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Francesca Truffa, Ashley Wong

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Undergraduate Gender Diversity and the Direction of Scientific Research

Abstract

Can diversity lead to greater research focus on populations underrepresented in science? Between 1960 and 1990, 76 all-male US universities transitioned to coeducation. Using a generalized difference-in-differences design, we find that coeducation led to a 44% increase in gender-related research publications. This increase is driven by research focused on female subjects and gender differences. While coeducation led to a compositional shift with more women and researchers interested in gender topics, much of the increase comes from male incumbent researchers shifting their research focus toward gender-related topics. The results support interaction with more diverse students and peers as key underlying mechanisms.

JEL-Codes: J160, O310, O340.

Keywords: gender diversity, direction of innovation, scientific research.

Francesca Truffa
Stanford Graduate School of Business
Stanford / CA / USA
ftruffa@stanford.edu

Ashley Wong
Tilburg University / The Netherlands
a.y.wong@tilurguniversity.edu

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1 Introduction

Do the topics of scientific research depend on the diversity of scientific institutions? The research topics of scientists can have important implications for social welfare. For example, the historical lack of research focus on women's health concerns has been linked to greater rates of misdiagnosis of medical conditions such as heart disease in women.[1] Understanding how scientists choose the topics of their research is fundamental for designing policies that can effectively promote diversity and inclusivity in scientific research.

Previous studies on the role of diversity for scientific research have focused exclusively on *who* is conducting research. For example, diverse researchers have been shown to bring new perspectives and interests in topics related to underrepresented populations.[2] However, *exposure* to diversity may also inspire scientists, regardless of demographic identity, to pursue new topics. In doing so, this study presents novel evidence on how increasing representation in the academic environment can have much broader implications for the direction of research beyond the first-order effect of diverse researchers on science. More generally, it shows that environmental and social factors can play key roles in influencing scientists' choice of research topics.

We investigate how the gender diversity of the academic environment can inspire new research on gender-related topics. To answer this question, we study a natural experiment that sharply increased female representation on college campuses: the switch of universities from male-only to coeducation. Between 1960 and 1990, 76 US higher education institutions began to enroll female students for the first time. These universities include many prominent research institutions, such as Johns Hopkins and many of the Ivy League

[1] A growing literature has documented the underrepresentation of women as research subjects as well as the paucity of research that studies sex and gender. In biomedicine, most clinical participants and research lab animals are male, even in studies of diseases and health conditions that affect both sexes (Heidari et al., 2016; Nielsen et al., 2018; Michelman and Msall, 2022). In studies that are inclusive of both genders, most do not consider differences by sex and gender (Nielsen et al., 2018). This knowledge gap extends to many other scientific fields and contexts (Cao et al., 2021). As a proxy for our knowledge of historical figures, only 19% of the *biographical* articles on Wikipedia are about women (Wikipedia, 2021). For more examples of gender imbalance in scientific representation and innovations, see https://genderedinnovations.stanford.edu/ and Criado-Perez (2019).

[2] A series of correlational studies show that increased female representation is correlated with medical advances in women's health issues (Schiebinger, 2000; Rosser, 2002; Nielsen et al., 2018; Koning et al., 2020).

universities (e.g., Yale, Princeton). Using a large publications dataset combined with a generalized difference-in-differences empirical strategy, we find that coeducation had a positive impact on the production of gender-related research at these institutions. We show that the increase not only comes from universities hiring researchers with greater interests in gender-related topics, but coeducation also directly shaped the research focus of incumbent, mostly male, scientists. Finally, we provide additional evidence suggesting that a more diverse academic environment inspires faculty to study new topics through their interactions with more diverse students and peers.

The transitions of universities from male-only to coeducation in the 1960s, '70s and '80s provide a promising setting to investigate the effects of gender diversity on gender-related research. In our identification strategy, we exploit the variation in the timing of when universities switched to coeducation. Importantly for the internal validity of our approach, historical accounts suggest that the decision to transition to coeducation was largely driven by financial concerns due to declining applications and student quality, orthogonal to faculty research interests (Miller-Bernal and Poulson, 2004; Goldin and Katz, 2011; Malkiel, 2016). Once the decision was made by the school administrators, coeducation was implemented quickly and female enrollment rose nearly immediately (Miller-Bernal and Poulson, 2004). The staggered and sharp introduction of coeducation allows us to identify the causal impact on gender-related research. Notably, these transitions occur during a period of major social movements that advocated for equal rights for women and minorities. Therefore, our analysis is able to isolate the effect of a direct exposure to a more diverse environment above and beyond the effects of the broader cultural phenomena that are increasingly bringing issues related to diversity into the academic discourse.

The key dataset for our analysis is the Microsoft Academic Graph, a large scientific publications database with information on more than 200 million papers. One million of these were published by researchers affiliated with the 76 universities that switched to coeducation during our sample period. Using the information on the titles and abstracts, we systematically classify the publications into gender- and non gender-related research across all fields using a keyword-based approach.

We document that switching to coeducation led to a sharp increase in female enrollment. In the three to six years after the policy change, the proportion of female students in the graduating class increased to 28%, on average. Turning to our key outcome of interest, we find that transitioning to coeducation led to a substantial increase in the production of gender-related research. On average, there was a 44% increase in the number of gender-related papers produced by scholars at the university three to six years after the onset of coeducation. This suggests that increasing female enrollment share by 8.5 percentage points, or 79 additional women on average, led to one additional gender-related publication per year. This increase predominantly stemmed from research that explored sex differences or focused on female subjects. Notably, male researchers, who constituted 88% of the researchers at baseline, drove much of this increase in gender-related publications.

The increase in gender diversity in the academic environment plays a critical role in explaining these findings. In particular, we show that the increase in gender-related research is concentrated in schools with the largest change in female student enrollment. We also rule out confounding stories, including changing social norms at the regional level, higher R&D expenditures for gender-related fields, and spillover effects from universities that were already coed.

Next, we isolate two key channels that explain this large increase in gender-related research output. Rather than an increase in the total number of researchers or in the productivity of researchers, the increase can be explained by both a compositional effect and a direct treatment effect on the research interests of faculty at the school. In terms of the compositional effect, we find that after coeducation, the schools had more female assistant professors and other researchers who were more likely to study gender-related topics. A Oaxaca-style decomposition reveals that the change in faculty gender can explain 6% of the effect, while the remaining comes from within-gender changes in gender-related research production.

More importantly for the overall effect, coeducation had a direct treatment effect on scientists' research topics. Focusing on incumbent researchers and using within-researcher variation, we show that researchers affiliated with the university prior to coeducation, who were predominately male, increased the number of gender-related publications by 57% per year. Among their research, the share of papers related to gender increased by 27%. These findings present novel evidence that exposure to diversity can change the direction of research of individual scientists.

We then explore three mechanisms that can explain why incumbent scientists shifted the direction of their research in response to coeducation: (i) classroom interactions between faculty and students, (ii) inclusion of female students in the research production process, and (iii) interaction among peer researchers. First, using class descriptions from historical course catalogues, we show that turning coed led to an increase in course offerings related to gender. This is consistent with the hypothesis that the arrival of female students generated new discussion topics and altered course content, which can influence faculty research interests. Second, we do a deeper dive into psychology, a field that traditionally uses undergraduates as research subjects. We show that the increase in gender-related research production in psychology was concentrated in experimental work, pointing to at least one concrete way that the undergraduate student body affected research questions of researchers at the university. Finally, we show that peer interactions can play a role in explaining the treatment effect on research direction. The increase in gender-related research came partly from an increase in co-authorships with female researchers. This result suggests that the change in researcher composition as a result of coeducation potentially generated peer effects that induced researchers to study new topics.

In the last part of the paper, we conclude by providing evidence suggesting that the shift in research focus also improved the *quality* of research at the universities. After the start of coeducation, there was a suggestive positive increase in the production of influential papers in the top decile of the citation distribution of the papers' respective fields. This is driven by a higher number of citations of gender-related research.

Our study shows that a change in representation can influence research and the estimates we document are economically meaningful. Using our results on female graduates and gender-related research, a back-of-the-envelope calculation reveals that the increase in female undergraduate representation can explain 19% of the overall increase in gender-related research between 1960 and 2015.

Together, we interpret our findings as evidence that transitions to coeducation increased undergraduate gender diversity, which, in turn, led to a broader shift in research focus toward gender-related topics at these universities. In addition to changing the composition of who conducted research at these universities, the key result is that the change directly impacted the research interests of individual scientists, highlighting the role of the academic environment in influencing research priorities. These results suggest that even during a time period when issues related to gender and race inequality were at the forefront of public debate, an increase in representation in the academic environment could also meaningfully shift researchers' interests toward topics related to underrepresented populations.

Our study makes several contributions. First, this paper furthers our understanding of where ideas come from and how scientists choose their topics of research. We present new causal evidence on how diversity in the academic environment can shape scientific knowledge production. How scientists choose their direction of research endeavors remains largely unexplained and few economic studies have investigated how scientists choose to position themselves in the ideas space (Azoulay et al., 2019). Prior works that studied this question have focused on incentives and market forces, such as competition from new entrants in the field (Borjas and Doran, 2012), perceived barriers to entry due to the presence of a superstar in the field (Azoulay et al., 2019), and the role of research funding (Myers, 2020). In comparison, *social* factors, such as the academic environment and the relationship between faculty and student, as potential mediating factors have received much less attention. One notable exception is the paper by Bell et al. (2018) which shows that childhood exposure to innovators in specific technology classes directly influences children's propensities to invent in those areas. We add to this literature by showing that exposure to diversity in the academic environment is also important for shaping the research agendas of individual scientists. In doing so, we are also relating the economic literature on the production of ideas to the longstanding literature in management science and social psychology that studies the relationship between environment and creativity (Amabile et al., 1996; Amabile, 2018).

Second, our paper contributes to the literature that seeks to understand the relationship between diversity *of researchers* and innovation. One strand of this literature studies the impact of immigrants on scientific progress and innovation (Kerr and Lincoln, 2010; Borjas and Doran, 2012; Moser et al., 2014; Borjas et al., 2017).[3] Substantial research also has shown that racial, gender, and ethnic diversity of team members is linked to higher creativity and higher team performance (see Horwitz and Horwitz (2007) for a review). A series of studies suggest that innovators and scientists are more likely to create products or study topics that are more similar to them in terms of gender and socioeconomic status (Schiebinger, 2000; Rosser, 2002; Nielsen et al., 2018; Koning et al., 2020; Nagaraj

[3]A related literature studies how ethnic diversity contributes to economic growth and prosperity, whereby one of the key channel is through increased innovation (Alesina and La Ferrara, 2005; Alesina et al., 2016).

et al., 2020; Einiö et al., 2023).[4] However, these studies focused on the diversity of the researchers' identities. We build on this literature by showing causally that diversity can affect ideas generation via a different channel: the diversity of the *environment*.

Third, this research builds on the body of literature examining the impacts of exposure to diversity on attitudes, preferences, and perspectives. Evidence suggests that peer interactions with minority or disadvantaged groups during one's formative years can shape social behaviors and political identity in adulthood (Rao, 2019; Billings et al., 2021). Moreover, a series of papers have shown that fathering daughters can influence men's political viewpoints (Washington, 2008; Doepke and Tertilt, 2009; Owsald and Powdthavee, 2010), their gender attitudes (Shafer and Malhotra, 2011; Borrell-Porta et al., 2018) and their behavior as managers (Cronqvist and Yu, 2017; Ronchi and Smith, 2021). This study extends this body of work by demonstrating that exposure to diversity can also affect research interests.

Finally, we also contribute to the literature on coeducation. A large body of research, mostly focused on secondary schools, has examined the impact of coeducation on student outcomes, such as academic engagement, academic achievement, and participation in traditionally female/male subjects (Trickett and Trickett, 1982; Jackson, 2009; Lavy and Schlosser, 2011; Jackson, 2012; Park et al., 2018). Recent studies have also explored university-level coeducation, including its historical context (Goldin and Katz, 2011) and its influence on female education attainment Currie and Moretti (2003). In another related paper, Calkins et al. (2020) study the effects of universities switching from female-only to coeducation on the major choices of students. We expand on these works by presenting new evidence that coeducation can have indirect effects on the production of research at universities, beyond student outcomes.

The remainder of this paper is structured as follows. Section 2 provides an overview of the history of coeducation in US higher education. Section 3 presents the data we use in our analysis. Section 4 describes our empirical strategy. Results appear in Section 5. Section 6 presents a decomposition of the increase in gender-related research and isolates the key channels. Section 7 analyzes three mechanisms for the treatment effect of coeducation on the direction of scientists' research. Finally, Section 8 concludes.

[4]A related literature on gender and scientific literature focuses on the underrepresentation of women in scientific fields (Beede et al., 2011) and the barriers women face in academia (Antecol et al., 2018; Card et al., 2019; Sarsons et al., 2019; Hengel, 2019).

2 Background

History of University Coeducation in United States Coeducation in higher education has a long history in the United States, but until the 1960s, women were barred from entering some of the nation's most prestigious colleges and universities. In 1835, Oberlin College became the first coeducational university when it first admitted women (Goldin and Katz, 2011). As shown in Figure 1, the transition of four-year institutions from male-only to coeducation occurred at a steady pace throughout the time period but accelerated during the period between 1960 and 1990, denoted by vertical lines.[5] This latter period forms the time frame of our analysis and is associated with the era with the highest coeducation activities. In total, 88 institutions switched during this period, including prominent research institutions such as the Ivy League universities (Columbia, Dartmouth, Princeton, and Yale) and selective liberal arts colleges (e.g., Amherst, Wesleyan, Williams). Today, only three universities in the United States remain male-only. The full list of institutions in our analysis can be found in Appendix Table A.1.[6]

It is important to note that while the sample period of interest was considered the celebrated historical period of coeducation, it did not play as important of a role in women's educational attainment as the earlier transitions did (Goldin and Katz, 2011). For instance, by 1924, over 75% of students were already enrolled in coed institutions and the switch to coeducation between 1960 and 1975 only increased the share of undergraduate women taught in coeducation settings by 4 percentage points (Goldin and Katz, 2011). However, the transitions to coeducation of these universities enabled women to enter some of the most prestigious and research-productive universities.

Determinants of Coeducation During 1960-1990 The dramatic increase in coeducational universities during this period was driven by a combination of cultural and economic factors. The decades of the '60s and '70s were a period of political and social unrest. Increasingly, students demanded integration both in terms of gender and race, and sought to be educated at coeducational institutions (Miller-Bernal and Poulson, 2004). This shift in

[5] Note that there were concurrent switches from female-only universities to coeducation throughout the entire time frame. However, this paper focuses on the male-only to coeducation switches.

[6] The total number of schools we study is 76, instead of 88, because we restricted to universities that were actively researching in fields that are feasible for gender-related research. See Section 3.4 for further details.

demand led to a reduction in enrollment growth and declining student quality at male-only universities compared to coeducational institutions (Goldin and Katz, 2011).

While cultural factors increased the demand for coeducation among students, male-only universities eventually switched to coeducation for financial reasons that were largely unrelated to universities' demand or supply of gender-related research, a feature that we will exploit in our empirical strategy (Miller-Bernal and Poulson, 2004; Goldin and Katz, 2011; Malkiel, 2016). As the historian Nancy Malkiel describes:

> "Coeducation happened because it was in the strategic self-interest of all-male institutions like Princeton and Yale to admit women. By the late 1960s, these schools were beginning to see their applications decline, along with their yields. The high school students they called the 'best boys' no longer wanted to go to all-male institutions [...] It was not the result of a high-minded moral commitment to opening educational opportunities to women, nor was it the result of deep thinking about how to educate women." (Malkiel, 2016)

This sentiment is also reflected in the way university presidents described the coeducation decision. One such example is a quote by Yale President Kingman Brewster Jr. in 1967 who declared in an address to alumni: "Our concern is not so much what Yale can do for women but what can women do for Yale." (Malkiel, 2016).

3 Data

We describe in this section the data used in our analysis. Additional details are provided in Appendix Section B.

3.1 University Data

To identify colleges that changed from single-sex to coeducation, we use the Coeducation College Database that was compiled and generously provided by Goldin and Katz (2011). The Coeducation College Database contains detailed information on the universe of four-year institutions (around 1,500) that existed from around 1897 to the present. The data provides the year when each school turned coed, defined by Goldin and Katz (2011) as "one that has classes for men and women together. These classes must include the central ones in a liberal arts college and cannot be limited to a particular school, such as nursing or education." Given that our research purpose is to understand how turning coed changed faculty research interests, we believe this is an appropriate definition in our context.

Data on student enrollment (1968–1998), faculty (1971–1998) and degrees awarded (1965–1998) come from the Integrated Postsecondary Education Data System (IPEDS) and its predecessor Higher Education General Information Survey (HEGIS) collected by the United States Department of Education. Finally, we collected and digitized course catalogue data with information on course descriptions for 22 universities that went coed during our sample period.[7]

3.2 Publications Data

For data on scientific publications, we use the Microsoft Academic Graph (MAG) database (Sinha et al., 2015), a large database with information on over 207 million papers, over one million of which were written by scholars affiliated with the schools that turned coed in our sample period between 1950 and 2005. The data include information on paper titles, abstracts, fields of study, researchers' names, and affiliation of the researcher at time of publication. Because the gender of the researcher is not provided in the MAG database, we classify the gender of the researcher by comparing the first name to four established names databases, including the US Social Security Administration baby name data and US census.[8]

3.3 Definition of Gender-Related Papers

Our main outcome of interest is gender-related research. To identify gender-related papers, we use a keyword-based text classification approach. We first define a set of gender-related words such as "female," "woman," and "mother." The full list of keywords is provided in Appendix Section C.1.1. The keywords are compiled from the data source, Datamuse API, a word-finding query search engine that is based on Google Books Ngrams data and other

[7]Only 22 universities in our sample made available online fully scanned course description information from historical course catalogue.

[8]We provide additional details on this procedure in Appendix Section B.3.

corpus-based datasets.[9] We select the top 20 most related words to "gender" and for each of these words, we collect five synonyms. Following the literature that has emphasized "female-focused" research and innovations (Koning et al., 2020), we exclude male-related words because historically men are considered "standard" in research.[10,11]

We define a paper as gender-related if at least one of the keywords appears in either the title or the abstract.[12] The key advantage of our methodology is that it can be applied broadly to all fields. In comparison, prior investigations of gender-related research topics focused on biomedicine, in which papers can be classified as gender- or female-related based on biological sex differences and disease incidence (Nielsen et al., 2018; Koning et al., 2020). In Section 5.2.2, we show that our results are robust to several alternative definitions of gender-related research.

Types of Gender-Related Research What kinds of research do we capture with our gender-related research definition? We randomly select 540 (45 from each field) gender-related publications and classify them into (i) research that is related to gender in terms of topics and (ii) research that focuses on sex differences, even if the research topic itself may not necessarily be related to gender.[13] In these instances, the paper may present analyses by sex or use a gender-diverse research sample, which may include nonhuman subjects. We are interested in both types of research because women and female animals have traditionally been underrepresented as research subjects (Nielsen et al., 2018). In Appendix Section C.4.1, we implement a machine learning algorithm to classify these two types of research and explore how coeducation may affect them.

In the random sample of 540 gender-related papers, we find that 66% are gender-related

[9] Accessed via https://www.datamuse.com/api/.

[10] We also exclude any slang terms.

[11] In Appendix Section C.3, we explore how research on other genders and sexual identities (e.g., men, LGBTQ) also changed as a result of coeducation. We find that coeducation also had a positive but insignificant impact on research on men- and LGBT-related topics.

[12] Note that the title is available for all papers while the abstract is available for 60% of papers. We find in Appendix Section D that abstracts are more likely to be available in later years and for the sciences. In addition, we show that abstract availability is not correlated with coeducation and does not materially influence our results.

[13] Three research assistants classify the research publications. The kappa-statistic of interrater agreement is 0.70, suggesting a high degree of agreement among the 3 RAs. We consider a paper to be in a specific category if at least two of the RAs agreed. Additional details on the audit process can be found in Appendix Section C.4.

in terms of topics, such as "Accounting for Changes in the Labor Supply of Recently Divorced Women" (Johnson and Skinner, 1988). Another 29% are gender-related research papers on sex differences. For example, we classify the paper "Respiratory Effects of Household Exposures to Tobacco Smoke And Gas Cooking on Nonsmokers" (Helsing et al., 1982) as gender-related because it studies differences by sex. The remaining 5% of the gender-related papers are misclassified, implying a false positive rate of 0.3%.[14,15] In Appendix Section C.4.2, we present two randomly selected examples of gender-related publications and their abstracts for each of the fields. Note that the misclassification of gender-related research would only bias our empirical results if it were systematically correlated with the timing of coeducation. This is unlikely to be the case, as we will show that our results are robust to alternative methods of identifying gender-related research and misclassification errors are likely to be orthogonal across different methodologies.

Trends in Gender-Related Research Production Our process results in 7.6 million gender-related publications among 36 million publications from all bachelor's, master's, or Ph.D.-granting universities in the United States between 1900 and 2015.[16]

We document two descriptive facts that suggest a positive relationship between gender-related research production and presence of female students on campus. First, Figure 2 shows a close relationship between the evolution of gender-related research (in blue) and female bachelor's degrees awarded (in orange).[17] In 1900, gender-related research was close to 0% on average across universities but gradually rose over the next decades. At the same time, female enrollment also increased from 20% to near parity by 1940. Both

[14]Following Advani et al. (2023), we compute the false positive rate as the ratio between the number of false positives FP over the sum of false positives and true negatives TN, i.e., $FPR = \frac{\#FP}{\#FP+\#TN}$. To compute the number of true negatives, we randomly select 100 papers that we classify as "non gender-related". After inspecting the full text of these papers, we find that 5% of them include both male and female subjects with the remaining 95% of them being true negatives. Given that 5% of papers in our sample are gender-related, we can re-scale and calculate the false positive rate as, $FPR = \frac{.05(5\%)}{.05(5\%)+.95(95\%)} = 0.3\%$.

[15]For instance, one misclassified paper, Kaufman-Scarborough and Menzel Baker (2005), discusses the American Disabilities Act (ADA). While it references the women's movement in its abstract regarding the origins of the ADA, the paper's main focus is not on gender issues.

[16]We identify all bachelor's, master's, or Ph.D. granting institutions using the 1987–2000 IPEDS dataset. This results in 1,345 institutions. We successfully matched 1,216 institutions to the MAG dataset. Note that the full MAG dataset contains 18,720 institutions.

[17]The two gray vertical lines denote the entry and exit dates of World War II for the United States.

gender-related research and female enrollment fell in the decades following World War II, but increased sharply beginning in 1960, coinciding with a period of major social movements that advocated for equal rights for women and minorities.[18] By 2015, gender-related research amounted to 8.2% of the university publications and female share of bachelor's degrees awarded is 57%. Notably, these trends highlight that the primary years of our analysis (1960 – 1990) represent an important period of growth for both gender-related research production and female college attainment.

Second, we find that gender-related research output also differs by the coeducational status of the university. Over the period from 1900 to 2015, a greater share of research is devoted to gender topics in female-only universities (8.5%) than in coeducational schools (5.6%), with male-only universities having the least of all (2.3%).[19] In our analysis, we will test whether transitioning to coeducation affects gender-related research production.

3.4 Sample Selection

In our analysis, we make two sample restrictions. First, we focus specifically on the fields in which it is reasonable for researchers to explore gender-related topics: social sciences, humanities, biology, environmental science, and medicine.[20] Appendix Figure A.2 shows the share of gender-related publications by fields across all degree-granting universities from 1900 and 1950. As hypothesized, gender-related research production is concentrated in these areas.[21] In the remainder of the paper, we will refer to this group of fields as "gender-related fields" and restrict our analysis to these fields.

Second, we restrict the sample of universities to those that are research-active in these gender-related fields. During our time period of interest between 1960 and 1990, 88 total schools switched from male-only to coeducation. We restrict to the 76 universities that published at least one paper (not necessarily gender-related) in social sciences, humani-

[18] The increase in male enrollment after World War II has been attributed to the GI bill (Bound and Turner, 2002; Stanley, 2003; Goldin et al., 2006) and prospects for draft deferments during the Vietnam War (Card and Lemieux, 2001).

[19] Appendix Figure A.1 plots the corresponding trends over time.

[20] The social sciences include the fields of sociology, psychology, political science, economics, geography, and business. The humanities include the fields of art, history, and philosophy.

[21] We exclude geography, geology, mathematics, physics, chemistry, engineering, computer science, and materials science. Note that these fields are lowest ranked in terms of gender-related papers across all definitions of gender-related research, including those using machine learning.

ties, biology, environmental science, or medicine within the five years prior to switching to coeducation. This restriction drops either universities that were not research active or universities that exclusively focused on math and sciences. Appendix Table A.2 shows that schools that are excluded from our sample are much smaller and did not publish any papers across any field in the year leading up to coeducation.[22]

Appendix Table A.3 presents the summary statistics on the main analysis sample of schools that turned coed from 1960 to 1990 at the school level (Panel A.3a), school-subfield level in the gender-related fields (Panel A.3b), and researcher level (Panel A.3c).[23] All characteristics are measured in the year before the school switched to coeducation, $\tau = -1$. Interestingly, 7% of the graduating cohort was female. While women were not taught in the same classes as the male students, "women were admitted to a few undergraduate programs, such as teaching and nursing" Goldin and Katz (2011) (pp. 415).[24] Prior to coeducation, gender-related research production was low, only around 3% of all research publications in the gender-related fields. About 12% of the researchers were female who were also more likely to publish gender-related research. Appendix Figure A.5 shows the distribution of the total number of papers (panel a), total number of gender-related papers (panel b), and share of gender-related papers (panel c) written by researchers over their entire lifetime. Although researchers produced on average 21 papers over their lifetime, 12% wrote only one paper. Only a small percentage of researchers consistently studied gender-related topics. In fact, among researchers with at least one gender-related publication, only 32% of them wrote more gender-related than non gender-related papers.

3.5 Descriptive Evidence

Before proceeding to the empirical analysis, we provide descriptive evidence on the evolution of student composition and gender-related research before and after coeducation.

In Appendix Figure A.6, we plot the average female share of bachelor's degrees awarded

[22]Our results hold when including all fields (including math and science) and/or the complete set of 88 universities, as demonstrated in Appendix Section I.5.

[23]The subfield is defined as the first sub-classification of the broad field of study (e.g., labor economics is a subfield of economics).

[24]We show in Appendix Figures A.3 and A.4 that female graduates were concentrated in the majors of education and health professionals prior to coeducation. A sizable portion of female undergraduates, around 20%, also studied in the social sciences.

in the years up to and after the implementation of the policy. Year 0 is normalized to be the first full year of coeducation.[25] Because it takes about four years for the first women enrolled at the school to graduate, we expect an increase in the female bachelor's degrees share around year 3. As hypothesized, female students on average increased sharply to nearly 30% of the graduates in the fourth full year of coeducation.[26]

Turning to research production, in Appendix Figure A.7, we plot the average number of gender-related papers at the subfield level across universities in the years before and after turning coed. The figures provide transparent evidence that while gender diversity was increasing on campus, there was a concurrent and sharp increase in gender-related research at the universities.

4 Empirical Strategy

To identify the causal impact of coeducation on student and research outcomes, we employ an event study methodology, or a generalized difference-in-differences design with staggered adoption. We estimate the model:

$$E(y_{idt}|\mathbf{X}_{idt}) = f(\sum_{\tau \neq -1} \beta_\tau YearRelativeCoed_{id\tau} + X_{idt} + \theta_{id} + \delta_t + \gamma_{dt}) \qquad (1)$$

where y_{idt} is the outcome of interest, such as total number of gender-related publications at school-subfield i in the discipline d (humanities, science, and social sciences) in year t.[27,28] θ_{id} are unit fixed effects, δ_t are year fixed effects, which control for overall trends in the outcome, and γ_{dt} are discipline-by-year fixed effects, which account for changes

[25] In Appendix Figure A.6b, we plot the analogous graph for log total degrees awarded.

[26] The increase in female graduates in the first three years after coeducation can be explained by universities enrolling sophomore, junior, or senior women at the time of coeducation.

[27] The subfield is defined as the first sub-classification of the broad field of study (e.g., labor economics is a subfield of economics).

[28] The disciplines are defined as follow. Humanities include art, history, and philosophy. Sciences include medicine, biology, and environmental science. Social sciences include psychology, sociology, economics, business, political science, and geography.

in research output that are common within disciplines.[29,30] For each school, we denote $\tau = 0$ as the first full year of coeducation. We include the full set of event time dummies, $YearRelativeCoed_{id\tau}$. The effect at $\tau = -1$ is normalized to zero.[31] In all of our specifications, we use all available observations between $\tau \geq -20$ and $\tau \leq 20$.[32] We will report only the event study coefficients estimated in the period between $\tau \geq -5$ and $\tau \leq 6$ as our sample is mostly balanced during this period. We also control for time-varying controls, X_{idt}, that include total publications, total publications with an abstract, and the average abstract length. We include these controls, because (i) we are interested in capturing the shift in research focus towards gender-related work, and (ii) the availability and length of abstracts would mechanically increase the likelihood of finding gender-related research. In Appendix Section D, we address potential concerns regarding missing abstracts and provide evidence that they do not affect our findings.

The function $f(\cdot)$ depends on the outcome variable of interest. In most cases, $f(\cdot)$ is the linear function. When y_{it} is count data such as the number of gender-related papers, we follow the innovation literature (Azoulay et al., 2010; Azoulay et al., 2019) and estimate the model using a Poisson quasi-maximum likelihood (QML) model, in which case $f(\cdot)$ is the exponential function.[33] In all specifications, we cluster at the school level. To summarize the magnitude of effects, we will report the post-period average of the β_τ for $0 \leq \tau \leq 2$ (i.e., $\frac{1}{3}\sum_{\tau=0}^{2}\beta_\tau$) and $3 \leq \tau \leq 6$ (i.e., $\frac{1}{4}\sum_{\tau=3}^{6}\beta_\tau$). By taking a simple average of the

[29] Some outcomes, such as female enrollment, are measured at the school level due to data availability. In such cases, we do not control for disciplines.

[30] In Section 5.2.2, we show the results are robust to the inclusion of field-by-year fixed effects at a lower level of field aggregation than discipline-level. However, the Poisson model does not converge for some outcomes that have less variation when we include the field-by-year fixed effects. As a result, our baseline specification includes discipline-by-year fixed effects. The Poisson model also does not converge for some researcher-level regressions (e.g. restricting to only female researchers). To be consistent, we do not include discipline-by-year fixed effects when estimating results at the researcher level. For the specifications that do converge, our results are nearly identical with or without these fixed effects.

[31] As highlighted by Borusyak et al. (2021), including the full set of event time dummies requires one additional normalization. In all specifications, we also omit the event time indicator for $\tau = -10$, but results are robust to omitting alternative event time coefficients. Results are available upon request.

[32] Note that our sample is not balanced because the date ranges for our data are: MAG 1950–2005, enrollment 1968–1998, faculty 1971–1998, and degrees awarded 1965–1998.

[33] The key advantage of the QML estimator is that it is consistent in the presence of fixed effects and can be used to model any non-negative dependent variable without the need to specify a distribution, even in cases with many zeroes, such as in our setting (Correia et al., 2020).

post-period coefficients, we do not have to assume a parametric form for the effects.[34] We report the two average treatment effects because we expect there to be publication lag and, thus, the effects should be strongest after the first few years.

4.1 Identifying Assumptions

In order to interpret the results of the event study specification as the causal treatment effects of coeducation on research outcomes, we rely on two key identifying assumptions: no anticipation of the treatment and parallel trends (Sun and Abraham, 2020; Borusyak et al., 2021). Under the no anticipatory effects assumption, we assume that units do not change their behavior in anticipation of the treatment. Under the parallel trends assumption, we assume that absent the reform, the difference in potential outcomes would be the same across all units and all periods conditional on the set of controls, unit and time fixed effects.

The main threat to identification is that unobserved changes in campus culture or faculty interests can explain both the timing of coeducation and changes in gender-related research production. For example, professors may become increasingly interested in having a more gender-diverse student body and convince administrators to switch to coeducation. Hence, prior to coeducation, faculty begin gender-related research projects. Several pieces of evidence suggest that this is unlikely to be the case.

As described in Section 2, the decision to turn coed was ultimately financially driven and was made by university administrators in response to declining student demand and student quality. Indeed, Appendix Figure A.8 shows that student quality, as measured by high school GPA, declined in the years prior to coeducation and immediately rose after coeducation. Moreover, Appendix Figure A.9 provides suggestive but noisy evidence that log total expenditures per student and log revenue per student both declined in the years prior to coeducation. These patterns corroborate historical accounts suggesting the coeducation policy was adopted as a strategy to draw higher-quality students and improve school financial outcomes (Miller-Bernal and Poulson, 2004; Malkiel, 2016).

Additionally, Appendix Table A.4 reports the results of bivariate regressions between the year of coeducation and school characteristics. We find no correlation between the timing of coeducation and characteristics related to gender research output in 1960, such

[34] These standard errors are computed using the Delta Method.

as number of researchers or share of female researchers. Instead, schools that are masters colleges and universities, with earlier years of opening, non-sectarian, and Methodist had earlier transitions to coeducation.[35] In Section 5.3, we show our results are robust to directly controlling for these controls in the regressions.

To address concerns that the timing of coeducation is correlated with campus cultural changes, we directly measure student activism from 1960 to 1980 using historical student newspaper archives. In Appendix Section E, we show that the year of coeducation was not related to school-specific trends in student activism, as measured by mentions of "women's rights", "civil rights", and "war protest" in student newspapers.

Finally, in support of our identification assumptions, we show in Appendix Figure A.7 that there is limited evidence of an upward trend in gender-related research in the raw data series prior to coeducation. To show that this pattern does not depend on timing of coeducation, Appendix Figure A.10 presents the analogous figures by year of coeducation in five-year bins. Reassuringly, this pattern is broadly similar across the figures.[36] Similarly, in the results section, we will show that the estimated pre-period coefficients do not differ significantly from zero.

Issues Related to Staggered Difference-in-Differences Design As highlighted by the recent econometric literature, our estimates may also be biased if there is heterogeneity in treatment effects between groups of units treated at different times. This bias can occur even if both the no-anticipatory effects and parallel trends assumptions hold (Goodman-Bacon, 2019; de Chaisemartin and D'Haultfoeuille, 2020; Callaway and Sant'Anna, 2020; Sun and Abraham, 2020; Borusyak et al., 2021).

Given the potential for biased estimates, we conduct a series of robustness checks for these issues in Appendix Section F. We implement a test for the influence of negative weights (de Chaisemartin and D'Haultfoeuille, 2020) and test the sensitivity of our estimates to potential violations of the parallel trends assumption following Rambachan and

[35]Note that the results on religious affiliation stands in contrast to results found in Goldin and Katz (2011). This is because we have restricted the sample to only those that switched between 1960 and 1990.

[36]We present the analogous figures by individual years of coeducation in Appendix Figure A.11. This is slightly noisier because for some years we only observe one or two schools that switched to coeducation. The raw data seem to suggest that there are heterogeneous treatment effects across cohorts that can potentially bias our empirical estimates. However, we will show that our results are robust to these concerns.

Roth (2023). In Figure 4, we show the robustness of our results to using an alternative estimator proposed by Sun and Abraham (2020) that allows for heterogeneous treatment effects across cohorts.[37] In Appendix Section F.4.2, we also present analogous results using the estimator proposed by Borusyak et al. (2021).[38] Finally, because the inclusion of a control group can alleviate issues related to heterogeneous treatment effects (Goodman-Bacon, 2019), we show in Figure 4 our estimates are robust to using four alternative groups of universities as control groups.

5 Results

In the first part of our analysis, we show that turning coed had an immediate impact on the gender diversity of the student population at the universities of interest. We then turn to research outcomes and show that turning coed positively affected the production of gender-related research. We then provide evidence that the increase was driven by the increase in gender diversity on campus associated with coeducation.

5.1 Effects of Turning Coed on Student Body

We first consider how transitioning to coeducation altered the composition of students at the universities. Figure 3 plots the event time coefficients and their 95% confidence intervals from estimating equation (1) for the female share of bachelor's degrees awarded and log number of total bachelor's degrees awarded. In Appendix Figure A.12, we present the analogous results using fall enrollment data. We summarize the magnitudes of these findings by presenting the average effects over the years 0 to 2 and 3 to 6 in Table 1. Female share of bachelor's degrees significantly increased by 21 percentage points. Relative to the

[37]The literature thus far has focused on the linear case. However, in Appendix Section F.3, we conduct Monte-Carlo simulations that show the Poisson model can also be biased. While it is beyond the scope of this paper to characterize this bias, our finding shows that it is important for researchers to consider these issues even when a linear model is not employed.

[38]Compared to the Sun and Abraham (2020) estimator, this method uses the average of *all* pre-treatment periods as the baseline outcome instead of the period prior to the reform. This may lead to greater biases if the parallel trends assumption does not exactly hold and discrepancies grow over time (de Chaisemartin and DHaultfuille, 2022). Since our sample is not balanced and contains observations as early as 20 years prior to coeducation, we focus on the Sun and Abraham (2020) estimator in the main text but we reassuringly find similar magnitudes using the Borusyak et al. (2021) estimator.

baseline share of 7%, this indicates that women made up 28% of the graduating classes three to six years after coeducation.

Total degrees increased by 18% during the same period. Given that the baseline class size is 539, this implies an increase of 97 students. Using the earlier estimates on the increase in female enrollment, this suggests that there was an increase of 141 female students and a decrease of seven male students. This means that the schools largely increased the student body size to accommodate the new female students rather than substituting female students for male students. The magnitudes are similar when we consider fall enrollment instead of degrees awarded. We explore heterogeneous effects by field of study in Appendix Section G. We find the largest increase in female degree share in the fields of geography, philosophy, psychology, and sociology.

5.2 Effects of Turning Coed on Gender-Related Research

We next consider the effects of turning coed on gender-related research. Figure 4 plots the event study coefficients for our main definition of gender-related research using the baseline Poisson model (Figure 4a), the alternative interaction-weighted (IW) estimator proposed by Sun and Abraham (2020) (Figure 4b),[39] and the baseline Poisson model with additional control groups: (i) universities that were always coeducational prior to 1940 (Figure 4c), (ii) matched control universities among those that were always coeducational prior to 1940 (Figure 4d), (iii) universities that were always male-only and never switched as of 2023 (Figure 4e), (iv) universities that were always female-only and never switched as of 2023 (Figure 4f).[40] We present the corresponding figures using the baseline specification for the subcomponents in gender-related papers—the number of papers with a gender-related word in the title and the number with a gender-related word in the abstract—in Appendix Figure A.13. We summarize the magnitude of the effects in Table 2.

In support of the validity of our empirical approach, we find a lack of pre-trends across all specifications in Figure 4. The coefficients in the pre-period are overall small in magnitude and are not statistically different from zero. Moreover, the effects of coeducation on

[39]Details on the interaction-weighted (IW) estimator (Sun and Abraham, 2020) and its application in our analysis are provided in Appendix Section F.4.1.

[40]Details on the construction of these control groups are provided in Appendix Section F.5.

gender-related research display similar patterns across various specifications and estimators, aligning closely with our baseline specification.[41,42]

After coeducation, there was a positive and significant increase in the output of gender-related publications. Within the first three years after turning coed, we find a 15% increase in the number of gender-related papers per year at the subfield level in Table 2, Column (1).[43] The increase was highest three years after the reform, as we may expect due to publication lag. In particular, gender-related research production was 44% higher on average between the third and sixth year after the switch to coeducation. Given that the baseline average of gender-related papers at each school-subfield was 0.57 papers, this is equivalent to 0.25 additional papers per year. This magnitude is similar to the increase we observe in the raw data, shown in Appendix Figure A.7. At the university level, this effect size corresponds to an additional 1.8 publications per year compared to the baseline average number of gender-related publications of 4.08 papers among gender-related fields. Comparing this with our results on female undergraduate enrollment (Section 5.1), this suggests that increasing female enrollment share by 8.5 percentage points, or 77 additional women on average, led to one additional gender-related publication.[44]

In Appendix Section H, we present the analogous estimates using OLS and negative binomial models. Although the estimates are less precise, we find similar patterns for the number of gender-related papers, with the largest effects in $\tau = 3$ (Appendix Figures H.1a and H.2). Results using the share of papers related to gender as outcome variable are insignificant. However, due to the large standard errors for the share of papers related to gender, we are only able to detect effect sizes that are larger than 0.016 p.p. at the 5% level, which is larger than what is implied by our baseline estimates using the Poisson model

[41]Note that the coefficients for the IW estimator should be interpreted in levels as this is a linear model. We show the comparison with OLS estimates for the baseline specification in Appendix Figure F.6. In Appendix Section F.4.2, we also present analogous results using the estimator proposed by Borusyak et al. (2021).

[42]The standard errors with the always-male control group are slightly larger because there are only three always-male universities.

[43]Because these models are estimated with a Poisson specification, the percentage change of the effect can be calculated by exponentiating the coefficient of interest and subtracting one. Then multiplying by 100 gives the percentage. In this case, $15\% = (e^{0.144} - 1) \times 100$.

[44]Assuming a linear relationship, we calculate this by dividing 1.8 publications by 141 women (or 21 percentage points), which is the increase in female enrollment as a result of turning coed. This implies 0.013 papers per additional woman, which corresponds to 77 additional female students for one additional paper. See Section 5.1.

(Appendix Table H.1).[45]

Turning to the effects by subcomponents of the main definition, we find that our main effects are largely driven by an increasing number of papers that include a gender-related word in the abstract. Switching to coeducation increased the number of papers with a gender-related word in the abstract by 43% in years 3 to 6 (Column (2)). In comparison, the magnitude is smaller and insignificant for the number of gender-related papers based on the title of the paper.[46]

Appendix Table A.5 explores these impacts by gender and finds that the effect sizes are similar in magnitude for papers written by both male and female researchers, but estimates for female researchers are not statistically significant. Given that male researchers make up 88% of the researchers at baseline, these results suggest that the overall effect is mainly driven by men.[47]

In Appendix Figure A.14 and Appendix Table A.7, we present the results on gender-related research for each field.[48] The effects are estimated by interacting the event time dummies in the baseline specification with a categorical variable for the fields. We find similar effects across all fields. The magnitude of effects is largest in the social sciences, medicine and biology, albeit not significantly different.

5.2.1 Discussion on Types of Gender-Related Research

What *types* of gender-related research increased as a result of coeducation? We discussed in Section 3.3 that our definition of gender-related papers captures both research with gender topics as the main focus as well as research that considers gender differences and has a gender-inclusive sample. Given that we find a larger increase in papers with a gender-

[45] Our baseline estimates suggest an increase of 1.8 gender-related papers. Relative to the baseline total number of papers of 128, this is a 0.014 p.p. increase in the share. We will show in the following sections that total publications do not increase as a result of coeducation.

[46] Given that our results are driven by papers with gender-related abstracts, one potential concern is that the availability or length of abstracts was also evolving at the same time as coeducation. To address these concerns, in our baseline specifications, we control for abstract availability and word count of abstracts. We also explore these issues related to missing abstracts further in Appendix Section D.

[47] Appendix Table A.6 presents the analogous results for new researchers, defined as those who have not published at the university before.

[48] Due to the small sample size, we grouped together arts, philosophy, and history as "humanities." Economics includes both economics and business. Other fields include environmental science and political science.

related abstract rather than title, the overall effect may reflect an increase in research that explores differences by sex—if research with a primary focus on gender topics is more likely to have a gender-related title. To test this hypothesis, in Appendix Figure C.2, we show using data from the audit we conducted (described in Section 3.3) that papers identified as gender-related based on the abstract are less likely to have a gender topic as main focus.[49] This suggests that the increase in gender-related research after coeducation is driven by research that focused on female subjects and gender differences.

An increase in research focus on gender differences is important for closing the gender gap in research representation and can have meaningful positive impacts for scientific knowledge.[50] However, there is a potential concern that researchers might have always explored gender differences within the main text of their papers, but the coeducation policy, having heightened the awareness of gender issues, could lead to more frequent mentions of gender differences in the abstracts of papers. This could potentially result in an artificial inflation of the increase in gender-related research. We argue that this is unlikely to be the case for two reasons. First, as we will discuss in Section 5.2.2, we find positive effects on gender-related research in medicine even when we use the National Library of Medicine's indexer to identify research on conditions and diseases that are more likely to affect women, which we would not necessarily capture with our gender-related keywords. Second, we collect 1,134 full-text articles written by a 25% random sample of incumbent researchers who started producing gender-related research (i.e. mentioning a gender keyword in the title or abstract) only after coeducation (see Appendix Section C.5). We show that after coeducation, these researchers were more likely to use any gender keywords *at all* in the full texts and the share of words in the full text related to gender also sharply increased, suggesting a fundamental shift in the content and focus of the researchers' work.

5.2.2 Robustness Checks

We conduct a series of checks to show our results are robust to alternative modeling choices and definitions of gender-related research. The results are summarized in Appendix Figure

[49] In Appendix Section C.4.1, we use a machine learning algorithm to classify gender-related papers into the two types, gender topic or gender-inclusive samples, and also find suggestive evidence that papers with gender-inclusive samples drove much of the increase in gender-related research.

[50] Indeed, under the NIH Policy on Sex as a Biological Variable, researchers are expected to consider sex and sex differences in research designs, analyses, and reporting in vertebrate animal and human studies since 2016. https://orwh.od.nih.gov/sex-gender/nih-policy-sex-biological-variable (Accessed 2023-05-29)

I.1. Additional details on each robustness exercise are presented in Appendix Section I.

The first set of checks show that our estimates are robust to using alternative definitions of gender-related research (see Appendix Section I.1.1). These include using alternative list of gender-related keywords, medical terms that identify female-focused medical research, and a machine learning classification algorithm, Naïve Bayes, that is trained on papers in the field of "gender studies" and gender-related journals. We also show our results are robust to using the number of times a gender-related keyword appears in the title or abstract.

The second set of robustness checks uses alternative specifications (Appendix Section I.1.2). These include restricting the analysis to only journal articles, using alternative field-year fixed effects, estimating at different levels of aggregation (school or school-by-field), and changing the time horizon of the data used in the regression analysis. We also show our results are similar when we drop universities that had affiliated coordinate or sister colleges prior to coeducation, such as Brown and Columbia. Given that female students may have already been integrated into campus life prior to coeducation, our results may be biased if these schools are included in the sample.

In addition, because most universities in our sample switched during the period between 1968 and 1972 (see Figure 1), we show in Appendix Section I.2 that our results are not sensitive to using only schools that switched during the 5-year period or *excluding* these schools. In Appendix Sections I.3 and I.4, we describe two additional checks: a randomization test with placebo turning coed dates and a leave-one-out exercise. The results of these checks show that the estimated impact of turning coed is unlikely to have occurred by chance and that our results are not driven by any one specific university in the sample. Finally, in Appendix Section I.5, we demonstrate that our results are also robust to the sample restrictions described in Section 3.4. Results are nearly identical when we include all fields, including non gender-related fields such as chemistry and physics, and/or universities we dropped that were not research-active in a gender-related field prior to coeducation.

5.3 Importance of Undergraduate Gender Diversity

Our results suggest that coeducation coincided with an increase in gender-related research production. In this section, we argue that this rise is driven by the increase in gender diversity in the academic environment rather than alternative confounding factors.

5.3.1 Heterogeneity by Female Enrollment

If the increase in gender-related research came from an increase in gender diversity on campus, we should expect a larger effect for schools that enrolled more female students. As shown in Appendix Figure A.15, there is considerable variation in the female share of bachelor's degrees awarded in the immediate aftermath of the reform.[51] Faculty working at a university with an above-median change in female enrollment experienced an increase of 28 percentage points in the share of female graduates, compared to the increase of 11 percentage points for faculty in below-median change schools.

To test this hypothesis, we estimate our baseline equation (1) with an interaction term for whether the university is above the median in the distribution of the change in female bachelor's degrees share from $\tau = -1$ to $\tau = 3$. Appendix Table A.8 shows that our findings are driven by the schools that experienced the highest increase in female students.[52] It is worth noting that the female share of bachelor's degrees at $\tau = 3$ may be endogenous as this is measured post reform. However, even if the relationship is not necessarily causal, it reveals a positive correlation between gender diversity in the student body and research.

5.3.2 Potential Confounders

We next rule out alternative confounding stories. First, the timing of the coeducation policy may reflect unobserved school characteristics that can also affect research production. However, baseline characteristics such as faculty size or gender composition, which could influence gender-related research, show no correlation with the year of coeducation (Section 4.1). In Appendix Figure I.7, we show that our results are robust to allowing different linear trends for the predictors of coeducation year: Carnegie classification, year of opening categories, and religious affiliation.[53]

Second, cultural changes may be correlated with both the timing of coeducation and

[51] As explained in Section 5.1, due to data availability we use female share bachelor's degrees awarded as proxy for enrollment.

[52] In this regression, there are 42 universities, given that we do not have information on bachelor's degrees awarded for all universities in all years.

[53] The Poisson model does not converge if we use fixed effects instead of linear trends due to the large number of covariates. However, we note that the inclusion of linear trends in a model with staggered adoption can lead to bias by over-weighting observations at the end of the sample (Goodman-Bacon, 2019). As a result, these results should be interpreted with caution.

production of gender-related research. To address this issue, we show our results are robust to including region-by-year fixed effects to capture broader regional trends in cultural attitudes (Appendix Figure I.8). Similarly, as mentioned in Section 4.1, we show in Appendix Section E our results are robust to controlling for school-specific measures of student activism on campus. We find that results are broadly similar when we control for student newspaper mentions of "women's rights", "civil rights", and "war protest."

Third, at the same time coeducation occurred, universities may have simultaneously promoted research on gender-related issues through financial incentives. However, this is unlikely, given that the primary reason for coeducation was financial concerns rather than gender equality concerns. Moreover, as we show in Appendix Section I.8, we find no evidence that R&D expenditures shifted toward gender-related departments within universities, based on data from the National Science Foundation. We also discuss in Section 6.1 that there is limited evidence that more faculty were hired in gender-related fields, suggesting that resources at the university were not diverted toward gender-related research.

A fourth potential explanation is that universities after coeducation became more competitive at attracting high-quality scholars who were at the forefront of their fields. Coed universities may have been better able to recruit new scholars during a time when gender topics were increasingly becoming a hot topic across many fields. If this was true, the effects we capture would not be mediated through the increasing diversity of the environment. In Appendix Section I.9, we present an analysis in which we identify the fastest-growing subfields in each field and show that coeducation did not lead to a sharp increase in research focus in these "hot" subfields, unlike the results we observe for gender-related research.

Fifth, an alternative explanation is that schools admitted more female graduate students at the same time coeducation occurred. For some of these universities, graduate programs were coeducational for many years before undergraduate admissions.[54] However, schools may have increased female graduate enrollment. As a result, the increase in gender-related research may not have necessarily come from the increase in gender diversity among the undergraduate student body. In Appendix Section I.10, we show that the size of the graduate student body did not increase and there was no effect on the gender composition of graduate students.

[54]For example, although the first female undergraduate arrived at Yale College in 1969, Yale's School of Art opened to female graduates in 1869 (https://guides.library.yale.edu/c.php?g=871411&p=6256097).

Finally, in Appendix Section I.11, we provide evidence that spillovers across universities are unlikely to bias our results. For example, scholars at universities that were treated later may be inspired by earlier universities switching to coeducation and began producing gender-related research prior to coeducation. This would bias our estimates upward. We find limited evidence of spillover effects of turning coed on universities outside of the sample in the same city or with close collaboration ties, suggesting that our results are unlikely to be driven by spillovers across universities in the sample.

6 Decomposing the Increase in Gender-Related Research

Our results thus far highlight the importance of undergraduate gender diversity on research production. In this section, we decompose the increase in gender-related research into three potential channels: (i) an increase in the number of faculty or researchers at the university, (ii) an increase in research productivity per researcher, or (iii) an increase in the propensity to produce gender-related research.[55]

6.1 Changes in Number of Faculty and Researchers

First, we rule out that the effects come from an increase in the number of faculty and researchers. In response to the growing student body, universities may have hired new researchers and new faculty, leading to an increase in research production in both gender- and non gender-related topics. However, Appendix Table A.9 reveals that there is limited evidence of a change in the total number of faculty and researchers at the school level.

While we do not observe an increase in faculty size at the school level, departments that received an influx of female students may have hired more faculty, potentially at the expense of other departments. However, Appendix Table A.10 shows that the proportion of researchers did not shift toward female-dominated fields, which were also the fields that produced the most gender-related research (see Appendix Figure A.16).[56]

[55]In other words, the number of gender-related papers at the school level is the product of the three terms: the number of researchers at the university, the number of papers per researcher, and the share of papers related to gender per researcher.

[56]Note that we do not have data on faculty at the department level so we are unable to analyze the analogous outcome using faculty data.

6.2 Changes in Research Productivity

We next show that the increase in gender-related research did not come from an overall rise in research productivity among the scientists at the university. Holding constant the number of faculty or researchers, an increase in the number of gender-related research papers may have also arisen if there were an increase in research productivity among the scientists at the university. For example, the increase in student enrollment could have generated additional revenues to fund university research, or the increase in diversity may increase research productivity as has been shown in studies in team settings (Hong and Page, 2004; Horwitz and Horwitz, 2007; Nathan and Lee, 2013).

Appendix Table A.11 shows null effects on the total number of papers per researcher.[57] We also do not find an effect on productivity for researchers in female-dominated and non-female-dominated fields in Appendix Table A.12. These results indicate that an increase in research productivity is unlikely to explain the overall increase in gender-related research.

6.3 Changes in the Propensity to Produce Gender-Related Research

Given the null effects on the number of researchers and research productivity, it follows that the increase in gender-related research must have come from an increase in the propensity of individual researchers to produce gender-related research. Specifically, the *share* of publications related to gender for individual researchers must be higher on average as a result of coeducation.

How can coeducation lead to an increase in the propensity to conduct gender-related research? There are two potential explanations: a *compositional effect*, or changes in who conducts research at the university, and a *treatment effect*, or direct impacts of coeducation on individual research focus. In this section, we will present evidence of these two explanations and quantify the relative magnitudes of these mechanisms.

[57]Note that in this specification, we include school fixed effects but not researcher fixed effects, because we want to capture the average change in research production, allowing for entries and exits of researchers in the sample.

6.3.1 Compositional Effect on University Faculty and Researchers

After coeducation, the composition of researchers at the university may have changed, leading to greater representation of researchers who were more interested in gender-related research. We investigate two potential compositional shifts: (i) an increase in female faculty and (ii) an increase in researchers who had prior interests in gender-related topics.

Gender Composition of Faculty We first investigate whether there was a change in the gender composition of faculty at these universities. Historical accounts suggest that the arrival of female students raised the demand for female faculty (Miller-Bernal and Poulson, 2004; Malkiel, 2016). Because female faculty researchers were more likely to conduct gender-related research as suggested by the baseline summary statistics (Appendix Table A.3c) and by the literature (Nielsen et al., 2018; Koning et al., 2020), more female faculty could lead to an increase in gender-related research.

In Appendix Table A.13, we present the effects of turning coed on the gender composition of the faculty at the school level.[58] Column (1) shows that the policy change led to a suggestive but insignificant increase in the share of female faculty at the school three to six years after coeducation. Instead, we find a 4.8 percentage point gain, or a 37% increase, in the share of female assistant professors (Column (2)). This suggests that after coeducation, schools hired new female faculty, but primarily for junior-level positions. Since the baseline share of assistant female faculty was 13%, this implies an increase to 17.8% female faculty, or 2.4 additional female professors (average number of assistant faculty was 50), after coeducation. In contrast, we find null effects for professors of higher ranks, such as associate and full professors (Columns (3) and (4)). To quantify the role of faculty gender composition, in Appendix Section J, we perform an Oaxaca-style decomposition to decompose the total increase in gender-related papers into changes in faculty gender composition (6%) and within-gender changes in gender publications per researcher (94%). Notably, the majority (65%) of the effect can be explained by the increase in gender-related research output by male researchers.[59]

[58]In Appendix Table A.14, we present the analogous results for female researchers identified using the MAG dataset. The results from this analysis, however, are inconclusive due to the large standard errors and potential measurement errors in identifying female researchers in the publications database.

[59]This effect combines both the selection effect (e.g. arrival of new male researchers interested in gender)

Researchers with Prior Interests in Gender Topics Transitioning to coeducation may have also increased the proportion of researchers who had prior interests in gender topics. For example, researchers with more gender-diverse research interests may be interested in working in a more gender-diverse environment. Anecdotal evidence also suggests that the arrival of female students increased demand for courses that are more gender-related (Price, 2016). As a result, universities may attract or retain faculty and researchers with a greater interest in these topics.

We test this hypothesis in Appendix Figure A.17. We estimate equation (1) at the researcher level, using as our outcome variable an indicator that takes on the value of 1 if the researcher had prior interests in gender-related topics based on their publication history. The sample includes all researchers, both incumbent and new researchers, who published at least one paper prior to the year coeducation began. The results are summarized in Appendix Table A.15. Researchers interested in gender are defined as those who had either written a gender-related paper, referenced a gender-related paper, or co-authored with a person who has written a gender-related paper at least once before the policy change.[60]

The causal estimates reveal a substantial increase in the likelihood of researchers having prior interests in gender-related topics. After coeducation, there was an increase of 5.3 percentage points (a large 152% increase) in the probability of having prior interests in gender-related topics in years 3 to 6. These results indicate that coeducation resulted in greater diversity in *who* conducted research at these universities, leading to an overall increase in diversity in research topics.

6.3.2 Treatment Effect on Direction of Research: Incumbent Researcher Analysis

Beyond changing the diversity of the faculty and researchers, coeducation may have also impacted researchers' propensity to produce gender-related publications through a *treatment effect*. Exposure to gender diversity may have raised new research questions as the

and the treatment effect (e.g. impact on research interests among male faculty). We perform an alternative decomposition inAppendix Section L to measure the importance of the treatment effect.

[60]Under this broad definition, around 2.1% of researchers at baseline were interested in gender-related topics. This is computed for those working in one of the gender-related fields.

faculty and scientists worked and interacted in a more diverse environment. However, *a priori*, it is not clear that the research focus of scientists would change. As documented by Borjas and Doran (2012, 2015) and Myers (2020), moving across ideas space, or cognitive mobility, is costly for researchers. Given that the arrival of female students at the university was unlikely to have changed the market returns to writing about gender in terms of publication likelihood or citations, scientists may not respond even if the college campus became more diverse. Furthermore, no empirical causal evidence has previously documented the link between teaching and faculty research.

To quantify the treatment effect on research directions, we leverage our panel data on researchers to study within-person changes in research production for incumbent researchers. We estimate equation (1) at the researcher level for researchers who have already published a paper at the university prior to coeducation and we include individual fixed effects to account for any time-invariant characteristics that determine the propensity to study gender-related topics.[61] We present the results in Table 3 with corresponding plots of the coefficients in Figure 5. The results show that turning coed led to a sharp increase in the production of gender-related papers for incumbent researchers in terms of number of gender-related papers and share of gender-related papers.[62] Incumbent researchers wrote 57% more gender-related papers per year after coeducation in years 3 to 6 (Column (1)). This corresponds to an increase in gender-related research publications per researcher of 0.03 (=0.57×0.05) per year, from 0.05 to 0.08 papers. Moreover, Column (2) shows that, during the same period, the share of gender-related papers increased by 1.6 percentage points (27%). Appendix Table A.16 and Appendix Figure A.18 explore the analogous effects by gender. We find a meaningful treatment effect on male incumbent researchers. However, the results for female researchers are only suggestive and are not robust to even minor parallel trends violations as shown in Appendix Section F.2.

The positive effect on the production of gender-related research among incumbent researchers points to a sizable treatment effect on the research interests of individuals at the university. The arrival of female students on campus induced incumbent researchers, who were mostly male, to explore topics related to gender.[63] To quantify the magnitude of the

[61]We assign researchers to the field in which they conduct the most research such that we only have one observation per researcher per year.

[62]Note that co-authored papers are assigned to each researcher on the team with full credit.

[63]We note that the treatment effects estimated for incumbent researchers are based on the sample of

treatment effect on research focus, in Appendix Section L, we show that the overall treatment effect can account for at least 46% of the overall increase in gender-related research.

7 Explaining the Treatment Effect on Research Focus

In this section, we provide evidence that faculty interactions with more diverse students and peers can explain the large treatment effect on scientists' research interests.

7.1 Classroom Interactions between Faculty and Students

We first examine whether the increase in undergraduate gender diversity led faculty to study new questions related to gender because of changes in classroom interactions. Anecdotal evidence suggests that the presence of female students induced changes in the curriculum and new discussions in the classrooms. A clear illustration of this can be seen in the shift in research of the prominent Yale psychologist, Roy Schafer, during the transition to coed (See Appendix Section M). Schafer was "challenged by [the female students'] critique" on Freud's views on women and published "Problems in Freud's Psychology of Women" four years after Yale turned coed (Fogel, 2019). This shift in research direction, seen as "a bomb on the male-dominated hierarchy that had long overseen classical psychoanalysis," provides compelling evidence of how faculty-student interactions can reshape research focus (Fogel, 2019).

In the absence of direct data linking professors to the courses they taught and their students, we provide further suggestive evidence by investigating changes in course content after coeducation. We collect and parse course catalogues with full course descriptions for 22 universities that transitioned to coeducation during our sample period to examine whether turning coed had an impact on courses related to gender.[64] We define a class as gender-related if the course description or course title includes any one of the gender-related words we defined in our main definition.

researchers who continue to publish at the university after coeducation. In Appendix Section K, we conduct a bounding exercise in the spirit of Lee (2009) to take into account potential selection in attrition in estimating these effects and find that selective attrition cannot account for majority of these effects.

[64]These universities are selected because they made available scanned images of their full course catalogues online.

In line with this hypothesis, we show in Appendix Figure A.19 that there was a noticeable increase in the number and share of classes related to gender in the years after coeducation. These descriptive results are confirmed by our causal estimates on the number and share of gender-related classes. Appendix Figure A.20 presents the plot of the regression estimates. Appendix Table A.17 reports the average effects over years 0 to 2 and 3 to 6. These results show that the number of classes increased by 5.1 per year.[65] Share of classes related to gender also increased by 0.7 percentage points after coeducation.

While it is unlikely that the total increase in gender-related research came only from the faculty teaching these new gender classes, these results provide suggestive evidence that classroom interaction between faculty and female students may play a role in the overall increase in gender-related research.

7.2 Complementarities Between Faculty and Students in Research Production: Case Study in Psychology

In addition to interactions with students in the classroom, complementarities often exist in the research production function between faculty and students. For example, undergraduate students often act as research assistants and can influence research directions through their participation in the research process. While we do not have information on research assistantships or the involvement of students in the research process, we can exploit a unique feature of the scientific production function in the field of psychology. Specifically, in psychology, undergraduates are often included in lab experiments as research subjects. In 1966, 73% of the articles published in the *Journal of Abnormal and Social Psychology* used "college students, chiefly male students enrolled in introductory psychology" (Smart, 1966). By changing the gender composition of the undergraduate student body, researchers may answer new research questions, specifically those related to gender that otherwise would not have been feasible. While this effect may be present in other experimental fields, we focus on psychology as this is a field that traditionally uses undergraduates as subjects.

In Appendix Table A.18, we investigate whether the increase in gender-related research in psychology was higher for experimental research.[66] Appendix Table A.18 shows the

[65]Due to the small number of observations, the Poisson model does not converge, so we estimate a linear model for this outcome.

[66]We classify a paper as experimental if it contains one of the words "experiment," "lab," "participant,"

average effects from estimating equation (1) with an interaction dummy for experimental papers. We find that the increase in total gender-related research in psychology was driven by experimental research, consistent with the hypothesis that the increase in female students affected research through their participation in lab experiments.[67] This provides one example of how interaction between the researcher and students in research settings can foster new research. Understanding whether this effect was driven by a relaxation of constraints (e.g., lowering the recruiting costs of female subjects) or inspiration through exposure to female students in the academic environment would be an interesting question for future analysis.

7.3 Interactions with Peer Researchers: Changing Co-Authorship Patterns

We have thus far provided suggestive evidence that research interests could be partly shaped by interactions with students in the classroom and in research settings. In addition, coeducation may have also changed the interactions among peers. For example, changes in the composition of researchers may have exposed researchers to different colleagues. They may now collaborate with researchers with different ideas and different interests. This could, in turn, generate interest in gender-related topics through peer effects.

In Appendix Table A.20, we present the results for the probability of writing a gender-related paper and the probability of co-authoring with a female researcher on a gender-related paper. The sample is restricted to incumbent researchers and conditional on having a publication in that period. Note that co-authors may not necessarily be incumbent researchers but they are restricted to researchers at the same university.We include researcher fixed effects in all regressions to leverage the within-researcher variation.

The results show that among all researchers, there was an increase in the probability of writing gender-related research by 2 percentage points, or 26%. Three to six years after co-

"treat," or "control" in the title or abstract.

[67] In Appendix Table A.19 we investigate whether we observe a similar increase in experimental gender-related research for the fields of biology and medicine. These two fields also conducted experimental research during our sample period, but were much less likely to recruit student research participants. Unlike the results for psychology, we find limited evidence that the increase in gender-related research in these two fields came from an experimental papers, suggesting the important role of female participants in psychology papers.

education, the likelihood of writing a gender-related paper was 10%. A substantial part of this increase came from collaborations with female researchers. In Column (4), we show that the likelihood of writing a gender-related research paper with a female collaborator increased by 0.9 percentage points to 2.9%, which explains about 29% of the total probability. Interestingly, the estimates also imply that male researchers were also exploring gender-related topics even when they were not co-authoring with female researchers.[68]

One explanation for this increase in the likelihood of co-authoring with a female researcher on a gender-related paper is that researchers were more likely to co-author with female researchers after coeducation. In Appendix Table A.21, we find no evidence of this effect for male incumbent researchers, ruling out this explanation. Instead, this suggests that collaborations with female colleagues were more likely to result in gender-related research after coeducation.[69]

This pattern of results is consistent with the hypothesis that changes in peer composition can influence scientific research focus. We do, however, acknowledge that we cannot rule out the scenario in which male researchers became interested in gender-related topics and sought collaborations with female researchers who may have expertise on the subject matter. Nonetheless, our results together suggest that gender diversity influenced faculty research interests by changing their interactions with students and other peer researchers.

8 Conclusions

This paper presents novel estimates on the impact of undergraduate gender diversity on academic research. We find that transitioning from male-only to coeducation led to a substantial increase in gender-related research publications by 44% on average between years 3 and 6 after the policy change.

The increase in gender-related research can be explained by two factors. First, there was an increase in the diversity of the researchers at the university, in terms of gender and prior research interests. Second, and more significantly, we document a treatment effect on the research focus of university researchers. After coeducation, we observe a rise

[68]Results for female researchers differ slightly. Appendix Table A.21 shows a positive effect on the likelihood that a female incumbent researcher will collaborate with another female researcher.

[69]An illustrative example is that of James Jekel, an assistant professor at Yale University, who began collaborating on gender-related topics with a female colleague, Lorraine Klerman, after the transition to coeducation. His publication list, provided in Appendix Section M, demonstrates this shift in research focus.

in gender-related research output and a shift in focus toward gender topics among male *incumbent* researchers. This shift underscores the substantial role of exposure to diversity on the research output of established faculty members.

Broadly, our findings highlight the significant role of diverse student and peer interactions in shaping research interests. Additionally, as shown in Appendix Section N, we find suggestive positive impacts of coeducation on quality of research. Given that gender-related research was more likely to be highly cited, a shift in research focus also corresponded to an increase in citations.

Together, our results highlight that an increase in representation can influence the direction of research of scientists. Figure 2 shows a sharp increase in both gender-related research and female enrollment beginning in 1960. During the period between 1960 and 2015, gender-related research increased from 2% to 8.2% while the female share of bachelor's degrees awarded increased from 27% to 57%. Extrapolating the estimates on female graduates and gender-related research from our analysis in Sections 5.1 and 5.2, our results suggest that the increase in gender diversity on campus can explain 19% of the overall increase in gender-related research.[70]

It is important to note that transitions to coeducation occurred during a period of broader cultural changes that increasingly brought issues of gender and racial inequality to the forefront of public and academic debates. As observed in Figure 2, research on gender was dramatically increasing over this time period. Given that research is a global market and the vast majority of universities were already coeducational by the time the schools in our sample transitioned, it is unlikely that faculty and researchers at the newly coed schools had not encountered this type of research before. Nonetheless, the results of our paper suggest that the arrival of female students on campus led to a shift in research topics above and beyond these broader cultural changes, highlighting the fundamental role that the immediate academic environment plays in affecting research ideas.

[70]Our results find that turning coed led to a 0.8 p.p. increase in the share of gender-related papers and a 21 p.p. increase in female bachelor's degrees awarded.

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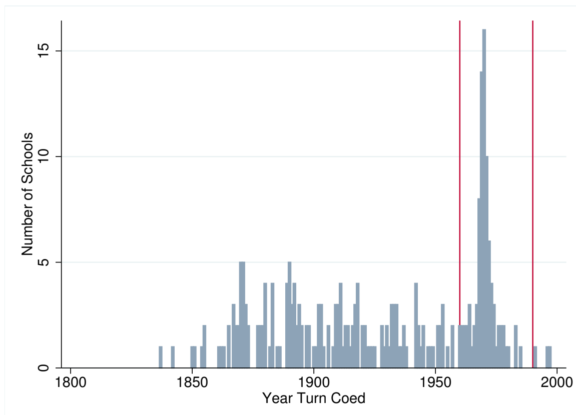
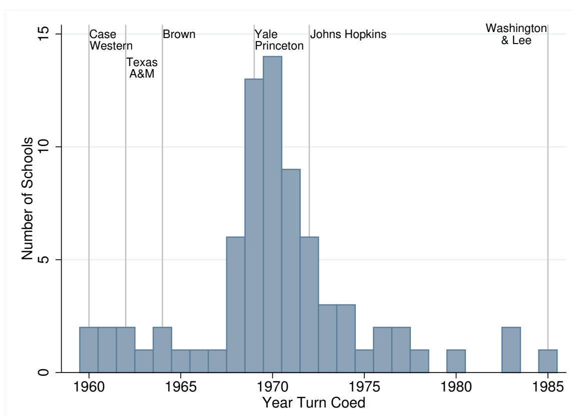
Figures

Figure 1: Distribution of Turn Coed Years

(a) All Years

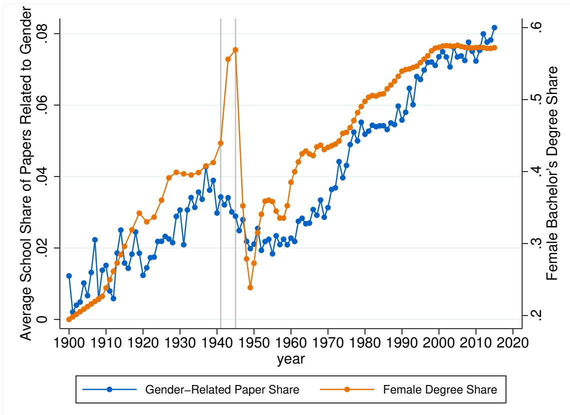


(b) Restricted to 1960-1990



Notes: This figure plots the frequency of coeducation dates for all universities that transitioned from male-only to coeducation for all years from 1800 to 2000 and for the sample period from 1960 to 1990. In (a), the vertical lines denote 1960 and 1990, respectively. In (b), vertical lines denote coeducation dates for a selected number of universities. Data comes from Coeducation College Database (Goldin and Katz, 2011).

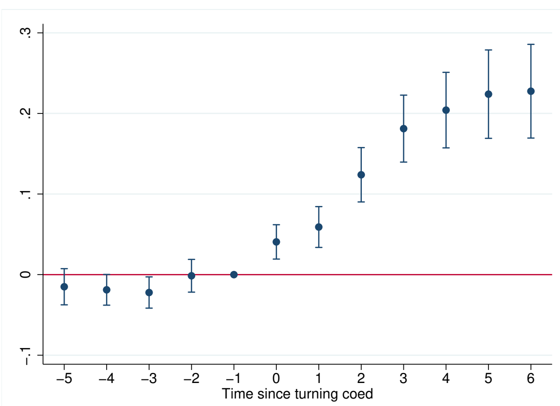
Figure 2: Trends in Female Bachelor's Degrees Awarded and Gender-Related Research, 1900–2015



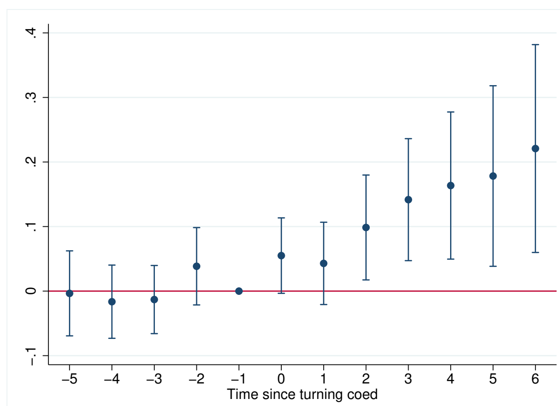
Notes: Figure 2 plots the share of Bachelor's Degrees awarded to women and the average share of papers related to gender published at each university. The sample consists of all bachelors, masters, or Ph.D.-granting universities in the U.S. from 1900 to 2015. Data on degrees awarded come from the 2005 and 2019 reports from the U.S. National Center for Education Statistics, Digest of Education Statistics, as well as the "120 Years of American Education: A Statistical Portrait" from the U.S. National Center for Education Statistics, 1993. Data on papers related to gender come from MAG from 1900 to 2015. A paper is counted multiple times for the number of authors. We discard observations with less than 10 total papers written in that year prior to averaging. The two gray lines denote 1941 and 1945 - the year when the U.S. entered and exited WWII, respectively.

Figure 3: Effect of Turning Coed on Undergraduate Student Body

(a) Female Bachelor's Degrees Share

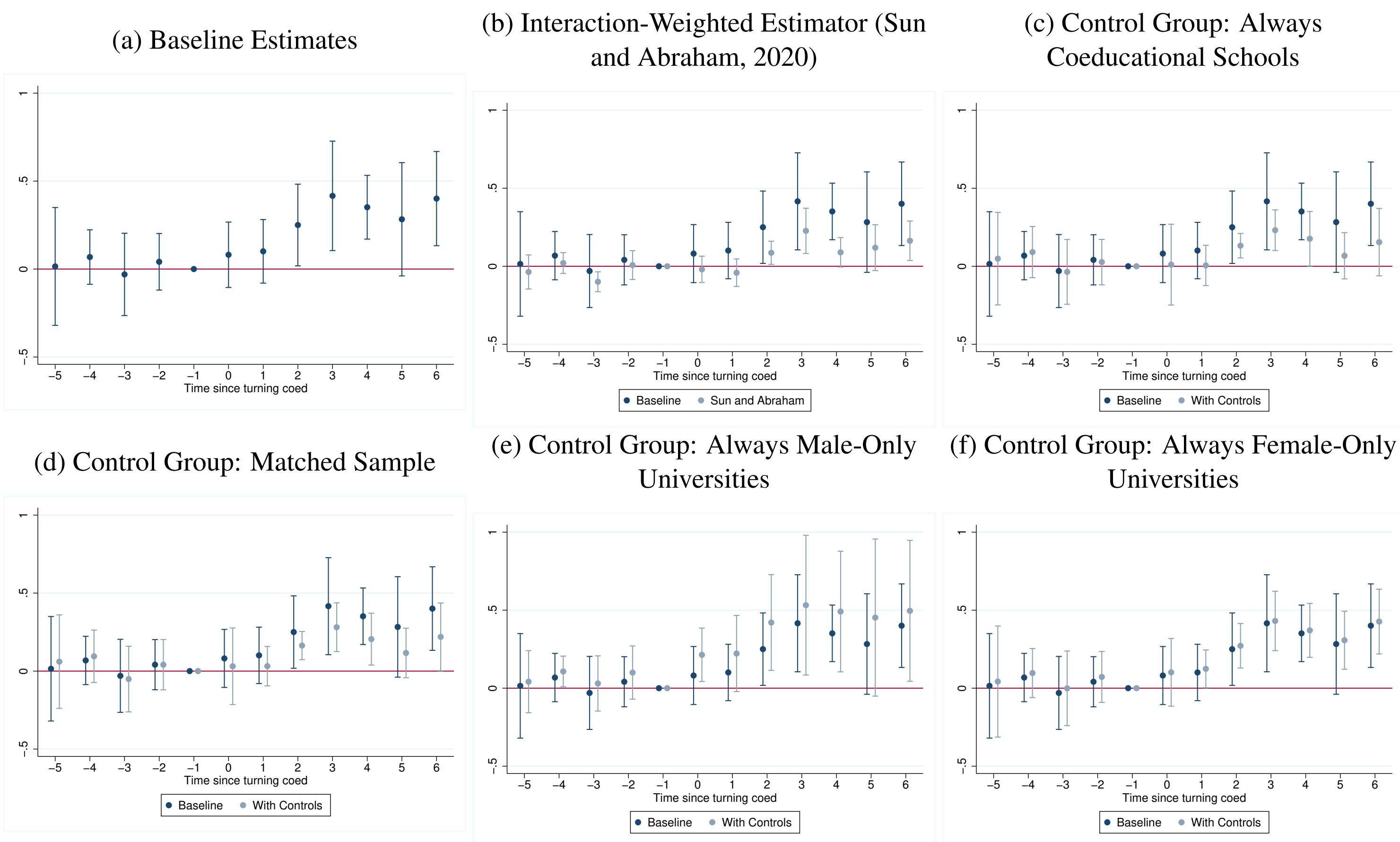


(b) Log Bachelor's Degrees Awarded



Notes: Figure 3 plots the event time coefficients and their 95% confidence intervals from estimating (1) for female share of bachelor's degrees awarded and log number of total bachelor's degrees awarded. Regressions are estimated using OLS. We include school fixed effects and year fixed effects. We cluster at the school level.

Figure 4: Effect of Turning Coed on Number of Gender-Related Publications

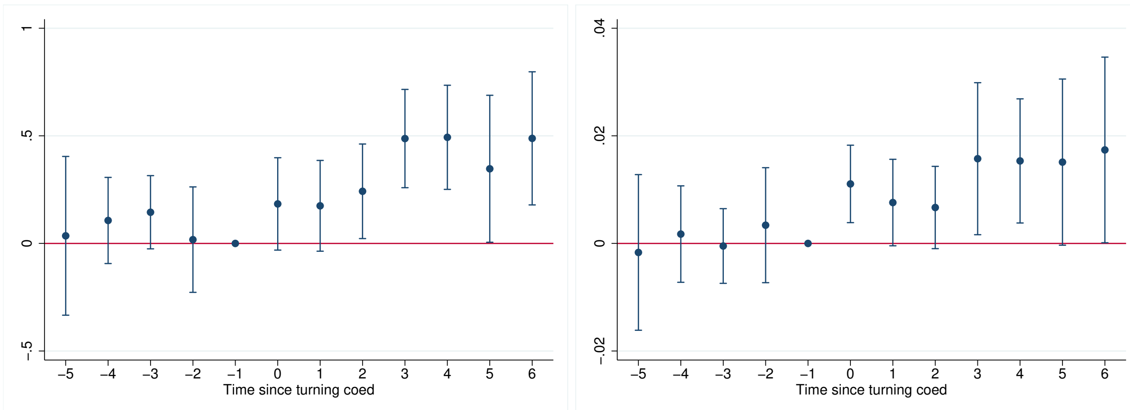


Notes: Figure 4 presents the main results using alternative estimators and specifications. Figure 4a plots the event time coefficients and their 95% confidence intervals from estimating equation (1) for total number of gender-related research publications. The specification is estimated using a conditional fixed effects Poisson model. Figure 4b compares the baseline estimates with the interaction-weighted (IW) estimator proposed by Sun and Abraham (2020). For the IW estimator, we bin together $\tau \leq -15$ and $\tau \geq 15$ in order to estimate the standard errors using the IW estimator due to few observations in the distant relative time periods. In Figures 4c, 4d, 4e, and 4f, we compare the baseline estimates with alternative estimates when we use different groups of schools as a control group. In all specifications, we include school-subfield fixed effects, year fixed effects, and discipline-by-year fixed effects. We also control for total publications, total publications with an abstract, and the average abstract length at the school-subfield. We cluster at the school level.

Figure 5: Effect of Turning Coed on Gender-Related Research by Incumbent Researchers

(a) Number of Gender-Related Papers

(b) Gender-Related Share



Notes: Figure 5 plots the event time coefficients and their 95% confidence intervals from estimating (1) for incumbent researchers, defined as researchers who have published one paper at the school prior to $\tau = -1$. The dependent variables are number of gender-related publications (Figure 5a) and share of papers related to gender (Figure 5b). The specification with the outcome number of gender-related papers is estimated using a Poisson model. The specification with the outcome gender-related share of papers is estimated using OLS. All specifications include incumbent researcher fixed effects and year fixed effects. We also control for total publications, total publications with an abstract, and the average abstract length at the school-subfield. Standard errors are clustered at the school level.

Tables

Table 1: Effect of Turning Coed on Student Body

	Bachelor's Degrees Awarded		Fall Enrollment	
	(1) Female Share	(2) Log Total	(3) Female Share	(4) Log Total
Years -5 to -2	-0.014	0.001	0.001	0.014
	(0.009)	(0.025)	(0.010)	(0.033)
Years 0 to 2	0.075	0.065	0.115	0.083
	(0.012)	(0.032)	(0.013)	(0.028)
Years 3 to 6	0.209	0.176	0.251	0.181
	(0.025)	(0.063)	(0.021)	(0.061)
Baseline Mean	0.07	5.99	0.06	7.57
Observations	1789	1789	1184	1184
Estimator	OLS	OLS	OLS	OLS

Notes: Table 1 reports the average effects from estimating equation (1) on student outcomes. Each column reports estimates from a separate regression. Effect at event time $\tau = -1$ is normalized to 0. Baseline mean is the mean of the outcome variable at $\tau = -1$. The coefficient for Years -5 to -2 is the pre-period average of the coefficients for $\tau = -5$ to $\tau = -2$. The coefficient for Years 0 to 2 is the post-period average of the coefficients for $\tau = 0$, $\tau = 1$, and $\tau = 2$. Similarly, the coefficient for Years 3 to 6 is the average of the coefficients for $\tau = 3$ to $\tau = 6$. All regressions include school fixed effects and year fixed effects. All regressions are estimated using OLS. Standard errors in parentheses are clustered at the school level.

Table 2: Effect of Turning Coed on Gender-Related Research

	(1) Number of Gender-Related Papers	(2) Number of Gender-Related Papers (Title)	(3) Number of Gender-Related Papers (Abstract)
Years -5 to -2	0.023	0.176	-0.014
	(0.091)	(0.148)	(0.089)
Years 0 to 2	0.144	-0.006	0.167
	(0.077)	(0.093)	(0.093)
Years 3 to 6	0.363	0.102	0.359
	(0.129)	(0.157)	(0.164)
Baseline Mean	0.57	0.19	0.49
Observations	63152	52066	53799
Estimator	Poisson	Poisson	Poisson

Notes: Table 2 reports the average effects from estimating equation (1) on gender-related research outcomes. Each column reports estimates from a separate regression. Effect at event time $\tau = -1$ is normalized to 0. Baseline mean is the mean of the outcome variable at $\tau = -1$. The coefficient for Years -5 to -2 is the pre-period average of the coefficients for $\tau = -5$ to $\tau = -2$. The coefficient for Years 0 to 2 is the post-period average of the coefficients for $\tau = 0$, $\tau = 1$, and $\tau = 2$. Similarly, the coefficient for Years 3 to 6 is the average of the coefficients for $\tau = 3$ to $\tau = 6$. All regressions include school-subfield fixed effects, year fixed effects, and discipline-by-year fixed effects. We also control for total publications, total publications with an abstract, and the average abstract length at the school-subfield. All regressions are estimated using a conditional fixed-effect Poisson model at the school-subfield-year level. School-subfield groups without variation or less than two observations are dropped from the respective sample in Poisson models. Standard errors in parentheses are clustered at the school level.

Table 3: Effect of Turning Coed for Incumbent Researchers

	(1) Gender-Related Papers	(2) Gender-Related Share
Years -5 to -2	0.076	0.001
	(0.093)	(0.004)
Years 0 to 2	0.200	0.008
	(0.097)	(0.003)
Years 3 to 6	0.454	0.016
	(0.132)	(0.006)
Baseline Mean	0.05	0.06
Observations	60753	77958
Estimator	Poisson	OLS

Notes: Table 3 reports the average effects from estimating equation (1) on gender-related research outcomes restricted to incumbent researchers, defined as researchers who have published one paper at the school prior to $\tau = -1$. Each column reports estimates from a separate regression. Effect at event time $\tau = -1$ is normalized to 0. Baseline mean is the mean of the outcome variable at $\tau = -1$. The coefficient for Years 0 to 2 is the post-period average of the coefficients for $\tau = 0$, $\tau = 1$, and $\tau = 2$. Similarly, the coefficient for Years 3 to 6 is the average of the coefficients for $\tau = 3$ to $\tau = 6$. All specifications include incumbent researcher fixed effects and year fixed effects. We also control for total publications, total publications with an abstract, and the average abstract length at the school-subfield. Column (1) is estimated using a conditional fixed-effect Poisson model at the researcher level. Researcher groups without variation or less than two observations are dropped from the respective sample in Poisson models. Column (2) is estimated using OLS. Standard errors in parentheses are clustered at the school level.

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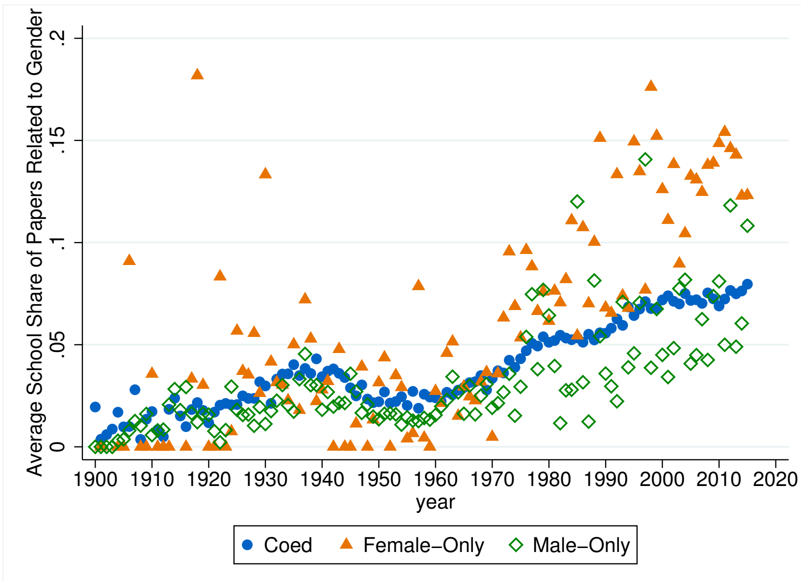
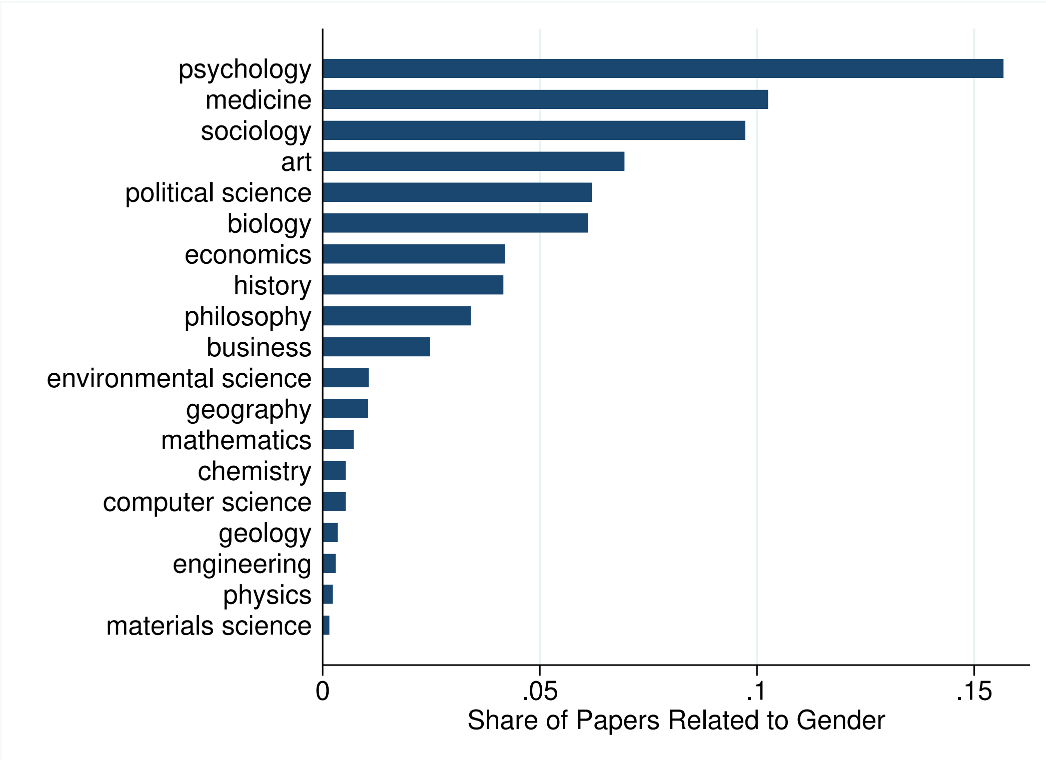
A Additional Figures and Tables

Figure A.1: Trends in Gender-Related Research by Coeducational Status, 1900–2015



Notes: Figure A.1 plots the average share of papers related to gender published across all bachelors, masters, or Ph.D.-granting universities in the United States from 1900 to 2015 by their coeducational status. Blue denotes universities that are coeducational during that year. Orange denotes female-only universities and green denotes male-only universities. Data on gender-related research come from Microsoft Academic Graph from 1900 to 2015. We discard observations with less than 10 total papers written in that year prior to averaging.

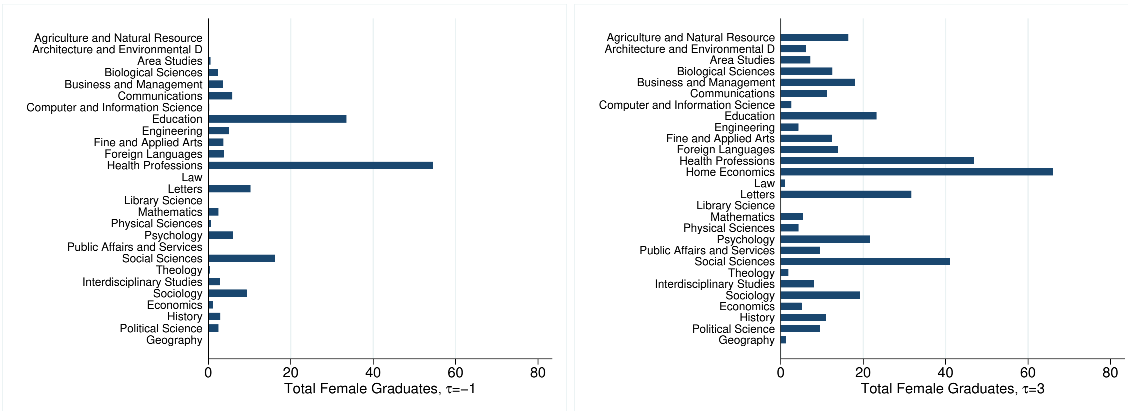
Figure A.2: Gender Related Share of Papers by Field



Notes: Figure A.2 shows the share of gender related papers by fields in all bachelor's, master's, or Ph.D.-granting universities in the United States between 1900 and 2015.

Figure A.3: Total Female Graduates by Major Before and After Coeducation

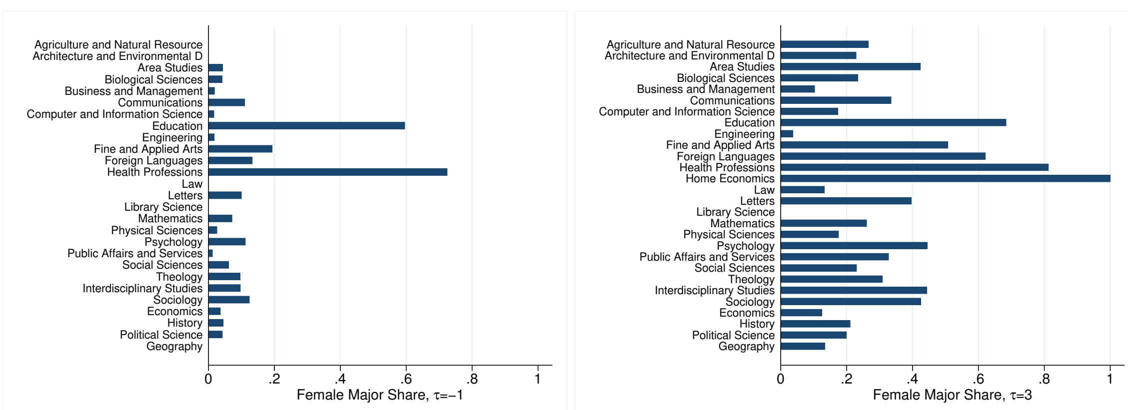
(a) $\tau = -1$ (b) $\tau = 3$



Notes: Figure A.3 shows the total number of female graduates by major one year before coeducation (Figure A.3a) and three years after coeducation (Figure A.3b).

Figure A.4: Share of Female Graduates by Major Before and After Coeducation

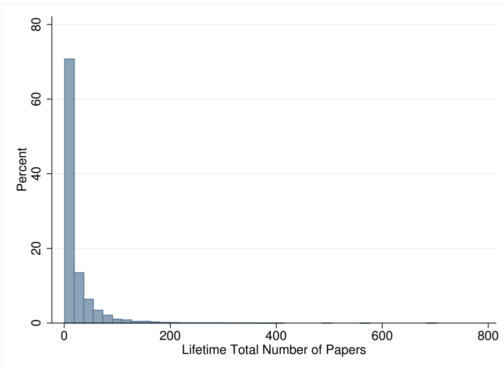
(a) $\tau = -1$ (b) $\tau = 3$



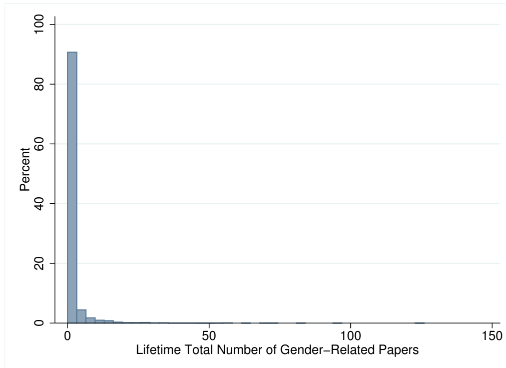
Notes: Figure A.4 shows the share of female graduates by major one year before coeducation (Figure A.4a) and three years after coeducation (Figure A.4b).

Figure A.5: Distribution of Lifetime Research Output

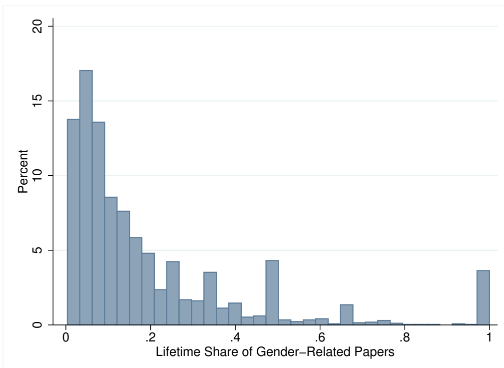
(a) Total Number of Papers



(b) Total Number of Gender-Related Papers



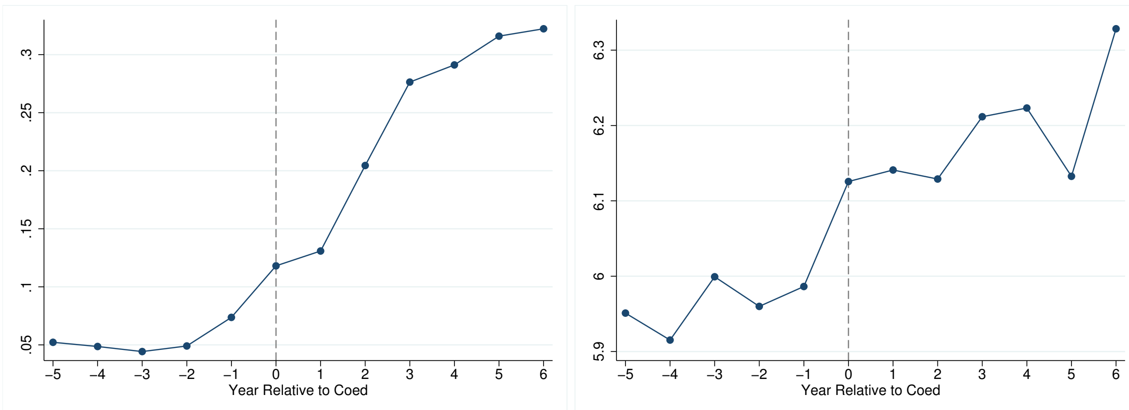
(c) Share of Gender-Related Papers (Conditional on Writing At Least One Gender-Related Paper)



Notes: Figure A.5 plots distribution of lifetime research output of researchers that were active one year prior to coeducation. Figure A.5c is restricted to researchers who have written at least one gender-related research paper in their lifetime.

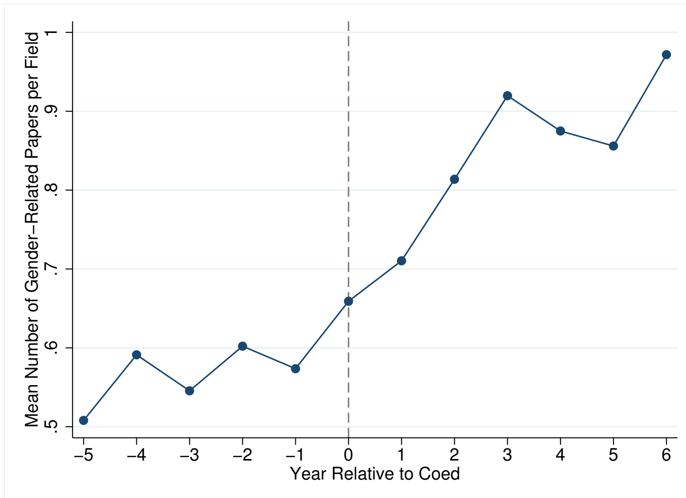
Figure A.6: Female Bachelor's Degrees Share and Log Bachelor's Degrees Around Coeducation Date

(a) Female Share of Bachelor's Degrees (b) Log Bachelor's Degrees Awarded



Notes: Figure A.6 plots the average female share of bachelor's degrees and log total bachelor's degrees awarded across universities that switched to coeducation in the years before and after the event. The data on female share of bachelor's degrees and log total bachelor's degrees awarded come from the degrees completion series of the HEGIS/IPEDS database available from 1965 to 1998.

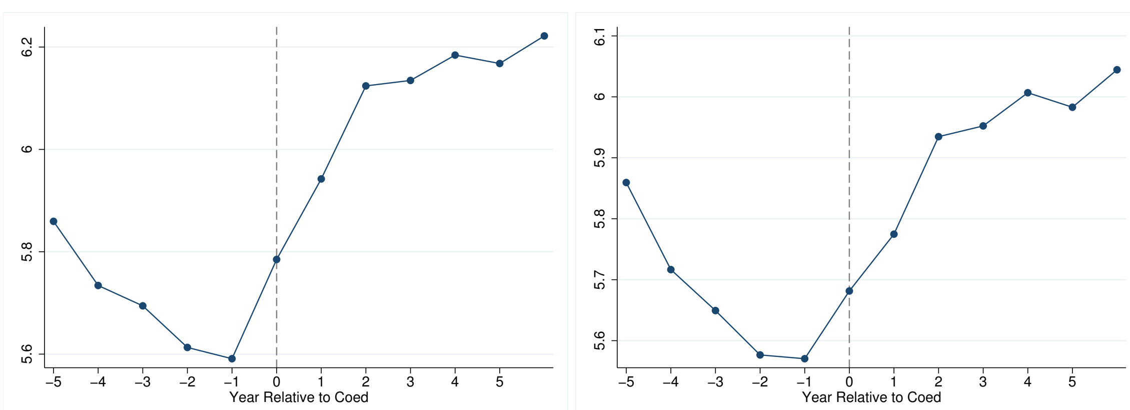
Figure A.7: Number of Gender-Related Research Publications Around Coeducation Date



Notes: Figure A.7 plots the average number of gender-related papers across school-subfields in universities that switched to coeducation in the years before and after the event. Data on gender-related research comes from Microsoft Academic Graph for the years between 1950 and 2005.

Figure A.8: Descriptive Dynamics for Student Quality

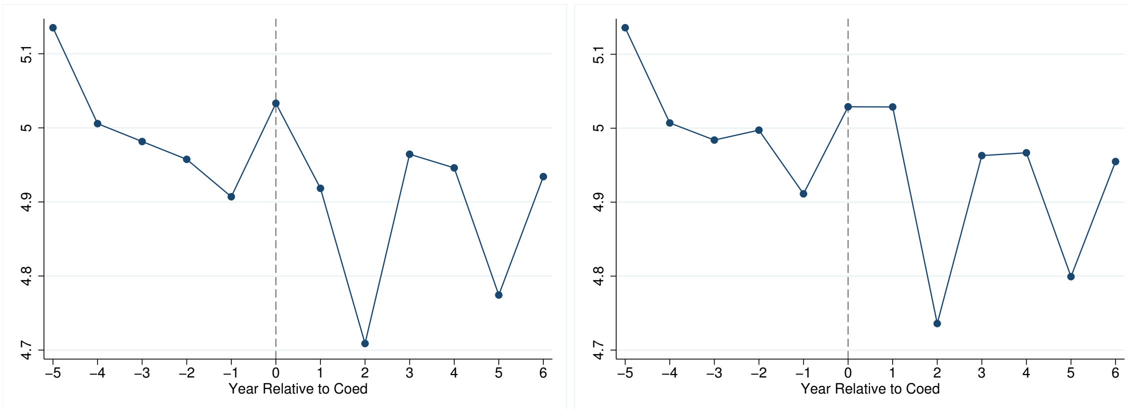
(a) High School GPA (b) High School GPA (Male Students Only)



Notes: Data on high school GPA come from the CIRP Freshman Survey Trends from 1966-1992 made available by HERI Data Archives. High school GPA is reported on a scale of 1 to 8, where 1 is equivalent to a D average and 8 is equivalent to an A or A- average.

Figure A.9: Descriptive Dynamics for School Financial Outcomes Around Coeducation

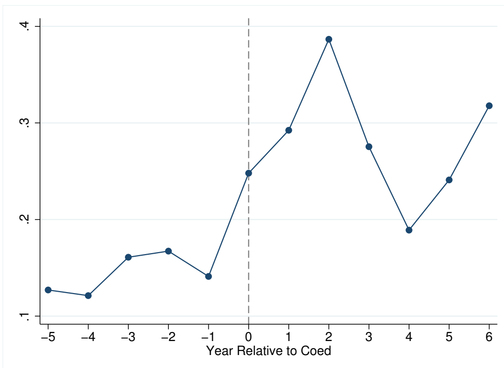
(a) Log Total Expenditures Per Student (b) Log Revenue Per Student



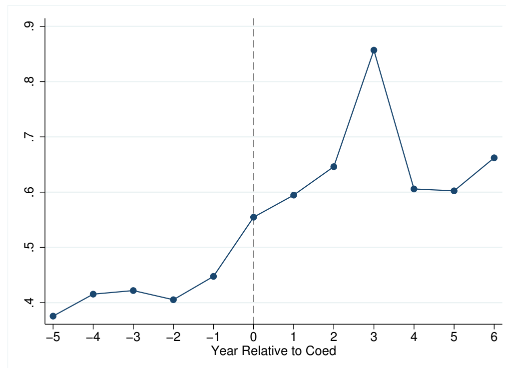
Notes: Figure A.9 plots the log total expenditures per student and log revenue per student across universities that switched to coeducation in the years before and after the event. The data on log total expenditures per student and log revenue per student come from the financial series of the HEGIS/IPEDS database available from 1968 to 1986.

Figure A.10: Trends in Number of Gender-Related Research Publications by Year of Coeducation (5-Year Bins)

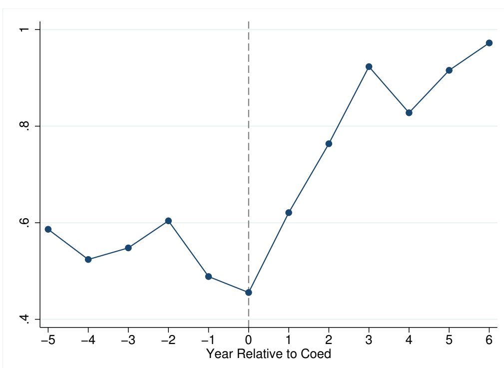
(a) 1960–1964



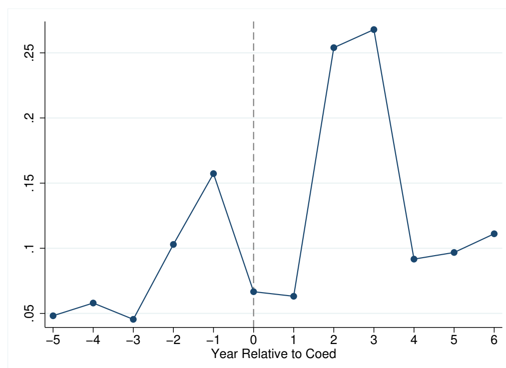
(b) 1965–1969



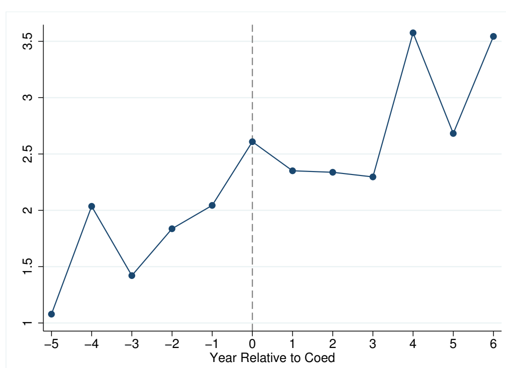
(c) 1970–1974



(d) 1975–1979

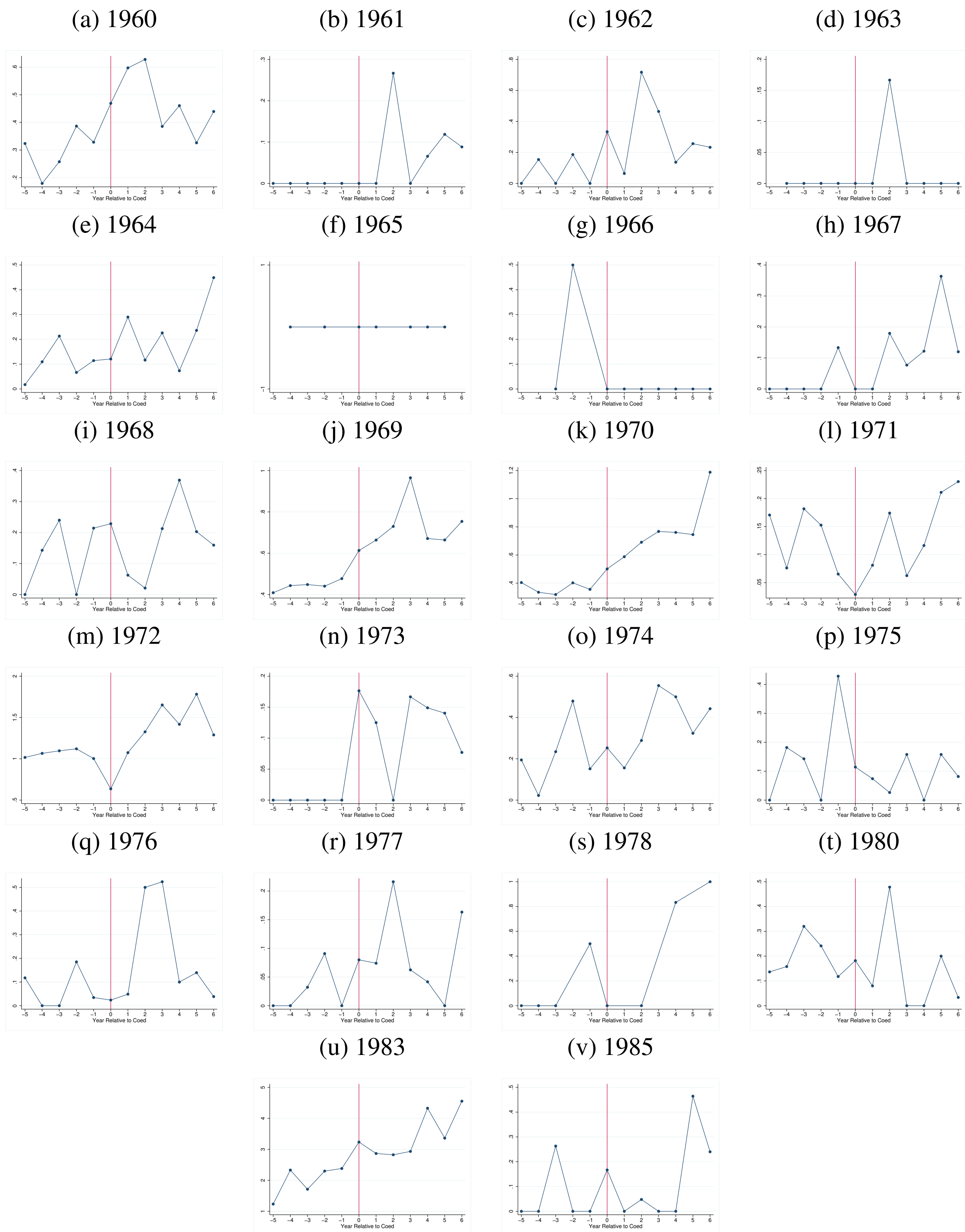


(e) 1980–1985



Notes: Figure A.10 plots the average number of gender-related papers by 5-year cohorts (based on year of coeducation) across school-subfields in universities that switched to coeducation in the years before and after the event. Data on gender-related research comes from Microsoft Academic Graph for the years between 1950 and 2005. The number of schools in each graph is as follows: 1960–1964: 9, 1965–1969: 22, 1970–1974: 35, 1975–1979: 6, 1980-1985:4.

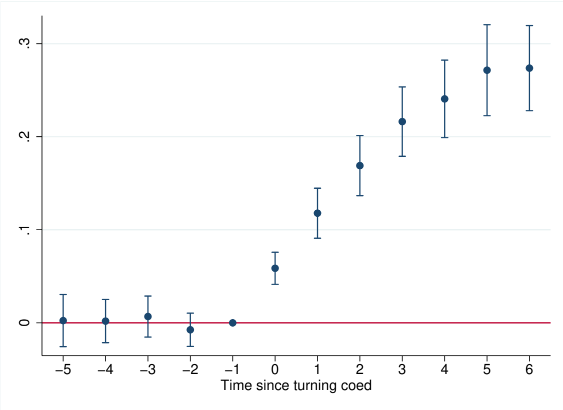
Figure A.11: Trends in Number of Gender-Related Research Publications by Year of Co-education



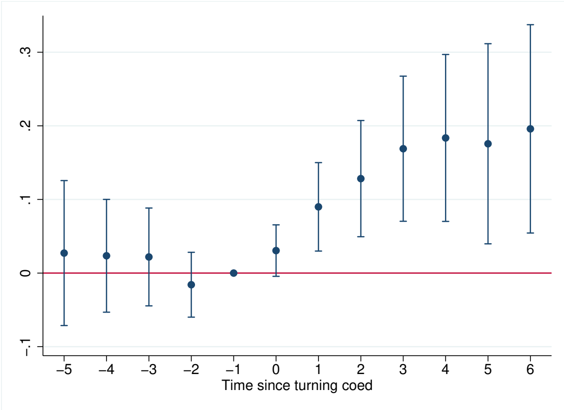
Notes: Figure A.11 plots the average number of gender-related papers by year of coeducation across school-subfields in universities that switched to coeducation in the years before and after the event. Data on gender-related research comes from Microsoft Academic Graph for the years between 1950 and 2005. The number of schools in each graph is as follows: 1960: 2, 1961: 2, 1962: 2, 1963: 1, 1964: 2, 1965: 1, 1966: 1, 1967: 1, 1968: 6, 1969: 13, 1970: 14, 1971: 9, 1972: 6, 1973: 3, 1974: 3, 1975: 1, 1976: 2, 1977: 2, 1978: 1, 1980: 1, 1983: 2, 1985: 1.

Figure A.12: Effect of Turning Coed on Enrollment

(a) Female Enrollment Share



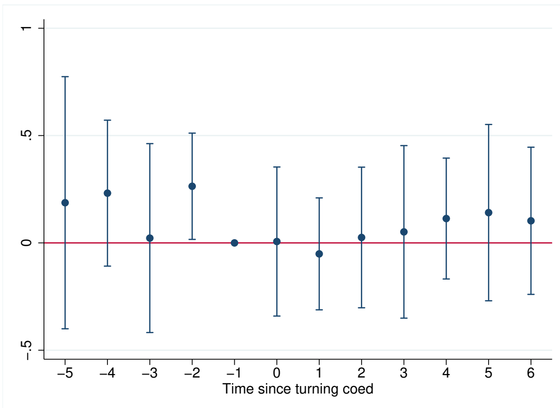
(b) Log Total Enrollment



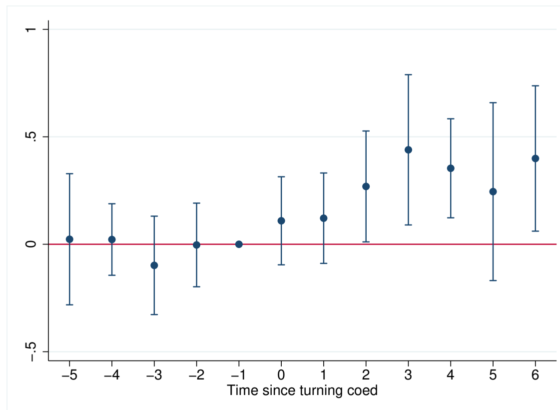
Notes: These figures plot the event time coefficients and their 95% confidence intervals from estimating equation (1) for the outcome variables, female share of enrollment and log total enrollment. All specifications are estimated using OLS. In the specifications, we include school fixed effects and year fixed effects. We cluster at the school level. Data on enrollment comes from HEGIS/IPEDS available from 1968 to 1998.

Figure A.13: Effect of Turning Coed on Gender-Related Publications by Subcomponents

(a) Number of Gender-Related Papers (Titles)

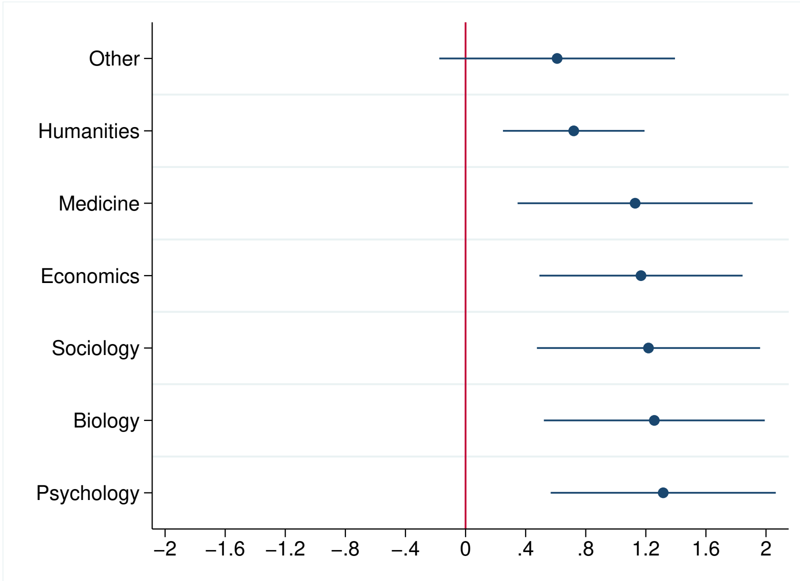


(b) Number of Gender-Related Papers (Abstracts)



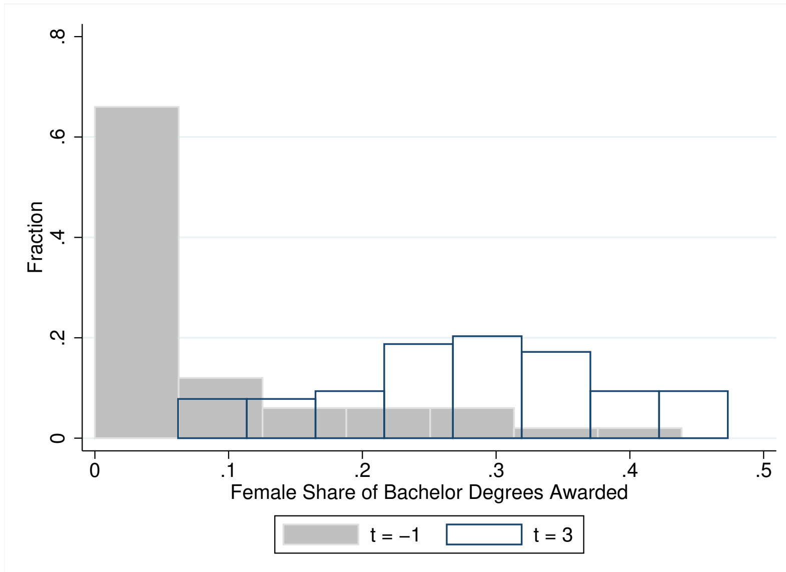
Notes: These figures plot the event time coefficients and their 95% confidence intervals from estimating equation (1) for the number of gender-related research publications using alternative definitions. The outcome variable in Figure A.13a is the number of gender-related papers based on the titles and the outcome variable in Figure A.13b is the number of gender-related papers based on the abstracts. All specifications are estimated using conditional fixed effects Poisson models. In the specifications, we include the school-subfield fixed effects, year fixed effects, and discipline-by-year fixed effects. We also control for total publications, total publications with an abstract, and the average abstract length at the school-subfield. We cluster at the school level.

Figure A.14: Effect of Turning Coed on Gender-Related Papers by Field



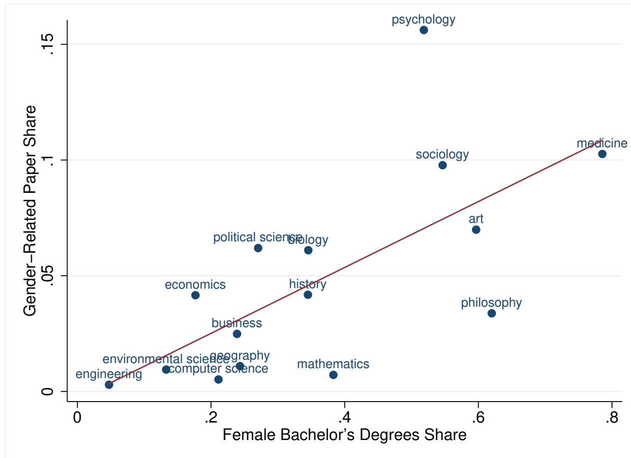
Notes: This figure plots the average effects for years 3 to 6 and their 95% confidence intervals from estimating a modified version of equation (1) in which we interact the event time dummies with a categorical variable for each field of study. The outcome variable is the number of gender-related papers. The specification is estimated using a conditional fixed effects Poisson model. In the specification, we include the school-subfield fixed effects and year fixed effects. We also control for total publications, total publications with an abstract, and the average abstract length at the school-subfield. We cluster at the school level.

Figure A.15: Distribution of Female Bachelor's Degrees Share Awarded



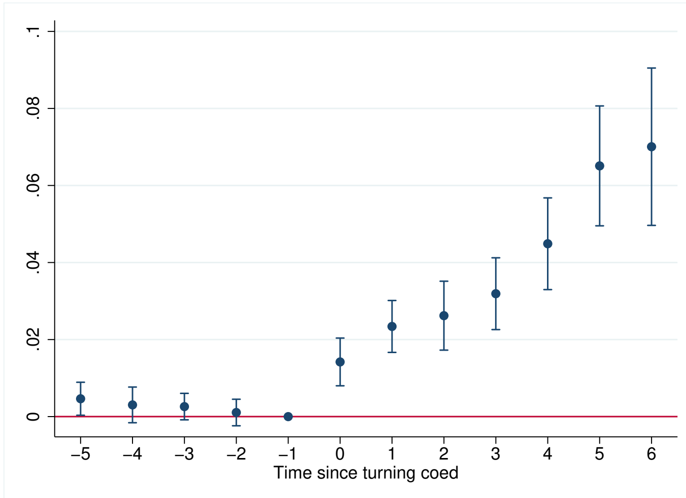
Notes: This figure plots the histogram for the female share of bachelor's degrees awarded at $\tau = -1$ and at $\tau = 3$. Data on bachelor's degrees awarded come from HEGIS/IPEDS data from 1965 to 1998. Prior to the policy, the vast majority of the universities were less than 10% female. A smaller number of schools had a higher female student share. This is partly driven by the consolidation of male-only universities and women's colleges. For example, St John's University of New York and Fordham University both had "initial" female bachelor's degrees share of greater than 30%. However, St John's University of New York transitioned to coeducation by merging with Notre Dame College (New York), a private women's college in 1971. Similarly, Fordham College at Rose Hill became coeducational in 1974 when it merged with Thomas More College. In these cases, data entries of the two schools have been combined in HEGIS, but the true female share of bachelor's degrees awarded prior to coeducation was likely close to 0%. Post reform, the distribution shows considerable variation in the female share of bachelor's degrees awarded. The share of female students ranged from as low as 6% to 47%.

Figure A.16: Relationship between Female Bachelor's Degrees Share and Share of Publications Related to Gender Across Fields of Study



Notes: This figure plots the relationship between female bachelor's degrees share and share of publications related to gender across fields of study. The sample period is from 1950-2005 and the data sample consists of universities that were already coed or never turned coed.

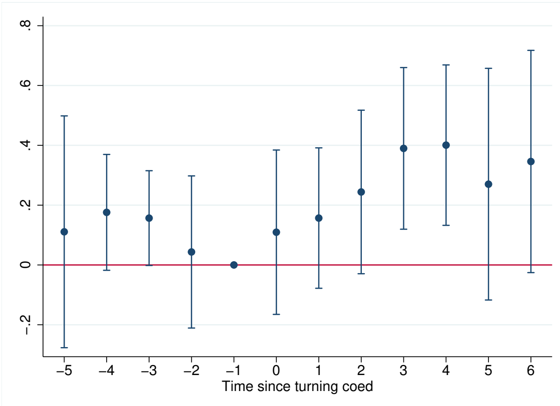
Figure A.17: Likelihood of Prior Interests in Gender Topics



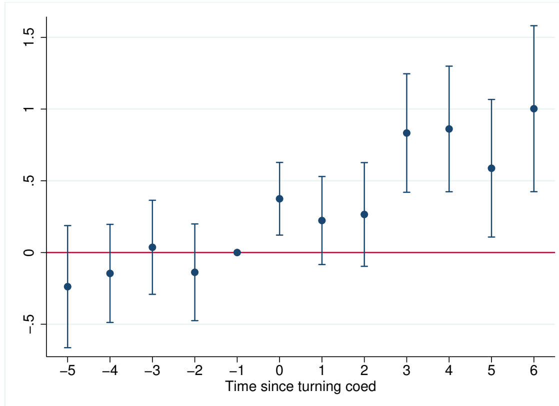
Notes: This figure plots the event time coefficients and their 95% confidence intervals from estimating equation (1). The dependent variable is an indicator for having prior interests in gender topics. Researchers interested in gender are defined as those who have either written a gender-related paper, referenced a gender-related paper, or co-authored with a person who has written a gender-related paper at least once before the policy change. Estimation at the researcher level using OLS. In the specification, we include school fixed effects, year fixed effects, and discipline-by-year fixed effects. We cluster at the school level.

Figure A.18: Effect of Turning Coed on Gender-Related Research by Incumbent Researchers and Gender

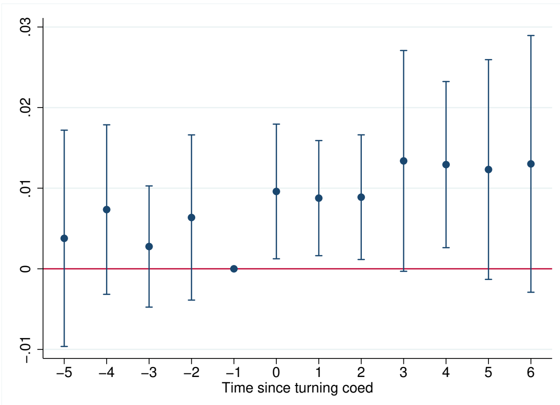
(a) Number of Gender-Related Papers (Males)



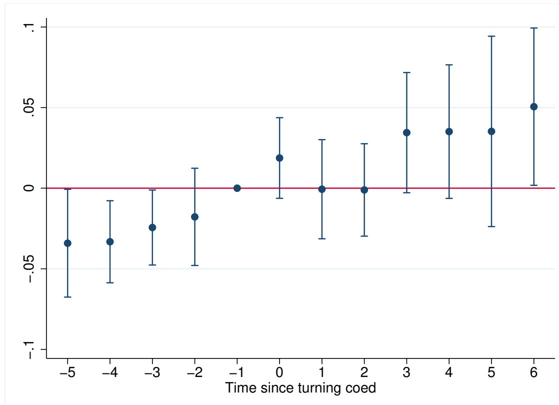
(b) Number of Gender-Related Papers (Females)



(c) Gender-Related Share (Males)



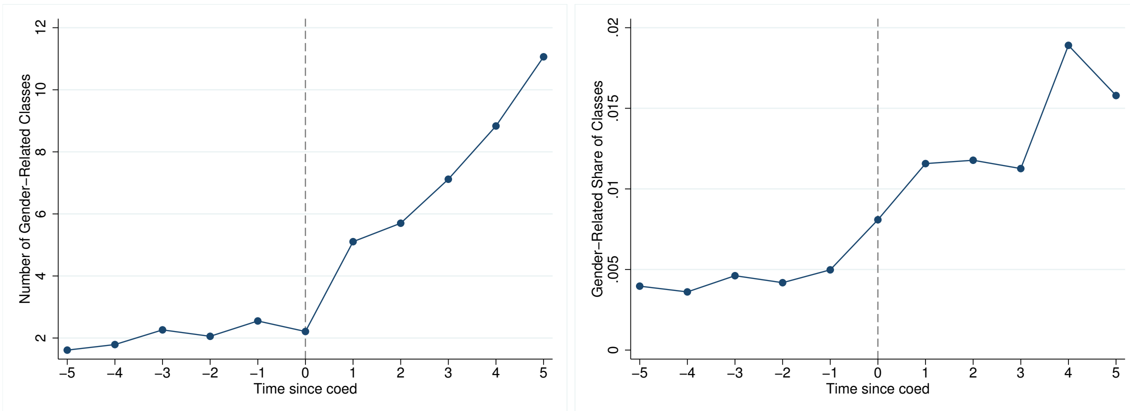
(d) Gender-Related Share (Females)



Notes: Figure A.18 plots the event time coefficients and their 95% confidence intervals from estimating (1) for incumbent researchers, defined as researchers who have published one paper at the school prior to $\tau = -1$. The dependent variables are number of gender-related publications (Figures A.18a and A.18b) and share of papers related to gender (Figures A.18c and A.18d). The specifications with the outcome number of gender-related papers are estimated using a Poisson model separately by gender. The specifications with the outcome gender-related share of papers are estimated using OLS separately by gender. All specifications include incumbent researcher fixed effects and year fixed effects. We also control for total publications, total publications with an abstract, and the average abstract length at the school-subfield. Standard errors are clustered at the school level.

Figure A.19: Trends in Course Offerings Related to Gender

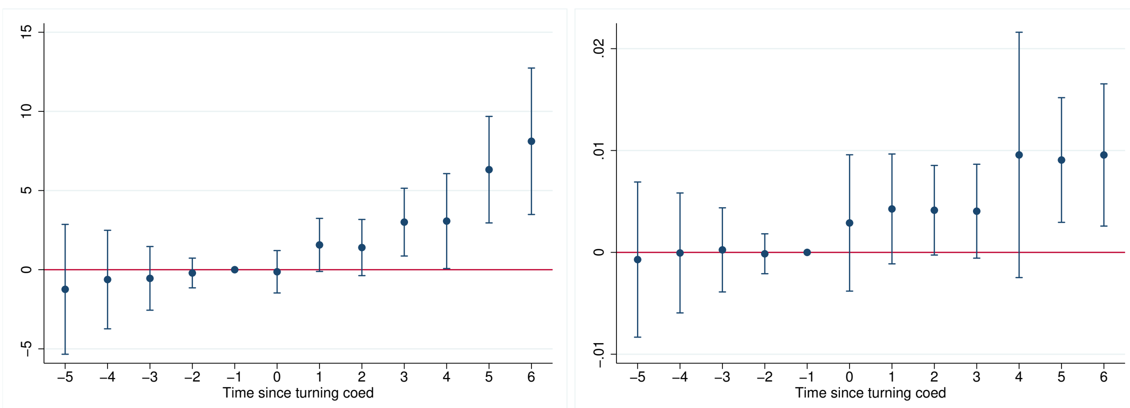
(a) Number of Gender-Related Classes (b) Gender-Related Share of Classes



Notes: This figure uses data from the course catalogue dataset we compiled. The sample includes the 22 universities for which we collected information on course offerings and course description.

Figure A.20: Effect of Turning Coed on Class Offerings Related to Gender

(a) Number of Gender-Related Classes (b) Share of Classes Related to Gender



Notes: These figures plot the event time coefficients and their 95% confidence intervals from estimating equation (1) for number of gender-related classes and share of classes related to gender. 95% confidence intervals are shown. In the specification, we include school fixed effects and year fixed effects fixed effects. We cluster at the school level. Data on courses are available for 22 universities with course description data.

Table A.1: List of Schools that Turned Coed

	School	Year Turn Coed
1	Case Western Reserve University	1960
2	Saint Francis College	1960
3	Catholic University Of America	1961
4	Santa Clara University	1961
5	Centre College Of Kentucky	1962
6	Texas A&M University	1962
7	St Marys University	1963
8	Brown University	1964
9	University Of San Francisco	1964
10	Saint Martin's College	1965
11	Saint Peter's College	1966
12	University Of New England	1967
13	Babson College	1968
14	John Carroll University	1968
15	Marist College	1968
16	Regis College	1968
17	Siena College	1968
18	Villanova University	1968
19	Franklin And Marshall College	1969
20	Georgetown University	1969
21	Kenyon College	1969
22	Princeton University	1969
23	Rockhurst College	1969
24	Saint Mary's College	1969
25	Trinity College	1969
26	Tulane University Of Louisiana	1969
27	University Of The South	1969
28	Washington & Jefferson College	1969
29	Wesleyan University	1969
30	Xavier University	1969
31	Yale University	1969
32	Boston College	1970
33	Colgate University	1970
34	Fairfield University	1970
35	La Salle University	1970
36	Lafayette College	1970
37	Providence College	1970
38	Rutgers University New Brunswick	1970
39	Saint Edward's University	1970
40	Saint Joseph's University	1970

Table A.1: List of Schools that Turned Coed – Continued

	School	Year Turn Coed
41	Saint Mary's College Of California	1970
42	Saint Michael's College	1970
43	Union College	1970
44	University Of Virginia-Main Campus	1970
45	Williams College	1970
46	Bowdoin College	1971
47	Lehigh University	1971
48	Loras College	1971
49	Loyola College	1971
50	Mount St Mary's University	1971
51	Randolph-Macon College	1971
52	Saint John Fisher College	1971
53	St John's University-New York	1971
54	Stevens Institute Of Technology	1971
55	College Of The Holy Cross	1972
56	Dartmouth College	1972
57	Davidson College	1972
58	Johns Hopkins University	1972
59	University Of Notre Dame	1972
60	Wofford College	1972
61	Loyola Marymount University	1973
62	Manhattan College	1973
63	University Of Scranton	1973
64	Fordham University	1974
65	Norwich University	1974
66	Saint Anselm College	1974
67	Amherst College	1975
68	United States Military Academy	1976
69	United States Naval Academy	1976
70	College Of Saint Thomas	1977
71	Hamilton College	1977
72	United States Coast Guard Academy	1978
73	Haverford College	1980
74	Columbia University In The City Of New York	1983
75	Saint Vincent College	1983
76	Washington And Lee University	1985

Notes: This table provides the list of schools that turned coed and their associated year of turning coed in chronological order. Data from the Coeducation College Database was compiled and generously provided by Goldin and Katz (2011).

Table A.2: Descriptive Statistics for Included versus Excluded Universities

(a) HEGIS Outcomes

	(1) Included Schools	(2) Excluded Schools	(3) Difference p-value in parentheses
Private	0.93	1.00	0.07
	(0.25)	(0.00)	(0.41)
Carnegie Classification			
Doctoral/Research Universities	0.28	0.10	-0.18
	(0.45)	(0.32)	(0.23)
Masters Colleges and Universities	0.34	0.30	-0.04
	(0.48)	(0.48)	(0.79)
Baccalaureate Colleges	0.32	0.30	-0.02
	(0.47)	(0.48)	(0.92)
Year of Opening	1850.89	1905.20	54.31
	(51.16)	(58.00)	(0.00)
Religious Affiliation			
Catholic	0.45	0.40	-0.05
	(0.50)	(0.52)	(0.78)
Presbytarian	0.05	0.10	0.05
	(0.22)	(0.32)	(0.55)
Methodist	0.03	0.00	-0.03
	(0.16)	(0.00)	(0.61)
Lutheran	0.00	0.00	0.00
	(0.00)	(0.00)	(.)
Baptist	0.00	0.00	0.00
	(0.00)	(0.00)	(.)
Nonsectarian	0.33	0.10	-0.23
	(0.47)	(0.32)	(0.14)
Total Degrees	539.48	113.78	-425.70
	(451.24)	(82.01)	(0.01)
Share of Revenue from Gifts	106.94	62.67	-44.27
	(101.00)	(45.58)	(0.30)
Total Current Revenue	143.38	119.25	-24.13
	(156.00)	(77.63)	(0.67)

Table A.2: Descriptive Statistics for Included versus Excluded Universities — Continued

(b) Research Outcomes

	(1) Included Schools	(2) Excluded Schools	(3) Difference p-value in parentheses
Total Papers	127.59	0.00	-127.59
	(336.60)	(0.00)	(0.24)
Total Gender-Related Papers	4.08	0.00	-4.08
	(14.22)	(0.00)	(0.37)
Total Papers from Female Researchers	19.39	0.00	-19.39
	(65.03)	(0.00)	(0.35)
Total Researchers	193.79	0.50	-193.29
	(495.99)	(0.58)	(0.44)
Female Researcher Share	0.12	0.00	-0.12
	(0.17)	(0.00)	(0.34)

Notes: Table A.2 presents the balance table for the 76 universities included in our sample compared to the 11 universities that were excluded because they did not have any research production in the humanities, social sciences, biology, medicine, or environmental science in the five years prior to the coeducation date: Pennsylvania State University - Mont Alto Campus (1963), Widener University - Pennsylvania Campus (1966), Biscayne College (1968), Illinois Benedictine College (1968), Delaware Valley College of Science and Agriculture (1969), Nichols College (1970), Christian Brothers College (1970), Menlo College (1971), Saint Mary's Seminary and University (1973), Webb Institute of Naval Arch (1978), and Westminster College (1979). All statistics are measured in the year prior to coeducation. Research outcomes are measured for all fields including non gender-related fields, such as physics and chemistry.

Table A.3: Summary Statistics

(a) Baseline $\tau = -1$ Summary Statistics at the School Level

	Mean	SD	Observations
Private	0.93	(0.25)	76
Carnegie Classification			
Doctoral/Research Universities	0.28	(0.45)	76
Masters Colleges and Universities	0.34	(0.48)	76
Baccalaureate Colleges	0.32	(0.47)	76
Other	0.07	(0.25)	76
Year of Opening	1850.89	(51.16)	76
Total Bachelor Degrees Awarded	539.48	(451.24)	50
Female Bachelor Degrees Share	0.07	(0.11)	50
Total Fall Enrollment	2496.04	(1995.81)	54
Female Fall Enrollment Share	0.06	(0.11)	54
Total Faculty	138.76	(217.20)	29
Female Faculty Share	0.08	(0.06)	20
Total Assistant Professors	50.35	(72.97)	26
Female Assistant Professor Share	0.13	(0.09)	19
Number of Papers	127.59	(336.60)	76
Number of Gender-Related Papers	4.08	(14.22)	76
Gender-Related Paper Share	0.03	(0.07)	67
Number of Gender-Related Papers (Gender-Related Fields)	4.01	(14.09)	76
Number of Female-Focused Medical Papers	1.16	(3.77)	76
Number of Researchers	193.79	(495.99)	76
Female Researcher Share	0.12	(0.17)	74

Notes: Table A.3a reports the summary statistics at the school level for the year prior to the first full year of coeducation. Data on Carnegie classification, years of opening as well as private/public status of the university come from HEGIS. Data on degrees awarded and fall enrollment come from the HEGIS/IPEDs database and are available for the years 1965-1998 and 1968-1998, respectively. The faculty data series come from HEGIS for the years 1971-1985. Data on papers and researchers come from the MAG database and are available for all the years between 1950 and 2005. Number of researchers is identified by assuming the researcher is at the university in all years between first and last publication date. Note that the difference in number of observations across research outcomes come from the fact that some universities published zero papers in the year prior to coeducation. School-level research outcomes are measured for all fields, including non gender-related fields, such as physics and chemistry.

Table A.3: Summary Statistics – Continued

(b) Baseline $\tau = -1$ Summary Statistics at the School-Subfield Level

	Mean/SD
Number of Researchers	7.18
	(18.94)
Female Researcher Share	0.10
	(0.22)
Number of Papers	9.25
	(26.40)
Number of Gender-Related Papers	0.57
	(2.76)
Number of Gender-Related Papers (Titles)	0.19
	(0.95)
Number of Gender-Related Papers (Abstracts)	0.49
	(2.52)
Gender Paper Share	0.04
	(0.15)
School-Subfield Observations	2146

Notes: In Table A.3b, we report summary statistics at the school-subfield level for the year prior to the first full year of coeducation. For this table, we only include the gender-related fields defined in Section 3.4. Data comes from the MAG database. Number of gender-related papers is the number of papers that contain one of the gender-related words we defined in Section 3.3 in the title or abstract. Gender-related paper share is the share of gender-related papers produced at the school-subfield.

Table A.3: Summary Statistics – Continued

(c) Baseline $\tau = -1$ Summary Statistics at the Researcher Level

	All	Male	Female
Years of Publication Experience	5.74	5.91	4.85
	(6.74)	(6.80)	(6.32)
Years at Turn Coed School	5.61	5.76	4.80
	(6.67)	(6.74)	(6.27)
Number of Papers	1.02	1.05	0.89
	(1.35)	(1.40)	(1.08)
Any Gender-Related Paper	0.05	0.04	0.07
	(0.21)	(0.20)	(0.26)
Number of Gender-Related Papers	0.05	0.05	0.08
	(0.27)	(0.26)	(0.32)
Share of Gender-Related Papers	0.05	0.05	0.09
	(0.21)	(0.20)	(0.28)
Researcher Observations	8319	6974	1345

Notes: In Table A.3c, we report summary statistics at the researcher level for all gender, for male researchers only and for female researchers only in the year before the school turned coed. We define years of publication experience to be the number of years since first publication for each researcher. Years at turn coed school is the number of years of experience at the school that turns coed.

Table A.4: Correlates of Year of Turning Coed

	(1) Year Turn Coed	
	β	SE
Private	-2.259	(2.710)
Carnegie Classification		
Doctoral/Research Universities	-1.058	(1.305)
Masters Colleges and Universities	-1.785	(0.966)
Baccalaureate Colleges	1.038	(1.209)
Year of Opening	-0.024	(0.011)
Religious Affiliation		
Catholic	-1.322	(1.092)
Presbytarian	-2.153	(1.992)
Methodist	1.243	(0.671)
Nonsectarian	2.132	(1.265)
Total Degrees (1965)	0.001	(0.002)
Share of Revenue from Gifts (1969)	-0.013	(0.005)
Total Current Revenue (1969)	0.000	(0.001)
Total Papers (1960)	0.003	(0.005)
Total Gender-Related Papers (1960)	0.173	(0.167)
Female Paper Share (1960)	-0.483	(3.360)
Total Researchers (1960)	0.002	(0.004)
Female Researcher Share (1960)	-4.727	(4.534)

Notes: Each coefficient and standard error reported come from a bivariate regression where the dependent variable is the year of coeducation and the independent variable is the corresponding school characteristic. Note that we do not have faculty data from HEGIS prior to 1971. Data on researchers come from MAG.

Table A.5: Effect of Turning Coed on Gender-Related Research by Gender

	Number of Gender-Related Papers		Number of Gender-Related Papers (Title)		Number of Gender-Related Papers (Abstract)	
	(1)	(2)	(3)	(4)	(5)	(6)
	Male	Female	Male	Female	Male	Female
Years -5 to -2	0.081	-0.111	0.211	0.169	0.051	-0.220
	(0.079)	(0.122)	(0.137)	(0.248)	(0.089)	(0.091)
Years 0 to 2	0.170	0.124	-0.041	0.116	0.181	0.191
	(0.098)	(0.153)	(0.141)	(0.163)	(0.111)	(0.170)
Years 3 to 6	0.395	0.336	0.097	0.159	0.385	0.394
	(0.134)	(0.232)	(0.190)	(0.236)	(0.157)	(0.297)
Baseline Mean	0.43	0.48	0.14	0.19	0.38	0.39
Observations	53630	27123	41100	22249	46336	23677
Estimator	Poisson	Poisson	Poisson	Poisson	Poisson	Poisson

Notes: Table A.5 reports the average effects from estimating equation (1) on gender-related research outcomes by gender of the author. Each column reports estimates from a separate regression, estimated at the school-subfield level. Effect at event time $\tau = -1$ is normalized to 0. Baseline mean is the mean of the outcome variable at $\tau = -1$. The coefficient for Years -5 to -2 is the pre-period average of the coefficients for $\tau = -5$ to $\tau = -2$. The coefficient for Years 0 to 2 is the post-period average of the coefficients for $\tau = 0$, $\tau = 1$, and $\tau = 2$. Similarly, the coefficient for Years 3 to 6 is the average of the coefficients for $\tau = 3$ to $\tau = 6$. All regressions include school-subfield fixed effects, year fixed effects, and discipline-by-year fixed effects. We also control for total publications, total publications with an abstract, and the average abstract length at the school-subfield. All regressions are estimated using a conditional fixed-effect Poisson model at the school-subfield-year level. School-subfield groups without variation or less than two observations are dropped from the respective sample in Poisson models. Standard errors in parentheses are clustered at the school level.

Table A.6: Effect of Turning Coed on Gender-Related Research Written by New Researchers by Gender

	Number of Gender-Related Papers		Number of Gender-Related Papers (Title)		Number of Gender-Related Papers (Abstract)	
	(1) Male	(2) Female	(3) Male	(4) Female	(5) Male	(6) Female
Years -5 to -2	0.332	-0.166	0.555	0.156	0.234	-0.278
	(0.143)	(0.161)	(0.202)	(0.246)	(0.157)	(0.157)
Years 0 to 2	0.395	-0.099	0.217	0.324	0.387	0.021
	(0.144)	(0.273)	(0.291)	(0.386)	(0.155)	(0.278)
Years 3 to 6	0.730	0.323	0.426	0.409	0.697	0.563
	(0.195)	(0.404)	(0.365)	(0.685)	(0.215)	(0.442)
Baseline Mean	0.10	0.19	0.03	0.05	0.09	0.15
Observations	38173	22589	26791	16652	33619	19151
Estimator	Poisson	Poisson	Poisson	Poisson	Poisson	Poisson

Notes: This table reports the average effects from estimating equation (1) on gender-related research outcomes written by new researchers by gender of the author. New researchers are defined as those who have never published a paper at the university before. Each column reports estimates from a separate regression, estimated at the school-subfield level. Effect at event time $\tau = -1$ is normalized to 0. Baseline mean is the mean of the outcome variable at $\tau = -1$. The coefficient for Years -5 to -2 is the pre-period average of the coefficients for $\tau = -5$ to $\tau = -2$. The coefficient for Years 0 to 2 is the post-period average of the coefficients for $\tau = 0$, $\tau = 1$, and $\tau = 2$. Similarly, the coefficient for Years 3 to 6 is the average of the coefficients for $\tau = 3$ to $\tau = 6$. All regressions include school-subfield fixed effects, year fixed effects, and discipline-by-decade fixed effects. All regressions are estimated using a conditional fixed-effect Poisson model at the school-subfield-year level. School-subfield groups without variation or less than two observations are dropped from the respective sample in Poisson models. Standard errors in parentheses are clustered at the school level.

Table A.7: Effect of Turning Coed on Gender-Related Papers by Field

	(1) Years 0 to 2	(2) Years 3 to 6
Humanities	0.264	0.720
	(0.380)	(0.240)
Biology	1.452	1.257
	(0.502)	(0.375)
Medicine	1.323	1.129
	(0.477)	(0.399)
Psychology	1.482	1.316
	(0.390)	(0.382)
Sociology	0.982	1.218
	(0.483)	(0.379)
Economics	1.265	1.168
	(0.391)	(0.345)
Other	0.699	0.610
	(0.677)	(0.400)

Notes: This table reports the implied average effects for each field of study from estimating a modified version of equation (1) in which we interacted each event time dummy with a categorical variable for the field. The outcome variable is the total number of gender-related papers. The estimates for Years 0 to 2 is the post-period average of the coefficients for $\tau = 0$, $\tau = 1$, and $\tau = 2$. Similarly, the coefficient for Years 3 to 6 is the average of the coefficients for $\tau = 3$ to $\tau = 6$. The specification is estimated using a conditional fixed effects Poisson model and includes school-subfield fixed effects, year fixed effects, and discipline-by-year fixed effects. We also control for total publications, total publications with an abstract, and the average abstract length at the school-subfield. Due to the small sample size, we grouped together arts, philosophy, and history as "humanities". Economics includes both economics and business. Other fields include environmental science and political science. Standard errors in parentheses are clustered at the school level.

Table A.8: Heterogeneity by Change in Female Share of Bachelor's Degrees Awarded from $\tau = -1$ to $\tau = 3$

	(1) Gender-Related Papers
Years 0 to 2	0.273
	(0.347)
Years 0 to 2 × Above Median	0.951
	(0.352)
Years 3 to 6	0.447
	(0.673)
Years 3 to 6 × Above Median	0.732
	(0.342)
Baseline Mean	0.574
Observations	23993
Estimator	Poisson

Notes: This table reports the average effects from estimating equation (1) on the total number of gender-related papers with an interaction term for whether the university is above the median in the distribution of the change in female bachelor's degree share from $\tau = -1$ to $\tau = 3$. Universities with an above median change in female enrollment on average experienced an increase of 28 percentage points in the share of female bachelor's degrees awarded. In comparison, universities with a below median change on average experienced an increase of 11 percentage points. Effect at event time $\tau = -1$ is normalized to 0. Baseline mean is the mean of the outcome variable at $\tau = -1$. The coefficient for Years 0 to 2 is the post-period average of the coefficients for $\tau = 0$, $\tau = 1$, and $\tau = 2$. Similarly, the coefficient for Years 3 to 6 is the average of the coefficients for $\tau = 3$ to $\tau = 6$. All regressions include school-subfield fixed effects, year fixed effects, and discipline-by-decade fixed effects. Note that due to the smaller sample, the Poisson only converges with discipline-by-decade fixed effects and not with decade-by-year. We also control for total publications, total publications with an abstract, and the average abstract length at the school-subfield. All regressions are estimated using a conditional fixed-effect Poisson model at the school-subfield-year level. School-subfield groups without variation or less than two observations are dropped from the respective sample in Poisson models. Standard errors in parentheses are clustered at the school level.

Table A.9: Effect of Turning Coed on Total Faculty and Researchers

	(1) HEGIS Total Faculty	(2) MAG Total Researchers
Years -5 to -2	-45.459	5.436
	(59.593)	(10.627)
Years 0 to 2	-20.255	-1.758
	(26.882)	(10.159)
Years 3 to 6	-7.053	-0.060
	(33.836)	(35.158)
Baseline Mean	191.62	193.79
Observations	1643	2842
Estimator	OLS	OLS

Notes: This table reports the average effects from estimating equation (1) on total number of faculty and number of researchers. Each column reports estimates from a separate regression. Effect at event time $\tau = -1$ is normalized to 0. Baseline mean is the mean of the outcome variable at $\tau = -1$. The coefficient for Years -5 to -2 is the pre-period average of the coefficients for $\tau = -5$ to $\tau = -2$. The coefficient for Years 0 to 2 is the post-period average of the coefficients for $\tau = 0$, $\tau = 1$, and $\tau = 2$. Similarly, the coefficient for Years 3 to 6 is the average of the coefficients for $\tau = 3$ to $\tau = 6$. All regressions include school fixed effects and year fixed effects. All regressions are estimated using OLS. Standard errors in parentheses are clustered at the school level.

Table A.10: Effect of Turning Coed on Share of Researchers in Female-Dominated Fields

	(1) Share of Researchers in Female-Dominated Fields
Years 0 to 2	0.003
	(0.021)
Years 3 to 6	0.013
	(0.037)
Baseline Mean	0.415
Observations	2701
Estimator	OLS

Notes: This table reports the average effects from estimating equation (1) on the share of researchers in female-dominated fields. We classify as female-dominated the fields in which women were over-represented in the sample of universities that already switched to coeducation prior to our sample period. These fields are medicine, philosophy, art, sociology and psychology. Effect at event time $\tau = -1$ is normalized to 0. Baseline mean is the mean of the outcome variable at $\tau = -1$. The coefficient for Years 0 to 2 is the post-period average of the coefficients for $\tau = 0$, $\tau = 1$, and $\tau = 2$. Similarly, the coefficient for Years 3 to 6 is the average of the coefficients for $\tau = 3$ to $\tau = 6$. The regression includes school fixed effects and year fixed effects. The specification is estimated using OLS at the school level. Standard errors in parentheses are clustered at the school level.

Table A.11: Effect of Turning Coed on Total Papers at the Researcher Level

	(1) Total Papers
Years -5 to -2	-0.002
	(0.012)
Years 0 to 2	-0.001
	(0.014)
Years 3 to 6	0.022
	(0.022)
Baseline Mean	0.90
Observations	490071
Estimator	OLS

Notes: This table reports the average effects from estimating equation (1) on total number of papers, measured at the researcher level. Effect at event time $\tau = -1$ is normalized to 0. Baseline mean is the mean of the outcome variable at $\tau = -1$. The coefficient for Years -5 to -2 is the pre-period average of the coefficients for $\tau = -5$ to $\tau = -2$. The coefficient for Years 0 to 2 is the post-period average of the coefficients for $\tau = 0$, $\tau = 1$, and $\tau = 2$. Similarly, the coefficient for Years 3 to 6 is the average of the coefficients for $\tau = 3$ to $\tau = 6$. All regressions include school fixed effects and year fixed effects. All regressions are estimated using OLS at the researcher level. Standard errors in parentheses are clustered at the school level.

Table A.12: Effect of Turning Coed on Total Papers at the Researcher Level by Female-Dominated Fields

	Total Papers	
	(1) Researcher in Female-Dom. Field	(2) Researcher in Male-Dom. Field
Years -5 to -2	0.001	-0.007
	(0.017)	(0.016)
Years 0 to 2	-0.001	-0.001
	(0.014)	(0.014)
Years 3 to 6	0.010	0.044
	(0.030)	(0.032)
Baseline Mean	0.90	0.90
Observations	271094	218975
Estimator	OLS	OLS

Notes: This table reports the average effects from estimating equation (1) on total number of papers, measured at the researcher level. The sample in Column (1) is restricted to only researchers in female-dominated fields while the sample in Column (2) is restricted to non female-dominated fields. Effect at event time $\tau = -1$ is normalized to 0. Baseline mean is the mean of the outcome variable at $\tau = -1$. The coefficient for Years -5 to -2 is the pre-period average of the coefficients for $\tau = -5$ to $\tau = -2$. The coefficient for Years 0 to 2 is the post-period average of the coefficients for $\tau = 0$, $\tau = 1$, and $\tau = 2$. Similarly, the coefficient for Years 3 to 6 is the average of the coefficients for $\tau = 3$ to $\tau = 6$. All regressions include school fixed effects and year fixed effects. All regressions are estimated using OLS at the researcher level. Standard errors in parentheses are clustered at the school level.

Table A.13: Effect of Turning Coed on Gender Composition of the Faculty

	(1) Female Faculty Share	(2) Female Asst. Professor Share	(3) Female Assoc. Professor Share	(4) Female Full Professor Share
Years -5 to -2	0.008	0.012	0.001	0.009
	(0.022)	(0.036)	(0.026)	(0.013)
Years 0 to 2	0.013	0.015	0.010	-0.003
	(0.011)	(0.017)	(0.018)	(0.008)
Years 3 to 6	0.020	0.048	0.006	0.005
	(0.013)	(0.021)	(0.026)	(0.010)
Baseline Mean	0.08	0.13	0.06	0.01
Observations	1635	1629	1629	1629
Estimator	OLS	OLS	OLS	OLS

Notes: Table A.13 reports the average effects from estimating equation (1) for female faculty outcomes. Each column reports estimates from a separate regression. Effect at event time $\tau = -1$ is normalized to 0. Baseline mean is the mean of the outcome variable at $\tau = -1$. The coefficient for Years -5 to -2 is the pre-period average of the coefficients for $\tau = -5$ to $\tau = -2$. The coefficient for Years 0 to 2 is the post-period average of the coefficients for $\tau = 0$, $\tau = 1$, and $\tau = 2$. Similarly, the coefficient for Years 3 to 6 is the average of the coefficients for $\tau = 3$ to $\tau = 6$. Data comes from HEGIS faculty data. All regressions include school fixed effects and year fixed effects. All regressions are estimated using OLS at the school level. Standard errors in parentheses are clustered at the school level.

Table A.14: Effect of Turning Coed on Gender Composition of Researchers (MAG)

	(1) Female Researcher Share	(2) Female Young Researcher Share
Years -5 to -2	0.00413	0.00415
	(0.00749)	(0.0125)
Years 0 to 2	-0.010	-0.019
	(0.010)	(0.014)
Years 3 to 6	-0.006	0.002
	(0.021)	(0.029)
Baseline Mean	0.12	0.13
Observations	16373	14432
Estimator	OLS	OLS

Notes: This table reports the average effects from estimating equation (1) on the share of female researchers at the school by field level. Young researchers are those with less than 5 years of publication experience. Each column reports estimates from a separate regression. Effect at event time $\tau = -1$ is normalized to 0. Baseline mean is the mean of the outcome variable at $\tau = -1$. The coefficient for Years -5 to -2 is the pre-period average of the coefficients for $\tau = -5$ to $\tau = -2$. The coefficient for Years 0 to 2 is the post-period average of the coefficients for $\tau = 0$, $\tau = 1$, and $\tau = 2$. Similarly, the coefficient for Years 3 to 6 is the average of the coefficients for $\tau = 3$ to $\tau = 6$. All regressions include school fixed effects, year fixed effects, and discipline-by-year fixed effects. All regressions are estimated using OLS at the school by field level. Standard errors in parentheses are clustered at the school level.

Table A.15: Effect of Turning Coed on Probability of Having Prior Interests in Gender

	(1) Any Prior Interest in Gender-Related Topics
Years 0 to 2	0.021
	(0.003)
Years 3 to 6	0.053
	(0.007)
Baseline Mean	0.021
Observations	129241
Estimator	OLS

Notes: This table reports the average effects from estimating equation (1) on an indicator for having prior interests in gender topics. Researchers interested in gender are defined as those who have either written a gender-related paper, referenced a gender-related paper, or co-authored with a person who has written a gender-related paper at least once before the policy change. Effect at event time $\tau = -1$ is normalized to 0. Baseline mean is the mean of the outcome variable at $\tau = -1$. The coefficient for Years 0 to 2 is the post-period average of the coefficients for $\tau = 0$, $\tau = 1$, and $\tau = 2$. Similarly, the coefficient for Years 3 to 6 is the average of the coefficients for $\tau = 3$ to $\tau = 6$. Estimation is at the researcher level. All regressions include incumbent researcher fixed effects, school fixed effects, and year fixed effects. All regressions are estimated using OLS at the school level. Standard errors in parentheses are clustered at the school level.

Table A.16: Effect of Turning Coed for Incumbent Researchers by Gender

	Gender-Related Papers		Gender-Related Share	
	(1)	(2)	(3)	(4)
	Male	Female	Male	Female
Years -5 to -2	0.122	-0.121	0.005	-0.027
	(0.092)	(0.134)	(0.004)	(0.012)
Years 0 to 2	0.170	0.288	0.009	0.006
	(0.121)	(0.118)	(0.003)	(0.011)
Years 3 to 6	0.352	0.821	0.013	0.039
	(0.153)	(0.219)	(0.006)	(0.021)
Baseline Mean	0.05	0.08	0.05	0.09
Observations	50463	10255	66887	11071
Estimator	Poisson	Poisson	OLS	OLS

Notes: Table A.16 reports the average effects from estimating equation (1) on gender-related research outcomes restricted to incumbent researchers, defined as researchers who have published one paper at the school prior to $\tau = -1$. Each column reports estimates from a separate regression. Regressions for each gender are estimated separately. Effect at event time $\tau = -1$ is normalized to 0. Baseline mean is the mean of the outcome variable at $\tau = -1$. The coefficient for Years 0 to 2 is the post-period average of the coefficients for $\tau = 0$, $\tau = 1$, and $\tau = 2$. Similarly, the coefficient for Years 3 to 6 is the average of the coefficients for $\tau = 3$ to $\tau = 6$. All specifications include incumbent researcher fixed effects and year fixed effects. We also control for total publications, total publications with an abstract, and the average abstract length at the school-subfield. Columns (1) and (2) are estimated using a conditional fixed-effect Poisson model at the researcher level. Researcher groups without variation or less than two observations are dropped from the respective sample in Poisson models. Columns (3) and (4) are estimated using OLS. Standard errors in parentheses are clustered at the school level.

Table A.17: Effect of Turning Coed on Number and Share of Classes Related to Gender

	(1) Number of Gender-Related Classes	(2) Gender-Related Class Share
Years -5 to -2	-0.654	-0.000
	(1.253)	(0.002)
Years 0 to 2	0.944	0.004
	(0.704)	(0.003)
Years 3 to 6	5.127	0.008
	(1.516)	(0.003)
Baseline Mean	2.55	0.00
Observations	373	373
Estimator	OLS	OLS

Notes: This table reports the average effects from estimating equation (1) on number of gender-related classes (Column (1)) and share of classes related to gender (Column (2)). Effect at event time $\tau = -1$ is normalized to 0. Baseline mean is the mean of the outcome variable at $\tau = -1$. The coefficient for Years -5 to -2 is the pre-period average of the coefficients for $\tau = -5$ to $\tau = -2$. The coefficient for Years 0 to 2 is the post-period average of the coefficients for $\tau = 0$, $\tau = 1$, and $\tau = 2$. Similarly, the coefficient for Years 3 to 6 is the average of the coefficients for $\tau = 3$ to $\tau = 6$. All regressions include school fixed effects and year fixed effects. All regressions are estimated using OLS at the school level. Data on courses are available for 22 universities with course description data. Standard errors in parentheses are clustered at the school level.

Table A.18: Gender-Related Research in Psychology

	(1) Gender-Related Papers
Years 0 to 2	-0.165
	(0.164)
Years 0 to 2 × Experimental	0.890
	(0.199)
Years 3 to 6	-0.210
	(0.223)
Years 3 to 6 × Experimental	0.626
	(0.165)
Baseline Mean	0.54
Observations	18031
Estimator	Poisson

Notes: This table reports the average effects from estimating a modified version of equation (1) in which we interact the event time dummies with an indicator variable for experimental research. We classify a paper as experimental if it contains one of the words "experiment", "lab", "participant", "treat", or "control" in the title or abstract. The outcome variable is the total number of gender-related papers. The sample is restricted to psychology papers. Effect at event time $\tau = -1$ is normalized to 0. Baseline mean is the mean of the outcome variable at $\tau = -1$. The coefficient for Years -5 to -2 is the pre-period average of the coefficients for $\tau = -5$ to $\tau = -2$. The coefficient for Years 0 to 2 is the post-period average of the coefficients for $\tau = 0$, $\tau = 1$, and $\tau = 2$. Similarly, the coefficient for Years 3 to 6 is the average of the coefficients for $\tau = 3$ to $\tau = 6$. The regression includes school-subfield fixed effects, year fixed effects, and experimental research-by-year fixed effects. We also control for total publications, total publications with an abstract, and the average abstract length at the school-subfield. The specification is estimated using a conditional fixed-effect Poisson model. School-subfield groups without variation or less than two observations are dropped from the respective sample in Poisson models. Standard errors in parentheses are clustered at the school level.

Table A.19: Experimental Gender-Related Research in Medicine and Biology

	(1) Medicine	(2) Biology
Years 0 to 2	0.050	0.288
	(0.085)	(0.156)
Years 0 to 2 $\times$ Experimental	-0.065	-0.325
	(0.141)	(0.217)
Years 3 to 6	0.351	0.523
	(0.119)	(0.240)
Years 3 to 6 $\times$ Experimental	-0.155	-0.091
	(0.118)	(0.196)
Baseline Mean	0.85	0.36
Observations	34121	22535
Estimator	Poisson	Poisson

Notes: This table reports the average effects from estimating a modified version of equation (1) in which we interact the event time dummies with an indicator variable for experimental research. We classify a paper as experimental if it contains one of the words "experiment", "lab", "participant", "treat", or "control" in the title or abstract. The outcome variable is the total number of gender-related papers. The sample is restricted to papers in medicine (column 1) and in biology (column 2), respectively. Effect at event time $\tau = -1$ is normalized to 0. Baseline mean is the mean of the outcome variable at $\tau = -1$. The coefficient for Years -5 to -2 is the pre-period average of the coefficients for $\tau = -5$ to $\tau = -2$. The coefficient for Years 0 to 2 is the post-period average of the coefficients for $\tau = 0$, $\tau = 1$, and $\tau = 2$. Similarly, the coefficient for Years 3 to 6 is the average of the coefficients for $\tau = 3$ to $\tau = 6$. The regression includes school-subfield fixed effects, year fixed effects, and experimental research-by-year fixed effects. We also control for total publications, total publications with an abstract, and the average abstract length at the school-subfield. The specification is estimated using a conditional fixed-effect Poisson model. School-subfield groups without variation or less than two observations are dropped from the respective sample in Poisson models. Standard errors in parentheses are clustered at the school level.

Table A.20: Effect of Turning Coed on Co-Authorship with Female Researchers among Incumbent Researchers

	Probability of Writing a Gender-Related Paper			Probability of Co-Authoring a Gender-Related Paper with a Female Researcher		
	(1)	(2)	(3)	(4)	(5)	(6)
	All	Male	Female	All	Male	Female
Years -5 to -2	-0.001	0.003	-0.028	-0.001	0.000	-0.007
	(0.006)	(0.006)	(0.014)	(0.004)	(0.005)	(0.008)
Years 0 to 2	0.011	0.010	0.019	0.001	-0.001	0.010
	(0.005)	(0.006)	(0.015)	(0.002)	(0.002)	(0.010)
Years 3 to 6	0.021	0.016	0.062	0.009	0.007	0.021
	(0.008)	(0.008)	(0.022)	(0.005)	(0.004)	(0.014)
Baseline Mean	0.08	0.07	0.12	0.02	0.01	0.03
Observations	77958	66887	11071	77958	66887	11071
Estimator	OLS	OLS	OLS	OLS	OLS	OLS

Notes: This table reports the average effects from estimating equation (1) for two outcome variables: an indicator variable that takes value one if the researcher has published at least one gender-related paper in that year (Columns 1-3) and an indicator variable that takes value one if the researcher has at least one gender-related research paper co-authored with a female researcher (Columns 4-6). Each column reports estimates from a separate regression. Column (1) and (4) include the full sample of incumbent researchers. Columns (2) and (5) are restricted to only male incumbent researchers. Column (3) and (6) are restricted to only female incumbent researchers. Effect at event time $\tau = -1$ is normalized to 0. Baseline mean is the mean of the outcome variable at $\tau = -1$. The coefficient for Years -5 to -2 is the pre-period average of the coefficients for $\tau = -5$ to $\tau = -2$. The coefficient for Years 0 to 2 is the post-period average of the coefficients for $\tau = 0$, $\tau = 1$, and $\tau = 2$. Similarly, the coefficient for Years 3 to 6 is the average of the coefficients for $\tau = 3$ to $\tau = 6$. All regressions include incumbent researcher fixed effects and year fixed effects. We also control for total publications, total publications with an abstract, and the average abstract length at the school-subfield. All regressions are estimated using OLS. Standard errors in parentheses are clustered at the school level.

Table A.21: Effect of Turning Coed on Co-Authorship with Female Researchers among Incumbent Researchers

	Probability of Co-Authoring with a Female Researcher		
	(1)	(2)	(3)
	All	Male	Female
Years -5 to -2	0.006	0.004	0.009
	(0.005)	(0.005)	(0.015)
Years 0 to 2	0.004	-0.004	0.055
	(0.007)	(0.007)	(0.027)
Years 3 to 6	-0.005	-0.016	0.062
	(0.010)	(0.011)	(0.036)
Baseline Mean	0.16	0.15	0.20
Observations	77958	66887	11071
Estimator	OLS	OLS	OLS

Notes: This table reports the average effects from estimating equation (1) on an indicator variable that takes value one if the researcher has published at least one research paper co-authored with a female researcher in that year. Each column reports estimates from a separate regression. Column (1) and (4) include the full sample of incumbent researchers. Columns (2) and (5) are restricted to only male incumbent researchers. Column (3) and (6) are restricted to only female incumbent researchers. Effect at event time $\tau = -1$ is normalized to 0. Baseline mean is the mean of the outcome variable at $\tau = -1$. The coefficient for Years -5 to -2 is the pre-period average of the coefficients for $\tau = -5$ to $\tau = -2$. The coefficient for Years 0 to 2 is the post-period average of the coefficients for $\tau = 0$, $\tau = 1$, and $\tau = 2$. Similarly, the coefficient for Years 3 to 6 is the average of the coefficients for $\tau = 3$ to $\tau = 6$. All regressions include incumbent researcher fixed effects and year fixed effects. We also control for total publications, total publications with an abstract, and the average abstract length at the school-subfield. All regressions are estimated using OLS. Standard errors in parentheses are clustered at the school level.

B Data Appendix

B.1 Higher Education General Information Survey (HEGIS) and Integrated Postsecondary Education Data System (IPEDS)

Data on student enrollment, faculty and degrees awarded come from the Integrated Postsecondary Education Data System (IPEDS) and its predecessor Higher Education General Information Survey (HEGIS) collected by the United States Department of Education National Center for Education Statistics (NCES).[71] The HEGIS and IPEDS series provide comprehensive information on all public and private two-year and four-year colleges, universities and technical institutions that participate in the federal student financial aid programs as required by the Higher Education Act of 1965. The data series contain information on institution characteristics, enrollments, completions, faculty and staff, finances, among others.

For our analysis, we merge together the HEGIS data series on degrees awarded 1965 to 1984, faculty from 1971 to 1985 and fall enrollment from 1968 to 1985. Additionally, we extend the sample to include faculty data from 1986 to 1998 and degrees data from 1985 to 1998 from IPEDS. The earned degrees data series provide information on the degrees and other formal awards conferred by each institution by gender of the student and field of specialty. We utilize this dataset to look at changes in the female share of bachelor degrees awarded. The data on faculty contain information for each institution on number of faculty, salaries, and academic rank by contract length and gender. We pool together the total number of faculty by rank in both 9 month and 12 month contracts. Finally, the fall enrollment data contain information on total enrollments of full-time and part-time students by class level, sex, race, and first-time enrollment status. In our analysis, we focus on all full-time undergraduate enrollments.

Our main outcome measure for undergraduate gender composition will utilize data on undergraduate degrees awarded because the time series for fall enrollment data begins later. Specifically, we will examine the female share of bachelor degrees awarded and the log of total bachelor degrees awarded. We also provide results using the available fall enrollment

[71] HEGIS data series were accessed from the Inter-university Consortium for Political and Social Research (ICPSR) and IPEDS data were accessed from the NCES website.

data for full-time undergraduates to calculate female enrollment share.

Our outcome variable for faculty composition is the female share of all faculty including instructors, assistant professors, associate professors and full professors on either 9-month or 12-month contracts. Because we may expect schools to increase the number of female professors after turning coed, we also consider the female share of professors.

B.2 Microsoft Academic Graph

For our main outcome variables on gender-related research, we use the Microsoft Academic Graph (MAG) database (Sinha et al., 2015). MAG is a large database with information on over 207 million papers, linked to 250 million authors and their respective institutions. Each paper record can be linked to the field of study, author, affiliation of the author at time of publication, publication date, journal and abstract. Note that papers in this context include journal articles, books, conferences, and patents. We do not distinguish between these document types and refer to them as "papers". The data is aggregated from feeds from publishers and web-pages indexed by Microsoft search engine, Bing (Sinha et al., 2015). Therefore, we are likely to capture both published and working papers. Among the over 25,000 institutions represented in this dataset, we matched 87 out of 88 schools that turned coed between 1960 and 1990 in our sample.

We extracted information on all papers published by any researcher that was affiliated with the turning coed schools between 1950 and 2005. In our analysis, we only use observations of papers written at the turning coed institution. We also restrict our analysis to researchers who were ever at only one turning coed school.[72] These restrictions lead to a total number of 1,333,306 papers and 471,628 unique researchers. For some additional analyses, we also collected data for a sample of 453 schools that either opened as coeducational universities prior to 1940 or turned coed after the end of our sample period in 1990.

[72] Less than 5% of researchers were at more than one treated school.

B.3 Gender of the Researcher

Because the gender of the researcher is not provided in the MAG database, we use name-matching algorithms to identify the gender of the researcher by comparing the first name of the author to four established names databases. These include the US Social Security Administration baby name data, US Census data in the Integrated Public Use Microdata Series, and census microdata from Canada, Great Britain, Denmark, Iceland, Norway, and Sweden from 1801 to 1910 created by the North Atlantic Population Project. We accessed these databases using the R package, "Gender" (`https://cran.r-project.org/web/packages/gender/gender.pdf`). The R package "Gender" classifies a name as female if at least 50% of the names are women. We also accessed the OpenGenderTracking Project (`http://opengendertracking.github.io`) accessed using the Python package "Gender-Detector" (`https://pypi.org/project/gender-detector/`). This algorithm gives a best guess of the ratio of genders of people with a given name. We use the default statistical significance threshold of 95. In our main analysis, we consider an author to be female if at least one of these sources identifies the name to be female.[73] We matched 93% of the researchers to a gender.

C Definition of Gender-Related Papers

C.1 Keywords-Based Approach

C.1.1 Set of Gender-Related Words

We define two sets of gender-related words such as "female", "woman", and "mother". The purpose of using a second list is to show that our results are not dependent on the data source from which the list of gender-related words is drawn. The first list of words is compiled from the data source, Datamuse API, a word-finding query search engine that is based on Google Books Ngrams data and other corpus-based datasets.[74] We selected

[73]This methodology of identifying gender of researchers is perhaps less conservative than prior studies that also used similar algorithms to assign gender to researchers. For example, Kim and Moser (2021) uses only one of the algorithms ("Gender-Detector").

[74]Accessed via `https://www.datamuse.com/api/`.

the top 20 most related words as "gender" and for each of these words, we collected five synonyms. Following the literature that has emphasized "female-focused" research and innovations (Koning et al., 2020), we exclude male-related words because historically men are considered "standard" in research. The second list is broader and is compiled from an alternative website, RelatedWords.org, using keyword searches "gender", "woman", and "female". The website provides an open-source search engine for finding related words and relies on several algorithms to provide the results. Among them, it crawls through ConceptNet, which is a knowledge database that connects words and phrases of natural language (Speer et al., 2017). We present both lists below. While we will utilize the first list of words as our main definition, we will show robustness to using the broader list of words in Section 5.2.2.

Main Definition

lady female females feminine femininity wife daughter wives daughters gender gendered girl girls homosexuality intersexual ladies maidenly matronly misogyny mothers sex sexes sexism sexist sexual sexuality sexualized sexually unisexual venereal woman womanhood womanly women

Broad Definition

female woman women gender girl pregnancy fertility domestic menopause sex sexual breast-feed sexes feminine marriage marital wife daughter females daughters wives marriages femininity feminism sexism sexist mother motherhood maternity matrilineal matrilineality matriarch matrilocal widow nursing childbirth abortion pregnant pregnancy married dowry maternal contraception birth maiden lady virginity midwife midwifery concubine mistress infant bride bridal maid sorority maternity bachelorette misogyny matron divorce wedding

For both versions, we implemented a keyword search methodology based on regular expressions. This approach allows for the matching of words regardless of their leading or trailing characters, thus maximizing the potential identification of relevant words. For example, "daughter" could also match "daughterly" or "stepdaughter". However, to ensure accuracy and avoid false positives, we implemented a comprehensive refinement process. Specifically, we analyzed random samples to identify and remove words or phrases that were incorrectly identified as gender-related. We iterated on this process and refinement process several times. To further reduce false positives, we introduced specific conditions to exclude irrelevant matches. For example, "daughter" would not match "daughter cell", a term in biology unrelated to gender. Similarly, "sex" would not match "sextant", "gender" would not match "engender", and "lady" or would not match "malady". After implementing these conditions, we sampled 540 papers randomly to verify the accuracy of our approach.

C.2 Machine-Learning Approach

To classify gender-related papers, we first construct a training sample. The training sample of papers are selected from a 50% random sample of all papers written between 1950 and 2005 by researchers affiliated at 453 universities that were already coeducational prior to 1940 or switch to coeducation after 1990. The training sample of gender-related papers consists of 5,434 papers classified by MAG in the field of "gender studies" and 8,923 published in gender-related journals.[75] For non gender-related papers, we use 1,900,208 papers whose titles do not contain any of the words in a broad set of gender-related words. The use of a training sample with gender-related and non gender-related papers follow the same logic as in Dittmar and Seabold (2015) and Becker and Pascali (2018).

It is important to note that in comparison to the non gender-related papers, the papers that are classified as gender-related make up a small minority of the entire training sample. This can lead to poor performance in most machine learning techniques for identifying the minority class. To address this issue, we implement a data augmentation for the minority class, Synthetic Minority Oversampling Technique (Chawla et al., 2002), a method that creates synthetic examples of the gender-related papers in order to balance the class distribution. This method has been shown to have higher performance than oversampling the minority class or undersampling the majority class. Next, we transform the text of the titles into a matrix of TF-IDF (term frequency-inverse document frequency) features. Each row of the matrix refers to a specific paper title and each column of the matrix represents a pos-

[75] We identify gender-related journals if the title of the journal contains one of the following words: "female", "woman", "women", "gender", "girl", "pregnancy", "fertility", "menopause", "sex", "sexual", "sexuality", "sexes", "feminine", "wife", "daughter", "females", "daughters", "wives", "femininity", "feminism", "sexism", "sexist", "mother", "motherhood", "maternity", "matrilineal", "matrilineality", "matriarch", "matrilocal", "widow", "childbirth", "abortion", "pregnant", "married", "dowry", "maternal", "contraception", "birth", "maiden", "lady", "midwife", "midwifery", "concubine", "mistress", "bride", "bridal", "maid", "sorority", "bachelorette", "misogyny", "matron".

sible word in the corpus of titles. The entries of the matrix capture the weighted frequency of each word. Words that appear frequently in the corpus are assigned less weight as they may carry less information than rarer words.

We then apply the Naïve Bayes (NB) classifier to this matrix to classify documents into gender-related papers. The Naïve Bayes algorithm is a text classification technique that is based on Bayes' Theorem with the assumption that each word in the title are conditionally independent of each other.[76] Naïve Bayes has been shown to have high performance in text classification problems and has been applied in the economics literature in recent papers such as Becker and Pascali (2018). After building the model on the training set of papers, we use it to compute the predicted probability of a paper being gender-related. We classify all papers as gender-related if the predicted probability is higher than 75%.

In our analysis, we use the keyword-based approach as our main definition of gender-related papers. The reason for this is twofold. First, the keyword-based approach provides an arguably more transparent method of identifying gender-related research and does not require the selection of a probability threshold as in the case of the machine learning approach. Second and more importantly, the training set for the machine learning models consists of papers in gender studies and gender-related journals. This may lead to an over-representation of papers in these specific fields with a dedicated gender-related journal, such as sociology and medicine.

C.3 Beyond Female-Focused Research

Our baseline gender-related research primarily focuses on female-related words. In this section, we expand the definition to include other genders and sexual identities. Specifically, we construct a list of keywords related to (i) men:

men, man, male, boy, dude, mankind, guy, gentleman, fellow, serviceman, father, signor, eunuch, brother, uncle, nephew, patriarch, patriarchy, widower, father, grandfather, dad, masculine, masculinity, boyfriend, androgen, son, andrology, manly, mannish, overman, manliness, bachelor, monsieur, husband, hombre, masculine, macho, patriarchal, virile, virility,

and a list of keywords related to (ii) LGBT: *lesbian, gay, transgender, cisgender, ho-*

[76]Because the TF-IDF matrix contains continuous values, we use a multinomial Naïve Bayes algorithm.

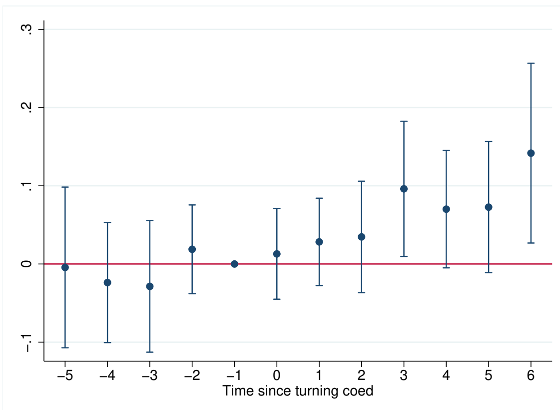
mosexual, homophile, queer, intersex, bisexuality, asexual, lgbt, bisexual, glbt, queers, homo, homophobia, sexuality, objectification, homosexuality, heterosexuality, heterosexism, misandry, misandrist, homophobe, sodomite, butches, bisexuals, homosexualism, asexuality, polyamorous, pansexual, genderqueer, agender, bigender, transvestism, biphobia, transphobia, polyamory, monosexuality.

We classified research as men-related if one of the men-related keywords appear and similarly for LGBT-related research. Appendix Figure C.1a shows the TWFE Poisson estimates for the broader definition of gender-related research in which we augment the baseline list of keywords with the men- and LGBT-related keywords. Similar to the main results, we observe a positive increase in research related to gender after coeducation. Appendix Figures C.1b and C.1c plot the analogous estimates for men- and LGBT-related research, respectively.[77] We find a positive but insignificant increase in men- and LGBT-related research. Then in Appendix Figure C.1d, we use as an outcome variable the share of female-related papers out of all papers related to any gender. This variable is constructed by dividing the total number of gender-related papers using the baseline definition by the total number of gender-related papers using the broad definition that includes men- and LGBT-related papers. Appendix Figure C.1d plots the linear estimates. We find a suggestive increase in more research focusing on women, although the estimates are imprecise. Appendix Table C.1 summarizes the results.

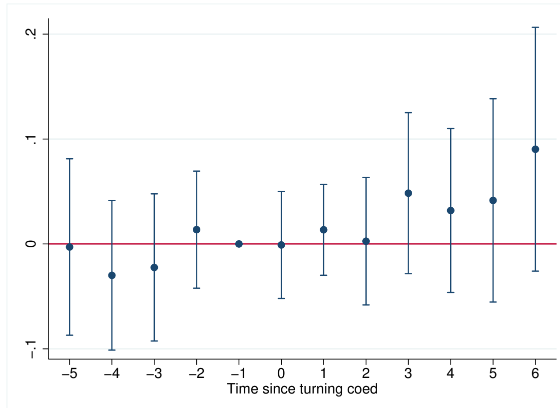
[77]Note that we allow papers to be classified into multiple categories. For example, a paper may be gender-related under the female-focused original definition and may also be considered men-related.

Figure C.1: Effect of Turning Coed on Number of Gender-Related Publications (All Genders and Sexualities)

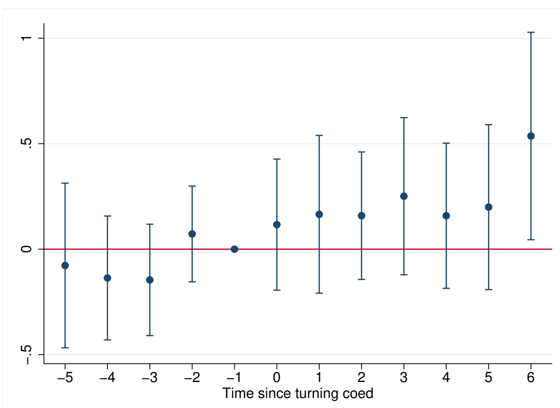
(a) Total Gender-Related Papers (All Genders and Sexualities)



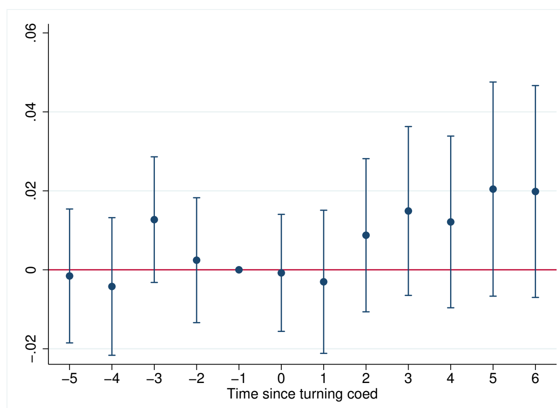
(b) Total Men-Related Papers



(c) Total LGBT-Related Papers



(d) Female-Related Share of Total Gender-Related Papers (All Genders and Sexualities)



Notes: These figures plot the event time coefficients and their 95% confidence intervals from estimating equation (1) for (a) total number of gender-related research including all genders and sexualities, (b) total men-related papers, (c) total LGBT-related papers, and (d) the female-related share of total gender-related papers. Except for (d), the specifications are estimated using conditional fixed effects Poisson models. For (d), the specification is estimated using OLS. In all specifications, we include school-subfield fixed effects, year fixed effects, and discipline-by-year fixed effects. We also control for total publications, total publications with an abstract, and the average abstract length at the school-subfield. We cluster at the school level.

Table C.1: Effect of Turning Coed on Gender-Related Research (Broad Alternative Definitions)

	(1) Number of Gender-Related Papers (Broad)	(2) Number of Men-Related Papers	(3) Number of LGBT-Related Papers
Years -5 to -2	-0.009	-0.010	-0.072
	(0.029)	(0.024)	(0.096)
Years 0 to 2	0.025	0.005	0.147
	(0.022)	(0.019)	(0.158)
Years 3 to 6	0.095	0.053	0.286
	(0.038)	(0.041)	(0.188)
Baseline Mean	5.47	4.66	0.23
Observations	94383	94297	40309
Estimator	Poisson	Poisson	Poisson

Notes: Table C.1 reports the average effects from estimating equation (1) on gender-related research outcomes: (1) total number of gender-related papers including all genders and sexualities, (2) total number of men-related papers, and (3) total number of LGBT-related papers. Each column reports estimates from a separate regression, estimated at the school-subfield level. Effect at event time $\tau = -1$ is normalized to 0. Baseline mean is the mean of the outcome variable at $\tau = -1$. The coefficient for Years -5 to -2 is the pre-period average of the coefficients for $\tau = -5$ to $\tau = -2$. The coefficient for Years 0 to 2 is the post-period average of the coefficients for $\tau = 0$, $\tau = 1$, and $\tau = 2$. Similarly, the coefficient for Years 3 to 6 is the average of the coefficients for $\tau = 3$ to $\tau = 6$. All regressions include school-subfield fixed effects, year fixed effects, and discipline-by-year fixed effects. We also control for total publications, total publications with an abstract, and the average abstract length at the school-subfield. All regressions are estimated using a conditional fixed-effect Poisson model at the school-subfield-year level. School-subfield groups without variation or less than two observations are dropped from the respective sample in Poisson models. Standard errors in parentheses are clustered at the school level.

C.4 Audit of Gender-Related Research Publications

In this section, we describe in detail the audit we conducted to classify gender-related research publications.

First, for each of the 12 fields in our analysis, we randomly selected 45 publications that we classified as gender-related using our baseline definition for a total of 540 papers. Then a team of RAs (two undergraduates, one master's student) were instructed to classify each of the same 540 papers into (i) research that is related to gender in terms of topics, (ii) research that focuses on sex differences, and (iii) not gender-related research based on the following definitions:

1. Gender Topic
   - Main focus of the paper is on a gender or sex-related topic, for example: gender differences in earnings, female labor force participation, women in Ancient Egypt, etc
2. Gender-Inclusive Sample (incl. non-human subjects)
   - Main focus of the paper is not gender or sex-related, but it presents analyses by sex or has a gender-diverse research sample (which may include nonhuman subjects), for example: labor force participation of men and women in the US.
3. Not Gender-Related
   - None of the above
   - Note: When this occurs, we asked the RA to identify why the algorithm incorrectly assumed it was not gender-related so that we we can improve the classification (for example, we now drop all papers that mention "daughter cell" as it is a term used in biology that is not related to women)

Additional Notes:

- Sometimes books do not have abstracts, but we have the list of chapter titles instead. If one of the listed chapter titles is about women, we consider the book to be gender-related (similar to observing a journal article on gender topics within a journal)
- We sometimes have fiction, book reviews, biographies, or autobiographies among our publications. If these have a female character, we classify them as:

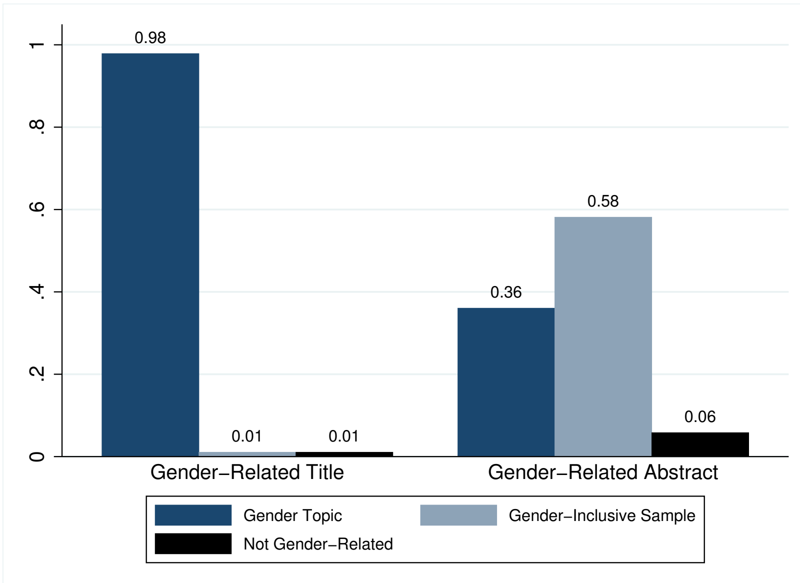
  - Gender Topic if a woman is the main character
  - Gender-Inclusive Sample if she is not the main character

- If a paper is about sexuality or sexual violence, we consider it gender-related or gender-inclusive (based on the logic above).

Finally, we consider a paper to be in a specific category if at least two of the RAs agreed. The kappa-statistic of interrater agreement is 0.70, suggesting a high degree of agreement among the three RAs. In the random sample of 540 papers, we find that 66% are gender-related in terms of topics, such as "Accounting for Changes in the Labor Supply of Recently Divorced Women" (Johnson and Skinner, 1988). Another 29% are gender-related research papers on sex differences. For example, we classify the paper "Respiratory Effects of Household Exposures to Tobacco Smoke And Gas Cooking on Nonsmokers" (Helsing et al., 1982) as gender-related because it studies differences by sex. The remaining 5% of the papers are false positives. For instance, one such paper by Kaufman-Scarborough and Menzel Baker (2005) discusses the American Disabilities Act (ADA). While it references the women's movement in its abstract regarding the origins of the ADA, the paper's main focus is not on gender issues. Thus, it was erroneously categorized as gender-related research.

Appendix Figure C.2 shows that in papers identified as gender-related based on the title, 98% of the papers are classified as gender topic. In comparison, the majority of papers identified as gender-related based on the abstract have a gender-inclusive sample (58%) compared to gender topic (36%).

Figure C.2: Audit on Types of Gender-Related Research Based on Gender-Related Paper Title or Abstract



Appendix Figure C.3 presents the corresponding breakdown by field, while Appendix Figure C.4 shows the distribution of false positives across fields. We find that fields such as sociology and art are more likely to have gender-related topics than gender-inclusive samples, compared to fields like medicine and environmental science. We also find that biology has the highest rates of false positives at 16%. In Appendix Figure C.5, we show our results are robust to dropping fields with the highest number of false positives (biology and philosophy).

Figure C.3: Audit on Types of Gender-Related Research By Field

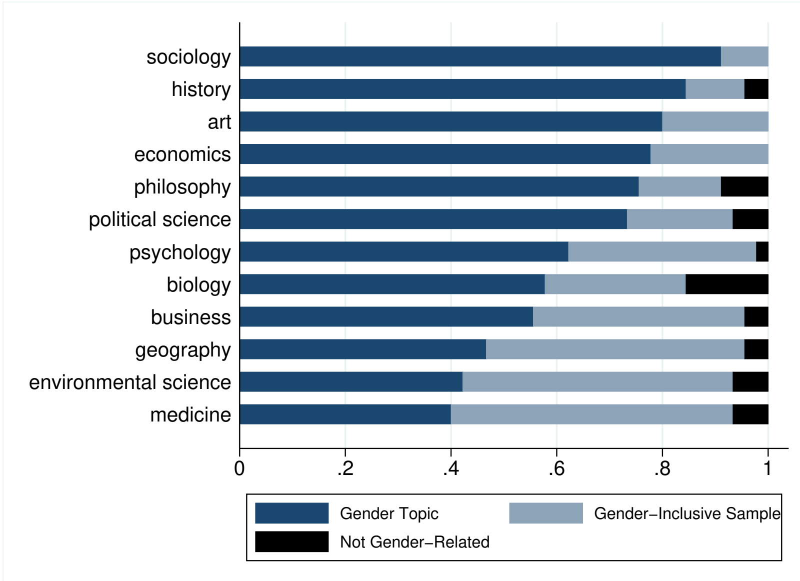


Figure C.4: Audit on False Positives By Field

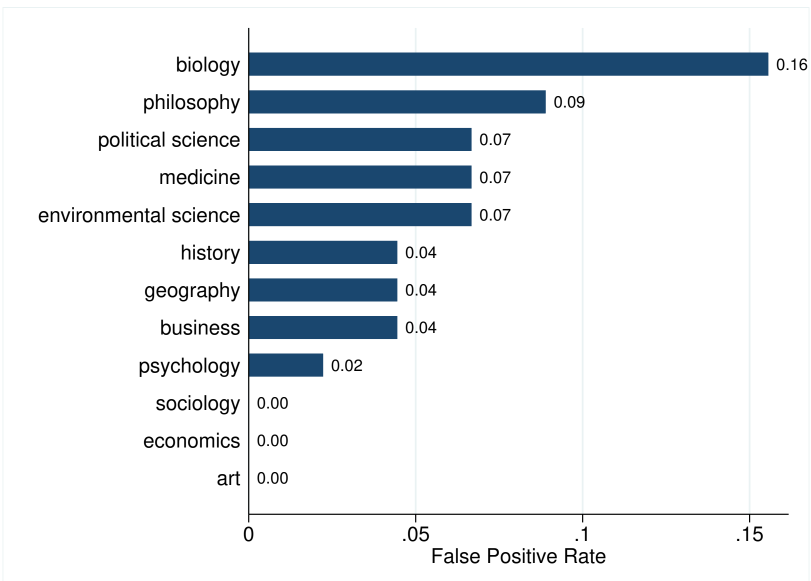
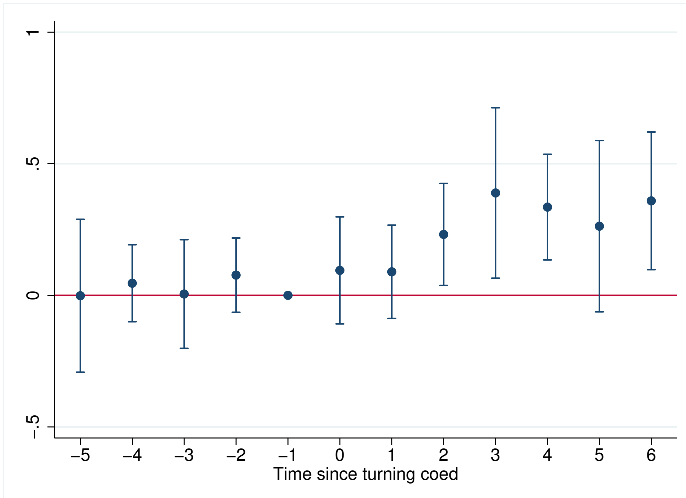


Figure C.5: Effect of Turning Coed on Number of Gender-Related Publications (Dropping Fields with High Number of False Positives)



Notes: Figure C.5 plots the event time coefficients and their 95% confidence intervals from estimating equation (1) for total number of gender-related research publications, dropping the two fields with the highest numbers of false positives (biology and philosophy). The specification is estimated using a conditional fixed effects Poisson model. In the specification, we include school-subfield fixed effects, year fixed effects, and discipline-by-year fixed effects. We also control for total publications, total publications with an abstract, and the average abstract length at the school-subfield. We cluster at the school level.

C.4.1 Machine Learning Classification of Gender-Related Research Types

Using the audited sample of papers as our training set, we apply the same ML Naïve Bayes approach described in C.2 to classify all gender-related papers in our sample as "gender topic" or "gender-inclusive sample". Specifically, for each paper, we use as features of the model the title and the abstract. We preprocess the text by tokenizing, filtering out stop words, remove words that only have length of one, select only nouns and adjectives, and then lemmatize each word. Next, we transform the text of the processed titles combined with abstracts into a matrix of TF-IDF (term frequency-inverse document frequency) features. Each row of the matrix refers to a specific paper title and each column of the matrix represents a possible word in the corpus of titles. The entries of the matrix capture the weighted frequency of each word. Words that appear frequently in the corpus are assigned less weight as they may carry less information than rarer words. We then apply the Naïve Bayes (NB) classifier to this matrix to classify documents into gender-topic or gender-inclusive sample papers. After building the model on the training set of papers, we use it to compute the predicted probability of a paper having a gender topic or a gender-inclusive sample. We assign the paper to that specific category if the predicted probability is higher than 50%.

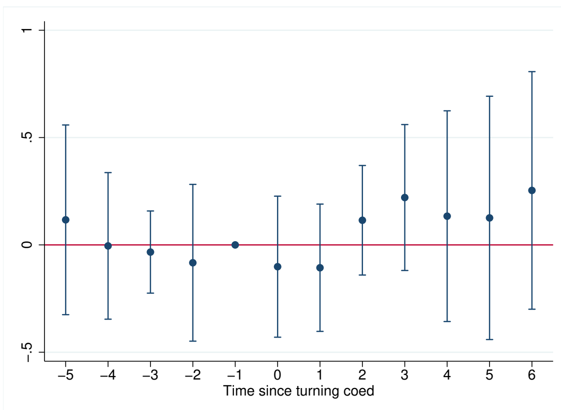
To evaluate the accuracy of our prediction, we trained the model on a random 20% sample of the training set, and then used the model to predict the rest of the training set. We find that our model accurately identifies 90% of papers with a gender topic. The remaining 10% are false negatives for the 'gender topic' category (i.e., papers with a gender topic that are incorrectly classified as having a gender-inclusive sample).

On the other hand, our model can accurately predict only 63% of papers with a gender-inclusive sample. The remaining 37% are false negatives for the 'gender-inclusive' category (i.e., papers with a gender-inclusive sample that are incorrectly classified as having a gender topic).

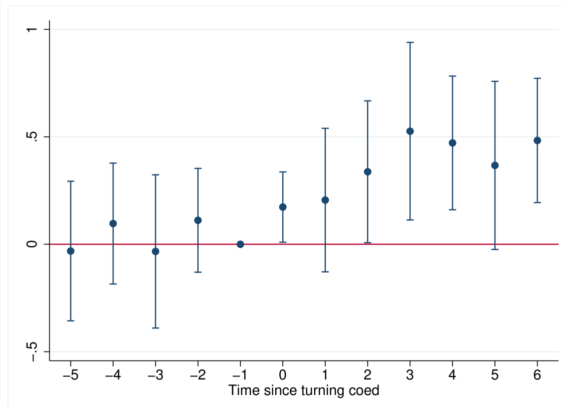
In Appendix Figure C.6, we explore whether the increase in gender-related research comes mostly from gender topics or gender-inclusive samples. We find that the main results are driven by papers with gender-inclusive samples. This parallels our findings on gender-related titles and gender-related abstracts. Specifically, we find that the increase in gender-related research comes mostly from an increase in papers with gender-related abstracts and as we show in Appendix Figure C.2, gender-related research identified by their abstracts are much more likely to have a gender-inclusive sample, rather than have gender as the main topic of the paper. Nonetheless, we approach these results with caution considering the current accuracy levels of our model. Specifically, the model's accuracy is 90% for papers with a gender topic and 63% for gender-inclusive papers. Although these figures are encouraging, they also suggest that there is a considerable scope for improvement, especially in accurately classifying gender-inclusive papers.

Figure C.6: Effect of Turning Coed on Types of Gender-Related Publications

(a) Number of Papers on Gender Topics



(b) Number of Papers with Gender-Inclusive Samples



Notes: Figure C.6 plots the event time coefficients and their 95% confidence intervals from estimating equation (1) for total number of gender-related research publications classified as gender-related based on topic or having a gender-inclusive sample using a ML algorithm. The specifications are estimated using a conditional fixed effects Poisson model. In the specification, we include school-subfield fixed effects, year fixed effects, and discipline-by-year fixed effects. We also control for total publications, total publications with an abstract, and the average abstract length at the school-subfield. We cluster at the school level.

C.4.2 Examples of Gender-Related Papers

We provide two randomly selected gender-related papers (using our baseline definition) from each of the gender-related fields. We categorize each paper into the following: (i) "Gender Topic": publication is on a gender studies topic, "Sex Differences": gender is not the focus of the research but analysis by sex is described, and "Not gender-related": misclassified paper.

Art

1. "New Women Versus Old Mores A Study Of Women Characters In Ba Jin's Torrents Trilogy" (Category: Gender Topic)
    - First author: Tsung Su
    - Publication year: 1990

- Abstract: The 1930s, in the history of modern Chinese literature, are what the late eighteenth century is to German literature, a time of great intellectual turmoil and creative vitality. During the so-called Sturm und Drang, or Storm and Stress period in German literature, literary giants like Goethe, Schiller, Lenz, and others rebelled against conventional artistic and moral standards. During the Chinese version of Storm and Stress in the 1930s, literary greats like Lu Xun, Lao She, Ba Jin, Cao Yu, Mao Dun, and legions of others rebelled against the old language and the old ethics, conventions, superstitions, and beliefs. Previously, in 1919, Chen Duxiu declared in the New Youth: "Because we esteem Mr. Democracy, we are against Confucianism, chastity, old ethics, and old politics; because we esteem Mr. Science, we are against old literature and old national culture."
- Gender-related definition: Gender-related title, ML Naïve Bayes

2. "Electronic Recording Of Mosquito Activity" (Category: Sex Differences)

   - First author: John A. Powell
   - Publication year: 1966
   - Abstract: Spontaneous locomotor activity of mosquitoes (Aedes aegypti) was tested over twenty-four hour periods using an electronic recording device which gave a permanent time graph of activity. Single mosquitoes were placed on a wire grid with alternate strands connected to the positive and negative poles of an electric circuit. Each time the mosquito moved, the electric current changed and the event was recorded by a pen-writer. The number of peaks per time interval gave the index of activity. Variables which may affect activity include age, physiological state, sex and strain. A distinct activity cycle was evident in both virgin and mated females but not in males; peak activity came in the early evening and activity was lowest in the early afternoon.
   - Gender-related definition: Gender-related abstract

Biology

1. "Fine Structure Of A Marine Proteomyxid And Cytochemical Changes During Encystment" (Category: Not Gender-Related)

   - First author: O. Roger Anderson
   - Publication year: 1979
   - Abstract: A proteomyxid (Biomyxa vagans) isolated from Sargassum sp. was maintained in laboratory culture with a bacterial food source. The life cycle consists of four stages: (1) resting cysts formed during unfavorable growth conditions, (2) a dispersal stage following excystment when active growth resumes, (3) generative growth characterized by large plasmodial cells which give rise to numerous daughter cells, and (4) a recruitment stage in which solitary cells become aggregated during progressively unfavorable growth conditions and eventually produce clusters of resting cysts. No sexual

reproduction was observed. The fine structure of active cells shows that they are multinucleated, possess a thin envelope of fibrillar material surrounding the cell, and contain digestive vacuoles filled with bacteria and detritus. Encysting cells exhibit lipid autophagy as shown by cytochemical staining and biochemical analysis of the lipid content of encysting cells compared to active cells. The cysts have a thickened cell coat, contain smaller nuclei than the active cells, possess fewer and smaller digestive vacuoles, and exhibit less secretory activity at the periphery of the cell. The nutrition and life history of Biomyxa vagans are discussed in relation to its surface-dwelling habit within a pelagic community.

- Gender-related definition: Gender-related abstract

2. "The Effects Of Progesterone On Estrogen Induced Luteinizing Hormone And Follicle Stimulating Hormone Release In The Female Rhesus Monkey" (Category: Gender Topic)

    - First author: F. A. Helmond
    - Publication year: 1980
    - Abstract: The effects of progesterone (P) in midcycle concentrations on the estradiol (E2) -induced gonadotropin release in the rhesus monkey were investigated by implanting Silastic capsules containing either crystalline E2 or P. All experiments were begun on day 3 or 4 of the menstrual cycle and finished 96 h later. In the control cycles E2 capsules (E2 increments to approximately 250 pg/ml) were implanted in all animals. In subsequent cycles E2 capsules were again implanted, but a P capsule was added (P increment to approximately 1.2 ng/ml) 0, 24, 32, and 46 h after the implantation of the E2 capsules (groups I, II, III, and IV, respectively). The time of maximum gonadotropin release in the E2 plus P cycles of all groups was advanced by approximately 12 h compared to their E2 control cycles (P plus P implants) was reduced to 70% of the E2 control means. When the time interval between the E2 and P im...
    - Gender-related definition: Gender-related title, ML Naïve Bayes

Business

1. "Women Still Want Marriage Sex Differences In Lonely Hearts Advertisements" (Category: Gender Topic)

    - First author: Sarah C. Sitton
    - Publication year: 1986
    - Abstract: Personal advertisements from a metropolitan newspaper were analyzed for content and amount of self-disclosure. Men and women disclosed information at the same rate. They also stipulated physical attractiveness, athleticism, and the desire for companionship equally often. Women, however, stipulated a desire for the partner's financial security and for marriage significantly more frequently than men.
    - Gender-related definition: Gender-related abstract, Gender-related title, ML Naïve Bayes

2. “Machiavellianism And The Discount Store Executive” (Category: Sex Differences)

    - First author: Martin T. Topol
    - Publication year: 1990
    - Abstract: This research investigated the Machiavellian orientation of discount store Executives and the relationships between Machiavellianism and job statisfaction and job success. The reported findings are based upon 212 responses to a mail questionnaire sent to a systematic random sample of discount store executives. Major findings of the present study are: [a] discount store executives are no More Machiavellian than other executives; [b] female executives in higher Machiavellian orientation than their male counterparts; [c] executives in higher Level management positions are less Machiavellian than those in lower level Positions; [d] executives who have achieved greater success, as measured by job title or income are more likely to have a lower Machiavellian orientation; and [e] executives who report higher levels of job satisfaction are generally more likely to have a lower Machiavellian orientation.
    - Gender-related definition: Gender-related abstract

Economics

1. “Path Analysis Of Familial Resemblance Of Pulmonary Function And Cigarette Smoking” (Category: Sex Differences)

    - First author: Mary Frances Cotch
    - Publication year: 1990
    - Abstract: The techniques of path analysis were utilized to assess the relative importance of genetic factors, personal smoking behavior, and shared environment in the resemblance of pulmonary function among relatives using both cross-sectional and longitudinal data from nuclear families. Data on 1-s forced expiratory volume, FEV1 (adjusted for age, sex, race, height, and ascertainment group) and the number of cigarettes smoked per day were available on 978 individuals in 384 nuclear families residing in the Baltimore metropolitan area. All these individuals were seen twice between 1971 and 1981, with an average of 5 yr between visits. The direct effect of an individual’s own smoking explained 10 and 3% of variation in adjusted FEV1 among parents and offspring, respectively. Shared environmental factors influencing personal smoking behavior accounted for 5% of the parent-offspring correlation in adjusted FEV1 and 3% of the sibling correlation in adjusted FEV1 in this sample. Undefined environmental factors that infl...
    - Gender-related definition: Gender-related abstract

2. “Accounting For Changes In The Labor Supply Of Recently Divorced Women” (Category: Gender Topic)

    - First author: William R. Johnson

- Publication year: 1988
- Abstract: How much of the rise in women's labor supply associated with divorce can be attributed to observable changes in the wife's environment? Such changes include a reduction in nonwage family income, a rise in her after-tax wage rate, changes in the number of children present, and a reduction in husband's hours at home. We use panel data to address this question. When we do not account for individual effects, we find that changes in observables are important, but a residual effect dependent solely on marital status remains. In estimates that do control for individual heterogeneity, observable changes in the wife's environment account for even less of the total shift in labor supply.
- Gender-related definition: Gender-related abstract, Gender-related title

Environmental Studies

1. "Respiratory Effects Of Household Exposures To Tobacco Smoke And Gas Cooking On Nonsmokers" (Category: Sex Differences)

    - First author: Knud J. Helsing
    - Publication year: 1982
    - Abstract: The records of 708 nonsmoking white adult residents of Washington County, MD, who had participated in two of respiratory symptoms were analyzed to evaluate the effects of exposure at home to two potential sources of indoor air pollution: cigarette smoking by other household members, and use of gas as a cooking fuel. After adjustment for the effects of age, sex, socioeconomic level, occupational exposure to dust, and years of residence in household, the presence of one or more smokers in the household was only suggestively associated with a higher frequency of chronic phlegm and impaired ventilatory function defined as FEV1 ¡ 80% predicted. The use for cooking was associated with a significantly increased frequency of chronic cough and a significantly greater percentage with impaired ventilatory function as measured both by FEV1 ¡ 80% predicted and by FEV1/FVC ¡ 70%.
    - Gender-related definition: Gender-related abstract

2. "Pecan Weevil Distribution In Some Texas Soils" (Category: Sex Differences)

    - First author: Marvin K. Harris
    - Publication year: 1975
    - Abstract: Pecan weevils, Curculio caryae (Horn)2, were found deeper in cultivated soils than in undisturbed sites, within the foliage canopy of the tree. No pecan weevils were found in unshaded soil outside of the tree canopy. Male and female weevils were homogenous in their vertical distribution within the soil. The depths at which weevils were found were apparently deeper than necessary to escape inclement weather at the sites studied.

- Gender-related definition: Gender-related abstract

History

1. "Sally Has Been Sick Pregnancy And Family Limitation Among Virginia Gentry Women 1780 1830" (Category: Gender Topic)

    - First author: Jan Lewis
    - Publication year: 1988
    - Abstract: The extent of family planning practice in the antebellum South of the United States is examined using data on 298 Virginia gentry women born between 1710 and 1849. The data are from letters and diaries and indicate that although fertility remained high a definite trend to lower marital fertility can be established by the 1840s and 1850s. (ANNOTATION)
    - Gender-related definition: Gender-related abstract,Gender-related title, ML Naïve Bayes

2. "Primers For Prudery Sexual Advice To Victorian America" (Category: Gender Topic)

    - First author: Ronald G. Walters
    - Publication year: 1974
    - Abstract: In Primers for Prudery Ronald G. Walters examines the historical and social context as well as the substance of sexual advice manuals in nineteenth-century America. Allowing the authors of these manuals to speak for themselves-with generous excerpts by contemporary authorities on subjects ranging from the virtues of celibacy to the vices of masturbation-Walters offers his readers a complex reading of the Victorian "prudery" referred to in the book's title. Supplementing each of the excerpts with extensive commentary, he places the advice manuals in the larger setting of gender and class issues. First published in 1974, Primers for Prudery now returns to print in a paperback edition with new selections from women's advice to women and a new preface in which Walters discusses changes that have occurred in the scholarship on sexuality since the book's first publication. He also provides an updated bibliographical note.
    - Gender-related definition: Gender-related abstract, Gender-related title, ML Naïve Bayes

Medicine

1. "Differences In Results For Aneurysm Vs Occlusive Disease After Bifurcation Grafts Results Of 100 Elective Grafts" (Category: Sex Differences)

    - First author: M. David Tilson
    - Publication year: 1980
    - Abstract: To compare abdominal aortic surgery for aneurysmal (AAA) vs occlusive (OCC) disease, 50 consecutive cases of elective bifurcation grafts for AAA and 50 consecutive cases for OCC disease were analyzed. The mean age of the AAA patients

was a decade greater than the OCC patients, and they had more associated diseases. Only six AAA patients were women, while women predominated in the OCC group. Only three AAA patients were claudicants and none had rest pain. About one third of the OCC group had distal disease, and 14 had rest pain. Operative mortality was 4% (two deaths in each group). The survival of the grafted AAA patients was almost equal to normal expectancy. There were no late thromboses of grafts in the AAA group, while there were five late failures in the OCC group. The OCC group underwent significantly more frequent reoperative surgery during the follow-up period. The numerous differences in the two population groups apparent in this study provide a basis for questioning the concept that aneurysms are caused by atherosclerosis. (Arch Surg 115:1173-1175, 1980)

- Gender-related definition: Gender-related abstract

2. "Anti Estrogen Effects On Estrogen Accumulation In Brain Cell Nuclei Neurochemical Correlates Of Estrogen Action On Female Sexual Behavior In Guinea Pigs" (Category: Gender Topic)

    - First author: William A. Walker
    - Publication year: 1977
    - Abstract: The presence of estrogen in brain and peripheral target tissues was monitored with respect to the display of sexual behavior in female guinea pigs. Temporal and quantitative aspects of estrogen accumulation in cell nuclei of cerebral cortex, hypothalamic-preoptic areas (H-POA), and pituitary of ovariectomized guinea pigs were determined after s.c. administration of [3 Hestradiol benzoate ([3 HEB) (100 Ci [3 HEB plus 0.8 g unlabeled EB). Nuclear accumulation of estrogen followed the pattern:pituitary¿H-POA¿cortex. Peak nuclear accumulation of estrogen in the pituitary occurred at 20 h after [3 HEB and then levels declined. In the nuclear fraction of H-POA, estrogen accumulation reached a peak by 11 h after [3 HEB injection and remained at peak values 43 h after [3 HEB. Nuclear accumulation of estrogen in the cortex was minimal. The accumulation of estrogen in whole homogenates and cell nuclei of brain and peripheral target tissues was assessed during the display of sexual behavior in EB-progesterone (P)-treated animals. [3 HEB was injected s.c. at 0 h and P (0.5 mg) was administered at 39 h. At the first display of lordosis the animals were killed and estrogen accumulation determined. No effect of P on estrogen retention in cell nuclei or whole homogenates could be detected. Additionally, the effects of the anti-estrogens, enclomiphene (ENC) and CI-628, on estrogen uptake and retention in brain and peripheral target tissues were determined. Using a treatment schedule of ENC known to inhibit EB-induced sexual behavior (4 serial injections of ENC 48 h prior to EB), estrogen accumulation was significantly reduced in whole homogenates of H-POA, pituitary, and uterus both at 2 h and 39 h after [3 HEB injextion. Nuclear accumulation was also suppressed in the pituitary and uterus at both time points while nuclear inhibition of H-POA was apparent only at 39 h. Similar treatment with CI-628,

which does not inhibit EB-induced sexual behavior in guinea pigs, also did not inhibit uptake in the H-POA. CI-628 suppressed estrogen accumulation in the pituitary and uterus by 39 h after [3 HEB. Using a treatment schedule of ENC known to facilitate the priming action of EB for the display of lordosis (2 serial injections of ENC 28 h prior to EB), estrogen accumulation in the H-POA was not affected at either 2 h or 11 h after [3 HEB injection. However, this treatment reduced whole homogenate uptake in the pituitary and uterus (at 11 h) and nuclear accumulation in the pituitary (at 2 and 11 h).

- Gender-related definition: Gender-related abstract, Gender-related title, ML Naïve Bayes

Philosophy

1. "Problems In The Historiography Of Women In The Middle East The Case Of Nineteenth Century Egypt" (Category: Gender Topic)

   - First author: Judith E. Tucker
   - Publication year: 1983
   - Abstract: The study of women in the history of the Middle East has been subject, until recent times, to a benign neglect born of the general focus of scholarship in the field and common misconceptions, shared by historians of other regions as well, about the study of women. First and foremost, the general backwardness of Middle East historiography, widely attested to in periodic surveys of the state of the art, consigned women, along with many other groups and classes in society, to a minor, if not totally insignificant, place in history.1 Concentration on visible political institutions, diplomatic events, and intellectual currents of the high, as opposed to popular, culture effectively wrote all but upper-class males out of the historical process. That Middle East history remained, to a large extent, confined to this rather narrow sphere long after historians of Europe and the Far East had embarked on studies of social and economic history is related to the origins and the orientation of the field itself. As a stepchild of "orientalism," Middle East history bears the imprint of its birth up to the present in its use of sources, its methodology, and its isolation.2 The very richness of written sources, in the form of treatises on science, theology and jurisprudence, historical chronicles, and works in a literary genre, tended to tie students of the Middle East, historians and others, to the written word; the availability and sheer number of these sources worked to discourage active investigation of other types of material, including archeological finds, oral traditions,
   - Gender-related definition: Gender-related abstract, Gender-related title, ML Naïve Bayes

2. "Asceticism And Society In Crisis John Of Ephesus And The Lives Of The Eastern Saints" (Category: Gender Topic)

   - First author: Susan Ashbrook Harvey
   - Publication year: 1990

- Abstract: John of Ephesus traveled throughout the sixth-century Byzantine world in his role as monk, missionary, writer and church leader. In his major work, ”The Lives of the Eastern Saints”, he recorded 58 portraits of monks and nuns he had known, using the literary conventions of hagiography in a strikingly personal way. War, bubonic plague, famine, collective hysteria, and religious persecution were a part of daily life and the background against which asceticism developed an acute meaning for a beleaguered populace. Taking the work of John of Ephesus as her guide, Harvey explores the relationship between asceticism and society in the sixth-century Byzantine East. Concerned above all with the responsibility of the ascetic to lay society, John's writing narrates his experiences in the villages of the Syrian Orient, the deserts of Egypt, and the imperial city of Constantinople. Harvey's work contributes to a new understanding of the social world of the late antique Byzantine East, skillfully examining the character of ascetic practices, the traumatic separation of 'Monophysite' churches, the fluctuating roles of women in Syriac Christianity, and the general contribution of hagiography to the study of history.
- Gender-related definition: Gender-related abstract

Political Science

1. “Civil Liberties And The American Public” (Category: Gender Topic)

    - First author: Hazel Erskine
    - Publication year: 1975
    - Abstract: Important new survey findings show the American public's restrictive approach to the First Amendment rights of people who express deviant views to be moderating over the last two decades. This mellowing is backed up by parallel findings of major liberalizing of the consensus in other areas, notably equality and sexual freedom. Liberalization has been limited in such areas as criminal justice and separation of church and state. Post-McCarthy and post-Watergate developments are credited, along with educational progress, with much of the advance. Reduced value consensus and a growing sense of self-interest in civil liberties seem to have contributed to the trends in support of civil liberties.
    - Gender-related definition: Gender-related abstract

2. “The Supreme Court Family Policy And Alternative Family Lifestyles The Clash Of Interests” (Category: Gender Topic)

    - First author: Patricia Spakes
    - Publication year: 1985
    - Abstract: This article reviews the basis for the judicial system's involvement in the development of national family policy. Major Supreme Court decisions in establishing the rights of the nuclear family, the extended family, foster families, communal families, homosexual couples, and unwed fathers are discussed. The Supreme Court is seen as

having established the parameters of a nationally defined family, and the implications of the court's actions for the development of national family policy are considered.

- Gender-related definition: Gender-related abstract

Psychology

1. "Child Sexual Abuse Who Is To Blame" (Category: Gender Topic)

    - First author: Sylvia D. Broussard
    - Publication year: 1988
    - Abstract: This study utilized written descriptions of sexual activity between an adult and a child to examine the impact of victim sex, perpetrator sex, respondent sex, and victim response (i.e., encouraging, passive, resisting) on the attribution of responsibility to the child and the adult perpetrator. A total of 360 college undergraduates (male = 180; female = 180) participated in the study. A main effect for victim response indicated that respondents attributed significantly more responsibility to the child and significantly less responsibility to the perpetrator when the child was described as encouraging the encounter. Children who remained passive were also held significantly more responsible than those who resisted, but there was not a significant difference between resisting and passive conditions in ratings of responsibility to the perpetrator. Several significant interactions affected ratings of responsibility to the perpetrator. The implications of these findings are discussed in terms of the need for educational programs to raise public awareness about the helplessness felt by sexual abuse victims and the needs of male victims in particular. Language: en
    - Gender-related definition: Gender-related abstract, Gender-related title, ML Naïve Bayes

2. "The Relationship Between Sensation Seeking And Delinquency A Longitudinal Analysis" (Category: Sex Differences)

    - First author: Helene Raskin White
    - Publication year: 1985
    - Abstract: A sample of 584 male and female adolescents were studied at two points in time to determine the relationship between self-reported delinquency and sensation seeking. Analyses of variance and covariance were used to test the effect of delinquency status and frequency of minor delinquent activity on sensation seeking at Time 1 and on changes in sensation seeking from Time 1 to Time 2. The results indicated that delinquency and sensation seeking are related in adolescence regardless of sex; those adolescents who are delinquent score significantly higher on the Disinhibition scale. This finding was not obtained for experience seeking. One implication of the findings is that rates of minor delinquency could be lowered by providing high sensation seekers with socially approved opportunities for meeting their sensation-seeking needs.
    - Gender-related definition: Gender-related abstract, ML Naïve Bayes

Sociology

1. "Literature On Pederasty" (Category: Gender Topic)

    - First author: G. Parker Rossman
    - Publication year: 1973
    - Abstract: Abstract As an aspect of research into pederasty, the author suggests that deeper insights into feelings and emotions, and aspects not usually discussed in scientific articles, might be obtained from an examination of biographies and biographical novels, from specifically pederast novels as well as from fiction with pederast incidents. The volume of legal, historical, fictional and psychological material shows that there is much more sexual involvement between men and boys than has been commonly believed.
    - Gender-related definition: Gender-related abstract, ML Naïve Bayes

2. "Feminism And Criminology" (Category: Gender Topic)

    - First author: Kathleen Daly
    - Publication year: 1988
    - Abstract: In this essay we sketch core elements of feminist thought and demonstrate their relevance for criminology. After reviewing the early feminist critiques of the discipline and the empirical emphases of the 1970s and early 1980s, we appraise current issues and debates in three areas: building theories of gender and crime, controlling men's violence toward women, and gender equality in the criminal justice system. We invite our colleagues to reflect on the androcentrism of the discipline and to appreciate the promise of feminist inquiry for rethinking problems of crime and justice.
    - Gender-related definition: Gender-related abstract, ML Naïve Bayes

Geography

1. "Clan Mothers and Godmothers: Tlingit Women and Russian Orthodox Christianity, 1840-1940" (Category: Gender Topic)

    - First author: Sergei Kan
    - Publication year: 1996
    - Abstract: Utilizing archival as well as ethnographic field data, this essay traces the history of the Tlingit women's conversion to Russian Orthodox Christianity. Their initial limited exposure to Orthodoxy, which occurred during the Russian-American Company era and was structured by larger trading, military, and socio-economic relationships between the Russians and the Tlingit, is contrasted with their massive conversion to Orthodoxy in the I880s, two decades after the purchase of Alaska by the United States. While examining the various political, social, and religious aspects of that conversion, the essay also explores the native women's own interpretations of Orthodoxy, which

has remained the favorite denomination of the more culturally conservative segment of the Tlingit community throughout the twentieth century.

- Gender-related definition: Gender-related title, gender-related abstract, ML Naïve Bayes

2. "Plant Virtues Are in the Eyes of the Beholders: A Comparison of Known Palm Uses among Indigenous and Folk Communities of Southwestern Amazonia" (Category: Sex Differences)

   - First author: Marina Thereza Campos
   - Publication year: 2003
   - Abstract: Despite its central importance to tropical forest conservation, the understanding of patterns in traditional resource use still is incipient. To address this deficiency, we compared known palm uses among two indigenous (Yawanawd and Kaxinawa) and two folk (rubber tapper and ribeirinho) communities in Southwestern Amazonia (Acre, Brazil). We conducted one-hundred-and -forty semi-structured "checklist" interviews about palm uses with male and female adults in the four communities. The knowledge of each community about the uses of the 17 palm species common to all communities was compared by testing for significant differences in the mean number of uses cited per informant and by calculating the Jaccard similarity index of known uses of palm species among the four communities. The following three hypotheses were confirmed: 1) the use of palms differs according to the cultural preferences of each community; 2) indigenous communities know significantly more about palm uses than folk communities; and 3) part of the indigenous knowledge was acquired through contact with Amazonian folk communities.
   - Gender-related definition: Gender-related abstract

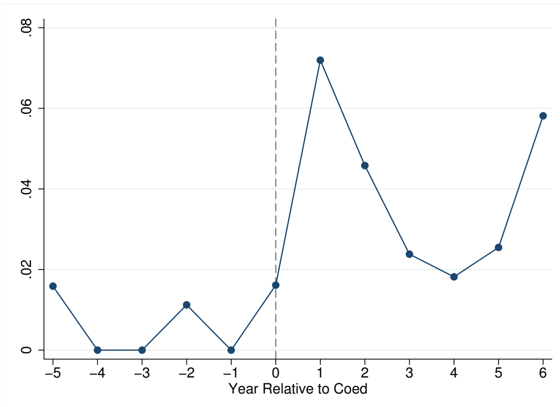
C.5 Incumbent Full-Text Analysis

One potential explanation for why we observe an increase in gender-related research post coeducation is that researchers are more likely to highlight gender differences in the abstracts or titles without corresponding changes in the actual text of articles. For example, it may be the case that researchers have always studied gender differences in the text but now are more likely to highlight these results. Because we only observe titles and abstracts, our baseline analysis cannot speak to this hypothesis. To make progress on this question, we randomly sampled 25% of all incumbent researchers who did not publish any gender-related research prior to coeducation ($-5 \leq \tau \leq -1$) but we observe to have started producing gender-related research after coeducation ($0 \leq \tau \leq 5$). We then systematically collected 1,134 publications written by these researchers over the time span $5 \leq \tau \leq 6$ using a combination of sources: Crossref, Elsevier ScienceDirect database, JAMA, and

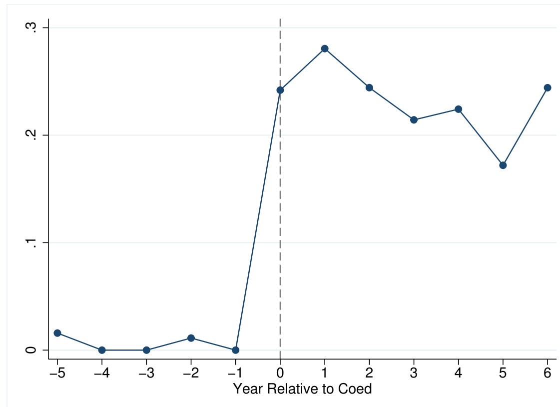
Wiley Online Library. We then digitized and converted the PDF articles into text. In Figure C.7, we use this sample of publications (restricted to those with abstracts in our data) to plot the likelihood of a paper having a gender-related title or abstract. By construction, we do not observe any papers with a gender-related title or abstract prior to coeducation. We then compare how gender-related language usage evolved in the full text of the articles. Around 40% of papers had mentioned a gender keyword in the full text prior to coeducation without any mention of gender in the abstract or title. However, after coeducation, we see a substantive increase in the extensive margin of using any gender-related words in the full text (around 58% of papers). Moreover, we find a sharp increase in the share of words in full texts that are related to gender, suggesting that there was indeed an increase in attention towards gender-related content after coeducation.

Figure C.7: Descriptive Dynamics for Gender-Related Research Among Incumbent Researchers using Full Texts

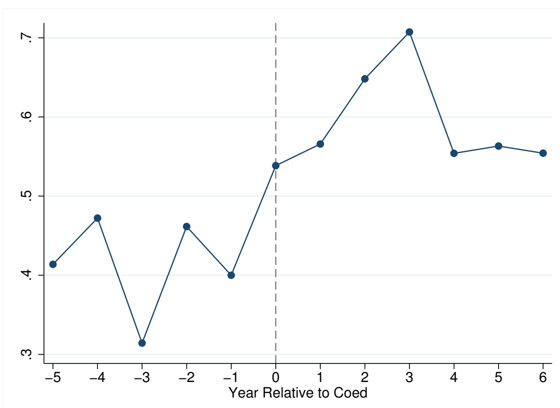
(a) Gender-Related Title



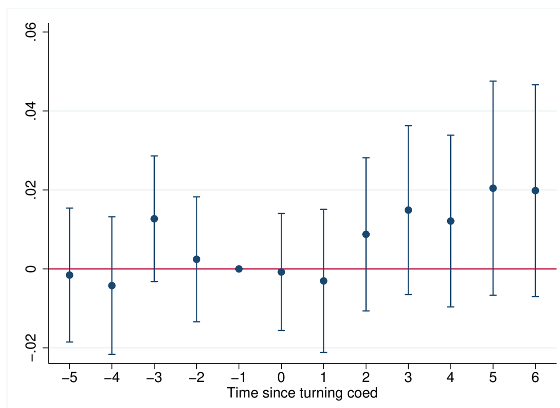
(b) Gender-Related Abstract



(c) Any Gender-Related Word in Full Text



(d) Share of Gender-Related Words in Full Text



Notes: In Figure C.7, we analyze full text publications of a 25% subsample of incumbent researchers who prior to coeducation did not write a gender-related paper (based on titles and abstracts), but wrote one after coeducation. The sample is restricted to 717 publications with abstract information among 156 researchers. Full text articles are collected using a combination of Crossref, Elsevier ScienceDirect, JAMA, and Wiley Online Library.

D Missing Abstracts

In this section, we provide additional evidence on missing abstracts.

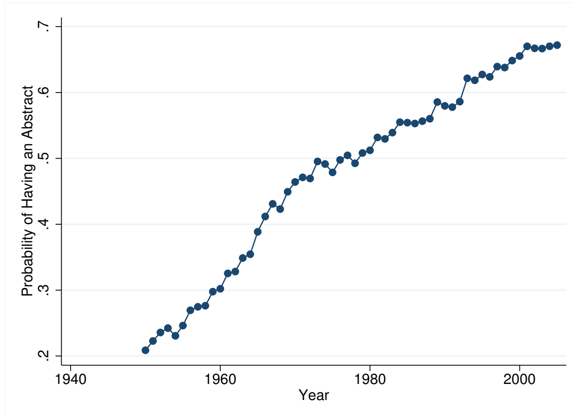
Note that our results are driven by papers with gender-related abstracts and that we observe the abstract for 60% of papers. It is therefore important to understand which papers have abstracts and whether having an abstract is correlated with the reform. Potential confounders could be: (i) the availability or length of abstracts are correlated with the time of coeducation; (ii) after the reform, papers with abstracts may become more prevalent in fields that are more likely to have female-related words; (iii) after the reform, papers become longer, which could also increase the likelihood of including female-related words.

First, we examine the factors that influence the availability of abstracts. Appendix Figure D.1 shows that the abstract availability has increased over time. Appendix Figure D.2 illustrates that the fields with the highest abstract availability are biology, medicine, and business, while sociology, philosophy, and art display the lowest share of abstracts.

Second, Appendix Table D.1 reports the TWFE estimates using total number of papers with abstract, the average abstract length, and the average title length as dependent variables. The results suggest that these outcomes do not change as a result of coeducation. These findings provide supportive evidence that the availability of abstracts is not the primary driver of our results.

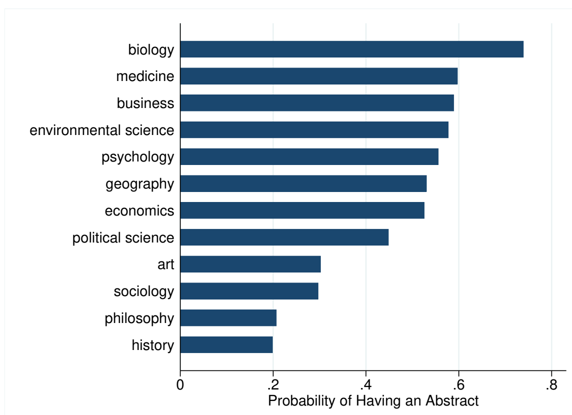
Finally, we replicate our main results on a restricted sample that includes only papers with abstracts. Appendix Figure D.3 show that our results hold when we exclude papers that solely contain title information.

Figure D.1: Availability of Abstracts, 1950–2005



Notes: The figure plots the probability of a paper having an abstract by year of publication in the sample of 76 universities that switched to coeducation between 1960 and 1990. The sample is restricted to papers published in one of the 12 fields in social sciences, humanities, medicine, environmental science, or biology.

Figure D.2: Availability of Abstracts by Field, 1950-2005



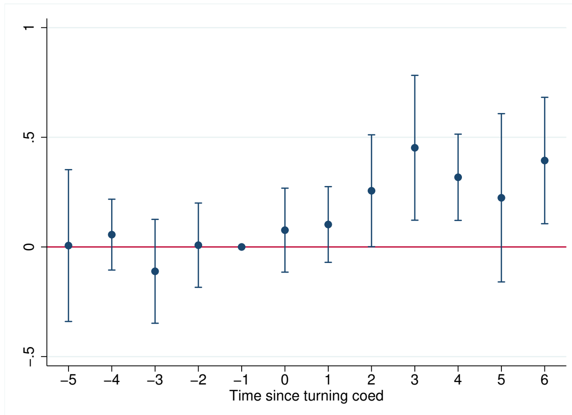
Notes: The figure plots the probability of a paper having an abstract by field in the sample of 76 universities that switched to coeducation between 1960 and 1990. The sample is restricted to papers published between 1950 and 2005.

Table D.1: Effects of Turning Coed on Length and Availability of Abstracts and Titles

	(1) Total Number with Abstracts	(2) Average Abstract Length	(3) Average Title Length
Years -5 to -2	-0.046	0.098	-0.035
	(0.075)	(1.215)	(0.200)
Years 0 to 2	0.077	-1.788	-0.136
	(0.135)	(2.411)	(0.279)
Years 3 to 6	0.176	-2.501	-0.091
	(0.236)	(3.477)	(0.336)
Baseline Mean	5.14	44.07	11.28
Observations	95886	95886	95886
Estimator	OLS	OLS	OLS

Notes: This table reports the average effects from estimating equation (1). The outcome variable is the total number of papers with an abstract. Effect at event time $\tau = -1$ is normalized to 0. Baseline mean is the mean of the outcome variable at $\tau = -1$. The coefficient for Years -5 to -2 is the pre-period average of the coefficients for $\tau = -5$ to $\tau = -2$. The coefficient for Years 0 to 2 is the post-period average of the coefficients for $\tau = 0$, $\tau = 1$, and $\tau = 2$. Similarly, the coefficient for Years 3 to 6 is the average of the coefficients for $\tau = 3$ to $\tau = 6$. The regression includes school-subfield fixed effects, year fixed effects, and discipline-by-year fixed effects. The specification is estimated using a conditional fixed-effect Poisson model. School-subfield groups without variation or less than two observations are dropped from the respective sample in Poisson models. Standard errors in parentheses are clustered at the school level.

Figure D.3: Effect of Turning Coed on Number of Gender-Related Publications (Restricted to Only Papers with Abstracts)



Notes: Figure D.3 plots the event time coefficients and their 95% confidence intervals from estimating equation (1) for total number of gender-related research publications restricted to the sample of papers with both information on titles and abstracts. The specification is estimated using a conditional fixed effects Poisson model. We also control for total publications, total publications with an abstract, and the average abstract length at the school-subfield. In the specification, we include school-subfield fixed effects, year fixed effects, and discipline-by-year fixed effects.

E Student Activism: Evidence from Historical College Student Newspapers

One potential concern is that the timing of coeducation is correlated with changes in campus culture that can affect faculty research prior to coeducation. To shed light on this, we construct direct measures of student activism during the period from 1960 to 1980, using student newspaper archives. To accomplish this, we first identified digital archives or repositories that housed historical student newspapers for each university in the study. We present the list of universities with searchable digital repositories of their college newspapers in Appendix Table E.1. Next, we conducted keyword searches within these databases, specifically looking for the terms: "womens rights", "civil rights", and "war protest" with each term searched individually. Subsequently, we recorded the number of search results per year for each university between 1960 and 1980. This systematic process allowed us to quantify student activism during this period based on the content of the student newspapers. However, it's worth noting that this search might also capture broader cultural or societal phenomena outside the university, as most student newspapers in our sample frequently reported on major news stories occurring off-campus, including events at other universities.

Appendix Figure E.1 shows the time series for the mentions of key activism themes over the time period across the universities in our sample. In line with historical events, mentions of civil rights spike around the Civil Rights Act of 1964 and remain elevated during the period of the Civil Rights Movement. Mentions of women's rights were relatively stable throughout the period, with a slight increase towards the end of the 1970s. By contrast, we see mentions of war protest peaked in the late 60s and early 70s.

To investigate the potential relationship between the timing of coeducation and mentions of the three key activism themes, while adjusting for the overall yearly trends, we plot the TWFE estimates in Appendix Figure E.2 from running our baseline specification using the student activism measures as outcome variables. The lack of obvious pre-trends suggests that timing of coeducation is unlikely to be correlated with student activism on campus. To further bolster this claim, Appendix Figure E.3 demonstrates that our estimates for the total number of gender-related papers remain largely unchanged when we control for these direct measures of student activism. Specifically, we estimate equation (1) with three additional control variables: number of student newspaper mentions of "womens rights", "civil rights", and "war protest". These estimates are somewhat noisier because we only have student activism measures for 30 universities, compared to the full sample of 76 universities. Consequently, these estimates are based on a significantly smaller sample.

Table E.1: List of Universities with Student Newspapers in Searchable Digital Repositories from 1960–1980

No.	School
1	Boston College
2	Bowdoin College
3	Brown University
4	Case Western Reserve University
5	Colgate University
6	College Of Saint Thomas
7	Columbia University In The City Of New York
8	Fordham University
9	Georgetown University
10	Kenyon College
11	Lafayette College
12	Loyola College
13	Norwich University
14	Princeton University
15	Providence College
16	Randolph-Macon College
17	Rutgers University New Brunswick
18	Saint Joseph's University
19	Santa Clara University
20	St Marys University
21	Texas A&M University
22	Trinity College
23	Union College
24	University Of Notre Dame
25	University Of San Francisco
26	University Of Scranton
27	University Of The South
28	Villanova University
29	Xavier University
30	Yale University

Figure E.1: Trends in Mentions for Key Activism Themes in College Student Newspapers (1960-1980)

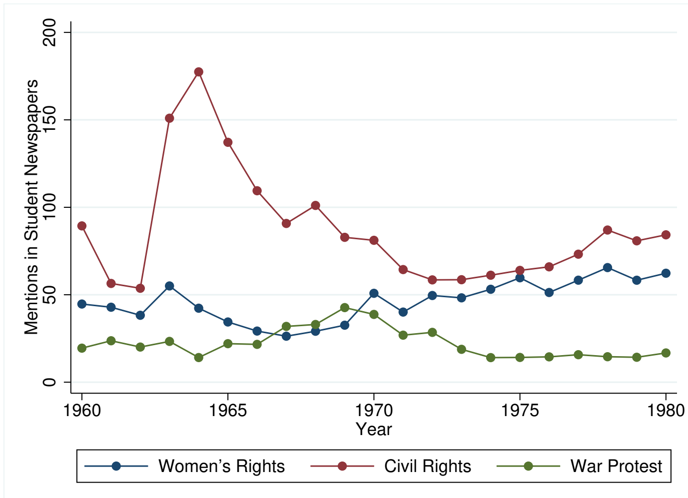
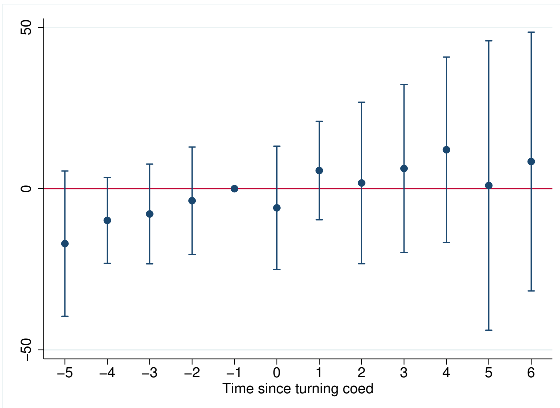
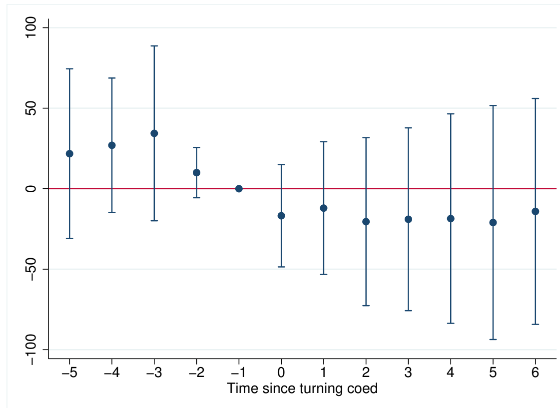


Figure E.2: Effect of Turning Coed on Mentions for Key Activism Themes in College Student Newspapers

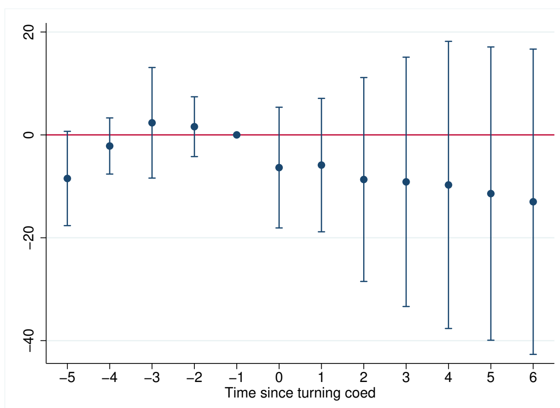
(a) Mentions of "Women's Rights"



(b) Mentions of "Civil Rights"

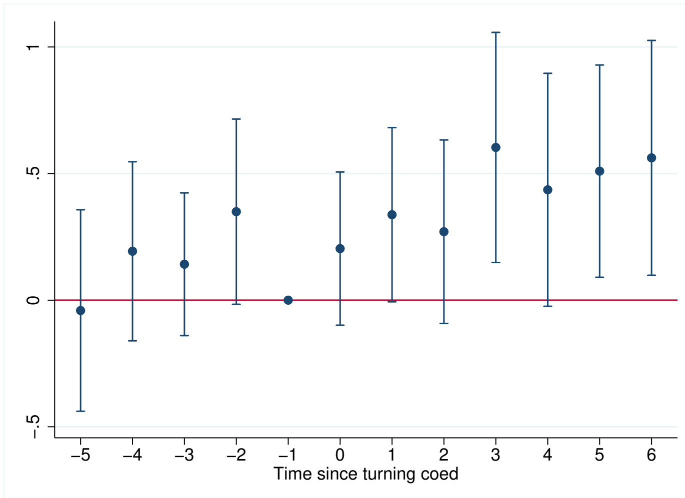


(c) Mentions of "War Protest"



Notes: These figure plot the event time coefficients and their 95% confidence intervals from estimating equation (1) for total mentions of (a) "women's rights", (b) "civil rights", and (c) "war protest". The specification is estimated using OLS. In the specification, we include school fixed effects and year fixed effects. We cluster at the school level.

Figure E.3: Effect of Turning Coed on Gender-Related Research — Controlling for Measures of Student Activism



Note: Notes: This figure plots the event time coefficients and their 95% confidence intervals from estimating equation (1) for total number of gender-related research while controlling for measures of student activism: total mentions of "women's rights", "civil rights" and "war protest". The specification is estimated using conditional fixed effects Poisson models. In the specification, we include school-subfield fixed effects, year fixed effects, and discipline-by-year fixed effects. We also control for total publications, total publications with an abstract, and the average abstract length at the school-subfield. We cluster at the school level.

F Issues Related to TWFE Models

F.1 Test for Influence of Negative Weights (de Chaisemartin and D'Haultfoeuille 2020)

We implement a test for the potential influence of negative weights proposed by de Chaisemartin and D'Haultfoeuille (2020). We use the Stata package provided by de Chaisemartin and D'Haultfoeuille (2020), "twowayfeweights." We find that at the school level the total sum of the negative weights is equal to only -.11. At the school-subfield level, the sum of the negative weights is -.28. At the school level, 554/1521 ATTs are negative while at the school-subfield level, 21988/67835 ATTs are negative. Because all weights must sum to one, these results indicate that the negative weights may not be especially influential in this setting.

F.2 Sensitivity Analysis to Violations of Parallel Trends Assumption

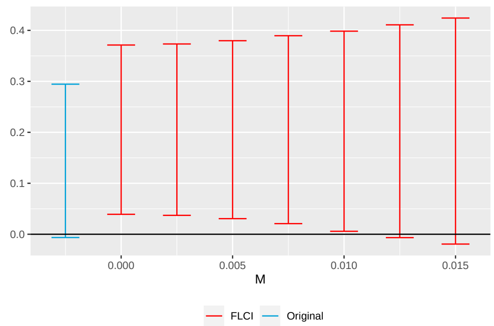
We implement the analysis recommended by Rambachan and Roth (2023) to test the sensitivity of our estimates to potential violations of the parallel trends assumption. Because we are worried about confounding factors from secular trends in gender norms and attitudes towards research about women, which we expect to evolve smoothly over time, we follow the advice outlined by Rambachan and Roth (2023) in Section 2.4.3. of their paper to impose a smoothness restriction. The parameter M in this case "governs the amount by which the slope can change between consecutive periods, and thus bounds the discrete analogue of the second derivative" (p. 2564). $M = 0$ is the special case where the difference in trends is exactly linear. We show sensitivity of our results to this restriction

Appendix Figure F.1 compares the the average effect for $0 \leq \tau \leq 2$ and $3 \leq \tau \leq 6$ against those obtained after allowing for per-period deviations from a linear trend up to an arbitrary amount, M. Appendix Figure F.2 presents the analogous version for the author-level analysis described in Section 6.3.2 where we restricted the sample to incumbent researchers and included researcher fixed effects. Appendix Figures F.3 and F.4 show the results for male and female researchers, respectively. From the figures, we can infer that the breakdown value for the baseline set of results is 0.010 (Figure F.1). This means we can reject a null effect if the linear extrapolation across consecutive periods in the pre-period is off by less than 0.01. Since we are utilizing a Poisson model, this implies a change in the slope of the growth rate of $e^{(0.01)} - 1$, or 1%, between consecutive periods.

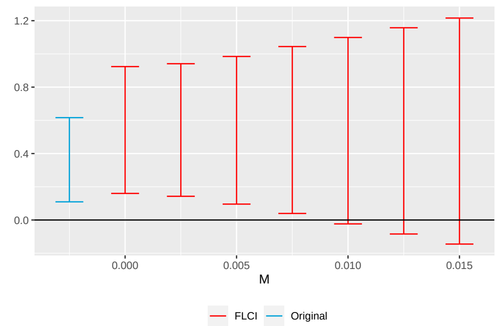
The breakdown value for incumbent researchers (both overall and for male researchers) is approximately 0.015 for the average effect in $3 \leq \tau \leq 6$. In contrast, the breakdown value for female incumbent researchers is 0. As a result, we cannot reject a null effect for female incumbent researchers.

Figure F.1: Sensitivity Analysis for Baseline Specification

(a) $0 \leq \tau \leq 2$



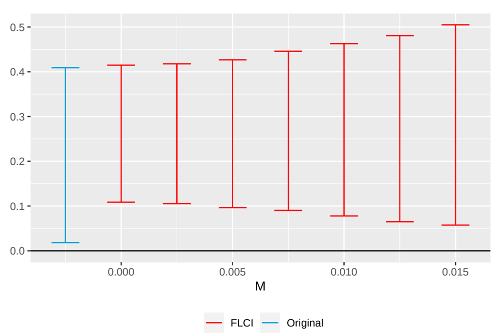
(b) $3 \leq \tau \leq 6$



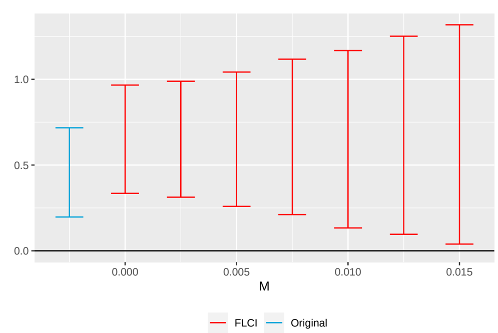
Notes: Figure F.1 shows the sensitivity analysis of estimates for total gender-related papers for the average effect for $0 \leq \tau \leq 2$ and $3 \leq \tau \leq 6$. "Original" is the 95% confidence intervals from our baseline estimates using the Poisson model. "FLCI" are the 95% confidence intervals when allowing for per-period violations of parallel trends of up to M, where M is the largest allowable change in slope of an underlying linear trend between two consecutive periods. Standard errors are clustered at the school level. Plots are generated using the "HonestDID" package provided by Rambachan and Roth (2023).

Figure F.2: Sensitivity Analysis: Incumbent Researchers

(a) $0 \leq \tau \leq 2$



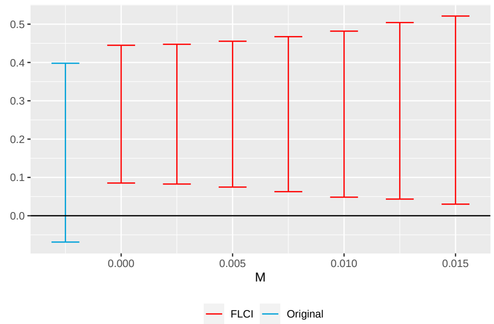
(b) $3 \leq \tau \leq 6$



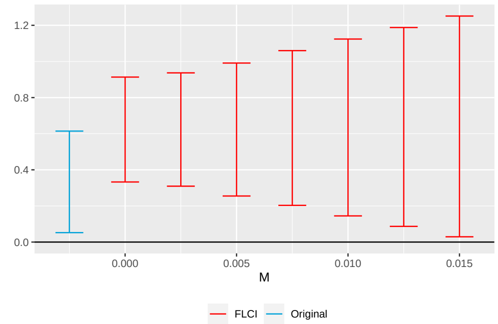
Notes: Figure F.2 shows the sensitivity analysis of estimates for total gender-related papers by incumbent researchers for the average effect for $0 \leq \tau \leq 2$ and $3 \leq \tau \leq 6$. "Original" is the 95% confidence intervals from our baseline estimates using the linear model. "FLCI" are the 95% confidence intervals when allowing for per-period violations of parallel trends of up to M, where M is the largest allowable change in slope of an underlying linear trend between two consecutive periods. Standard errors are clustered at the school level. Plots are generated using the "HonestDID" package provided by Rambachan and Roth (2023).

Figure F.3: Sensitivity Analysis: Incumbent Researchers - Males

(a) $0 \leq \tau \leq 2$



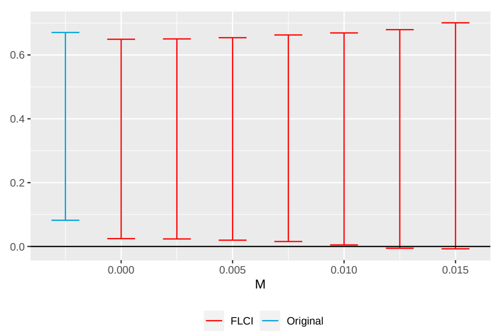
(b) $3 \leq \tau \leq 6$



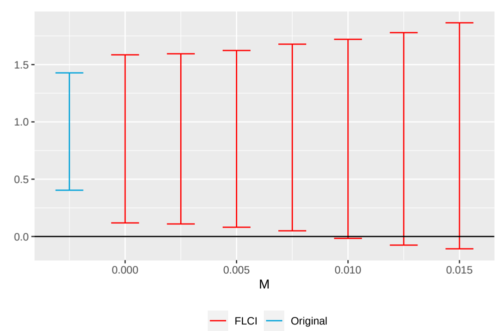
Notes: Figure F.3 shows the sensitivity analysis of estimates for total gender-related papers by male incumbent researchers for the average effect for $0 \leq \tau \leq 2$ and $3 \leq \tau \leq 6$. "Original" is the 95% confidence intervals from our baseline estimates using the linear model. "FLCI" are the 95% confidence intervals when allowing for per-period violations of parallel trends of up to M, where M is the largest allowable change in slope of an underlying linear trend between two consecutive periods. Standard errors are clustered at the school level. Plots are generated using the "HonestDID" package provided by Rambachan and Roth (2023).

Figure F.4: Sensitivity Analysis: Incumbent Researchers - Females

(a) $0 \leq \tau \leq 2$



(b) $3 \leq \tau \leq 6$



Notes: Figure F.4 shows the sensitivity analysis of estimates for total gender-related papers by female incumbent researchers for the average effect for $0 \leq \tau \leq 2$ and $3 \leq \tau \leq 6$. "Original" is the 95% confidence intervals from our baseline estimates using the linear model. "FLCI" are the 95% confidence intervals when allowing for per-period violations of parallel trends of up to M, where M is the largest allowable change in slope of an underlying linear trend between two consecutive periods. Standard errors are clustered at the school level. Plots are generated using the "HonestDID" package provided by Rambachan and Roth (2023).

F.3 Heterogeneous Treatment Effects in Poisson Models: Monte-Carlo Simulations

In this section, we investigate whether heterogeneous treatment effects can lead to biased estimates of the true relative time coefficients in a conditional fixed effects Poisson model. To do so, we construct a simulated panel dataset with one outcome variable that comes from a Poisson process and one with from a linear process under the assumption of homoskedastic, serially uncorrelated error terms. We assume heterogeneous treatment effects that depend on the calendar time, which implies that treatment effects would also depend on cohort, violating our Assumption 3.

Following the procedure described in Borusyak et al. (2021), we create a panel of $I = 300$ units, observed for $\tau = 15$ periods each. In this section, we will denote calendar time as t, the treatment date as E_i, and relative time as $K_{it} = t - Ei$. Total number of observations is 4,500. We uniformly assign treatment dates, for each unit i, between $t = 10$ and $\tau = 16$. Units with $E_i = 16$ are never treated in the sample. Treatment effects depend on calendar time and assumed to be $\tau_{it} = t - 12.5$. We assume that Assumptions 1 (parallel trends) and 2 (no anticipation effects) hold, such that the treatment effects for the pre-periods are zero ($\tau_{it} = 0$ for all $t < E_i$). We model the linear outcome Y as the following:

$$Y_{it} = \alpha_i + \beta_t + \sum_{h \neq -1} \tau_h 1[K_{it} = h] + \epsilon_{it} \tag{A1}$$

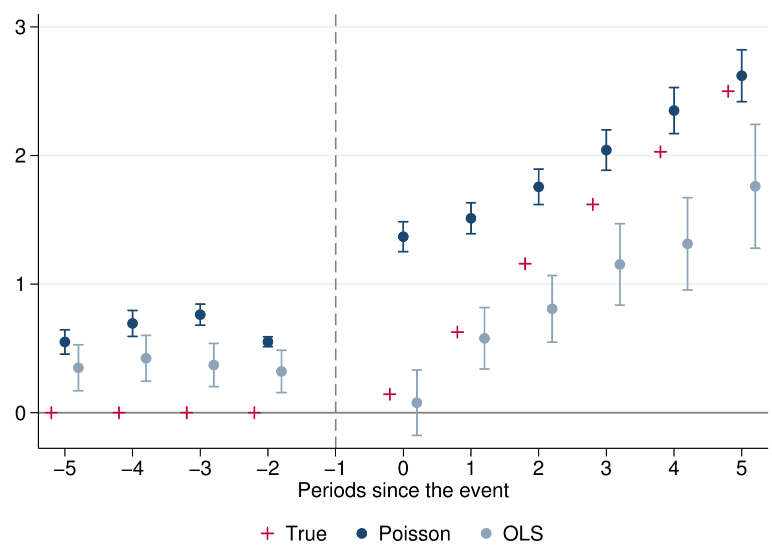
where α_i is the unit fixed effect and β_t is the time fixed effect. Analogously, the Poisson outcome Y^p is modeled as:

$$\begin{aligned} \mu_{it} &= \exp(\alpha_i + \beta_t + \sum_{h \neq -1} \tau_h 1[K_{it} = h]) \\ Y^p_{it} &\sim Poisson(\mu_{it}) \end{aligned} \tag{A2}$$

In our simulation, we set the fixed effects to $\alpha_i = \ln(i)$, where i is the unit number, and $\beta_t = 0.3t$. We assume homoskedastic errors and mutually independent errors, where $\epsilon_{it} \sim N(0, 1)$. "Poisson errors" are drawn from using a Poisson distribution with mean μ_{it} as described in (A2). The true ATTs τ_h is given by the mean of τ_{it} observed in the data at each relative time horizon. Note by construction, if unbiased, the estimated parameters from the OLS and Poisson models should be the same.

In Appendix Figure F.5, we present the results of the simulation using estimates from the simulated panel. The figure highlights that both the linear model and the Poisson model are biased in the presence of heterogeneous treatment effects. Both models would indicate violations of the parallel trends and no anticipation assumptions in the pre-period. This suggests that the problems shown for the two-way fixed effects model can generalize to the Poisson case.

Figure F.5: Simulated Event Study Coefficients with Heterogeneous Treatment Effects



Notes: This figure plots simulated event study coefficients with heterogeneous treatment effects and their 95% confidence intervals. "True" represents the actual relative-time treatment effect. The figure highlights that both the linear model and the Poisson model can be biased in the presence of heterogeneous treatment effects.

F.4 Alternative Estimators

F.4.1 Interaction-Weighted Estimator

We provide evidence for the validity of our estimates by using an alternative estimator, "interaction-weighted estimator," proposed by Sun and Abraham (2020) that is robust to heterogeneous treatment effects. The interaction-weighted estimator is a regression-based estimator that provides a weighted average of the treatment effects in a way that's more interpretable than the estimates from a standard two-way fixed effects estimator (Sun and Abraham, 2020). Specifically, each event time coefficient from this estimation is a weighted average of the cohort-specific ATT, where the weights are given by the share of cohorts that experienced at least t periods relative to treatment and normalized by the total event time periods we are estimating.

The interaction-weighted estimator is a regression-based estimator that provides a weighted average of the treatment effects in a way that's more interpretable than the estimates from a standard two-way fixed effects estimator (Sun and Abraham, 2020). Specifically, each event time coefficient from this estimation is a weighted average of the cohort-specific ATT, where the weights are given by the share of cohorts that experienced at least t periods relative to treatment and normalized by the total event time periods we are estimating.

Formally, the event time coefficient for a given relative time period, $t \in g$ is given by

$$\nu_g = \frac{1}{|g|} \sum_{t \in g} \sum_{e} CATT_{e,t} Pr\{E_s = e | E_i \in [-t, T-t]\}$$

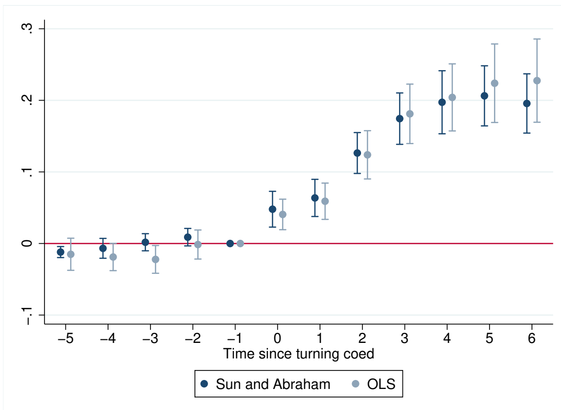
where $CATT_{e,t}$ is the cohort ATT, defined as $CATT_{e,t} = E[Y_{s,e+t} - Y(0)_{s,e+t} | E_s = e]$. E_s is the year of turning coed for a specific school s. t is the relative year. $Y(0)$ is the potential outcome of school s if it were not treated. Note that under the treatment effects homogeneity assumption, the cohort-specific ATT are the same for all cohorts so the estimates would be very similar to those estimated in a two-way fixed effects model.

The interaction-weighted estimator is implemented in three steps. First, cohort ATTs are computed by estimating a two-way fixed effects model that interacts with the event time dummies with cohort indicators. Because there are no never-treated units, we omit the latest-treated cohort (i.e., those that switched to coeducation in 1985) and estimate this model using observations prior to 1985. Second, the weights, $Pr\{E_s = e|E_i \in [-t, T-t]\}$, are estimated by using the sample shares in the data. Finally, the interaction-weighted estimator is formed. Sun and Abraham (2020) show in their paper that this estimator is consistent under the parallel trends and no anticipation assumptions.

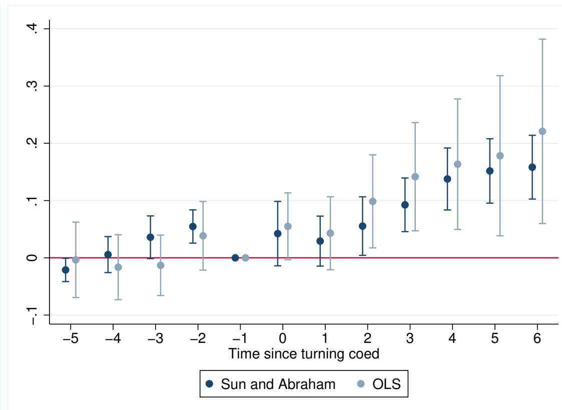
Appendix Figure F.6 compare the coefficients estimated for the outcomes female share of bachelor's degrees awarded, log bachelor's degrees awarded and total gender-related papers. Note that we show the Poisson and OLS estimates for the total number of gender-related papers. For all outcomes, we find a very similar and consistent pattern with the results using the Sun and Abraham (2020) method. The consistent results across the different outcomes provide support for our identification strategy.

Figure F.6: Robustness to Heterogeneous Treatment Effects: Interaction-Weighted Estimation (Sun and Abraham, 2020)

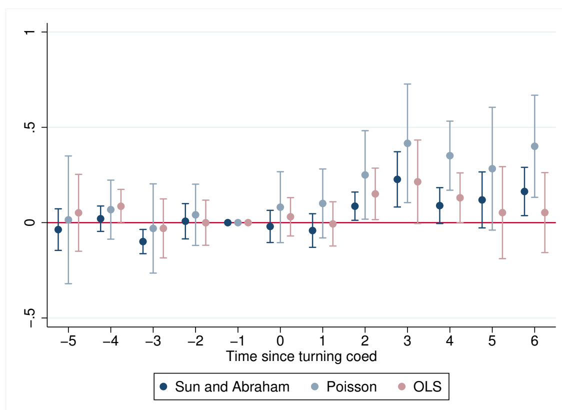
(a) Female Bachelor's Degrees Share



(b) Log Bachelor's Degrees Awarded



(c) Total Gender-Related Papers



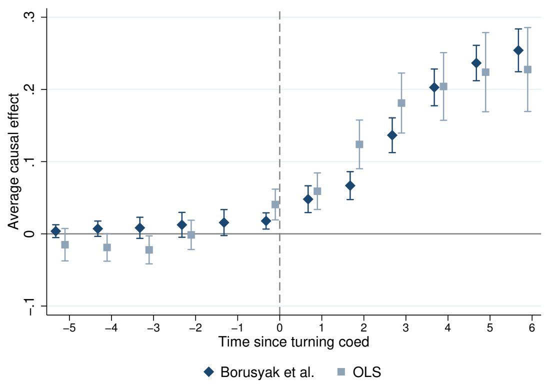
Notes: These figures plot the event time coefficients and their 95% confidence intervals from estimating equation (1) using alternative estimation strategies. The outcome variables are female bachelor's degrees share and log bachelor's degrees awarded. "Sun and Abraham" refers to using the interaction-weighted (IW) estimator proposed by Sun and Abraham (2020). Figures F.6a and F.6b compares the baseline estimates using OLS with the IW estimator. These are estimated at the school level and include school fixed effects, and year fixed effects. Figure F.6c compares the baseline estimates for total gender-related papers estimated using a conditional fixed effects Poisson model with OLS and the IW estimator. We bin together $\tau \leq -15$ and $\tau \geq 15$ in order to estimate the standard errors using the IW estimator due to few observations in the distant relative time periods. Note that for the IW estimator, we use only observations up to 1985, when the last school switched to coeducation and use the last school as the control group. This estimation is at the school-subfield level and we include school-subfield fixed effects, year fixed effects, and discipline-by-year fixed effects. We cluster at the school level.

F.4.2 Borusyak et al. (2021) Estimator

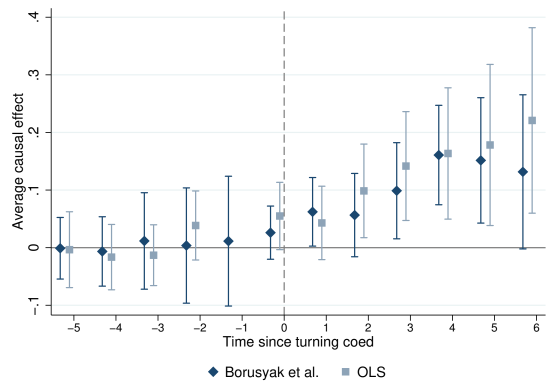
In this section, we provide robustness of our results to using the alternative estimator proposed by Borusyak et al. (2021).

Figure F.7: Robustness to Heterogeneous Treatment Effects: (Borusyak et al., 2021) Estimator

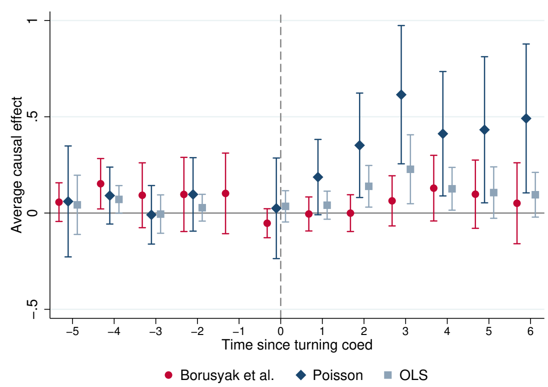
(a) Female Bachelor's Degrees Share



(b) Log Bachelor's Degrees Awarded



(c) Total Gender-Related Papers



Notes: These figures plot the event time coefficients and their 95% confidence intervals from estimating equation (1) using alternative estimation strategies. The outcome variables are female bachelor's degrees share, log bachelor's degrees awarded and total gender-related papers. Figures F.7a and F.7b compare the baseline estimates using OLS with the Borusyak et al. (2021) estimator. These are estimated at the school level and include school fixed effects, and year fixed effects. Figure F.7c compares the baseline estimates for total gender-related papers estimated using a conditional fixed effects Poisson model with the Borusyak et al. (2021) estimator. For this outcome, as opposed to the main specification, we restrict to $-10 \leq \tau \leq 10$ because the Borusyak et al. (2021) compares post-treatment outcomes to the average of all pre-treatment outcomes and our sample is not balanced when we use the full sample. This estimation is at the school-subfield level and we include school-subfield fixed effects, year fixed effects, and discipline-by-year fixed effects. We cluster at the school level for all specifications.

F.5 Using Alternative Control Universities

To address the concern that event study estimates are more likely to be biased without a pure control group, we show that our results are robust to using four alternative groups of universities as a pure control group. In Figures 4c, 4d, 4e, and 4f, we plot in dark blue the baseline estimates using the main specification and in light blue the alternative estimates when we use different groups of schools as a control group.

First, we use universities that opened as coeducational prior to 1940 as an additional control group (Figure 4c). Because these schools never switched, we assigned these universities to event time -1 so that they will contribute to the estimate of the year fixed effects, following the practices recommended by (Goodman-Bacon, 2019).

Second, we implement Propensity Score Matching (PSM) to identify for each treated university, the nearest neighbor among all schools that opened as coed prior to 1940 based on Carnegie Classification, Barron's 2009 Competitiveness Ranking, region, religion, log total publications and log total citations. Total publications and total citations are cumulative totals for the university as of 2018. We perform 1-to-1 matching without replacement in descending order and include other control universities with identical (tied) pscores. The logit estimation of the propensity score is reported in Appendix Table F.1. All matched control universities are assigned to event time -1 for all periods. We then estimate the baseline equation using the sample of matched treated and control universities. The estimates are plotted in Figure 4d.

Finally, we use universities that remain either male-only (see Appendix Table F.2) or female-only (Appendix Table F.3 as an additional control group. We assign the single-sex universities to event time -1. The estimates are plotted in Figures 4e and 4f.

Across all sets of alternative control universities, we find very similar patterns in the effect of coeducation on gender-related research as in the baseline specification.

Table F.1: Propensity Score Estimation

	(1) Treated
Carnegie Classification	
Doctoral or Research Universities	-2.651
	(1.615)
Masters Colleges or Universities	-1.553
	(1.630)
Baccalaureate Colleges	0.234
	(1.358)
Barron's 2009 Ranking	
Most Competitive	3.149
	(0.952)
Highly Competitive	2.314
	(0.906)
Very Competitive	-0.330
	(1.029)
Region	
Northeast	3.314
	(0.906)
Midwest	0.720
	(0.945)
South	2.616
	(0.918)
Religion	
Non-sectarian	0.531
	(0.655)
Catholic	8.149
	(1.400)
Log Total Publications	-0.0608
	(0.920)
Log Total Citations	0.445
	(0.748)
Constant	-9.666
	(2.489)
Observations	315

Notes: This table reports the logit estimates from regressing a a treated dummy on school characteristics. Untreated universities are universities that opened as coeducational before 1940. Total publications and total citations are cumulative totals for the university in the MAG database as of 2018.

Table F.2: List of Male-Only Schools that Never Turned Coed

	School
1	Hampden-Sydney College
2	Morehouse College
3	Wabash College

Notes: This table provides the list of male-only schools that never turned coed as of March 2023. Data from the Coeducation College Database was compiled and generously provided by Goldin and Katz (2011). Compared to the database, University of Arkansas at Little Rock was not included in our analysis because it is now a coeducational university.

Table F.3: List of Female-Only Schools that Never Turned Coed

	School
1	Agnes Scott College
2	Alverno College
3	Barnard College
4	Brenau College
5	Bryn Mawr College
6	Cedar Crest College
7	College Of Saint Catherine-Saint Catherine Campus
8	Hollins University
9	Meredith College
10	Mills College
11	Mount Holyoke College
12	Mount Mary College
13	Saint Mary's College
14	Salem College
15	Scripps College
16	Simmons College
17	Smith College
18	Spelman College
19	Stephens College
20	Sweet Briar College
21	Trinity College
22	Wellesley College
23	Wesleyan College

Notes: This table provides the list of female-only schools that never turned coed as of March 2023. Data from the Coeducation College Database was compiled and generously provided by Goldin and Katz (2011). Compared to the database, the following schools are not included in our analysis because they have switched to coeducational: Mary Baldwin College, Caldwell University, Hood College, Russell Sage College, Marymount Manhattan College, Benedictine College, Carlow University, Bennett College, Texas Wesleyan University, Texas Woman's University, Molloy College.

G Effects of Turning Coed on Student Body: Heterogeneity by Major

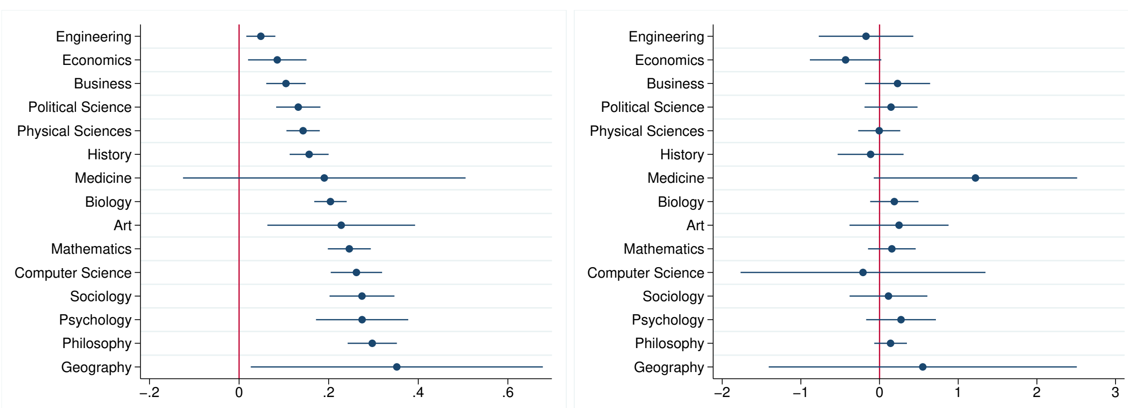
Because female students have different preferences over different fields of study, the arrival of female students also had implications on the gender composition and student body size of departments. In Appendix Table G.1, we report the average effects for female share of bachelor's degrees awarded from estimating equation (1) for each field of study separately. The corresponding causal effects for years 3 to 6 are plotted in Appendix Figure G.1a. We report the analogous results for log bachelor's degrees awarded by field in Appendix Table G.2 and Appendix Figure G.1b.

We find an increase in the share of female students across all fields. The fields, geography, philosophy, psychology and sociology experienced the largest increase in gender diversity among its students.[78] By contrast, we do not find a substantial increase in department sizes. This suggests that some male students may have shifted out of the departments with an increase in female share of bachelor's degrees. In a recent paper, Calkins et al. (2020) show that women in female-only universities that transitioned to coeducation were more likely to shift out of traditionally male-dominated majors. It is beyond the scope of this paper to explore how the arrival of female students influenced the major choices of the male students, but it would be an interesting avenue to explore for future research.

Figure G.1: Effect of Turning Coed on Bachelor's Degrees Awarded by Field

(a) Female Share of Bachelor's Degrees

(b) Log Bachelor's Degrees Awarded



Notes: These figures plot average effects for years 3 to 6 and their 95% confidence intervals from estimating a modified version of equation (1) in which we interact the event time dummies with a categorical variable for each field of study. The outcome variables are the female share of bachelor's degrees awarded and log bachelor's degrees awarded. All specifications are estimated using OLS. In the specifications, we include school fixed effects and year fixed effects. We cluster at the school level.

[78]Interestingly, we also observe a significant increase in computer science. During this period, women's share of computer science degrees was rising rapidly. See `https://www.npr.org/sections/money/2014/10/21/357629765/when-women-stopped-coding`.

Table G.1: Effect of Turning Coed on Female Bachelor's Degrees Share by Field

	Years 0-2	Years 3-6
Physical Sciences	0.041	0.143
	(0.012)	(0.019)
Engineering	0.006	0.049
	(0.006)	(0.017)
Philosophy	0.116	0.297
	(0.016)	(0.028)
Art	0.101	0.228
	(0.059)	(0.084)
Sociology	0.106	0.274
	(0.022)	(0.037)
Business	0.020	0.105
	(0.009)	(0.022)
Psychology	0.095	0.275
	(0.031)	(0.053)
Economics	0.015	0.085
	(0.019)	(0.033)
Political Science	0.041	0.132
	(0.015)	(0.025)
Geography	0.164	0.352
	(0.102)	(0.166)
Mathematics	0.087	0.246
	(0.017)	(0.024)
Computer Science	0.124	0.262
	(0.034)	(0.029)
Medicine	0.017	0.190
	(0.089)	(0.161)
Biology	0.073	0.204
	(0.011)	(0.018)
History	0.054	0.156
	(0.015)	(0.022)

Notes: This table reports the implied average effects for each field of study from estimating a modified version of equation (1) in which we interacted each event time dummy with a categorical variable for the field. The outcome variable is the share of female bachelor's degrees awarded. The estimates for Years 0 to 2 is the post-period average of the coefficients for $\tau = 0$, $\tau = 1$, and $\tau = 2$. Similarly, the coefficient for Years 3 to 6 is the average of the coefficients for $\tau = 3$ to $\tau = 6$. The specification is estimated using OLS and includes school fixed effects and year fixed effects. Standard errors in parentheses are clustered at the school level.

Table G.2: Effect of Turning Coed on Log Bachelor's Degrees Awarded by Field

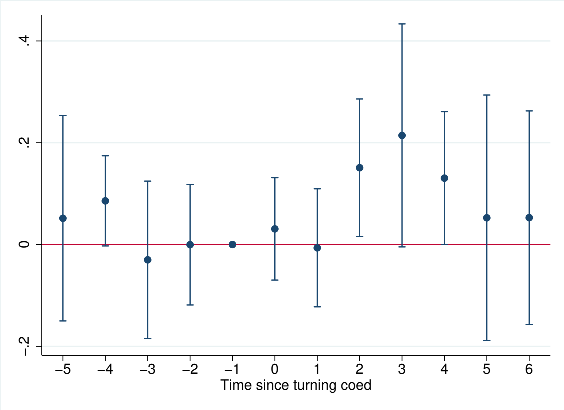
	Years 0-2	Years 3-6
Physical Sciences	-0.054	-0.004
	(0.095)	(0.136)
Engineering	-0.068	-0.172
	(0.152)	(0.307)
Philosophy	0.050	0.140
	(0.056)	(0.106)
Art	0.154	0.248
	(0.184)	(0.321)
Sociology	-0.030	0.114
	(0.136)	(0.252)
Business	0.060	0.229
	(0.100)	(0.211)
Psychology	0.106	0.273
	(0.117)	(0.226)
Economics	-0.267	-0.431
	(0.109)	(0.232)
Political Science	0.092	0.146
	(0.096)	(0.172)
Geography	0.232	0.550
	(0.621)	(0.999)
Mathematics	0.106	0.157
	(0.092)	(0.155)
Computer Science	0.204	-0.210
	(0.626)	(0.794)
Medicine	0.669	1.219
	(0.355)	(0.660)
Biology	0.045	0.188
	(0.075)	(0.157)
History	-0.059	-0.113
	(0.102)	(0.214)

Notes: This table reports the implied average effects for each field of study from estimating a modified version of equation (1) in which we interacted each event time dummy with a categorical variable for the field. The outcome variable is log total bachelor's degrees awarded. The estimates for Years 0 to 2 is the post-period average of the coefficients for $\tau = 0$, $\tau = 1$, and $\tau = 2$. Similarly, the coefficient for Years 3 to 6 is the average of the coefficients for $\tau = 3$ to $\tau = 6$. The specification is estimated using OLS and includes school fixed effects and year fixed effects. Standard errors in parentheses are clustered at the school level.

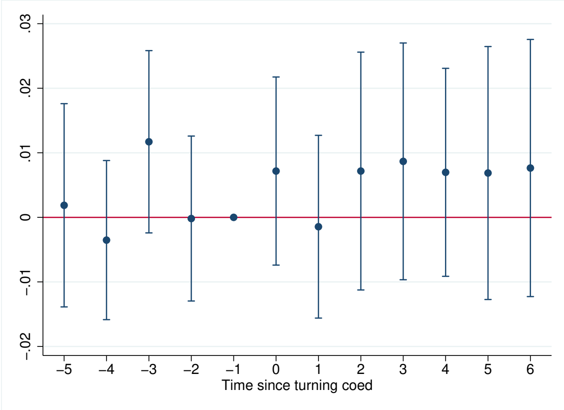
H OLS and Negative Binomial

Figure H.1: Effect of Turning Coed on Gender-Related Publications (OLS)

(a) Number of Gender-Related Papers

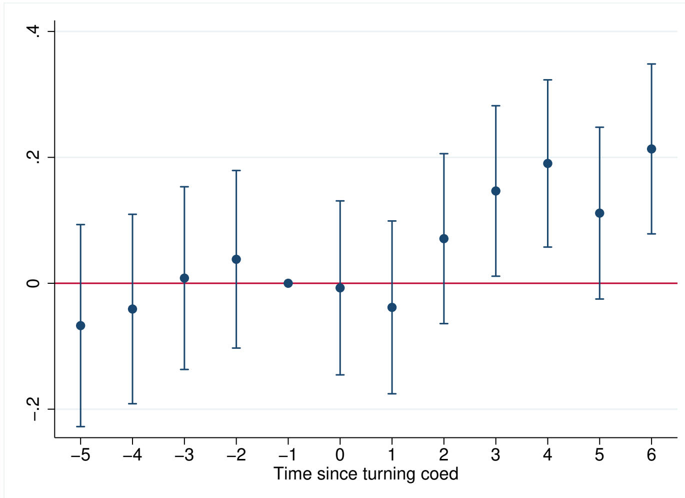


(b) Share of Papers Related to Gender



Notes: Figures H.1a and H.1b plot the event time coefficients and their 95% confidence intervals from estimating equation (1) for total number of gender-related research publications and share of publications related to gender, respectively. The specifications are estimated using OLS. We include school-subfield fixed effects and discipline-by-year fixed effects. We also control for total publications, total publications with an abstract, and the average abstract length at the school-subfield.

Figure H.2: Effect of Turning Coed on Number of Gender-Related Publications (Negative Binomial)



Notes: Figure H.2 plots the event time coefficients and their 95% confidence intervals from estimating equation (1) for total number of gender-related research publications. The specification is estimated using a conditional fixed effects negative binomial model. In the specification, we include school-subfield fixed effects and year fixed effects. The model however does not converge with discipline-by-year fixed effects or with additional control variables, such as total number of papers in the subfield.

Table H.1: Effect of Turning Coed on Gender-Related Research (OLS and Negative Binomial)

	(1) Number of Gender-Related Papers	(2) Number of Gender-Related Papers	(3) Gender-Related Share
Years -5 to -2	0.027	-0.015	0.002
	(0.060)	(0.056)	(0.005)
Years 0 to 2	0.058	0.008	0.004
	(0.042)	(0.056)	(0.007)
Years 3 to 6	0.113	0.165	0.008
	(0.089)	(0.058)	(0.008)
Baseline Mean	0.57	0.57	0.04
Observations	95886	63254	95886
Estimator	OLS	Negative Binomial	OLS

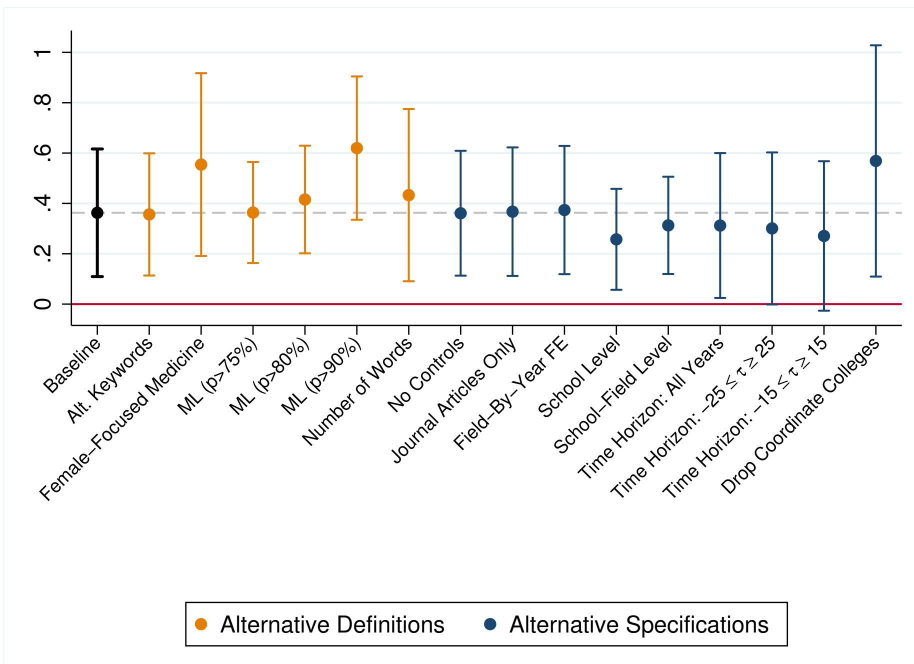
Notes: Table H.1 reports the average effects from estimating equation (1) on gender-related research outcomes. Each column reports estimates from a separate regression. Column (1) is estimated using OLS and Column (2) is estimated using a fixed effect negative binomial model. Effect at event time $\tau = -1$ is normalized to 0. Baseline mean is the mean of the outcome variable at $\tau = -1$. The coefficient for Years -5 to -2 is the pre-period average of the coefficients for $\tau = -5$ to $\tau = -2$. The coefficient for Years 0 to 2 is the post-period average of the coefficients for $\tau = 0$, $\tau = 1$, and $\tau = 2$. Similarly, the coefficient for Years 3 to 6 is the average of the coefficients for $\tau = 3$ to $\tau = 6$. Column (1) includes school-subfield fixed effects, year fixed effects, and discipline-by-year fixed effects. We also control for total publications, total publications with an abstract, and the average abstract length at the school-subfield. Column (2) include only school-subfield fixed effects and year fixed effects, because the model does not converge with discipline-by-year fixed effects or with additional control variables, such as total number of papers in the subfield. Standard errors in parentheses are clustered at the school level.

I Additional Robustness Checks

I.1 Alternative Definitions and Specifications

Appendix Figure I.1 compares the baseline average effect estimated for total gender-related papers for the years 3-6 after the policy with alternative definitions and specifications. The following subsections describe the analysis of each of the individual components and present the corresponding event-study results.

Figure I.1: Robustness to Alternative Definitions and Specifications



I.1.1 Alternative Definitions

We show our results are robust to using alternative definitions of gender-related research. As described in Appendix Section C.1.1, we construct two sets of keywords to identify gender-related research. The coefficient labeled "Alt. Keywords" in Appendix Figure I.1 is estimated using the alternative list with a broader set of words.

Next, we use the methodology employed by Koning et al. (2021) to classify medical research. Specifically, we pass the text of the title and abstract of each paper in the field of medicine through the National Library of Medicine's Medical Text Indexer (MTI). We identify a paper as "female-focused" if the MTI includes "Female" as one of the top Medical Subject Headings (MeSH). "Female" is defined as "female organs, diseases, physiologic processes, genetics, etc.; do not confuse with WOMEN as a social, cultural, political, economic force" (Koning et al., 2021). The result of using this definition is labeled "Female-Focused Medicine" in Appendix Figure I.1. Note that this estimation is restricted to only the field of medicine.

In addition, we use a machine-learning model to identify the probability a paper is gender-related based on the title of the paper. We utilize titles because this information is available for all the papers in our dataset while abstracts are only available for 60% of the papers. We briefly summarize the procedure here and provide additional details in Appendix C.2. We proceed by first constructing a training set of gender-related papers and clearly *non* gender-related papers published at universities outside of our sample. We define gender-related papers as those classified by MAG in the field of "gender studies" and those published in gender-related journals. For non gender-related papers, we use papers whose titles do not contain any of the words in a broad set of gender-related words. We then apply the Naïve Bayes (NB) classifier to this training set to compute the predicted probability of a paper being gender-related in our sample. We classify all papers as gender-related if the predicted probability is above a given threshold.

Appendix Figure I.1, "ML ($p > X\%$)" presents the average effect of turning coed on the number of gender-related papers produced using Naïve Bayes for the cutoff $X \in \{75, 85, 90\}$. We find a consistent pattern across all definitions of a clear and sharp increase in gender-research production after coeducation.

Finally, we show that our results are robust to using the number of times a gender-related word appears in the title or abstract. We present the result in Appendix Figure I.1, labeled "Number of Words". We find a consistent increase in gender-related word usage.

I.1.2 Alternative Specifications

Appendix Figure I.1, "No Controls" shows that our results are very similar when we remove the time-varying controls from our specification: total number of papers, total number of papers with abstracts, and average number of words used in the abstracts.

"Journal Articles Only" shows that our results are unchanged after restricting to the sample of journal articles. As explained in Section 3, in our main analysis, we include all research publications, including journal articles, books, and conference papers.

"Field-By-Year FE" shows that our results are robust to using field-by-year fixed effects instead of discipline-by-year fixed effects, where the field is at a lower level of aggregation.The field categories are art/philosophy, biology/environmental science, medicine, psychology, sociology, business/economics, political science, and history. We grouped together smaller fields such that the Poisson model converges.

Next, we show that our results on research are also robust to estimation at the school level or school-field level instead of the school-subfield level. For the school level analysis, by construction we can not include discipline-by-year fixed effects. Field level here refers to fields such as economics, history, arts. This is more dis-aggregated than the disciplines of humanities, social science and science.

We then show that the results are robust to changing the time horizon of the data sample. In our main results, we utilize all observations 20 years before and after coeducation. As robustness, we show that results remain similar when changing the time horizon to all data available: from -35 to 45, from -25 to 25, or from -15 to 15 years relative to coeducation.

Lastly, we drop universities with coordinate or sister women's colleges prior to coeducation. Potentially, including these universities in our sample may bias our results because female students may have already integrated in the campus life prior to coeducation. In nearly all cases, these universities went coed through merging with their sister college. These universities include

- Loras College / Columbia College Women's
- Tulane University / Newcomb College
- Rutgers University - New Brunswick / Douglass

- Canisius College / Canisius College Women's
- John Carroll University / John Carroll Women's
- Xavier University / Xavier Women's
- Brown University / Pembroke College
- Saint Mary's University / St. Mary's Women's
- Hamilton College / Kirkland College
- St. Edward's College / Maryhill College
- Fordham College / Thomas More College
- St John's University-New York / Notre Dame College (New York)
- *Columbia University / Barnard (did not switch through merger)*

We find similar results when we exclude these universities from our analysis.

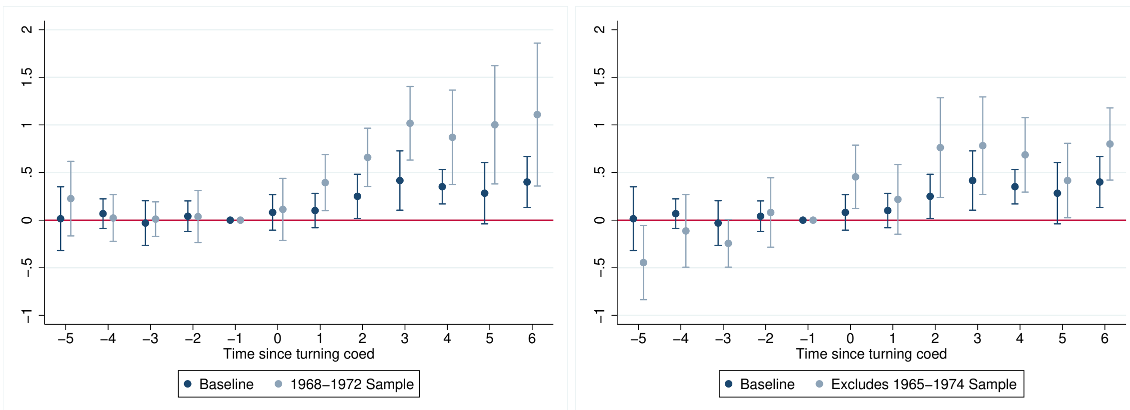
I.2 Sensitivity to University Sample

Figure 1 suggests that most universities in our sample switched during the period between 1968 and 1972. In this section we test the sensitivity of our results to restricting the sample to the middle five-year period (1968–1972) and *excluding* this middle period. Figure I.3 uses universities that were always coeducational prior to 1940 as an additional control group.

Figure I.2: Effects of Turning Coed on Gender-Related Papers Restricted to Universities that Switched in 1968–1972 or Excluding Universities that Switched in 1968–1972

(a) 1968–1972 Sample

(b) Excluding 1968–1972 Sample

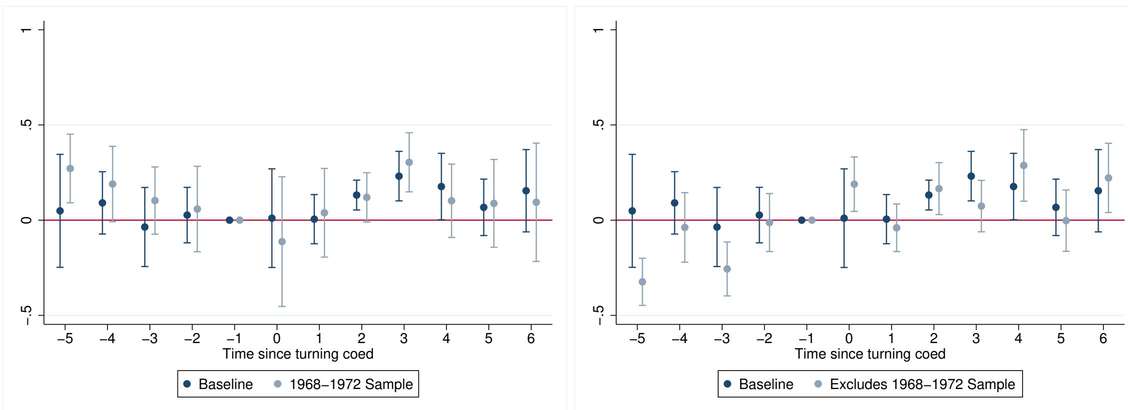


Notes: We estimate equation (1) for our main outcome variable, number of gender-related papers for the period with the most switches (1968–1972) and for all other years excluding 1968–1972 schools. Baseline estimates from the main analysis are also plotted.

Figure I.3: Effects of Turning Coed on Gender-Related Papers Restricted to Universities that Switched in 1968–1972 or Excluding Universities that Switched in 1968–1972 (Using Always-Coed As Control Schools)

(a) 1968–1972 Sample

(b) Excluding 1968–1972 Sample



Notes: We estimate equation (1) for our main outcome variable, number of gender-related papers for the period with the most switches (1968–1972) and for all other years excluding 1968–1972 schools. In all regressions, we use schools that universities that opened as coeducation before 1940 as control universities.

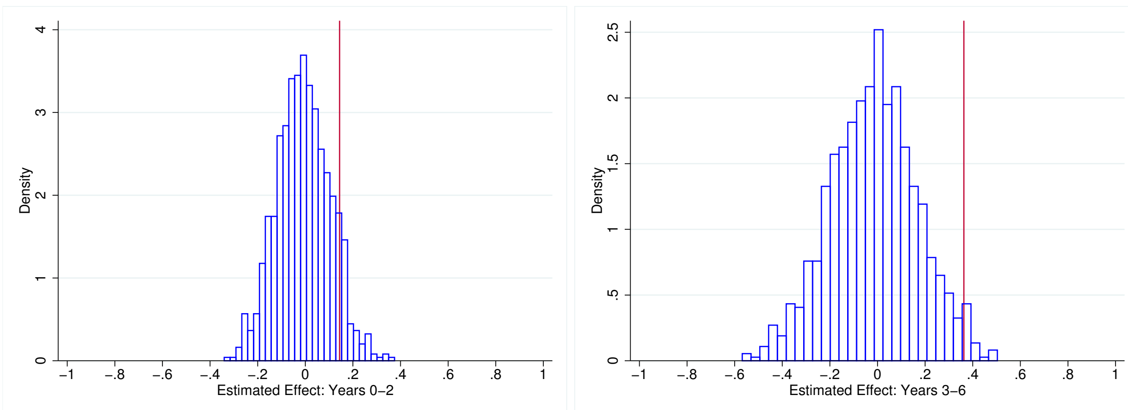
I.3 Placebo Turning Coed Dates

Next, we conduct a randomization test in which we assign placebo turning coed dates to all schools in our sample.[79] We do this 1,000 times and in each iteration, we estimate the equation (1) for our main outcome variable, the number of gender-related papers. In Appendix Figure I.4, we plot the two distributions of the placebo treatment effects. The vertical lines indicate the actual causal effects we estimated using the true turn-coed dates. As can be seen from the graphs, the estimated true effect for Years 3-6 is much larger than most of the placebo effects and is in the top 2% of the distribution. This provides supporting evidence that the estimated impact of turning coed on research is unlikely to have occurred by chance.

[79] We assign to each school without replacement a placebo turn-coed date from the actual distribution of coed dates with uniform probability.

Figure I.4: Effects of Turning Coed on Gender-Related Papers Using Placebo Treatment Dates

(a) Estimated Effect in Years 0-2 (b) Estimated Effect in Years 3-6

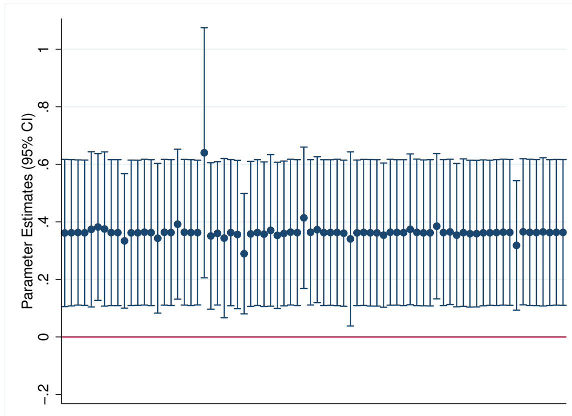


Notes: This figure plots the distributions of the placebo treatment effects computed using a randomization test as follows: We assign to each school without replacement a placebo turn-coed date from the actual distribution of coed dates with uniform probability. We conduct this 1,000 times and in each iteration, we estimate equation (1) for our main outcome variable, number of gender-related papers and store the average effect for years 0 to 2 and 3 to 6. The vertical lines indicate the actual coefficients we estimated using the true turn coed dates. The estimated effect in Years 0-2 is in the 89th percentile of the distribution while the estimated effect in Years 3-6 is in the 98th percentile of the corresponding distribution.

I.4 Robustness to Dropping Each University Once

We conduct an analysis to show that our results are not driven by any one specific university in the sample. In particular, we estimate equation (1) for our main outcome variable, number of gender-related papers, 76 times. In each iteration, we successively drop one university from the sample and plot the average effect for years 3 to 6 in Appendix Figure I.5. We find highly consistent results across all regressions, which suggests our results are not driven by any particular school.

Figure I.5: Effects of Turning Coed on Gender-Related Papers Leaving Out One University at a Time



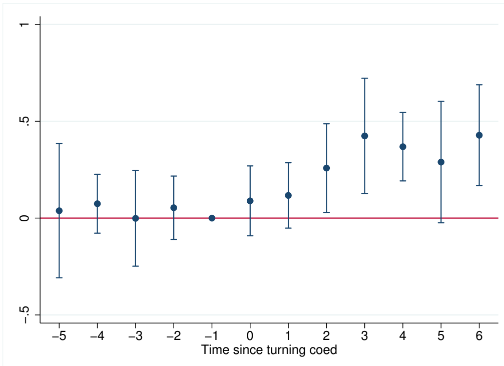
Notes: We estimate equation (1) for our main outcome variable, number of gender-related papers, 76 times. In each iteration, we successively drop one university from the sample and plot the average effect for years 3 to 6.

I.5 Robustness to Sample Restrictions

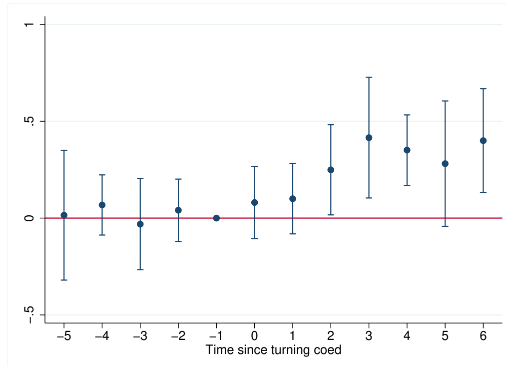
Our preferred specification makes two sample restrictions: (i) universities that have published in one of the gender-related fields (social sciences, humanities, biology, environmental science, or medicine) prior to coeducation and (ii) only publications in the gender-related fields. In Figure I.6, we show that our results are robust to the inclusion of all universities and/or all fields.

Figure I.6: Robustness to Sample Restrictions

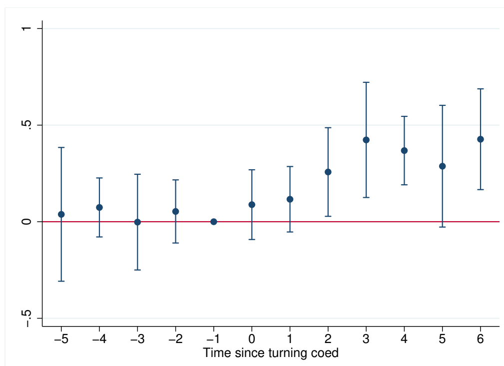
(a) Main University Sample, All Fields



(b) All University Sample, Main Fields



(c) All University Sample, All Fields



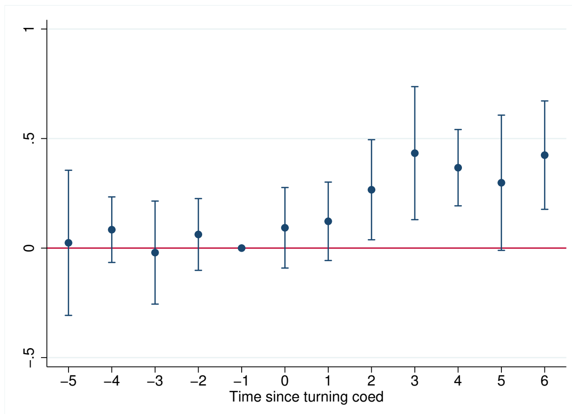
Notes: Figure I.6 plots the event time coefficients and their 95% confidence intervals from estimating equation (1) for total number of gender-related research publications. The specification is estimated using a conditional fixed effects Poisson model. In the specification, we include school-subfield fixed effects, year fixed effects, and discipline-by-year fixed effects. We also control for total publications, total publications with an abstract, and the average abstract length at the school-subfield. "Main University Sample" is the 76 universities in the baseline specification that published at least once in either social sciences, humanities, medicine, environmental science, or biology prior to turning coed. "All University Sample" consists of the 84 schools that turned coed between 1960 and 1990 regardless of their publication history. "Main Fields" refer to the field restriction in the baseline specification to social sciences, humanities, environmental science, medicine, and biology. "All Fields" include all fields represented in the Microsoft Academic Research dataset, including physics, chemistry, etc.

I.6 Predictors of Timing of Coeducation

Appendix Table A.4 shows the results from bivariate regressions between the year when school switches to coeducation and each of the school-level characteristics. We find that schools that are masters colleges and universities, with earlier years of opening, non-sectarian, and Methodist are correlated with earlier transitions to coeducation. In Appendix

Figure I.7, we directly control for potential differential trends along these dimensions by allowing for different linear trends for each Carnegie classification, year of opening categories and religious affiliation. We show that our results are robust to these additional controls.

Figure I.7: Effects of Turning Coed on Gender-Related Papers Using Additional Controls



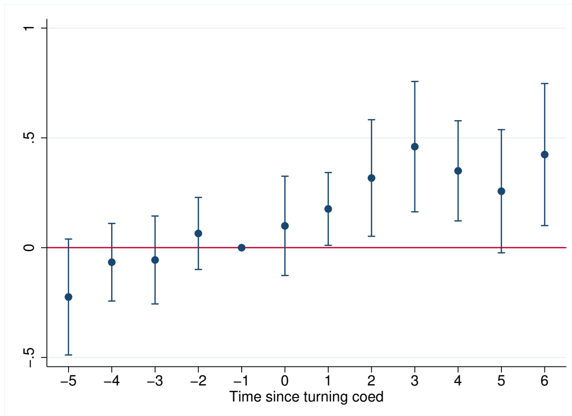
Notes: This figure plots the event time coefficients and their 95% confidence intervals from estimating equation (1) for total number of gender-related research. The specification is estimated using conditional fixed effects Poisson models. In the specification, we include school-subfield fixed effects, year fixed effects, and discipline-by-year fixed effects. We also control for total publications, total publications with an abstract, and the average abstract length at the school-subfield. We include as additional controls linear trends for each Carnegie classification (Doctoral Universities, Masters Colleges and Universities, Baccalaureate Colleges, and other higher education university types), year of opening categories (before 1850, 1850-1859, 1900-1949, 1950 or later) and religious affiliation (Catholic, Presbyterian, Methodist, or non-sectarian). We cluster at the school level.

I.7 Regional Cultural Shifts

A potential threat to identification is that unobserved broader cultural changes at the regional level may be correlated with both the timing of coeducation and production of gender-related research.[80] In Appendix Figure I.8, we show that our results are robust to the inclusion of region-by-year fixed effects, where the region is given by the nine U.S. Census divisions.

[80] Charles et al. (2018) show that sexist attitudes between 1977 and 1998 differ substantially across U.S. regions, and even across states within regions.

Figure I.8: Effects of Turning Coed on Gender-Related Papers Including Region-By-Year Fixed Effects

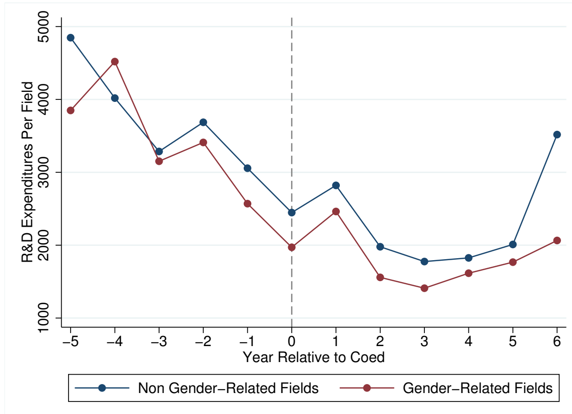


Notes: This figure plots the event time coefficients and their 95% confidence intervals from estimating equation (1) for total number of gender-related research. The specification is estimated using conditional fixed effects Poisson models. In the specification, we include school-subfield fixed effects, year fixed effects, and discipline-by-year fixed effects. We also include region-by-year fixed effects, where the region represents the nine U.S. Census divisions. We also control for total publications, total publications with an abstract, and the average abstract length at the school-subfield. We cluster at the school level.

I.8 R&D Funding Towards Gender-Related Fields

We explore whether coeducation shifted R&D investments towards gender-related research. Data on research expenditures come from The Higher Education Research and Development (HERD) Survey conducted by the National Science Foundation, which collects annual data on R&D expenditures by fields of study. This data is available beginning in 1972. Appendix Figure I.9 shows the trends in R&D Expenditures by field of study. Gender-related fields include biology, economics, environmental science, medicine, political science, psychology and sociology in the years before and after coeducation. The trends in both types of field are similar prior and after coeducation. There is limited evidence that R&D expenditures are relatively higher in gender-related fields.

Figure I.9: Trends in R&D Expenditures by Field



Notes: Higher Education Research and Development Survey 1972-1990. Gender-related fields include biology, economics, environmental science, medicine, political science, psychology and sociology. Non gender-related fields are chemistry, computer science, engineering, mathematics and physics.

I.9 Shift in Research Towards "Hot" Topics

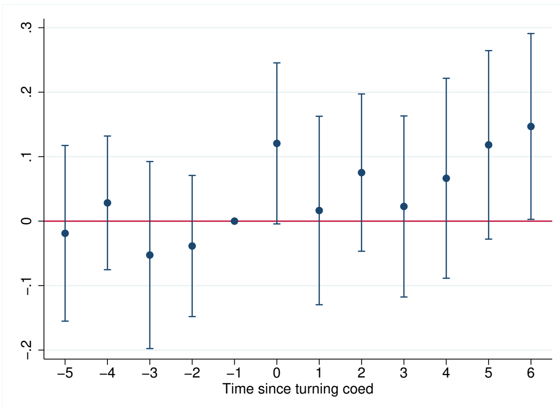
One potential confounding factor is that by turning coed, universities are now more competitive at attracting scholars who are at the forefront of their fields, at a time when gender-related topics are becoming a key research focus. In this case, the increase in gender-related research would not be mediated through the increase in gender diversity on campus. To investigate this, we use an external sample of universities to classify the fastest-growing subfields, or "hot" subfields.[81] Specifically, for each subfield, we calculate the percentage change in the number of papers produced between 1960 and 1990. Then we identify the top 25th percentile of subfields within each field as the hot fields.

Unlike our results for gender-related papers, Appendix Figure I.10 shows that there is no evidence of a sharp increase in the number of papers or the share of papers written in hot fields at the school level.

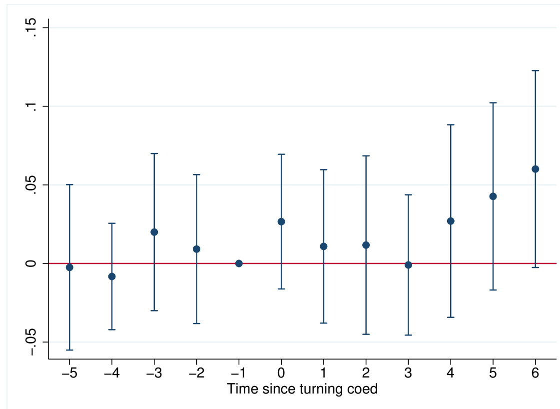
[81] We used the sample of universities that either opened as coeducational universities prior to 1940 or turned coed after the end of our sample period in 1990.

Figure I.10: Effects of Turning Coed on Research in Hot Topics

(a) Number of Papers in Hot Topics



(b) Share of Paper in Hot Topics



Notes: The figures plots the event time coefficients and their 95% confidence intervals from estimating equation (1) for total number of papers in hot subfields and share of papers in hot subfields. Figure I.10a is estimated using a conditional fixed effects Poisson model while Figure I.10b is estimated using OLS. Both specifications are estimated at the school level and restricted to gender-related fields. We also control for total publications, total publications with an abstract, and the average abstract length at the school-subfield. We cluster at the school level.

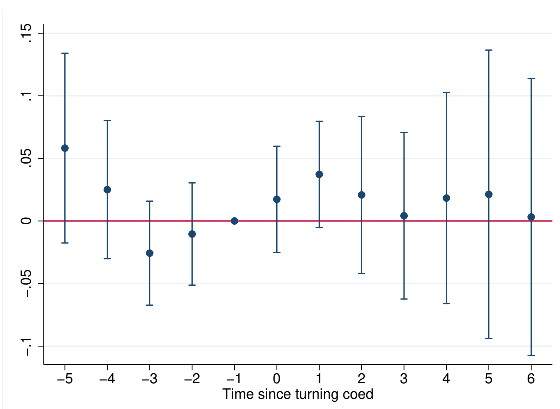
I.10 Total Graduate Students and Female Share of Graduate Students

An potential alternative explanation for the increase in gender-related research is that schools admit more female graduate students when they turn coed. Although graduate programs in many of these universities have been coeducational for many years before undergraduate admissions, schools may increase female graduate enrollment. If this was the case, the increase in gender-related research may not necessarily come from the increase in gender diversity among the undergraduate student body.

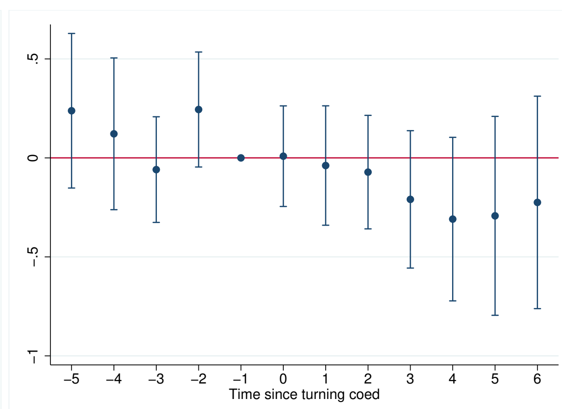
Appendix Figures I.11 and I.12 plot the event time coefficients and their 95% confidence intervals from estimating equation (1) for the female share of degrees awarded and log number of total degrees awarded in master's and doctorate programs, respectively. We find no significant effect of coeducation on the size of the graduate student body and on the gender composition of graduate students.

Figure I.11: Effect of Turning Coed on Master's Student Body

(a) Female Master's Degrees Share

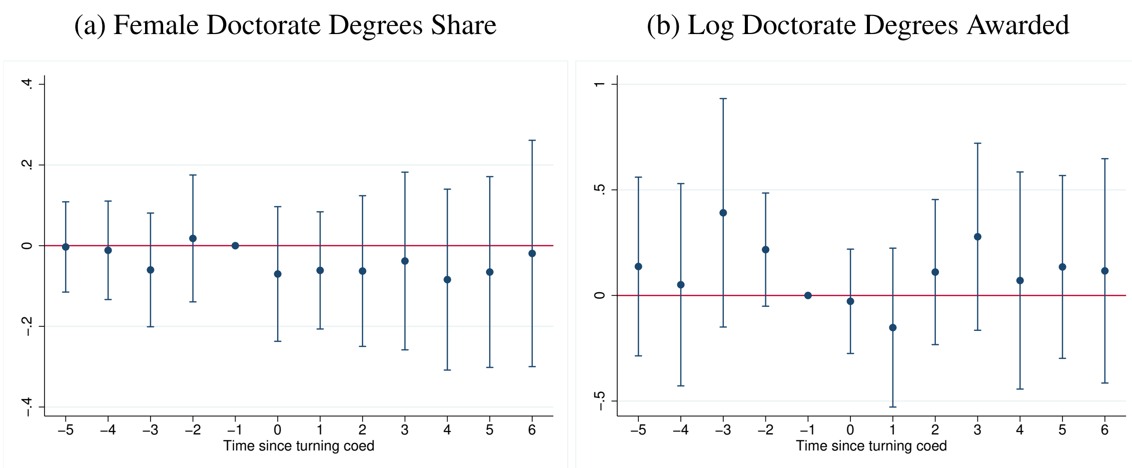


(b) Log Master's Degrees Awarded



Notes: Figure I.11 plots the event time coefficients and their 95% confidence intervals from estimating (1) for female share of master's degrees awarded and log number of total master's degrees awarded. Regressions are estimated using OLS. We include school fixed effects and year fixed effects. We cluster at the school level.

Figure I.12: Effect of Turning Coed on Doctorate Student Body



Notes: Figure I.12 plots the event time coefficients and their 95% confidence intervals from estimating (1) for female share of doctorate degrees awarded and log number of total doctorate degrees awarded. Regressions are estimated using OLS. We include school fixed effects and year fixed effects. We cluster at the school level.

I.11 Spillovers to Local Universities and Universities with Strong Co-Authorship Ties

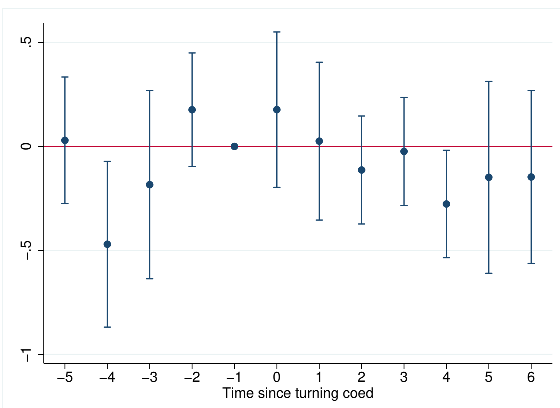
We investigate whether the increase in gender-related research resulted in spillovers to universities outside of our sample. We focus on universities that either opened as coeducational universities prior to 1940 or turned coed after the end of our sample period in 1990. We consider two types of spillovers. First, we analyze local spillovers to nearby universities in the same city as the coeducational schools. A large literature in agglomeration economics has documented the presence of local knowledge spillovers from universities (Anselin et al., 1997). Potentially, turning coed may lead other universities in the same geographical area to increase research production related to gender. Alternatively, the university that becomes coeducational may start attracting scholars from local universities. This would lead to a fall in gender-related research at the surrounding universities.

Appendix Figure I.13a captures the spillover effects on gender-related research for 50 universities that were in the same city but did not turn coed between 1960 and 1990. We assign to these universities the earliest coeducation date of the schools that went coed in that same city. We find no evidence that local universities were affected by a neighboring university that switched to coeducation.

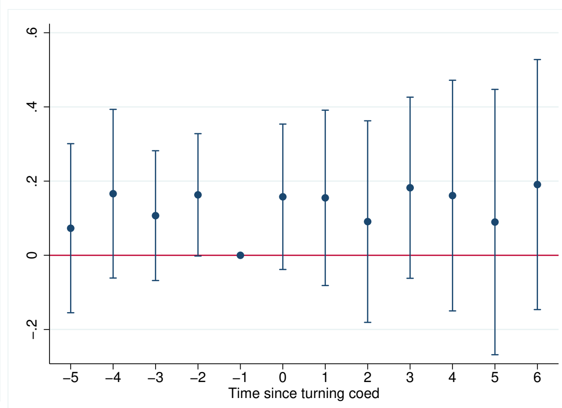
Second, we investigate whether there were spillover effects to universities with close collaboration ties with the schools that switched to coeducation. For each turn-coed university, we identify the top three most-connected universities among the universities that opened as coeducational or never turned until after 1990 based on the number of co-authored papers between 1950 and 2005. We assign to these universities the earliest coeducation date of the turn-coed universities they have ties to. Appendix Figure I.13b reveals limited evidence that coeducation led to increases in gender-related research at these universities.

Figure I.13: Spillover Effects of Turning Coed

(a) Spillovers to Universities in the Same City



(b) Spillovers to Universities with Close Collaboration Ties



Notes: The figures plots the event time coefficients and their 95% confidence intervals from estimating equation (1) for total number of gender-related research for universities that either opened as coeducational universities prior to 1940 or turned coed after the end of our sample period in 1990. Appendix Figure I.13a captures the spillover effects on gender-related research for 50 universities that were in the same city but did not turn coed between 1960 and 1990. We assign to these universities the earliest coeducation date of the schools that went coed in that same city. Appendix Figure I.13b captures the spillover effects on gender-related research on 77 universities that were among the top three most-connected universities to the schools that went coed, but did not turn coed between 1960 and 1990. We assign to these universities the earliest coeducation date of the turn-coed universities they had ties to. The specifications are estimated using conditional fixed effects Poisson models. We also control for total publications, total publications with an abstract, and the average abstract length at the school-subfield. We cluster at the school level.

J Decomposition of Total Increase in Gender-Related Papers

In this section, we use a Kitagawa-Oaxaca-Blinder style decomposition to show to what extent the total increase in gender-related papers is explained by change in faculty composition, versus by within-group increasing propensity to study gender-related topics.

Specifically, the change between mean number of gender-related papers per researcher (μ) from time t to $t+1$ can be decomposed into:

$$\begin{aligned} \mu_{t+1} - \mu_t = & s_{t+1}^F * \mu_{t+1}^F + s_{t+1}^M * \mu_{t+1}^M - (s_t^F * \mu_t^F + s_t^M * \mu_t^M) \\ & = [(s_{t+1}^F - s_t^F) * \mu_t^F + s_{t+1}^F * (\mu_{t+1}^F - \mu_t^F)] \\ & + [(s_{t+1}^M - s_t^M) * \mu_t^M + s_{t+1}^M * (\mu_{t+1}^M - \mu_t^M)] \end{aligned} \tag{A3}$$

where s_t^G and s_{t+1}^G are the share of researchers of gender $G \in \{Male, Female\}$ in the year before coeducation (t) and on average between year 3 and 6 post coeducation ($t+1$), respectively. μ_t^G and μ_{t+1}^G are the number of gender-related papers produced by researchers of gender G in the year before coeducation (t) and on average between year 3 and 6 post coeducation ($t+1$), respectively. The first term of the decomposition is the part of the increase in gender-related papers due to a change in the number of female researchers. The second component represents the part of the effect driven by an increase in the production of gender-related papers by female researchers. Analogously, the third term is the part explained by a change in the number of male researchers and the fourth term is the part due to an increase in the production of gender-related papers by male researchers.

To compute the components, we use the estimates reported in Appendix Table J.1. This table reports the coefficients for the number of gender-related papers at the author level for all researchers, both incumbent and non-incumbent researchers. Because we are using a linear decomposition, we use a linear model for the estimates as opposed to the Poisson model. The coefficient (0.011) for Years 3 to 6 in Column (1) represents the total increase in number of papers related to gender $\mu_{t+1} - \mu_t$. Similarly, the corresponding coefficient in Column (2) combined with the baseline mean (0.04) allows us to infer μ_{t+1}^M, (0.009+0.04), the number of gender-related papers written by male researchers post coeducation. For μ^F_{t+1}, we use equation A3 to back out the effect on the number of gender-related papers written by female researchers post-coeducation rather than using the estimated effects reported in Column (3). This is due to the fact that our estimates for female researchers show evidence of a large negative pre-trend and are not robust to slight deviations from parallel assumptions as we show in Appendix Section F.2. For s^G_{t+1} and s^G_t, we utilize summary statistics from Appendix Table A.3 for baseline values and estimates from Appendix Table A.13 to compute the share of male and female researchers post coeducation.

The decomposition suggests that the increase in the total gender related papers can be attributed to the following factors:

- 13% due to an increase in the number of female researchers
- 21% due to an increase in the production of gender-related papers by female researchers
- -7% due to a decrease in the number of male researchers
- 73% due to an increase in the production of gender-related papers by male researchers

In short, 6% (13-7) of the overall effect is explained by changes in gender composition, with the remaining 94% (21+73) is explained by the within-gender propensity to produce gender-related research. Notably, the increase is primarily driven by the increase in the gender-related research output by *male* researchers. In Sections 6.3.1 and 6.3.2, we discuss that this can come from a change in the composition of male researchers (e.g., those that are more interested in gender-related research arriving after the school has turned coed) as well as a direct treatment effect on researchers at these universities.

Table J.1: Effect of Turning Coed on Gender-Related Research Estimated at the Author Level

	Gender-Related Papers		
	(1)	(2)	(3)
	All	Male	Female
Years -5 to -2	0.001	0.002	-0.009
	(0.005)	(0.004)	(0.008)
Years 0 to 2	0.005	0.004	0.008
	(0.003)	(0.003)	(0.010)
Years 3 to 6	0.011	0.009	0.025
	(0.006)	(0.005)	(0.015)
Baseline Mean	0.05	0.04	0.07
Observations	490071	385286	104783
Estimator	OLS	OLS	OLS

Notes: This table reports the average effects from estimating equation (1) on the total number of gender-related papers at the author level. Effect at event time $\tau = -1$ is normalized to 0. Baseline mean is the mean of the outcome variable at $\tau = -1$. The coefficient for Years 0 to 2 is the post-period average of the coefficients for $\tau = 0$, $\tau = 1$, and $\tau = 2$. Similarly, the coefficient for Years 3 to 6 is the average of the coefficients for $\tau = 3$ to $\tau = 6$. All regressions include school fixed effects, year fixed effects, and discipline-by-year fixed effects. We also control for total publications, total publications with an abstract, and the average abstract length at the school-subfield. All regressions are estimated using OLS at the author-year level. Standard errors in parentheses are clustered at the school level.

K Accounting for Selection in Incumbent Researcher Analysis

We have shown that turning coed had significant and positive impact on the gender-related research production of incumbent researchers. However, the inclusion of individual fixed effects means that this effect is only identified for those who have chosen to remain at the school after the policy change. The treatment effects estimated using individual fixed effects may be biased if there are time-varying unobservables that are correlated with attrition. For example, it may be the case that researchers who are more affected by the policy are also those that are induced into staying at the university longer.

To take into account any selective attrition effects, we conduct a bounding exercise on the treatment effect in the same spirit as the bounding exercise proposed by Lee (2009). Specifically, we assume that all researchers that leave the sample would have produced zero gender-related research had they remain at the university. We implement this under two different assumptions. Under the first assumption, we assign incumbent researchers to their original university and impute zero gender-related research for all periods for which they are active, i.e., until the end of their publishing career. However, this does not take into account those that choose to leave the university and stop publishing entirely in response to the reform. Hence, under the second, more conservative, assumption, we assume all incumbent researchers would continue publishing until they have reached the median length of publication careers in the sample (7 years) or the actual end of their career, whichever is greatest.

In Table K.1, we present the baseline average estimates from equation (1) without accounting for selection (Column 1), and after accounting for selection under the first (Column 2) and second assumption (Column 3). These results show that under the first assumption, the treatment effect accounts for at least 96% (=$(e^{0.441} - 1)/(e^{0.454} - 1)$) of the increase in gender related papers. This large percentage is driven by the fact that only 3% of incumbent researchers continue publishing after leaving their original university. Under the more conservative assumption that everyone will publish for at least seven years, we find that the treatment effect for incumbent researchers can account for at least 90% (=$(e^{0.418} - 1)/(e^{0.454} - 1)$) of the total effect even accounting for selective attrition.

We can use these results to conduct analogous computations in Section L for how much the treatment effect would explain for the overall increase. From our main results using the subfield analysis, we observe an overall increase in gender-related research by 44% in years 3 to 6 (See Section 3.3). Given that there were 4.08 total gender-related research publications at each university at baseline (Appendix Table A.3), this implies a total increase of $.44 \times 4.08 = 1.8$ at the university level.

To provide a lower bound for how much the treatment effect can explain under heterogeneous treatment effects, we assume that the treatment effect for all new researchers is zero. Note that by years 3 to 6, incumbent researchers represent 39% of researchers at the university. Under the first assumption, we observe a treatment effect of 55% = $(e^{0.441} - 1) \times 100$. Exporting this treatment effect, we calculate that at least $.39 \times .55 \times 4.08 = .88$ papers, or 49%, can be explained by the treatment effect. Under the second assumption, we observe a treatment effect of 52% = $(e^{0.418} - 1) \times 100$. In this case, at least $.39 \times .52 \times 4.08 = 0.83$ papers, or 46%, can be explained.

Table K.1: Bounding the Selection Effect of Turning Coed on Incumbent Researchers

	Gender-Related Papers		
	(1) No Selection	(2) Selection on Attrition I	(3) Selection on Attrition II
Years 0 to 2	0.200	0.193	0.164
	(0.097)	(0.098)	(0.098)
Years 3 to 6	0.454	0.441	0.418
	(0.132)	(0.131)	(0.134)
Baseline Mean	0.05	0.15	0.15
Observations	60753	61452	62331
Estimator	Poisson	Poisson	Poisson

Notes: This table reports the estimates from conducting a bounding exercise on the selection effect of incumbent researchers. Column (1) is the baseline estimates from estimating equation (1) using a Poisson model for incumbent researchers at the researcher level. In Columns (2) and (3), we account for potential selective attrition by assuming all researchers that leave the sample would have produced zero gender-related research had they remain at the university. In Column (2), we assign incumbent researchers to their original university and impute zero gender-related research for all periods for which they are active, i.e., until the end of their publishing career. In Column (3), we assume all incumbent researchers would continue publishing until they have reached the median length of publication careers in the sample (7 years) or the actual end of their career, whichever is greatest. All specifications are estimated using a Poisson model and include researcher FE and year FE. We also control for total publications, total publications with an abstract, and the average abstract length at the school-subfield.

L Quantifying the Treatment Effect on Research Focus

In our analysis, we have ruled out key explanations for the increase in gender-related research: (i) increases in the number of faculty and researchers and (ii) increases in research productivity. Instead, we have isolated two mechanisms. The first channel is the compositional change in who conducts research at these universities. The second, and perhaps more surprising, channel is the treatment effect on research focus as shown by our analysis on incumbent researchers. How much of the overall increase in gender-related research can be explained by this treatment effect on research interests?

To quantify the magnitude, we apply the partial identification framework described in Manski (2007). We first note that the average treatment effect on the treated for gender-related research production for all researchers, including both incumbents and new arrivals, is given by $E[Y_i(1) - Y_i(0)]$, where i is an individual scientist. $Y_i(1)$ and $Y_i(0)$ denote the number of gender-related research papers produced by scientist i in the presence or absence of coeducation, respectively. We define this to be the treatment effect on research focus because it captures the changes in gender-related research production as a direct result of coeducation. This expression can be further decomposed into the treatment effects for incumbents and non-incumbents as

$$E[Y_i(1) - Y_i(0)] = \theta E[Y_i(1) - Y_i(0)|orig = 1] + (1 - \theta)E[Y_i(1) - Y_i(0)|orig = 0] \quad \text{(A4)}$$

where $orig$ denotes incumbent researchers and θ is the share of incumbent researchers.

Under our identifying assumptions, we are able to estimate $E[Y_i(1) - Y_i(0)|orig = 1]$ using the incumbent researcher analysis in Section 6.3.2, because we can observe production of gender-related research of incumbent researchers prior to coeducation. However, if treatment effects differ across individuals, then the treatment effects estimated for the incumbent researchers may not generalize to the new researchers (i.e. $E[Y_i(1) - Y_i(0)|orig = 1] \neq E[Y_i(1) - Y_i(0)|orig = 0]$). Heterogeneity in treatment effects across researchers is reasonable to assume given that we have documented changes in the selection of researchers as a result of coeducation. For example, researchers with prior interests in gender-related research may respond less to a gender-diverse environment because they would have written a similar number of gender-related publications regardless of the gender composition of the student body.

To make progress on this question, we compute a lower bound for how much the treatment effect can explain the total effects in the years 3 to 6 after coeducation. Specifically, we assume all new researchers are selected in such a way that they would have produced the same number of gender-related publications regardless of the coeducation policy. This corresponds to the assumption that the treatment effect among these researchers is zero. This yields a lower bound provided that coeducation would not have induced any of the new researchers to produce *fewer* gender-related papers than they would have otherwise. Specifically, we assume $E[Y_i(1) - Y_i(0)] \geq 0$ for all researchers i.

To compute this bound, we first note that by years 3 to 6, incumbent researchers represent 39% of researchers at the university ($\theta = .39$). The estimated treatment effect from the incumbent researcher analysis is 57%.[82] Given that the average university published 4.08 gender-related research papers at baseline (Appendix Table A.3) and, by definition, all of these publications were written by incumbent researchers, this implies that the average treatment effect for existing researchers in levels is $E[Y_i(1) - Y_i(0)|orig = 1] = .57 \times 4.08 = 2.33$ additional gender-related papers. Plugging into equation (A4) and assuming zero treatment effect for non-incumbent researchers (i.e., $E[Y_i(1) - Y_i(0)|orig = 0] = 0$), the lower bound for the average treatment effect for researchers is given by $E[Y_i(1) - Y_i(0)] = .39 \times 2.33 = 0.91$. How does this compare with the overall increase in gender-related research we observe empirically?

To answer this question, note that from our main results using the subfield analysis, we find an overall increase in gender-related research of 44% in years 3 to 6 (See Section 3.3). This implies a total increase of $.44 \times 4.08 = 1.8$ papers at the university level. As a result, the relative magnitude of the treatment effect (.91) and the total effect (1.8) suggests that the treatment effect can account for at least 51% of the overall increase in gender-related research even assuming all new researchers were not affected by the policy.

[82] Note that the estimates from the incumbent analysis are based on the sample of researchers that continue to publish at the university after coeducation. For this to identify the treatment effect, we are assuming selection at random, conditional on controls. We take into account any potential selective attrition among the incumbents and recompute this exercise in Appendix Section K.

M Examples of Incumbent Researchers

We present the works of two male incumbent researchers at Yale University who began producing gender-related research after Yale turned coeducational in 1969. Papers in blue are gender-related.

Roy Schafer, Psychologist, Yale University[83]

1953 Chief Psychologist in Yale Department of Psychiatry

...

1965 Contributions Of Longitudinal Studies TO Psychoanalytic Theory. Schafer, R. *Journal of the American Psychoanalytic Association*, 1965, 13(3), pp. 605–618

1967 Ego autonomy and the return of repression. Schafer, R. *International journal of psychiatry*, 1967, 3(6), pp. 515–518

1967 Ideals, the ego ideal, and the ideal self. Schafer, R. *Psychological issues*, 1967, 5(2), pp. 131–174

1968 On the theoretical and technical conceptualization of activity and passivity. Schafer, R. *The Psychoanalytic quarterly*, 1968, 37(2), pp. 173–198

1968 The mechanisms of defence. Schafer, R. *International Journal of Psycho-Analysis*, 1968, 49(1), pp. 49–62

1969 Yale University goes coed.

1970 Requirements for a critique of the theory of catharsis. Schafer, R. *Journal of Consulting and Clinical Psychology*, 1970, 35(1 PART 1), pp. 13–17

1970 The psychoanalytic vision of reality. Schafer, R. *International Journal of Psycho-Analysis*, 1970, 51(3), pp. 279–297

1970 An overview of Heinz Hartmann's contributions to psychoanalysis. Schafer, R. *International Journal of Psycho-Analysis*, 1970, 51(4), pp. 425–446

[83] Biography can be found at `https://psycnet.apa.org/record/2019-58349-005`

1972 Internalization: process or fantasy? Schafer, R. *Psychoanalytic Study of the Child*, 1972, VOL.27, pp. 411–436

1972 The psychoanalytic view of reality (I). Schafer, R. *Psyche*, 1972, 26(11), pp. 881–898

1972 The psychoanalytic view on reality (II). Schafer, R. *Psyche*, 1972, 26(12), pp. 952–973

1973 Concepts of self and identity and the experience of separation-individuation in adolescence. Schafer, R. *The Psychoanalytic quarterly*, 1973, 42(1), pp. 42–59

1973 The idea of resistance. Schafer, R. *International Journal of Psycho-Analysis*, 1973, 54(3), pp. 259–285

1974 Problems in freud's psychology of women. Schafer, R. *Journal of the American Psychoanalytic Association*, 1974, 22(3), pp. 459–485

...

On Roy Schafer's "Problems in Freud's Psychology of Women", Fogel (2019) writes:

> "Schafer is extremely critical of Freuds published views on women, and finds them seriously wanting... In 1974 Schafer was well established in the field—an admired and respected thinker, writer, consultant, and teacher. Important at that historical moment was his work at the Yale University Student Health Center as the university was transitioning from an all-male to a coeducational institution. Second wave feminism was on the march, and psychoanalysis was under scrutiny. Young women at Yale were as yet a significant minority, but many of them were outspoken, newly empowered to question their teachers. Freud and psychoanalysis were prominently included in their inquiry. Challenged by their critique, Schafer listened and learned, and then rose to that challenge—a bold and courageous act at the time... In short, Schafer dropped a bomb on the male-dominated hierarchy that had long overseen classical psychoanalysis—the traditional ego psychology as developed and practiced in America for so many years."

James Franklin Jekel, Emeritus C-E.A. Winslow Professor of Public Health, Yale University[84]

Beginning in 1970, one year after coeducation, Jekel began collaborating with Lorraine Vogel Klerman, an Assistant Professor in Public Health at Yale University, on topics related to gender. Based on historical records, she was already at Yale prior to coeducation since at least 1968.[85] Her research prior to coeducation has focused on gender topics, related to pregnancies and teenage motherhood.

1967 Jekel starts as Assistant Professor at Yale University.

1968 Role of acquired immunity to T. pallidum in the control of syphilis. Jekel, J.F. *Public health reports*, 1968, 83(8), pp. 627632

1969 Yale University goes coed.

1969 Influence of the prevalence of infection on tuberculin skin testing programs. Jekel, J.F., Greenberg, R.A., Drake, B.M. *Public health reports*, 1969, 84(10), pp. 883886

1969 Some problems in the determination of the false positive and false negative rates of tuberculin tests. Greenberg, R.A., Jekel, J.F. *American Review of Respiratory Disease*, 1969, 100(5), pp. 645650

1970 Suicide attempts in a population pregnant as teenagers. Gabrielson, I.W., Klerman, L.V., Currie, J.B., Tyler, N.C., Jekel, J.F. *American journal of public health and the nation's health*, 1970, 60(12), pp. 22892301

1971 A Pilot Program in High School Drug Education Utilizing Non-Directive Techniques and Sensitivity Training. Dearden, M.H., Jekel, J.F. *Journal of School Health*, 1971, 41(3), pp. 118–124

1972 Communicable disease control and public policy in the 1970s–hot war, cold war, or peaceful coexistence? Jekel, J.F. *American journal of public health*, 1972, 62(12), pp. 1578–1585

[84]Biography can be found at `https://ysph.yale.edu/profile/jfj2/`

[85]Yale Medicine: Alumni Bulletin of the School of Medicine, 1968-1969. `https://core.ac.uk/download/304683574.pdf`. Accessed on June 30, 2023.

1972 Pregnancy and special education: who stays in school? Foltz, A.M., Klerman, L.V., Jekel, J.F. *American journal of public health*, 1972, 62(12), pp. 1612–1619

1972 Subsequent pregnancies among teenage mothers enrolled in a special program. Currie, J.B., Jekel, J.F., Klerman, L.V. *American journal of public health*, 1972, 62(12), pp. 1606–1611

1972 An analysis of statistical methods for comparing obstetric outcomes: Infant health in three samples of school-age pregnancies. Jekel, J.F., Currie, J.B., Klerman, L.V., McCarthy, N., Sarrel, P.M., Greenberg, R.A. *American Journal of Obstetrics and Gynecology*, 1972, 112(1), pp. 919

N Effects on Quality of Research

What are the implications of our findings for the quality of research produced by these universities? In this section, we use the citations information in our dataset to speak to this question.

As a proxy for quality, we use the number of citations available in the MAG dataset for each paper and measure the likelihood of a paper becoming a "hit" paper, defined as those in the top 10% of the citations distribution for all publications written in that field and year. Appendix Figure N.1 shows descriptively that gender-related research papers are of higher quality and consistently have a much higher probability of being a hit publication. This suggests that the shift toward gender-related research may have led to an increase in hit publications at the university. Indeed, turning to causal estimates, we find a small but imprecise increase in total number of papers in the top 10% of the field-year citation distribution (Appendix Figure N.2).

Figure N.1: Share of Papers in the Top 10% of the Field-Year Citation Distribution

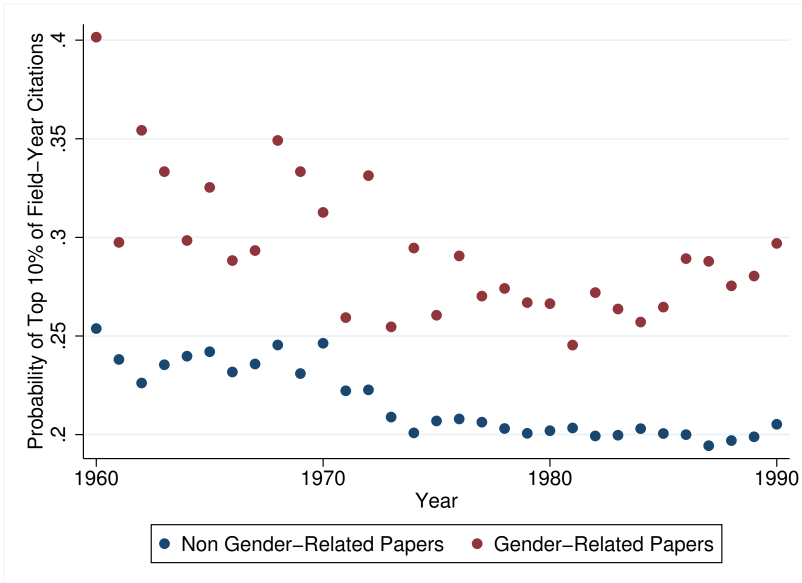
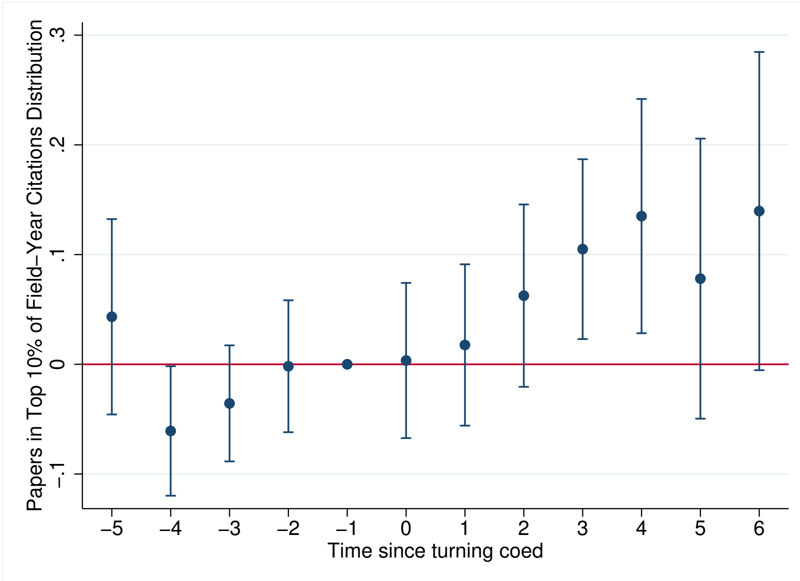


Figure N.2: Effect of Turning Coed on Quality of Research at the School-Field Level



Notes: The figure plots the event time coefficients and their 95% confidence intervals from estimating equation (1) for total number of papers in the top 10% of the citation distribution among papers published in that field and year. The regression includes school-subfield fixed effects, year fixed effects, and discipline-by-year fixed effects. We also control for total publications, total publications with an abstract, and the average abstract length at the school-subfield. The regression is estimated using a conditional fixed-effect Poisson model at the school-subfield-year level. School-subfield groups without variation or less than two observations are dropped from the respective sample in Poisson models. We cluster at the school level.

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versity, Nichols College, Norwich University, Princeton University, Randolph-Macon College, Saint Anselm College, Saint Edward's University, Saint John Fisher College, Saint Joseph's University, Saint Mary's College, Saint Michael's College, Santa Clara University, Siena College, St John's University-New York, Stevens Institute of Technology, Trinity College, United States Military Academy, University of New England, University of Scranton, University of The South, University of Wisconsin-Milwaukee, Villanova University, Washington And Lee University, Wesleyan University, Widener University Pennsylvania Campus, Williams College, Wofford College, Xavier University, Yale University.