single-authored tradition results in 71.1% of minority-led articles having only one author, placing it in the lower-left quadrant.

Evaluation Gap

The evaluation gap concerns the degree to which the citation impact of a specialty/topic is associated with the share of contributions from minority populations. To elucidate this issue, we unpack the homophily between author identity and research specialty at the discipline and topic levels. At the discipline level, we group journals by their cross-listed WoS disciplines, calculate the relative

Table 2.
Regression models predicting article citations

Variables	Model 1 FA-based All Institutions		Model 2 Team-based All Institutions		Model 3 FA-based T10 Institutions		Model 4 FA-based T50 Institutions	
	B (S.E.)	t	B (S.E.)	t	B (S.E.)	t	B (S.E.)	t
Author Identity								
<i>Gender = Female</i>	.04*** (0)	11.0	.05*** (.01)	9.2	.03 (.01)	2.0	.04*** (.01)	5.0
<i>Race/Ethnicity</i> (ref: Anglo-Saxon)								
<i>European</i>	-.02*** (0)	-4.6	-.0003 (.01)	-.05	.02 (.02)	1.5	-.01 (.01)	-1.6
<i>Asian</i>	-.07*** (.01)	-9.4	-.07*** (.01)	-7.0	-.02 (.03)	-.9	-.06*** (.02)	-4.0
<i>Slavic</i>	-.07*** (.01)	-9.9	-.05*** (.01)	-4.7	-.04 (.03)	-1.3	-.06*** (.02)	-3.7
<i>Hispanic/Latino</i>	-.07*** (.01)	-10.8	-.02 (.01)	-1.8	-.02 (.03)	-.6	-.05** (.02)	-2.7
<i>African/African</i>	-.06*** (.01)	-7.1	-.05*** (.01)	-4.0		-1.4	-.09*** (.02)	-4.9
<i>American</i>					-.05 (.04)			
<i>Jewish</i>	-.07*** (.01)	-7.1	-.08*** (.02)	-5.2	-.06 (.04)	-1.7	-.08*** (.02)	-4.0
<i>Others</i>	-.03** (.01)	-3.8	-.005 (.01)	-2.7	-.003 (.03)	-.1	-.03* (.02)	-1.4
<i>Region = South</i>	-.02*** (.01)	-4.0	-.03** (.01)	-2.7			.14 (.12)	1.2
Team Diversity								
<i>Mixed-Gender</i>	.005 (.01)	1.0	.002 (.01)	.39	-.03 (.02)	-1.6	-.01 (.01)	-0.7
<i>Cross-Racial/Ethnic</i>	.02** (.01)	3.2	.02** (.01)	3.1	.05* (.02)	2.4	.03** (.01)	2.8
<i>Cross-Regional</i>	-.06*** (.01)	-5.4	-.05*** (.01)	-3.8	-.06 (.06)	-1.1	-.07*** (.03)	-2.6
<i>Cross-National</i>	.09*** (.01)	14.8	.08*** (.01)	13.0	.05* (.02)	2.2	.06*** (.01)	4.8
<i>%Outgroup</i>	.06*** (.01)	6.8	.02* (.01)	1.7	.007 (.04)	.2	.04 (.02)	1.9
Control Variables								
<i>Team Size</i>	.05*** (0)	15.6	.03*** (0)	10.6	.07*** (.01)	5.9	.05*** (.01)	8.0
<i>#Cited References</i>	.003*** (0)	49.1	.003*** (0)	37.5	.003*** (0)	15.1	.003*** (0)	25.7
<i>Author Reputation</i>	.002*** (0)	38.0	.001*** (0)	21.8	.001 (0)	9.4	.001*** (0)	17.4
<i>Author Publication</i>	.01*** (0)	14.8	.001*** (0)	24.5	.01 (0)	4.3	.01*** (0)	7.3
<i>Article Age</i>	.03*** (0)	61.4	.04*** (0)	51.5	.04*** (0)	18.6	.03*** (0)	33.3
<i>Journal Prestige</i>	.01*** (0)	115.2	.01*** (0)	77.7	.01*** (0)	33.2	.01*** (0)	54.2
<i>Affiliation Prestige</i>	13.9*** (.71)	19.6	12.1*** (1.0)	12.0	-1.63 (3.52)	-0.5	4.43** (1.51)	2.9
<i>Topics (K=50)</i>	YES		YES		YES		YES	
Constant	.61*** (.12)	5.1	.65*** (.15)	4.4	1.42*** (.40)	3.5	1.08*** (.24)	4.6
N	68,558		68,558		5,249		16,025	
Adjusted R²	.428		.441		.438		.422	

Notes: Dependent Variable: $\log_{10}(\#Citations_i + 1)$. As this variable was positively skewed, we applied the logarithm transformation to conform it to normality. To ensure that all entries can undergo log transformation, we add 1 to each observation, thereby avoiding negative and zero values. Since the models include gender-related variables, they are largely confined to data from 2007 onward, given the large volume of missing values in WoS's author first name column before 2007.

representation of minority scholars in each co-discipline, and visualize the results using a heatmap.

As shown in subplot A of figure 5, female scholars are highly concentrated in Women's Studies, while racial/ethnic minority scholars and Global South scholars are more concentrated in Area Studies and Social Issues. Racial/ethnic minorities are also overrepresented in History. These minority-concentrated fields are all located in the lower half of the graph, implying that they are less cited than average. High-impact co-disciplines, such as Communication and Geography, are in various shades of blue. This finding further indicates that women and other minority scholars are less present in more rewarding specialties.

At the topic level, we also find a clear affinity between gender/ethnic identity and topic selection.¹⁰ While Anglo-Saxon and European scholars tend to study elections (Topic 47), racial/ethnic minorities are more committed to studying the foreign policies of developing countries (Topic 1), national security (Topic 18), and authoritarianism (Topic 12). Women devote a larger proportion of their work to gender politics (Topic 4) and social movements (Topic 19), while men are relatively more focused on political economy (Topic 10). Global South scholars intersect with women and racial/ethnic minorities, who focus their research on the foreign policies of developing countries (Topic 1), social movements (Topic 19), and authoritarianism (Topic 12). In line with the findings

regarding co-disciplines, minority-concentrated topics receive fewer citations than average. A further investigation (online appendix note S4) reveals that identity-topic affinity is more prevalent among women and racial/ethnic minority authors, while men and racial/ethnic majority authors are more ubiquitous across various topics and less likely to be trapped in the evaluation gap.

Citation Gap

To cast more systematic light on the issue, we implement ordinary least squares regression models to examine the extent to which the citations that an article obtains are associated with author identity and team diversity. As mentioned earlier, author identity can be quantified in FA-based and team-based ways. Models 1 and 2 in table 2 represent the FA-based and team-based effects, respectively. Most coefficients are consistent across these two models in terms of relative effect sizes, implying that our results are robust to different specifications. For the sake of clarity, we mainly report model 1's results. Additionally, author identity and team diversity might have heterogeneous effects depending on authors' affiliations—historically excluded authors experience a reduced disadvantage once they make their way to top universities. To address this heterogeneity, we employ six additional models that focus on a subset of articles led by authors from the top 10, 20, 30, 40, 50, and 100 universities. University rankings are established based on team-based *Affiliation Prestige*, as described in the Data and Measures section. Due to space constraints, we present only two of these six models in the main text, while providing details of the remaining models in online appendix table S7. The racial/ethnic composition of the top 15 universities is displayed in online appendix figure S3.

First, the models corroborate that author identity is an important source of variation in citation impact. Articles authored by women tend to receive more citations than those authored by men when journal prestige is included as a control, and when the intersection of gender, race, and affiliation is disaggregated. In other words, when published in the same journal on the same topic, women's work may accrue more citations than men's work.

Unlike female authors, racial/ethnic minorities and Global South authors are in a clearly disadvantaged position in garnering citations. The consistently negative coefficients indicate that articles authored by racial/ethnic minorities and Global South scholars tend to receive fewer citations than those authored by Anglo-Saxon and Global North scholars, even when published in the same outlet and focusing on the same topic. The largest citation gaps emerge among *Hispanic/Latino* ($B_{Hispanic/Latino} = -.075$, $t = -10.8$) and *Slavic* authors ($B_{Slavic} = -.073$, $t = -9.9$). Articles led by Hispanic/Latino or Slavic authors receive 17.2% and 15.9% fewer citations than those led by Anglo-Saxon authors.

The model also affirms that cross-identity collaboration is a potent cure for the citation gap. Cross-national and cross-racial/ethnic collaboration can inspire impactful research ($B_{cross-national} = .088$, $t = 14.8$, $B_{cross-racial/ethnic} = .016$, $t = 3.2$). All else being equal, cross-national teams attract 22.5% more citations than domestic teams, and cross-racial/ethnic teams attract 3.8% more citations than racially homogeneous teams. Collaborating with outgroup members is an effective strategy for historically excluded scholars to break through the citation gap and expand their research impact to a wider audience. However, if the cross-national team comprises scholars from the Global South and North, the positive effect of internationality will be undercut. South–North teams, which are cross-national by nature, receive only 6.4% more citations than domestic teams, lower than the citation premium (22.5%) for cross-national teams within the Global North or South.

Additionally, although we have seen a growing trend of mixed-gender collaboration, the regression results suggest that the citation disparity between mixed-gender and same-gender works is not statistically significant. This result is congruent with Maliniak, Powers, and Walter (2013), who find that mixed-gender teams do not outperform same-gender teams in terms of citations received in studies of international relations.

By examining the cited references, we find that both the quantity and the diversity of references positively impact citations. If reference diversity, i.e., *%Outgroup References*, increases from 0% (fully ingroup) to 100% (fully outgroup), an article's citation count will increase by 15.9%. Relatedly, reference quantity, i.e., *#References*, is also conducive to citation impact ($B_{\#references} = .003$, $t = 49.1$). Citing more references and citing broadly beyond the group boundary both can attract wider attention and more recognition.

Finally, models 3 and 4 reveal that author identity and team diversity can have varying effects depending on the authors' affiliation. In model 3, the impacts of author identity (both gender and race/ethnicity) decrease to insignificant levels and all indicators of team diversity diminish in statistical significance within the top 10 high-status universities. Nonetheless, when we expand our investigation to include the top 50 universities, we observe that most variables related to author identity and team diversity regain statistical significance, with the exception of articles by European scholars. This means that even African/African American, Jewish, Slavic, Asian, and Hispanic/Latino scholars within the circle of top 50 universities face a significant citation gap with Anglo-Saxon scholars. Model S4 in online appendix table S7 further substantiates that European-origin scholars are the least vulnerable to citation gaps and their citation disparity with Anglo-Saxon scholars is statistically insignificant in the top-100 circle. In contrast, scholars of African descent appear to be the most vulnerable to citation gaps, who face

a statistically substantial citation gap, even when they secure affiliations with the top 20 universities.

Conclusion

This study draws on 50 years of publication records and analyzes the disparities in the production and diffusion of political science research. We utilize multi-dimensional measurements to unpack the intersectionality of gender, race/ethnicity, and regional diversities. Our multivariate regression models point to the need to ascertain the influence of author identity while taking into account where an article is published and what topics it is related to.

The results show that despite historical disparities (Monroe et al. 2008), women and racial/ethnic minority scholars have gradually improved their representation and successfully expanded their collaboration networks over time. Although the publication gap still exists, it is gradually shrinking and moving closer to reflecting the demographic composition of the field. Although female researchers remain underrepresented by 5% in publications compared to APSA membership, their visibility has increased, narrowing the publication gap across journal tiers. Similar progress is seen among Asian, Hispanic/Latino, and African/African American scholars, but those from the Global South and of Slavic descent remain disproportionately concentrated in lower-tier journals despite increased visibility. Furthermore, top-tier journals have taken the lead in promoting a collaborative culture in academic publishing. They have published more collaborative papers and shown greater openness toward articles produced by cross-racial/ethnic and cross-national teams. The allocative mechanism, measured by the publication gap, has been largely reduced.

In spite of the closing publication gap, historically excluded scholars are subject to a nontrivial evaluation gap stemming from identity-specialty homophily. Minorities tend to converge in research specialties that reflect their identities. These specialties often receive fewer citations and less recognition, mirroring the “brown-on-brown research syndrome” (Jackson 2008). The concentration of minority scholars in a specialty might render that specialty less valuable in light of gender and racial norms.

In terms of citation gaps, we examine the impacts of author identity and team diversity on citation gaps. The results show that despite experiencing considerable publication and evaluation gaps, female authors receive more citations than male authors, when publishing in the same journal and focusing on the same topic. Unlike women, racial/ethnic minorities and Global South scholars face a significant citation gap. Nonetheless, this citation gap can be effectively counteracted by cross-identity collaboration. We argue that cross-identity collaboration can offer historically excluded scholars a new avenue to break through

the publication gap, overcome systemic bias, and improve visibility. Our findings substantiate the existence of a diversity dividend in academic publishing. Diversity breeds success and promotes impact, as collaborators from different walks of life can generate diverse perspectives, raise sensitivity to a wide set of issues, enrich problem-solving repertoires, and tap into networks of diverse audiences (Hong and Page 2004; Nielsen et al. 2017; Uzzi et al. 2013; Woolley et al. 2010).

Finally, we model the heterogeneity of citation gaps experienced by scholars from different bands of universities. We find between-group citation gaps diminish to insignificant levels and the impact of cross-identity collaboration becomes negligible when we limit our investigation to the top 10 universities. African/African American scholars appear to be more vulnerable to citation gaps than others, while European-descent scholars are the least vulnerable. For European-descent scholars, the citation gap can be effectively compensated if they can make their way into the top 100 universities. However, *African/African American* scholars are subject to substantial citation disadvantages, even when they have secured affiliation with the top 20 universities. This finding highlights the persistent evaluative mechanism faced by scholars of African descent.

Generally speaking, our study paints an encouraging picture of political science moving in the right direction to diversify the profession. However, as publication gaps narrow, inequality problems take on a more subtle form, residing in evaluation and citation gaps. Overt discrimination is supplanted by covert devaluation. Despite increased productivity, citation gaps persist. It is the reproduction, rather than the production, of knowledge, that increasingly stages and perpetuates inequality.

Recognizing the urgency to mitigate such evaluative inequality, an increasing number of journals are proactively urging their prospective contributors to conduct self-assessments of citation diversity. Recently, prominent journals such as the *American Journal of Political Science*, *Comparative Political Studies*, and *Perspectives on Politics* waived references from the word count in order to promote inclusive citing practices (American Journal of Political Science 2024; Arjona and Pearlman 2023; Comparative Political Studies 2023). These initiatives have the potential not only to catalyze a norm of equity, but also to boost the field’s impact, as according to our empirical findings, citation diversity and quantity are both conducive to research impact.

Our analysis also reveals two groups, namely Global South and Slavic scholars, who face alarmingly intractable gaps in publication and citation that cannot be effectively alleviated by cross-identity collaboration. Global South scholars are largely underrepresented, undercited, and underconnected in an increasingly globalized world.

Furthermore, their cross-cutting connections with Global North scholars are not as rewarding as other types of collaborations. North–South collaboration is not a valid solution for addressing their predicament. Slavic scholars are subject to a different dilemma. In spite of their relatively high productivity, scholars of Slavic origins experience significant segregation and citation handicaps. Compared with other racial/ethnic groups, they are less likely to participate in collaboration and even less likely to engage in cross-identity collaboration. A large share of studies by Slavic scholars appear in lower-tier area-focused journals, which, on the one hand, can help them counteract the publication gap prevalent in mainstream journals but, on the other hand, may also lead to intellectual marginalization, confining their research output to a small circle with fewer rewards.

There are several limitations to our work. First, we endeavor to elucidate the degree to which publication, evaluation, and citation gaps prevail in our field without reasoning why these gaps arise. This latter approach requires a historical account of disciplinary development and scientific norms of knowledge communities that are beyond the scope of our investigation. The implications and analytical capacities of this study are therefore limited. Second, even though an array of confounding factors has been controlled for, we do not factor in the influences of research quality, methodology, or theoretical approach (Guston 2000; Suhay and Druckman 2015). Besides, due to the lack of data, the measurement of reference diversity is limited to racial/ethnic diversity. The gender and geo-institutional character of references is not covered here. Finally, all categorization schemes face a trade-off between nuance and generalizability. We classify individual scholars into demographic groups and sort institutions into regional groups, which inevitably erases variation within groups. For example, all universities in the United States are grouped and labeled uniformly as Global North institutions, even though they differ in terms of prestige and resources.

Despite these limitations, this paper represents a systematic endeavor to examine the determinants of scientific output and outcome in the political science discipline. Its findings both confirm and complicate widespread assertions about gender, racial/ethnic, and geo-institutional inequalities. Future research can continue to explain how these inequalities come into being and what policy remedies may be utilized to address them.

Supplementary Material

The supplementary material for this article can be found at <https://doi.org/10.1017/S1537592724000641>.

Acknowledgements

The authors' sincere appreciation goes to the editorial team of *Perspectives on Politics* and three reviewers whose constructive and insightful feedback greatly improved our work.

Data Replication

Data replication sets are available in Harvard Dataverse at: <https://doi.org/10.7910/DVN/QZNVZ0>.

Notes

- 1 We fully acknowledge that gaps in publication, citation, and evaluation may arise due to a variety of norms and practices in knowledge production. For instance, minority scholars may choose to submit their work to non-English language journals and to target specific audiences. Political scientists worldwide are also guided by different approaches, methods, and topical focuses. Nevertheless, a coherent framework supported by extensive data remains conducive to examine the interplay between authority identity and publication records in order to advance discussion of the evolution of our discipline (See Hix 2004; Sigelman 2006).
- 2 It is worth noting that the gender publication gap does not necessarily indicate a gender bias in the review process. Actually, most of the above-mentioned studies do not find conclusive evidence to suggest that author gender influences review outcomes (Breuning and Sanders 2007; Djupe et al. 2019; König and Ropers 2018; Østby et al. 2013; Peterson 2018). As APSR editors Patterson and Smithey (1991) once put it, “What is published in the Review is, in fact, very largely a function of what is submitted.” Breuning and Sanders (2007) even found that the acceptance rates of female authors is higher than their proportion as submitting authors. In other words, the publication gap may arise from the submission gap, as female scholars are less likely to submit their works to highly visible journals than male scholars. In addition, Evans and Moulder (2011) suggest that the publication gap can also be attributable to the small share of women participating in the academic workforce in political science. By studying top journals in political science, they found that once gender differences in academic positions are accounted for, publication disparities between men and women are negligible.
- 3 Non-research content such as letters, editorial materials, and book reviews are excluded because they do not represent an intellectual contribution as substantial as original research articles. For this purpose, we only retained items that are labeled as “articles” by WoS, which according to WoS official interpretation included only original research works.

- 4 Two journals have changed their names during this period. One is *PS: Political Science & Politics*. It was established in 1968 under the title *PS* (1968–1987) as the newsletter of APSA and then obtained its current title in 1988. Another is *American Federationist* (1894–1976) which changed its title to *AFL-CIO American Federationist* (1976–1982) in 1976 and stopped publication in 1982. We treated journals of different titles as independent subjects since the scope of the journals has been changed.
- 5 While we recognize the importance of including diverse gender identities in our research, the current study is limited by the data available in WoS database. This database only allows us to measure binary gender identities (male and female), which may not capture the full spectrum of gender identities, including gender-expansive and gender-nonconforming identities.
- 6 We borrow the operationalizations of Global South and Global North from previous research (Breuning et al. 2018; Castro Torres and Alburez-Gutierrez 2022; Demeter 2019), which classify the developed countries in Western Europe, North America, Oceania, and Asia (mostly the OECD member countries) as the Global North, while regarding the developing countries in Asia, Latin America, Africa, the Middle East, and Eastern Europe as the Global South. For details on the classification of countries, please refer to online appendix table S4.
- 7 In most cases, the cited references in WoS only display the last names of the cited authors, with their first names and affiliations missing. As a result, we can only estimate the percentage of racial/ethnic outgroup references.
- 8 In the following section of this paper, we classify Anglo-Saxons and Europeans as racial/ethnic majorities, given their dominant presence in the discipline, while considering all other groups as racial/ethnic minorities.
- 9 The most prestigious journal in this subfield, *Post-Soviet Affairs* (PSA), however, is apparently divergent from other specialist journals. In stark contrast to *Politicka Ekonomie*, where 60% of the articles were authored by Slavic researchers, PSA features a significantly lower proportion (21%) of Slavic authors, and a much more pronounced presence of Anglo-Saxon and European authors.
- 10 To evaluate a group's relative representation in a given topic area, we first multiply the probabilities of the topic occurring in an article by the group's prorated authorship to yield the group's contribution to the topic in each article. Then, we take the total of the group's contributions to the topic across all articles and divide the sum by the total frequency of the topic in the dataset. The resulting value will be the group's relative contribution to this topic. For instance, if an

article is 20% about topic A and women account for 50% of its authorship, women's contribution to topic A through this article 0.1 ($20\% \times 50\% = 0.1$). Then, if women have cumulatively contributed 12.5 articles to topic A and topic A in general occurs in 25 articles, then we say women have contributed to 50% of topic A. Finally, we compile women's relative contributions to 50 topics and standardize them by removing the group mean and scaling them to unit variance. That is, if mean and standard deviation of women's representation in these topics are 0.3 and 0.1 respectively, then the group-normalized representation of women in topic A is $2 \left((0.5 - 0.3) / 0.1 = 0.2 \right)$. Relative representation scores above 0 are shown in red while negative scores are in blue. The higher the value, the deeper the color.

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