Undergraduate Gender Diversity and Direction of Scientific Research*

Francesca Truffa† Ashley Wong‡

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Abstract

Can diversity lead to greater research focus on populations underrepresented in science? Diverse researchers can bring new questions and perspectives, but exposure to diversity may also inspire scientists, regardless of demographic identity, to pursue new topics. This paper studies a new determinant of research ideas: the diversity of the academic environment. Between 1960 and 1990, 76 all-male US universities, including many elite and prominent research institutions, transitioned to coeducation. Using a generalized difference-in-differences design, we document a 42% increase in the number of gender-related research publications authored by scholars at newly coed universities. This increase is explained by a combination of a more diverse researcher pool in terms of gender and prior research interests, as well as a shift in the research focus of individual scientists towards more gender-related topics. A bounding exercise suggests that the direct effects of the policy on scientists' research focus can account for more than half of these gains. These findings suggest that a diverse academic environment can influence the direction of scientific research.

JEL Codes: J16, O31, O34

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†Northwestern University, 2211 Campus Drive, Evanston, IL 60208, francesca-truffa2021@u.northwestern.edu

‡Northwestern University, 2211 Campus Drive, Evanston, IL 60208, ashleywong2021@u.northwestern.edu.

1 Introduction

Does the direction 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.

We consider in this paper a new determinant of scientific research topics: the diversity of the academic environment. Studies on the role of diversity for scientific research have focused on diverse researchers who may bring new perspectives and new interests in topics related to underrepresented populations.[2] Instead, we ask whether a more diverse academic *environment* can influence the research topics of scientists regardless of their identity. Despite increasing evidence that exposure to diversity can shape views and attitudes (Rao, 2019; Billings et al., 2021), there is limited empirical evidence on how a diverse environment can influence ideas generation and the direction of scientific research.

In this paper, 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 gender diversity 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, leading to large changes in gender composition among the student body. These universities include many of the most prominent research institutions, such as Johns Hopkins and many of the Ivy League universities (e.g., Yale, Princeton).

We use this setting to examine the effects of undergraduate gender diversity on the production of research publications related to gender by scientists at these universities. Using

[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 (Nielsen et al., 2018; Heidari et al., 2016; Treadwell et al., 2019; Koning et al., 2019). 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. As a proxy for our knowledge in 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).

information on the titles and abstracts from a large scientific research database, we systematically classify over 1 million publications into gender- and non gender-related research across all fields using a keyword-based approach. To identify causal effects, we employ a generalized difference-in-differences design that exploits the variation in the timing of when universities switched to coeducation to document the impact of the reform on gender-related research publications. The key assumption in this approach is that the year in which the university turned to coeducation is not related to changes in gender-related research production. In support of this, 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 (Goldin and Katz, 2011; Malkiel, 2016; Miller-Bernal and Poulson, 2004).

The analysis proceeds in three steps. In the first step, 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 among the graduating class increased to 28%. 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. Three to six years after coeducation, there was a 42% increase in the number of gender-related papers produced by scholars at the university. This corresponds to a 45% increase in the share of publications related to gender. This effect is largest for the social sciences, particularly psychology and sociology. We also show that the increase in gender-related research is concentrated in schools with the largest change in female student enrollment, pointing to the role of gender diversity in the student body in explaining our results.

In the second step, we isolate two key channels that explain this large increase in gender-related research output. Rather than an increase in total number of researchers or an increase in the productivity of researchers, we show that part of the increase can be explained by changes in the composition of the university researchers. After coeducation, there were more female assistant professors and other researchers who were more likely to study gender-related topics.

More importantly, we find that coeducation also directly shaped scientists' research focus. Focusing on incumbent researchers and using within-researcher variation, we show that researchers who were affiliated at the university prior to coeducation increased the number of research publications related to gender by 54%. Among their research, the share of papers related to gender increased by 28%. The effects are larger in magnitude for female researchers than for male researchers, but because males represented 88% of the incumbent researchers, this implies a large proportion of the overall increase came from male researchers. These findings present novel evidence that exposure to diversity can change the direction of research of individual scientists.

We conclude this part of the analysis by quantifying how much of the overall effect can be explained by the treatment effect on research interests compared to the changes in the composition of faculty. We compute a lower bound for the treatment effect by assuming all new researchers would have a treatment effect of zero. Under this assumption, the impact on research interests can explain at least 50% of the overall increase in gender-related research.

In the final step of the analysis, we explore three mechanisms that can explain why individual scientists shifted the direction of their research in response to coeducation. We present suggestive evidence that the shift in research focus was driven in part by the following channels: (i) classroom interactions between faculty and students, (ii) inclusion of female students in the research production process, and (iii) interaction between peer researchers. First, using class descriptions from historical course catalogue, 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 is concentrated in experimental work, pointing to at least one concrete way that the undergraduate student body affects 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. We show that the increase in gender-related research comes partly from an increase in co-authorships between incumbent male researchers and new female researchers. This result highlights that the change in researcher composition as a result of coeducation potentially generated peer effects that induced researchers to study new topics.

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 towards gender-related topics at these universities. In addition to changing the composition of who conducts research at these universities, the key result is that the change directly impacted the research interests of individual scientists.

To provide suggestive evidence on the welfare implications of the shift in research focus, we show that coeducation led to a positive but imprecise increase in quality of research produced at these universities, driven by higher citations of gender-related research. We also document a substantial increase in medical papers focused on female organs and diseases, suggesting potential new discoveries in areas of women's health which traditionally is understudied (Koning et al., 2020). Together, the results of this paper suggest that in order to increase diversity in research topics and close the knowledge gap related to women and other minorities, it is important to consider not only the diversity of who is conducting research but also the diversity and inclusiveness of the academic environment.

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 for research focus 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 the 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 and innovation. One strand of this literature studies the impact of immigrants on scientific progress and innovation (Moser et al., 2014; Borjas et al., 2017; Borjas and Doran, 2012; Kerr and Lincoln, 2010).[3] In management science, substantial research 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). More closely related to our paper is the literature that examines the relationship between diverse

[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 et al., 2016; Alesina and La Ferrara, 2005).

researchers and scientific research topics.[4] A series of studies suggest that the entrance of women in previously male-dominated fields can influence research priorities and agendas (Nielsen et al., 2018; Rosser, 2002; Schiebinger, 2000; Koning et al., 2019). In another paper, Nagaraj et al. (2020) show that increasing data access for scientists with fewer resources led to new research on previously understudied regions close to their localities and increased diversity in research topics. 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, our paper contributes to an older debate in higher education research on the relationship between teaching and research (Schwarz, 2016; Hattie and Marsh, 1996). In a meta-analysis of over 58 studies, Hattie and Marsh (1996) find little to no evidence that teaching complements research productivity. In contrast, in a survey of prominent economists, Becker and Kennedy (2005) show that teaching plays an important role in enhancing research in economics. Importantly, one of the key channels highlighted by Becker and Kennedy (2005) is through direct interactions with students such as holding discussions and answering questions. We show in this paper that this hypothesis is consistent with the increase in gender-related research that we observe. Our paper also speaks to a related question on whether faculty research influences what students learn or whether demand by students drives research. In a recent paper, Biasi and Ma (2020) analyze college course syllabi to quantify the distance between course content and frontier research in that field. They show that instructors and their research activity explain much of this gap, suggesting that faculty research influences what students learn in the classroom. We speak to this question by showing that student demands can influence both class topics and on faculty research interests.

Finally, we also contribute to the literature on coeducation. A large literature, 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 (Jackson, 2012; Park et al., 2018; Jackson, 2009; Lavy and Schlosser, 2011; Trickett and Trickett, 1982). Three related studies examined coeducation at the university level. Among them, Goldin and Katz (2011) discuss in depth the history of university coeducation in the United States, the reasons for why universities switched to coeducation, and the impact of these switches on female higher education attainment. In Currie and

[4] A related literature on gender and scientific literature focuses on the underrepresentation of women in scientific fields (Beede et al., 2011). Recent studies have pointed to potential barriers women face in the sciences, such as gender differences in recognition (Sarsons et al., 2019), publication standards (Card et al., 2019; Hengel, 2019), and promotion rates (Antecol et al., 2018).

Moretti (2003), the authors utilize university openings as well as conversions to coeducation of the male-only universities in their empirical strategy to estimate the impact of increasing mother's education on birth outcomes. 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 a background 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 research of scientists. Section **??** performs a back-of-the-envelope calculation to quantify the number of missing gender-related research papers at these universities. Finally, Section 9 concludes.

2 Background

2.1 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 most prestigious colleges and universities, such as Princeton and Yale. In the second half of the twentieth century, cultural and economic factors led to an acceleration in the transitions to coeducation.

In 1835, Oberlin College became the first coeducational university when it first admitted women (Goldin and Katz, 2011). From the Civil War Era until the 1950s, there was a gradual increase in coeducation and, at the same time, coeducation proliferated at the high school level.[5] As shown in Appendix Figure A1, the transition of 4-year institutions from male-only to coeducation occurred at a steady pace throughout the time period after 1835,

[5]Historians highlighted two key reasons that spurred the transitions to coeducation during this early period. First, at the first women's rights convention in Seneca Falls, New York, in 1848, the women's movement made access to education a central tenet (Miller-Bernal and Poulson, 2004). Women's rights advocates petitioned for females' entry in men's colleges and universities and favored coeducation because they believed women's colleges provided inferior education (Miller-Bernal and Poulson, 2004). Second, the Morill Acts in 1862 and 1890 also encouraged coeducation and many of the land grant colleges established through the act opened as coeducation (Goldin and Katz, 2011).

but accelerated during the period between 1960 and 1990, denoted by vertical lines.[6] This period forms the timeframe 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).

In Appendix Table A1, we provide the full list of universities that we include in our analysis.[7] The schools listed are a combination of private nonsectarian selective research institutions (e.g., Princeton), private Catholic liberal arts colleges (e.g., University of Notre Dame, Boston College), and larger public research universities (e.g., University of Virginia). The majority of colleges that turned coed during this period are predominantly private, nonsectarian or Catholic universities that were founded earlier. By the end of this period, only four universities in the United States remained male-only.

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 transitions to coeducation that occurred in the the first half of the twentieth century 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. Indeed, in 1980, despite only enrolling 6.5% of all full-time undergraduate students, the universities in our sample produced 12.6% of all research publications among all U.S. nonprofit universities that offer four-year bachelor's degrees.

2.2 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, also known as the "counterculture", that was characterized

[6]Note that there were concurrent switches from female-only universities to coeducation throughout the entire timeframe. However, in this paper we will focus on the male-only to coeducation switches. In Appendix Section F, we show that there was no effect on gender-related research when colleges switched from female-only to coeducation.

[7]Note the total number of schools we study is 76, 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.

by the civil rights movement, anti-Vietnam War movement, sexual revolution, and women's movement. Increasingly, students demanded integration both in terms of gender and race, and sought to be educated at coeducational institutions (Miller-Bernal and Poulson, 2004).[8] This shift in 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 because of 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, 2018). As the historian Nancy Malkiel describes:

> "In the United States, 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, and the key issue was their ability to continue to attract those 'best boys.' [...] 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. Rather, it was about what women could do for previously all-male institutions-about how women would help these schools renew their hold on the 'best boys'." (Malkiel, 2018)

This sentiment is also reflected in the way acting university presidents described the coeducation decision. One such example is a quote by Yale President Kingman Brewster Jr. in an 1967 address to alumni: "Our concern is not so much what Yale can do for women but what can women do for Yale." (Malkiel, 2018). Similarly, historians Miller-Bernal and Poulson (2004) argued that universities moved to coeducation in order to boost enrollment (e.g., Lincoln, Georgetown), increase student quality to enhance selectivity (e.g., Lehigh) and status, and to improve educational experience to attract male students (e.g., Yale, Princeton).[9]

[8] A 1968 poll of male high school students showed 78% favored coeducation compared to 5% that favored single-sex schools (Miller-Bernal and Poulson, 2004).

[9] In 1975, Congress also passed legislation that made federal military institutions coeducational.

3 Data

3.1 Data Sources

We combine several data sources that contain information on the coeducation dates (Coeducation College Database), higher education institutions (HEGIS/IPEDS), course offerings, and academic research production (Microsoft Academic Graph).

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 4-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.[10]

In order to shed light on underlying mechanisms, we also digitized course catalogue data with information on course descriptions for 22 universities that went coed during our sample period. Appendix Figure A2 provides an example of a course we identified as gender-related.

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 document record can be linked to the field of study, title, publication date, journal, abstract, author, and affiliation of the author at time of publication. In our analysis, we use journal articles, books, and conference papers. We do not distinguish between these document types and refer to them as "papers". In robustness checks, we show that results are unchanged if we restrict to only journal articles.[11] The data is aggregated from feeds

[10]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.

[11]See Section 5.2.3. Note that across the years included in our analysis, journal articles are 99.24% of our

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. To measure the number of active authors at the school at a given moment, we will assume the author is at the institution in all the years between the first and last time they have a paper affiliated at the school. Throughout the paper, we will use the term "researcher" to refer to the authors of papers who are affiliated to the schools in our sample.

We restrict our attention to schools that went coed between 1960 and 1990. In particular, our main outcomes of interest such as student enrollment and research output become available during this time. This restriction results in 88 schools that switched from male-only to coeducation. 87 schools are successfully matched to the MAG database. 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.[12] These restrictions lead to a total number of 1,333,306 papers and 471,628 unique researchers.[13] We describe in Section 3.4 how we further restrict this dataset for our research question.

3.2 Gender Coding of Researchers

Because the gender of the researcher is not provided in the MAG database, we utilize a series of customized name-matching algorithms to identify the gender of the researcher by comparing the first name of the author to four established names databases.[14] In our main analysis, we consider an author to be female if at least one of these sources identifies the name to be female.[15] We matched 93% of the researchers to a gender.

sample, books are 0.73% and conference papers are 0.03%.

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

[13]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.

[14]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.

[15]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

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. Specifically, we conduct a textual analysis on the paper titles and abstracts of each paper to identify papers based on a list of keywords. 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.[16] We selected 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.[17] We present both lists in Appendix Section B.1.1. 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 5.2.3.

For each list of words, we construct a gender-related measure that takes on a value of one if a gender-related word appears in the title or the abstract. Note that the title is available for all papers while the abstract is available for 60% of papers. The key advantage of our methodology is that it can be applied broadly to all fields. In comparison, prior research that studied gender-related research topics focused on biomedicine in which papers can be classified a gender- or female-related based on biological sex differences and disease incidence (Nielsen et al., 2018; Koning et al., 2020). However, we note that our definition likely underestimates the true quantity of gender-related research because we do not capture these medical-related studies.

What kinds of research do we capture with our gender-related research definition? We randomly selected 100 gender-related publications and classified them into research that is related to gender in terms of topics and research that focuses on sex differences. In the latter

only one of the algorithms ("Gender-Detector").

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

[17]Among them, it crawls through ConceptNet, which is a knowledge database that connects words and phrases of natural language (Speer et al., 2017).

case, the research topic may not necessarily be related to gender, but the paper presents analyses by sex or has 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 the random sample of 100 papers, we find that 63% of the papers are gender-related in terms of topics. These include papers such as "New Women Versus Old Mores A Study Of Women Characters In Ba Jin's Torrents Trilogy" (Su, 1990) and "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 8% of the papers are false positives.[18] In Appendix Section B.2.2, 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 is systematically correlated with the timing of coeducation. This is unlikely to be the case as we will show our results are robust to alternative methods of identifying gender-related research and misclassification errors are likely to be orthogonal across different methodologies.

In Section 5.2.3, we will validate our definition of gender-related research in two ways. First, we will show that the share of publications related to gender that is identified by our methodology in medicine is similar, but smaller, in magnitude and follows the same trends as those of the female-focused patents in biomedicine identified by Koning et al. (2021). Second, we will show our results are robust to an alternative definition of gender-related research using a machine learning text classification approach.

In our analysis, we will 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.

[18] For example, one biology example paper is misclassified because it studies "daughter cells" which is a biological term that does not relate to the gender or sex of the cell.

3.4 Sample Selection

Because the goal of this paper is to understand how turning coed led to changes in gender-related research production, we consider only fields in which it is reasonable for researchers to explore gender-related topics. Using data from an alternative sample of universities, we calculate the share of papers written from 1950 to 2005 that are gender-related within each of the 19 broad field categories defined in MAG.[19] Figure 1 shows the share of gender related papers by fields. We exclude from our analysis the bottom third of these fields. As a result, our sample consists of the following 11 fields: medicine, sociology, psychology, biology, history, political science, art, philosophy, economics, environmental science, and business.[20] We define this group of fields as "gender-related fields."

We restrict the sample of universities to those that have published at least one paper in any of these gender-related fields within the five years prior to switching to coeducation. This allows us to capture the impact of coeducation on universities that are actively producing research in these fields. The final number of universities in our sample is 76. See Appendix Table A1 for the full list of schools.

3.5 Descriptive Trends

In Appendix Figure A3, we plot how gender-related research production evolves over the time period between 1960 and 1990 at universities that switched to coeducation in our sample. We show separately the gender-related share of papers in all fields and in the 11 gender-related fields. The figure shows that gender-related research represented over 2% of all research publications at these universities in 1960. This number nearly doubles when we only consider gender-related fields, but remains a small share of the research conducted in these disciplines in 1960. Over the next decades, the share of research related to gender more than doubled. The strong relationship between the two data series suggests that the increase is driven by the increasing prominence of gender-related topics within the gender-related fields. Specifically, by 1990, nearly one in ten papers published in these fields are related to gender.

[19] Specifically, we considered universities that either opened as coeducational prior to 1940, or that were single-sex and never turned coed or turned coed after 1990. These restrictions lead to a total of 522 institutions. We matched 453 of these institutions to the Microsoft Academic Graph dataset.

[20] We exclude geography, geology, mathematics, physics, chemistry, engineering, computer science, and materials science. Note that these fields are also lowest ranked in terms of gender-related papers when we use the alternative machine learning definitions.

We show in Appendix Figure A4 the trends separated by gender. On average, women are more likely to work on gender-related topics. While the increase in gender-related research is sharper for women, we also observe a sizable shift in research towards gender-related topics for men over the sample period.

In Appendix Figure A5, we present the trends for a select number of gender-related fields. We observe an increase in gender-related research production across all disciplines. This graph reveals that the fields with the highest increase in gender-related research were psychology and sociology.

In Appendix Table A3, we compare how share of papers related to gender differ across universities that switched to coeducation during this period from male-only with schools that opened as coeducational in 1940. The share of papers related to gender in the all-male schools that switched to coeducation is significantly lower compared to those that were always coed by 1 percentage points or 14% compared to the overall mean in the always-coed schools.

The descriptive trends highlighted in this section show that the time period during which universities in our sample transition to coeducation coincided with an increase in gender diversity in research. This shift towards gender-related topics came from both male and female researchers, and occurred broadly across many fields.

3.6 Summary Statistics

Table 1 presents the summary statistics on the full sample of schools that turned coed from 1960 to 1990 at the school level (Panel 1a), school-subfield level in the gender-related fields (Panel 1b), and researcher level (Panel 1c).[21] All characteristics are measured in the year before the school has switched to coeducation, $\tau = -1$.

In the sample of schools that transitioned to coeducation, 93% of the schools are private and a majority of the schools are either masters or baccalaureate colleges. 28% are doctoral or research universities. The average university opened in 1851. The schools were relatively small with a total fall enrollment of 2,496 on average and 539 students in the graduating class. 7% of the graduating cohort was female, which in most cases represented female students graduating from separate single-sex baccalaureate programs on campus, such as nursing or education programs (Goldin and Katz, 2011).

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

Each school had 138 total faculty members on average. The faculty was disproportionately male: female faculty share was 8%. There were 50 total assistant professors of whom 13% were female.

In terms of research production, the average university produced around 128 papers across all disciplines prior to switching to coeducation and 4.04 gender-related papers, 3.96 of which were published in gender-related fields. 3% of all research publications were gender-related.[22]

The average total number of researchers was 200, 12% of whom female. These numbers differ slightly from the statistics calculated using faculty data from HEGIS. This discrepancy comes from three reasons. First, because we identify researchers based on publications, authors in MAG can include faculty, postdocs, graduate students, visiting scholars, and other researchers who were affiliated with the university when the paper was published. Likewise, faculty reported in HEGIS may not necessarily conduct research and hence we would not observe them in the MAG data. Second, we have a much smaller sample of schools for the faculty data at $\tau = -1$ because the data series for faculty in the HEGIS dataset begins in 1971 compared to 1950 for the MAG data. Third, there may be researchers at the university who have not started publishing by $\tau = -1$ that we do not observe. In general, when we compare the MAG data with the HEGIS data for the same university, the number of researchers is on average about 70% of the total number of faculty across all years, suggesting that a substantial proportion of faculty did not publish.

In Panel (b), we present descriptive statistics at the school-subfield level, restricting to the gender-related fields.[23] Within each school-subfield, there were 7.48 researchers active at $\tau = -1$. Women represented 10% of the researchers. On average, 5.62 papers were published at each subfield. 0.35 were gender-related. The average gender-related paper share was 4%.

Summary statistics at the researcher level are presented in Panel (c). These statistics are also based on the sample that is restricted to the gender-related fields. The table shows that at baseline, the average researcher had 5.85 years of publication experience, 5.72 of which was at the school that transitioned to coeducation. This suggests most researchers had worked at only one institution prior to the reform. Women had slightly lower publication experience at 4.92 compared to 6.03 years for men. The average researcher published 1.03 papers in the year prior to coeducation. 0.06 of them were related to gender. Women were more likely

[22]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.

[23]Note that both researchers and publications may be assigned to multiple subfields if a paper is multidisciplinary. As a result, aggregating these statistics to the school level will give a higher number of researchers and publications than in Panel (a).

to produce gender-related research compared to men. 9% of their work was gender-related compared to 5% for men.

4 Empirical Strategy

In this section, we present our estimating equations and describe the identifying assumptions. We employ an event study methodology, or a generalized difference-in-differences design with staggered adoption, to identify the causal impact of coeducation on student and research outcomes. Using an event study allows us to identify the dynamic effects in the years after a college has turned coed. Due to the lengthy research process and publication lag, we expect changes in gender-related research production to increase gradually over time and manifest in publications several years after the switch to coeducation. As a result, we allow the effects to vary flexibly over time.

We estimate the effect of turning coed on a series of student and research outcomes using the equation:

$$E(y_{it}|\mathbf{X}_{it}) = f(\sum_{\tau \neq -1} \beta_\tau YearRelativeCoed_\tau + \theta_i + \delta_t + \gamma_{dt}) \tag{1}$$

where y_{it} is the outcome of interest. i denotes the unit of analysis which, depending on the outcome, may be at the school-level, researcher-level or the school-subfield level. The subfield is defined as the first sub-classification of the broad field of study (e.g., labor economics is a subfield of economics). t is the calendar year and τ denotes the year relative to coeducation. For each school, we denote $\tau = 0$ as the first full year of coeducation. $YearRelativeCoed_\tau$ are indicators for each year relative to when the school turns coed. We include the full set of event time dummies. The effect at $\tau = -1$ is normalized to zero, such that all coefficients can be interpreted as the effect of coeducation at each event time relative to the year before the school has turned coed.[24] We also include unit fixed effects (θ_i) and calendar year fixed effects (δ_t). Unit fixed effects control for any systematic differences in our outcomes across schools, researchers or subfields. Year fixed effects flexibly control for any overall changes in our main outcome variables that are common across units. In all of our specifications, we use all available observations between $\tau \geq -20$ and $\tau \leq 20$. We will report only the event

[24] 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.

study coefficients estimated in the period between $\tau \geq -5$ and $\tau \leq 6$ as our sample is mostly balanced during this period.[25] In Appendix Figure A6, we show the number of universities we observe in the MAG data for each year since coeducation. The data is balanced starting two years prior to coeducation. Five years prior to coeducation, we observe 65 out of 74 universities, or 87.8%.

In general, for most of our research outcomes, we estimate equation (1) at the school-subfield level. This allows us to include school-subfield fixed effects to capture inherent, time-invariant differences across fields in their propensity to conduct gender-related research.[26] For research outcomes, we also include discipline (humanities, science, and social sciences) by year fixed effects, γ_{dt}, to control for changes in research output that are common within disciplines.[27] In Section 5.2.3, we show the results are robust to the inclusion of field-by-year fixed effects at a lower level of field aggregation.[28]

The function $f(\cdot)$ depends on the outcome variable of interest. In most cases, $f(\cdot)$ is the linear function and we estimate the model using OLS. When y_{it} is count data such as the number of gender-related papers, we follow the innovation literature (Azoulay et al., 2019; Azoulay et al., 2010) and estimate the model using a Poisson quasi-maximum likelihood (QML) model, in which case $f(\cdot)$ is the exponential function. 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).[29] 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., $\frac{1}{4}\sum_{\tau=3}^{6}\beta_\tau$).[30] By taking a simple average of the post-period coefficients, we do not have to assume a parametric form for the effects. 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.

[25]We show in Section 5.2.3 that our results are robust to restricting to different time horizons, such as using all observations from $\tau = -35$ to $\tau = 44$.

[26]We show in Section 5.2.3 that our results are consistent when we conduct the analysis at the school level or at the school-field level.

[27]Humanities include art, history, and philosophy. Sciences include medicine, biology, and environmental science. Social sciences include psychology, sociology, economics, business, political science.

[28]However, the Poisson model does not converge for some outcomes that have less variation. As a result, our baseline specification includes the discipline-by-year fixed effects. The Poisson model also does not converge for some researcher-level outcomes, such as when we restrict the sample to only female researchers. To be consistent, we do not include discipline-by-year fixed effects when estimating results at the researcher level.

[29]We implement this using the Stata package, ppmlhdfe, which allows for multi-way fixed effects.

[30]This follows the methodology employed by Jacome (2020).

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.[31] The second identifying assumption is the parallel trends assumption, in which 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.[32]

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. There are several reasons for why this is unlikely to bias our results. First, if there is a correlation in changes in faculty interests and coeducation, we should observe an increasing upward trend in gender-related research output in the years prior to coeducation. In the results section, we show for our main outcome variables that there is limited evidence of an upward trend in the raw data prior to coeducation and the estimated pre-period coefficients do not differ significantly from zero.

Furthermore, as described in Section 2, the decision to turn coed was ultimately financially-driven and was made in response to the declining student demand and student quality by university administrators. These reasons are likely to be orthogonal to faculty research (Malkiel, 2016; Miller-Bernal and Poulson, 2004). In line with this hypothesis, we show in Appendix Figure A7 that prior to coeducation, student quality based on the high school GPA of the incoming freshmen classes was declining. These trends reverse after the arrival of female students. To further provide support for this identifying assumption, Appendix Table A2 shows the results from bivariate regressions between the year when the school switched to coeducation and each of the school-level characteristics. We find that the year of coeducation is not correlated with the public or private status, faculty size, gender com-

[31] Formally, in the notation of potential outcomes, this is equivalent to $E[Y_t - Y_t(0)|\mathbf{X}] = 0$ for all t prior to the policy, conditional on covariates $\mathbf{X}$.

[32] Formally, we assume that $E[Y_{it}(0) - Y_{it'}(0)|\mathbf{X}]$ has to be the same across units i for all periods t, t'.

position of the faculty, or baseline research production. Instead, schools that are masters colleges or universities, non-sectarian, Methodist, and those with earlier years of opening, are correlated with earlier transitions to coeducation.[33] In Section 5.2.3, we directly control for potential differential trends along these dimensions. We show that our results are robust to these additional controls. Additionally, in Section 5.2.3, we also address the concern that broader cultural shifts may be happening at different times across regions and may be correlated with timing of coeducation by including region-by-year fixed effects. We find similar results.

An alternative threat to identification is through spillovers across units, leading to a violation of the no anticipatory effects assumption. Potentially, scholars at universities that are treated later may be inspired by earlier universities switching to coeducation and begin producing gender-related research prior to coeducation. This would lead to a downward bias in our results. Alternatively, faculty that preferred a male-only environment may choose to enter schools that switched to coeducation later. As a result, the universities that switched later may be producing fewer papers prior to coeducation than they would have otherwise. This would then lead to an upward bias in our results. However, we show in Appendix Section G no evidence of spillover effects of turning coed on universities outside of the sample in the same city or with close collaboration ties.

Recent econometric studies have highlighted that the event study coefficients may be biased if there is heterogeneity in treatment effects between groups of units treated at different times (de Chaisemartin and D'Haultfoeuille, 2020; Goodman-Bacon, 2019; Borusyak et al., 2021; Callaway and Sant'Anna, 2020; Sun and Abraham, 2020). In these cases, each event time coefficient may be "contaminated" with effects from other cohorts. Specifically, Sun and Abraham (2020) show the coefficients are linear combinations of cohort-specific effects from multiple relative periods. The presence of heterogeneous treatment effects can lead to negative weights, potentially causing the estimated treatment effect to be negative even if the true average treatment effects are all positive (de Chaisemartin and D'Haultfoeuille, 2020).[34]

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

[34]As shown by Goodman-Bacon (2019) and Callaway and Sant'Anna (2020), the inclusion of a control group can partially help to alleviate this issue. Because schools that have already turned coed prior to our sample may be on different trends in gender-related research production in the presence of heterogeneous treatment effects, the ideal control group would be never-treated schools that remain male-only and never turn coed until after the end of our sample period in 1990. Unfortunately, there are only 4 universities in the

It is important to highlight that these concerns have only been examined for the linear model. While we utilize OLS for estimating impacts on student outcomes such as female bachelor degree share or log number of students, our main estimating equation for gender-related research productivity is a Poisson model. Due to the large number of zeroes in the outcome variable, the linear model is unlikely to be appropriate in this case and can lead to biased results. However, it has not been documented in the literature whether the conditional fixed effects Poisson model also suffers from the same concerns related to the two-way fixed effects model. To make progress on this question, in Appendix Section C, we conduct Monte-Carlo simulations that show that the Poisson model can, indeed, also lead to biased estimates in cases with heterogeneous treatment effects across cohorts. 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.

Given the potential for biased estimates, we conduct two exercises to show that heterogeneous treatment effects are unlikely to greatly bias our results. First, we implement a test for the potential influence of negative weights proposed by de Chaisemartin and D'Haultfoeuille (2020).[35] We find that at the school level the total sum of the negative weights equals to only -.02. At the school-subfield level, the sum of the negative weights is zero.[36] Given that all weights must sum to one, these results indicate that the negative weights are not influential in this setting. Second, in Section 5.2.3, we test the robustness of our results using an alternative estimator proposed by Sun and Abraham (2020) that allows for heterogeneous treatment effects. We show that our results are consistent when using this alternative estimator, further suggesting that the negative weights associated with heterogeneity in treatment effects are unlikely to be an important concern in our setting.

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-

United States that continue to be male only after this period. As a result, in our preferred baseline analysis, we do not include a control group.

[35]We utilize the Stata package provided by de Chaisemartin and D'Haultfoeuille (2020), "twowayfeweights".

[36]At the school level, 363/1533 ATTs are negative while at the school-subfield level, 0/72145 ATTs are negative.

related research. We found larger effects in the social sciences such as psychology and sociology. We also show that universities with the largest increase in female students experienced a greater increase in gender-related research output. We then provide evidence on the robustness of our results.

5.1 Effects of Turning Coed on Student Body

We first consider how transitioning to coeducation altered the composition of students at the universities. In Figure 2a, we plot the average female share of bachelor's degrees awarded and log total degrees awarded in the years up to and after the implementation of the policy. 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.[37] As hypothesized, female students on average increased sharply to nearly 30% of the graduates in the fourth full year of coeducation ($\tau = 3$). It is worth noting that the average female share is nonzero in years prior to coeducation because many schools accepted transfers or had a select number of classes for women in separate colleges such as the nursing or education schools (Goldin and Katz, 2011). Appendix Figure A8 shows the distribution of the female share of bachelor's degrees at $\tau = -1$, the period prior to coeducation, and $\tau = 3$, the period after turning coed in which the first cohort of female students is expected to graduate. The figure shows a substantial change in the distribution of female student share across universities before and after coeducation. Prior to the policy, the vast majority of the universities were less than 10% female.[38] 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%.

How did the arrival of female students affect the total student body size? One possibility is that the universities substituted female students one-for-one for male students. Another possibility is that the universities enlarged the class size. At institutions such as Yale University, the admittance of female students in the first years did not correspond to a reduction

[37] Recall that year 0 is normalized to be the first full year of coeducation.

[38] 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%.

in male students. In 1969, when Yale transitioned to coeducation, 230 women were admitted along with the usual class size of 1,000 men (Fetters, 2021). In Figure 2b, we provide suggestive evidence that, indeed, the size of the student body increased on average. Comparing log total bachelor's degrees awarded at $\tau = 3$ relative to $\tau = -1$, we observe an increase of around 0.25 log points.

The descriptive trends shown in Figure 2 are confirmed by our regression results. 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 A9, 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 2. Consistent with the descriptive evidence, the female share of bachelor's degrees significantly increased by 21 percentage points. Relative to the baseline share of 7%, this indicates women made up 28% of the graduating classes three to six years after coeducation. Total degrees increased by 18% during the same period, suggesting that the schools increased student body size to accommodate the new female students. The magnitudes are similar when we consider fall enrollment instead of degrees awarded.

Heterogeneity by Major

In Appendix Table A4, 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 A10a. We report the analogous results for log bachelor's degrees awarded by field in Appendix Table A5 and Appendix Figure A10b.

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.[39] 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.[40]

[39] 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`.

[40] 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.

The increase in female students as well as the changing size of the departments can have important implications for the research being produced in these departments by, for example, affecting the composition of faculty and the content of classroom discussions. In the next section, we will explore how transitioning to coeducation influenced the research production at these universities and the underlying mechanisms.

5.2 Effects of Turning Coed on Gender-Related Research Production

We next consider the effects of turning coed on gender-related research. Before presenting the formal regression results, we show the variation in the raw data. In Figure 4, we plot the average number of gender-related papers at the subfield level across universities in the years before and after turning coed. The figure provides transparent suggestive evidence on the impact of coeducation on gender-related research. As shown in Figure 4, in the years prior to turning coed, the number of gender-related papers per school-field averaged around 0.35 papers per year. After turning coed, this number sharply increased. Five years after coeducation, the average number of papers nearly doubled to 0.65 papers per subfield per year. Similarly, after controlling for the total number of papers published, we also observe an increase in the number of papers that are related to gender at the subfield level post reform. This increase is concentrated in years two and three after the reform.

We confirm these descriptive patterns in our regression analysis. Figure 5 plots the event study coefficients from estimating the Poisson model on our main definition of gender-related research. We present the corresponding figures for the subcomponents, the number of papers with a gender-related word in the title and the number of papers with a gender-related word in the abstract, in Appendix Figure A11. We summarize the magnitude of the effects in Table 3. The omitted period is the year prior to coeducation.

We first note that the validity of our identification strategy is supported by the lack of pre-trends in the figure. There is limited evidence that research related to gender was trending upwards prior to turning coed. This would be the case if researchers began increasing gender-related research output even prior to coeducation. Instead, the coefficients in the pre-period are overall small in magnitude and are not statistically different from zero.

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 17% increase in the number of gender-related papers at the subfield level in Column (1).[41] The increase was highest three years after the reform, as we may expect due to publication lag. In particular, gender-related research production was 42% higher 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 0.35 papers, this is equivalent to 0.15 additional papers between the third and sixth year after the policy change. This magnitude is similar to the increase we observe in the raw data, shown in Figure 4. At the university level, this effect size corresponds to an additional 1.68 publications compared to the baseline average number of gender-related publications of 3.96 papers among gender-related fields.

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 40% in years three to six (Column (2)). In comparison, the magnitude is smaller and insignificant for the number of gender-related papers based on the title of the paper. However, since the baseline mean for this outcome is much smaller, we are likely under-powered to detect an effect.

In Table 4, we show that our main results on gender-related research are similar when we account for potential changes in total research production at the subfield level in our estimation. We report the baseline results in Column (1), and the results when we control directly for the total number of papers published in Column (2). The inclusion of the control has minimal effect on the estimates for gender-related research. Consistent with this result, in Column (3) we find an increase in the share of papers related to gender by 1.8 percentage points, or a 45% increase. These results suggest that there was a shift in research focus towards gender-related research, representing a growing gender diversity in research topics at the university.

5.2.1 Heterogeneity by Field

To unpack these results, we first consider whether the effects are concentrated in specific fields. In Appendix Figure A12 and Appendix Table A6, we present the results on gender-

[41]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, $17\% = (e^{0.153} - 1) \times 100$.

related research for each field.[42] The effects are estimated by interacting the event time dummies in the baseline specification with a categorical variable for the fields. The results show that the largest effects are in the social sciences, including sociology, psychology, and economics. In these fields, transitioning into new research topics related to gender potentially may be less costly. For example, research in the social sciences do not require large capital expenditures on research equipment and are often not conducted in research labs that may already have set research agendas. We find slightly smaller increases in biology and medicine, followed by humanities. The smaller effect for humanities may reflect the nature of the publication process in these fields. Because scholars are more likely to publish books rather than journal articles in these fields, it may take longer for the effects to manifest.

5.2.2 Heterogeneity by Female Enrollment

Next, we study whether the increase in gender-related research is related to the increase in the proportion of female students at the university after the policy. As we showed in Appendix Figure A8, there is considerable variation in the female share of bachelor's degrees awarded in the immediate aftermath of the reform.[43] If increasing gender diversity drives the results on gender-related research, we would expect larger effects for schools that enrolled more female students.

We test this hypothesis by estimating 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 $\tau = 3$. 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.

Appendix Table A7 shows that our findings are driven by the schools that experienced the highest increase in female students.[44] The coefficient on the interaction term is positive and significant, suggesting larger effects for schools above the median. It is worth noting that the female share of bachelor's degrees at $\tau = 3$ may be endogenous as this is measured

[42] 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.

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

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

post reform. However, we think the results of this exercise provide valuable insights for two reasons. First, even if the relationship is not necessarily causal, it reveals a positive correlation between gender diversity of the student body and research. Second, based on historical evidence and our previous results, it is reasonable to think that the admissions policies of universities are largely uncorrelated with production of gender-related research.

5.2.3 Robustness Checks

In this section, we conduct a series of robustness checks to provide supporting evidence for the validity of our results.

Robustness to Issues Related to Staggered Difference-in-Differences Design

As we described in Section 4.1, the event study coefficient represents a weighted average of cohort-specific average treatment effects from units treated at different times (Sun and Abraham, 2020; de Chaisemartin and D'Haultfoeuille, 2020; Goodman-Bacon, 2019; Borusyak et al., 2021; Callaway and Sant'Anna, 2020). The presence of heterogeneous treatment effects and negative weights would invalidate the test for parallel pretrends when examining the pretreatment lead estimates, because each pre-period coefficient may be biased (de Chaisemartin and D'Haultfoeuille, 2020). Although these econometric concerns have been highlighted for the linear model, simulations described in Section 4.1 reveal that negative weights and heterogeneous treatment effects can also lead to bias in a nonlinear model.

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. We present additional details on the estimator in Appendix Section D.

Appendix Figure A13 shows the comparison between the coefficients estimated using our baseline specification (1) and the coefficients produced using the Sun and Abraham (2020) approach 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 estimates for the total number of gender-related papers. For student outcomes, the estimates are nearly identical. For the number of gender-related papers, the estimates differ slightly and even though the comparison is with the Poisson coefficients, 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.

Robustness of Gender-Related Research Definition

We validate our measure of gender-related research in several ways. First, in Appendix Figure A14, we compare the trends in gender-related research in medicine using our definition with the share of patent applications that are female-focused as identified by Koning et al. (2021). The gender focus of the patent in Koning et al. (2021) is identified by passing the patent text through the National Library of Medicine's Medical Text Indexer (MTI) which classifies "Male" or "Female" as one of the top Medical Subject Headings (MeSH). We can observe that the trends and magnitudes using the two methodologies are very similar. However, the share of gender-related papers using our definition is lower, reflecting that our list of keywords do not include many medical terms and conditions.

We next show our results are robust to using alternative definitions of gender-related research. First, as we described in Section 3.3, we construct two sets of keywords to identify gender-related research. We show that our results are robust to using the alternative list with a broader set of words.

Second, 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 B.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 higher than 75%.

Appendix Figure A15 reports the event study coefficients of the effect of turning coed on the number of gender-related papers produced using our three alternative measures: baseline definition, alternative broader set of keywords, and Naïve Bayes. Appendix Table A8 summarizes the causal effects. We find a consistent pattern across all definitions of a clear and sharp increase in gender-research production after coeducation. In addition, we test whether the results using the machine learning definition are robust to different thresholds for classifying gender-related research. As mentioned above, the current definition classifies a publication as gender-related if it has a predicted probability higher than 75%. In Appendix Table A9, we show the results are robust to using the cutoffs 80% and 90%.

Third, 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 results in Appendix Figure A16. We find a consistent pattern in gender-related word usage.

Additional Checks

We also run a series of alternative robustness checks. First, to provide support for the parallel trends assumption, we include additional controls to account for potential differential trends across universities based on pre-existing differences. As shown in Appendix Table A2, the year of coeducation was correlated with the type of university, year of opening and religious affiliation. In Appendix Figure A17, we show our results are robust to allowing different linear trends for Carnegie classification, year of opening categories and religious affiliation.[45]

An alternative 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.[46] In Appendix Figure A18, we show that our results are robust to the inclusion of region-by-year fixed effects, where region is given by the nine U.S. Census divisions.

Next, we conduct a randomization test in which we assign placebo turning coed dates to all schools in our sample.[47] We do this 1,000 times and in each iteration, we estimate

[45]The Poisson model does not converge if we use fixed effects instead of linear trends. 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.

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

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

the equation (1) for our main outcome variable, the number of gender-related papers. In Appendix Figure A20, 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 effects are much larger than any of the placebo effects, providing supporting evidence that the estimated impact of turning coed on research is unlikely to have occurred by chance.

Appendix Figure A21 shows that our results are unchanged after restricting to the sample of journal articles.[48] We also show that our results are robust to dropping medicine. Because many medical schools are not on the same campus as the main undergraduate colleges, if our results are driven by medicine, this may indicate a spurious correlation. However, as shown in Appendix Figure A22, the results are largely unchanged after dropping publications in medicine.

Additionally, we 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. In Appendix Table A10, we show that the results remain very robust to 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. In Appendix Figure A23, 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.[49] The pattern of effects as well as the magnitudes are very similar. Finally, in Appendix Figure A24, we show 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.

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. Note that the number of gender-related papers at the school level is given by the product of three components: the number of researchers at the university, number

[48]As explained in Section 3, in our main analysis, we include all research publications, including journal articles, books, and conference papers.

[49]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.

of papers per researcher, and the share of papers related to gender per researcher. This simple decomposition suggests that the increase in gender-related research can come from the following: (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.

We will show in this section that the increase in gender-related research does not come from changes in the number of faculty or average productivity per researcher. Instead, the result is explained by the third component: after coeducation, the average researcher must have a higher share of research output that is related to gender. We show this increase in the propensity to study gender-related topics at the researcher level is driven by two key channels. First, there was a change in the composition of researchers at the university, such that the average researcher was more interested in gender-related topics at baseline. Second, we document a direct impact on scientist's research interests in gender-related topics. Specifically, we find that exposure to coeducation shifted the research focus of incumbent researchers. We then conclude the section with a bounding exercise on the relative magnitude of these effects.

6.1 Changes in Number of Faculty and Researchers

We first consider whether coeducation increased the number of researchers at the university. As we have documented in Section 5.1, the policy change led to an increase in the student body size. Moreover, historical accounts suggest that the admissions of female students improved the finances of universities. In response, universities may hire new researchers and new faculty, leading to an increase in gender-related research production. To test this hypothesis, we investigate the effect of turning coed on the total number of faculty and researchers at the school level. We do not find an effect of the policy on these outcomes as shown in Appendix Table A11.

While we do not observe an increase in faculty size at the school level, universities may shift resources across departments. For example, departments that received an influx of female students may hire more faculty, potentially at the expense of other departments. As Appendix Figure A25 shows the departments that are female-dominated in terms of student majors are also the departments that produce the most gender-related research.[50] As a result, an increase in total faculty in these specific departments would also lead to an increase in

[50] Appendix Figure A25 uses the sample of schools that were already coed or never turned coed.

gender-related research even if total faculty at the school does not change.

To investigate this potential channel, we classify fields as female-dominated based on the female major share and ask whether there were relatively more faculty and researchers in female-dominated departments as a result of coeducation. Because the fields where female students actually entered at a given school may be endogenous to the school's resource allocation, we define female-dominated fields using the distribution of female share in schools that were already coeducational prior to our sample period. Appendix Figure A26 shows the share of women majoring in each field between 1965 and 1984.[51] Notably, some of the fields, such as economics and business, which we classified as *gender-related* for our analysis, have a low female major share. Given that the share of female students over this time period for this sample of school was 49%, we classify as female-dominated the fields in which women were over-represented.[52]

In Appendix Table A12, we present the estimates for the outcome variable, the share of researchers publishing in female-dominated fields.[53] The regression is estimated at the school level and includes school fixed effects. We find that there was no significant increase in the proportion of researchers active in these fields.[54]

6.2 Changes in Research Productivity

Holding constant the number of faculty or researchers at the university, an increase in the number of gender-related research papers may also arise if there was an increase in research productivity among the scientists at the university. This productivity effect may come from several channels. First, the increase in student enrollment could generate additional revenues to fund university research. Second, the increase in diversity may increase research productivity. Although the evidence has been mixed, several studies have shown that diversity in a team setting or among firm management can boost productivity and innovation.[55] Although our setting focuses on vertical diversity (i.e., at the student level) rather than horizontal diversity (i.e., among the researchers) as in these studies, there may be spillovers in innovative thinking across all fields and topics, not unique to gender-related topics. As a result, we may

[51]Note that medicine includes both pre-medical and nursing programs.

[52]These are medicine, philosophy, art, sociology and psychology.

[53]Alternatively, we present the results for total researchers by each field separately in Appendix Table A13. We do not find evidence of an increase in researchers in any specific field.

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

[55]For example, see Horwitz and Horwitz (2007); Nathan and Lee (2013); Hong and Page (2004)

observe an increase in research production in both gender and non gender-related topics.

To test this hypothesis, we investigate the effect of turning coed on the number of papers produced by researchers at the researcher level. Appendix Table A14 shows the average effects from estimating equation (1) on the total number of papers per researcher.[56] We find no significant effect of the policy on this outcome, indicating that increases in research productivity are unlikely to explain the overall increase in gender-related research.

We also find no evidence that productivity increased in the fields that experienced an increase in department size due to coeducation. In Appendix Table A15, we present similar results for researchers in female-dominated industries and non female-dominated industries separately. We show there was no change in researcher productivity in either of these fields.

6.3 Changes in the Propensity to Produce Gender-Related Research

We have shown that the increase in research output related to gender cannot be explained by increases in number of researchers or research productivity. It follows that the increase in gender-related research must 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 on average higher 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.

6.3.1 Compositional Effect on University Faculty and Researchers

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

[56]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.

Gender Composition of Faculty

We first investigate whether there was a change in the gender composition of faculty at the university. Historical accounts suggest that the arrival of female students raised the demand for female faculty at these universities (Malkiel, 2016; Miller-Bernal and Poulson, 2004). Because female faculty researchers are more likely to write gender-related research as suggested by the baseline summary statistics (Table 1c) and by the literature (Nielsen et al., 2018; Koning et al., 2020), more female faculty can lead to an increase in gender-related research.

In Table 5, we present the effects of turning coed on the gender composition of the faculty at the school level.[57] 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. Since the baseline share of female faculty was 13%, this implies an increase to 17.8% female faculty, or 6.6 additional female professors (average number of faculty was 138), after coeducation. In contrast, we find null effects for professors of higher ranks, such as associate and full professors (Columns 3 and 4).

Researchers with Prior Interests in Gender Topics

Transitioning to coeducation may also increase the proportion of researchers who have 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 A27. We estimate equation (1) at the researcher level, using as outcome variable, an indicator that takes on the value of 1 if the researcher has prior interests in gender-related topics based on their publication history. The sample includes all researchers, both incumbent and new researchers, who have published at least one paper prior to the year of coeducation. The results are summarized in Appendix

[57] In Appendix Table A16, we present the analogous results for female researchers identified using the MAG dataset. The results from this analysis however is inconclusive due to the large standard errors and potential measurement errors in identifying female researchers in the publications database.

Table A17. 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. Under this broad definition, around 2.6% of researchers at baseline were interested in gender-related topics.[58] However, it is important to note that we can only define prior interests in gender topics for those with publications prior to the coeducation date of their respective university. As a result, it is possible that we underestimate the number of researchers that may be interested in gender topics.

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 6.5 percentage points (a large 150% increase) in the probability of having prior interests in gender-related topics in years three to six. Given the small baseline rate, it is unlikely that these researchers are driving most of the overall increase. However, these results indicate that coeducation resulted in a growing diversity in *who* conducts research at these universities. This change can help explain the overall increase in diversity in research topics.

6.3.2 Treatment Effect on Direction of Research of Scientists

Beyond changing the diversity of the faculty and researchers, coeducation may also impact researchers' propensity to produce gender-related publications through a *treatment effect* on the research focus of scientists at the university. Exposure to gender diversity may raise new research questions as the faculty and scientists work and interact in a more diverse environment. However, *a priori*, it is not clear that the research focus of scientists would change. As documented by Myers (2020) and Borjas and Doran (2012, 2015), moving across ideas space, or cognitive mobility, is costly for researchers. Given that the arrival of female students at the university is 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 becomes 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

[58]This is computed for those working in one of the gender-related fields.

for any time-invariant characteristics that determine the propensity to study gender-related topics.[59] We present the results in Table 6 with corresponding plots of the coefficients in Figure 6. 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.[60] Incumbent researchers wrote 54% more gender-related papers after coeducation in years 3 to 6 (Column (1)). This corresponds to an increase in research publications related to gender per researcher of 0.03 (=0.54×0.06) from 0.06 to 0.09 papers. Moreover, Column (2) shows that, during the same period, the share of gender-related papers increased by 1.7 percentage points (28%).

Table 7 shows the analogous results by gender. We estimate the main specification for male and female researchers separately. Figure 7 plots the corresponding event time coefficients. We find a meaningful treatment effect on both male and female researchers. Male researchers wrote 44% more gender-related papers on average (Column (1)). Importantly, we also find a shift in the focus of their research. After coeducation, we document a 1.4 percentage point (28%) increase in the share of gender-related papers written by male researchers (Column (3)). In contrast, female researchers had a larger treatment effect and wrote 104% more gender-related papers between three to six years after the school turned coed (Column (2)). Similarly, the share of gender-related papers written by female researchers increased by 4 percentage points, corresponding to a 44% increase (Column (4)).

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 to explore topics related to gender. Notably, because male researchers represented the vast majority of researchers at the schools (88%), they were the main drivers of the overall effect on total number of gender-related papers.[61]

In sum, these results on incumbent researchers document a novel determinant of research focus: the diversity of the academic environment. They highlight that social factors can be important drivers for the kinds of ideas and questions researchers choose to study.

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

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

[61]We note that the treatment effects estimated for incumbent researchers are based on the sample of researchers that continue to publish at the university after coeducation. In Appendix Section E, 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.

6.3.3 Quantifying the Treatment Effect on Research Focus

In the previous sections, 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

$$E[Y_i(1) - Y_i(0)] = \theta E[Y_i(1) - Y_i(0)|orig = 1] + (1 - \theta)E[Y_i(1) - Y_i(0)|orig = 0] \quad (2)$$

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 54%.[62] Given that the average university published 3.96 gender-related research papers at baseline (Table 1) 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 $E[Y_i(1) - Y_i(0)|orig = 1] = .54 \times 3.96 = 2.14$ additional gender-related papers. Plugging into equation (2) 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 $E[Y_i(1) - Y_i(0)] = .39 \times 2.14 = 0.83$. 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 42% in years 3 to 6 (See Section 3.3). This implies a total increase of $.42 \times 3.96 = 1.67$ papers at the university level. As a result, the relative magnitude of the treatment effect (.83) and the total effect (1.67) suggests that the treatment effect can account for at least 50% of the overall increase in gender-related research even assuming all new researchers were not affected by the policy.

Together, these calculations highlight that working in a more gender-diverse academic environment meaningfully changed university research production, in part, by influencing the research interests of the individuals working at these universities. In the following section, we will explore potential mechanisms for why we observe this sizable treatment effect on scientists.

[62]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 E.

7 Explaining the Treatment Effect on Research Focus

What explains the large treatment effect on scientists' research interests? In this section, we provide evidence on three mechanisms: (i) classroom interactions between faculty and students, (ii) interactions between researchers and students in research settings, and (iii) changes in peer interactions among faculty and researchers. We first show that after coeducation, there was an increase in courses related to gender, which can indirectly affect the choice of research topics among faculty. Second, we conduct a case study in psychology to show that the increase in gender-related research was driven by experimental research, which traditionally recruits undergraduate students as research participants. Finally, we show that coeducation changed interactions between peer researchers. Specifically, we find that the increase in gender-related publications by incumbent male researchers resulted partly from co-authorships with new female researchers at the university after coeducation. This result indicates that a change in collaboration networks can partially explain the shift in research focus.

7.1 Classroom Interactions between Faculty and Students

We examine whether the increase in undergraduate gender diversity leads faculty to study new questions related to gender because of changes in class topics. Anecdotal evidence suggests that the presence of female students induced changes in the curriculum and course offerings. For example, at Yale University, the Special Assistant on the Education of Women, Elga Wasserman "argued forcefully for womens studies as a necessary element of coeducation and organized eight courses focused on women by the second year [of turning coed]" (Yale University, 2019). This demand for gender-oriented content may have prompted professors to update their curriculum and indirectly affected their research production.

To investigate this effect, ideally, we would be able to link professors and their research to the content of the courses they taught, as well as the gender composition of the students. Unfortunately this data is not available. Instead, to provide evidence on whether coeducation led to changes in course content, we collect and digitize course catalogue with full course descriptions for 22 universities that transitioned to coeducation during our sample period. We study whether coeducation had an impact on courses related to gender. 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.

In line with this hypothesis, we show in Appendix Figure A28 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 of gender-related classes and share of gender-related classes. Appendix Figure A29 presents the plot of the regression estimates. Appendix Table A18 reports the average effects over years 0 to 2 and 3 to 6. These results show that the number of classes increased by 4.8 classes.[63] 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 course content and class discussions may be changing even in classes that are not explicitly gender-related. 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

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

psychology as this is a field that traditionally uses undergraduates as subjects.

In Appendix Table A19, we investigate whether the increase in gender-related research in psychology was higher for experimental research.[64] Table A19 shows the 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. 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 can be partly shaped by interactions with students in the classroom and in research settings. In addition, coeducation may also change the interactions among peers. For example, changes in the composition of researchers may expose researchers to different colleagues. They may now collaborate with researchers with different ideas and different interests. This can, in turn, generate interest in gender-related topics through peer effects.

In Appendix Table A20, 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.[65] 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 2.3 percentage points, or 29%. Three to six years after coeducation, the likelihood of writing a gender-related paper was 10.3%. A substantial part of this increase came from collaborations with female researchers. In Column (4), we show

[64] We classify a paper as experimental if it contains one of the words "experiment", "lab", "participant", "treat", or "control" in the title or abstract.

[65] Collaborators may be in a different field at the same university.

that the likelihood of writing a gender-related research paper with a female collaborator increased by 1 percentage points to 2%, which explains about 20% of the total probability. For male researchers, the difference in magnitude between columns (2) and (5) suggests that the increase in gender-related research by male researchers is partially explained by collaborations with female researchers.

We now explore the nature of these co-authorships. One explanation for this increase in the likelihood of co-authoring with a female researcher on a gender-related paper is that researchers are more likely to co-author with female researchers after coeducation. In Appendix Table A21, 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.

We next explore whether co-authorships after coeducation occurred more frequently with incumbent female researchers. In Appendix Table A22, we find that the likelihood of male researchers collaborating with incumbent female researchers declined after the reform (largely due to attrition of researchers). Given that there was no change in the likelihood of collaborating with a female researcher, this suggests the male researchers were increasingly collaborating with *new* female researchers who may bring new ideas. Interestingly, as we showed in Appendix Table A20, male researchers were also exploring gender-related topics even when they were not co-authoring with female researchers.[66]

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 new female researchers who may have expertise on the subject matter.

8 Discussion: Welfare Implications

The increase in research focus on gender-related topics may have important welfare implications. However, quantifying these effects is difficult and requires ascertaining the value of research after coeducation, which includes both the new gender-related research and the new *non* gender-related research, as well as the counterfactual value of research the univer-

[66]Results for female researchers differ slightly. Appendix Table A21 shows a positive effect on the likelihood that a female incumbent researcher will collaborate with another female researcher. In Appendix Table A23, we find female researchers were more likely to co-author after coeducation, suggesting that women were increasingly more likely to be included as part of the collaboration networks at the university.

sity scholars would have produced. To do so, we would need to quantify the quality of the research and assign a value for the importance of conducting research in a gender-related topic compared to another research topic. As a result, it is beyond the scope of this paper to fully characterize the welfare implications of our findings. We provide some suggestive pieces of evidence that can speak to this question.

First, we focus on the number of citations as a measure of quality. Appendix Figure A31 shows that gender-related research papers tend to be of higher quality and consistently have a much higher probability of being in the top 10% of the citations distribution for all publications written in that field and year. Turning to causal estimates, we also find a small, but imprecise increase in total number of papers in the top 10% of the field-year citation distribution in Appendix Figure A32.

Second, we investigate whether coeducation increased medical research on women, which can have direct impacts on the health and well-being of women. To identify female-focused medical research, we use the National Library of Medicine's Medical Text Indexer (MTI) to obtain the top ten Medical Subject Headings (MeSH) for all papers in the field of medicine in our sample.[67] We classify a paper as female-focused if MTI applies the heading "Female", which refers to any research that covers "female organs, diseases, physiologic processes, genetics, etc.; do not confuse with WOMEN as a social, cultural, political, economic force." Appendix Figure A33 shows that coeducation had a substantial effect on female-focused medical research. The number of papers increased by 73% (=$(e^{.55} - 1) \times 100$) in years 3 to 6. Relative to the baseline mean of 0.09 papers, this represents 0.07 additional papers on female-related health issues.

Together, these results provide suggestive evidence that the increase in gender-related research potentially had a positive impact on quality of research and generated new research focused on women's health. Understanding which research topics were crowded out and the quality of this research would be an interesting avenue for future research to pursue.

9 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 the share of female students by 21 percentage points. At the same time,

[67] We follow the same procedure Koning et al. (2020) applied to patents text.

the publications of gender-related research increased by 42% between year three and five after the policy change. This corresponds to a 45% increase in the share of publications related to gender. We find the largest impacts for psychology and sociology, as well as universities that experienced the greatest change in female enrollment.

We isolate two key channels for this increase in gender-related research. Rather than an increase in university researchers or research productivity, the increase can be explained by a combination of (i) an increase in the diversity of the researchers at the university, in terms of gender and prior research interests, and (ii) a treatment effect on the research focus of university researchers. After coeducation, we observe a rise in gender-related research output and a shift in focus towards gender topics among *incumbent* researchers. A bounding exercise reveals that at least 50% of the overall gains in gender-related research can be explained by this treatment effect. This result documents for the first time that a policy that changes the diversity of the academic institution can change the direction of research of scientists.

We provide evidence for three mechanisms that can explain the sizable treatment effects for incumbent researchers. First, we find that there was an increase in course offerings related to gender, which can indirectly affect faculty's research interests through classroom interactions with students. Second, we show that the increase in gender-related research in psychology was driven by experimental research, which often involves undergraduate research subjects. This provides one example of how female undergraduates may influence the research production process. Third, we provide evidence that peer interactions with fellow researchers can be an important factor. We show that the increase in gender-related research among male incumbent researchers resulted from an increase in co-authorships with new female researchers, suggesting that peer effects may play a key role.[68]

A large body of research in economics has emphasized the importance of innovation for economic growth (Romer, 1990). However, "who" and "what" gets studied in research can have important implications not only for growth but also for welfare. The historical scientific gap in knowledge related to women has led to inequities in health knowledge and outcomes (Kirschstein and Merritt, 1985). Our findings suggest that in order to increase diversity in research topics and close the knowledge gap related to women and other minorities, it is important to consider not only the diversity of who is conducting research but also the diversity and inclusiveness of the academic environment. Our results indicate that increasing the diversity of the academic *environment* can broaden research interests and increase diversity in research, contributing to a richer body of scientific knowledge.

[68]In Appendix Section 8, we present a discussion of the welfare implications of our findings.

References

Alesina, A., J. Harnoss, and H. Rapoport (2016). Birthplace diversity and economic prosperity. *Journal of Economic Growth 21*, 101–138.

Alesina, A. and E. La Ferrara (2005). Ethnic diversity and economic performance. *Journal of Economic Literature 43*(3), 762–800.

Amabile, T. (2018). *Creativity in context: updates to The social psychology of creativity.* Routledge.

Amabile, T. M., R. Conti, H. Coon, J. Lazenby, and M. Herron (1996). Assessing the work environment for creativity. *Academy of Management Journal 39*(5), 1154–1184.

Anselin, L., A. Varga, and Z. Acs (1997). Local geographic spillovers between university research and high technology innovations. *Journal of Urban Economics 42*(3), 422–448.

Antecol, H., K. Bedard, and J. Stearns (2018). Equal but inequitable: Who benefits from gender-neutral tenure clock stopping policies? *American Economic Review 108*(9), 2420–2441.

Azoulay, P., C. Fons-Rosen, and J. S. Graff Zivin (2019, August). Does science advance one funeral at a time? *American Economic Review 109*(8), 2889–2920.

Azoulay, P., J. Graff Zivin, and J. Wang (2010). Superstar Extinction. *Quarterly Journal of Economics 125*(2), 549–589.

Becker, S. O. and L. Pascali (2018). Religion, Division of Labor and Conflict: Anti-Semitism in German Regions over 600 Years. *Working Paper*.

Becker, W. E. and P. E. Kennedy (2005). Does teaching enhance research in economics? *The American Economic Review 95*(2), 172–176.

Beede, D. N., T. A. Julian, D. Langdon, G. McKittrick, B. Khan, and M. E. Doms (2011). Women in stem: A gender gap to innovation. *Economics and Statistics Administration Issue Brief* (04–11).

Bell, A., R. Chetty, X. Jaravel, N. Petkova, and J. Van Reenen (2018, 11). Who Becomes an Inventor in America? The Importance of Exposure to Innovation*. *The Quarterly Journal of Economics 134*(2), 647–713.

Biasi, B. and S. Ma (2020). The education-innovation gap. *Working Paper*.

Billings, S. B., E. Chyn, and K. Haggag (2021, September). The long-run effects of school racial diversity on political identity. *American Economic Review: Insights 3*(3), 267–84.

Borjas, G. J. and K. B. Doran (2012). The Collapse of the Soviet Union and the Productivity of American Mathematicians. *Quarterly Journal of Economics 127*(3), 1143–1203.

Borjas, G. J. and K. B. Doran (2015). Prizes and Productivity: How Winning the Fields Medal Affects Scientific Output. *Journal of Human Resources 50*(3), 728–758.

Borjas, G. J., K. B. Doran, and Y. Shen (2017). Ethnic Complementarities after the Opening of China: How Chinese Graduate Students Affected the Productivity of Their Advisors. *The Journal of Human Resources 53*(1), 1–31.

Borusyak, K., X. Jaravel, and J. Spiess (2021). Revisiting Event Study Designs: Robust and Efficient Estimation. *Working Paper*.

Calkins, A., A. J. Binder, D. Shaat, and B. Timpe (2020). When sarah meets lawrence: The effect of coeducation on women's major choices.

Callaway, B. and P. H. Sant'Anna (2020). Difference-in-differences with multiple time periods. *Journal of Econometrics*.

Card, D., S. DellaVigna, P. Funk, and N. Iriberri (2019, 11). Are Referees and Editors in Economics Gender Neutral? *The Quarterly Journal of Economics 135*(1), 269–327.

Charles, K. K., J. Guryan, and J. Pan (2018, August). The effects of sexism on american women: The role of norms vs. discrimination. Working Paper 24904, National Bureau of Economic Research.

Chawla, N. V., K. W. Bowyer, L. O. Hall, and W. P. Kegelmeyer (2002, Jun). Smote: Synthetic minority over-sampling technique. *Journal of Artificial Intelligence Research 16*, 321357.

Correia, S., P. Guimares, and T. Zylkin (2020). Fast poisson estimation with high-dimensional fixed effects. *The Stata Journal 20*(1), 95–115.

Criado-Perez, C. (2019). *Invisible women : data bias in a world designed for men.* New York : Abrams Press.

Currie, J. and E. Moretti (2003). Mother's Education and the Intergenerational Transmission of Human Capital: Evidence from College Openings. *Quarterly Journal of Economics 118*(4), 1495–1532.

de Chaisemartin, C. and X. D'Haultfoeuille (2020). Two-way fixed effects estimators with heterogeneous treatment effects. *American Economic Review 110*(9), 2964–2996.

Dittmar, J. and S. Seabold (2015, August). Media, Markets and Institutional Change: Evidence from the Protestant Reformation. CEP Discussion Papers dp1367, Centre for Economic Performance, LSE.

Fetters, A. (2021, May). The first of the 'yale women'.

Goldin, C. and L. F. Katz (2011). Putting the "Co" in Education: Timing, Reasons, and Consequences of College Coeducation from 1835 to the Present. *Journal of Human Capital 5*(4), 377–417.

Goodman-Bacon, A. (2019). Difference-in-difference with variation in treatment timing. *Working Paper 25018*.

Hattie, J. and H. W. Marsh (1996). The Relationship between Research and Teaching: A Meta-Analysis. *Review of Educational Research 66*(4), 507–542.

Heidari, S., T. F. Babor, P. De Castro, S. Tort, and M. Curno (2016). Sex and gender equity in research: rationale for the sager guidelines and recommended use. *Research Integrity and Peer Review 1*(1), 2.

Helsing, K. J., G. W. Comstock, M. B. Meyer, and M. L. Tockman (1982). Respiratory effects of household exposures to tobacco smoke and gas cooking on nonsmokers. *Environment International 8*, 365–370.

Hengel, E. (2019). Publishing while female: Are women held to higher standards? evidence from peer review. *Working Paper*.

Hong, L. and S. E. Page (2004). Groups of diverse problem solvers can outperform groups of high-ability problem solvers. *Proceedings of the National Academy of Sciences of the United States of America 101*, 16385.

Horwitz, S. K. and I. B. Horwitz (2007). The effects of team diversity on team outcomes: A meta-analytic review of team demography. *Journal of Management 33*(6), 987–1015.

Jackson, K. (2012). Single-sex schools, student achievement, and course selection: Evidence from rule-based student assignments in Trinidad and Tobago. *Journal of Public Economics 96*(1).

Jackson, M. O. (2009). Student demographics, teacher sorting, and teacher quality: evidence from the end of school desegregation. *Journal of Labor Economics 27*(2), 213–256.

Jacome, E. (2020). Mental health and criminal involvement: Evidence from losing medicaid eligibility. *Working Paper*.

Johnson, W. R. and J. Skinner (1988). Accounting for changes in the labor supply of recently divorced women. *The Journal of Human Resources 23*(4), 417–436.

Kerr, W. and W. Lincoln (2010). The supply side of innovation: H1b visa reforms and u.s. ethnic invention. *Journal of Labor Economics 28*(3), 473–508.

Kim, S. D. and P. Moser (2021, October). Women in science. lessons from the baby boom. Working Paper 29436, National Bureau of Economic Research.

Kirschstein, R. L. and D. H. Merritt (1985). Women's health. report of the public health service task force on women's health issues. *Public Health Reports (1974-) 100*(1), 73–106.

Koning, R., S. Samila, and J.-P. Ferguson (2019). Female inventors and inventions. *Working Paper*.

Koning, R., S. Samila, and J.-P. Ferguson (2020, May). Inventor gender and the direction of invention. *AEA Papers and Proceedings 110*, 250–54.

Koning, R., S. Samila, and J.-P. Ferguson (2021). Who do we invent for? patents by women focus more on women's health, but few women get to invent. *Science 372*(6548), 1345–1348.

Lavy, V. and A. Schlosser (2011). Mechanisms and Impacts of Gender Peer Effects at School. *American Economic Journal: Applied Economics 3*(2), 1–33.

Lee, D. S. (2009). Training, wages, and sample selection: Estimating sharp bounds on treatment effects. *Review of Economic Studies 76*, 1017–1102.

Malkiel, N. (2016). Keep the Damned Women Out: The Struggle for Coeducation.

Malkiel, N. W. (2018). *"Keep the damned women out": the struggle for coeducation*. Princeton University Press.

Manski, C. (2007). *Identification for Prediction and Decision*. Harvard University Press.

Miller-Bernal, L. and S. L. Poulson (2004). *Going Coed: Women's Experiences in Formerly Men's Colleges and Universities, 1950-2000*. Vanderbilt University Press.

Moser, P., A. Voena, and F. Waldinger (2014). German-jewish migrs and u.s. invention. *American Economic Review 104*(10), 3222–3255.

Myers, K. (2020, October). The elasticity of science. *American Economic Journal: Applied Economics 12*(4), 103–34.

Nagaraj, A., E. Shears, and M. de Vaan (2020). Improving data access democratizes and diversifies science. *Proceedings of the National Academy of Sciences 117*(38), 23490–23498.

Nathan, M. and N. Lee (2013). Cultural diversity, innovation, and entrepreneurship: Firm-level evidence from london. *Economic Geography 89*(4), 367–394.

Nielsen, M. W., J. P. Andersen, L. Schiebinger, and J. W. Schneider (2018). One and a half million medical papers reveal a link between author gender and attention to gender and sex analysis. *Nature Human Behaviour 1*, 791–796.

Nielsen, M. W., C. W. Bloch, and L. Schiebinger (2018). Making gender diversity work for scientific discovery and innovation. *Nature Human Behaviour 2*, 726–734.

Park, H., J. R. Behrman, and J. Choi (2018). Do single-sex schools enhance students STEM (science, technology, engineering, and mathematics) outcomes? *Economics of Education Review 62*, 35–47.

Price, H. (2016). 588 Superwoman: The Introduction of Coeducation at Yale, 1969-1973. *The Yale Historical Review 6*(1), 64–74.

Rao, G. (2019, March). Familiarity does not breed contempt: Generosity, discrimination, and diversity in delhi schools. *American Economic Review 109*(3), 774–809.

Romer, P. (1990). Endogenous Technological Change. *Journal of Political Economy 98*(5), S71–S102.

Rosser, S. V. (2002). An overview of women's health in the US since the mid-1960s. *History and Technology 18*, 355–369.

Sarsons, H., K. Gerxhani, E. Reuben, and A. Schram (2019). Gender differences in recognition for group work. *Working Paper*.

Schiebinger, L. (2000). Has Feminism Changed Science? *Signs 25*(4), 1171–1175.

Schwarz, D. R. (2016). Chapter 17. *Are Teaching and Research Mutually Exclusive?*.

Sinha, A., Z. Shen, Y. Song, H. Ma, D. Eide, B. june (Paul) Hsu, and K. Wang (2015). An Overview of Microsoft Academic Service (MAS) and Applications. *Proceedings of the 24th International Conference on World Wide Web (WWW 2015 Companion)*, 243–246.

Smart, R. (1966). Subject selection bias in psychological research. *Canadian Psychologist/Psychologie canadienne 7*.

Speer, R., J. Chin, and C. Havasi (2017). Conceptnet 5.5: An open multilingual graph of general knowledge. *In proceedings of AAAI 31*.

Su, T.-C. (1990). New women versus old mores: A study of women characters in ba jin's torrents trilogy. *Chinese Studies in History 23*, 54–67.

Sun, L. and S. Abraham (2020). Estimating dynamic treatment effects in event studies with heterogeneous treatment effects. *Journal of Econometrics*.

Treadwell, H. M., M. Ro, L. Sallad, E. McCray, and C. Franklin (2019). Discerning disparities: The data gap. *American Journal of Men's Health 13*(1), 1557988318807098. PMID: 30345874.

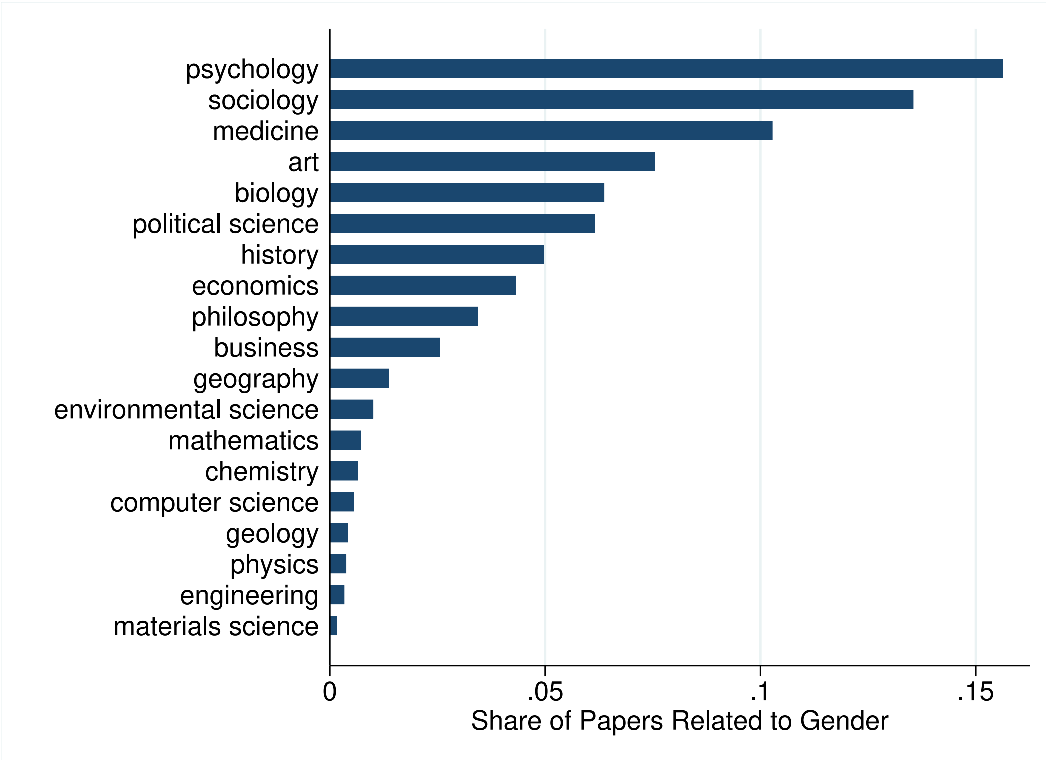
Trickett, E. and P. Trickett (1982). The independent school experience: aspects of the normative environment of single-sex and coed secondary schools. *Journal of Educational Psychology 73*(3), 374–381.

Wikipedia (2021, Oct). Wikiproject women in red.

Yale University (2019). WGSS at Yale: Reflections, Celebrations, and Visions. *Yale University: Womens, Gender, and Sexuality Studies*.

Figures

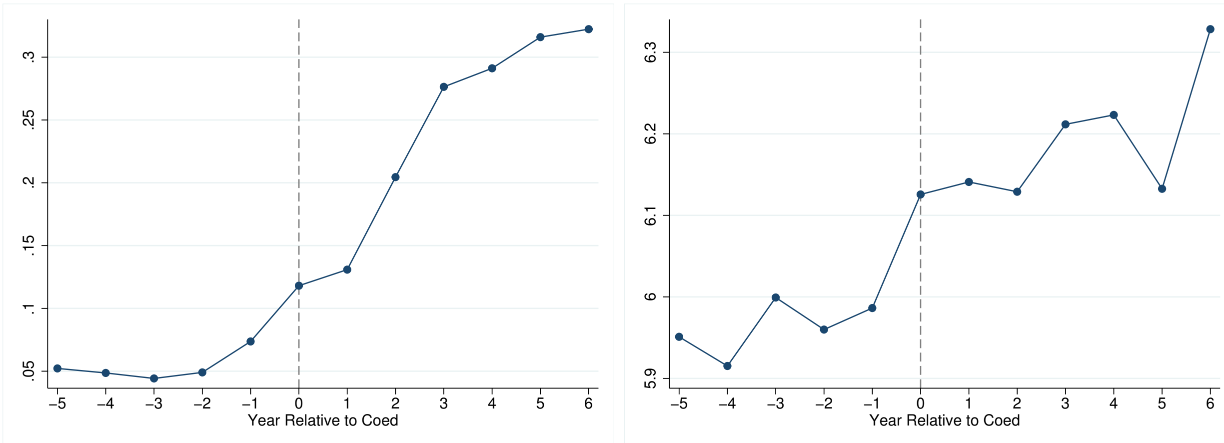
Figure 1: Gender Related Share of Papers by Field



Notes: Figure 1 shows the share of gender related papers by fields in universities that have transitioned to coeducation prior to 1940 or never turn coed from 1950 to 2005. In our analysis, we refer to fields in the top two terciles as the "gender-related fields" and exclude the bottom tercile of these fields.

Figure 2: Trends in Female Bachelor's Degrees Share and Log Bachelor's Degrees

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

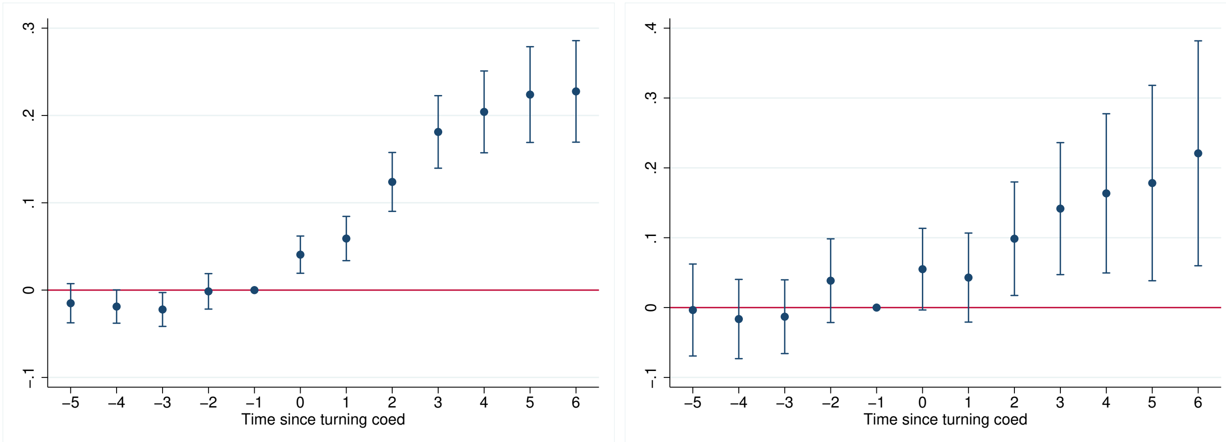


Notes: Figure 2 plots the average female share of bachelor's degrees and log total bachelor's degrees awarded across universities that switched to coeducation in the years before and after the event. The data on female share of bachelor's degrees and log total bachelor's degrees awarded come from the degrees completion series of the HEGIS/IPEDS database available from 1965 to 1998.

Figure 3: Effect of Turning Coed on Undergraduate Student Body

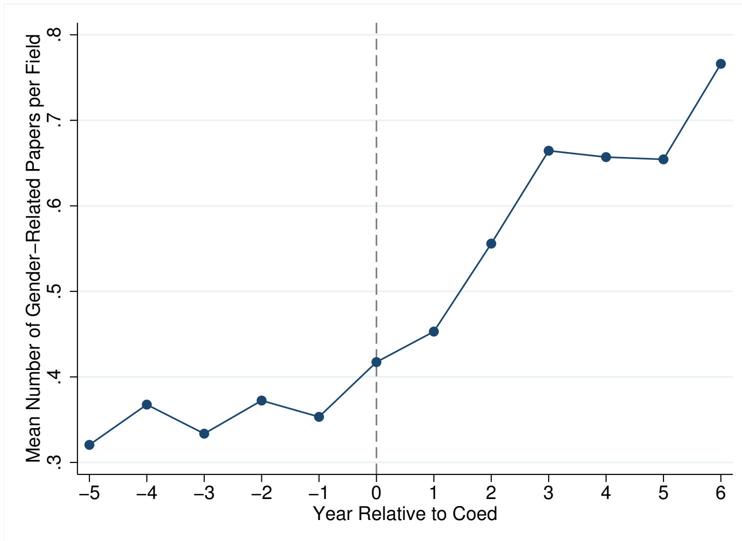
(a) Female Bachelor's Degrees Share

(b) Log Bachelor's Degrees Awarded



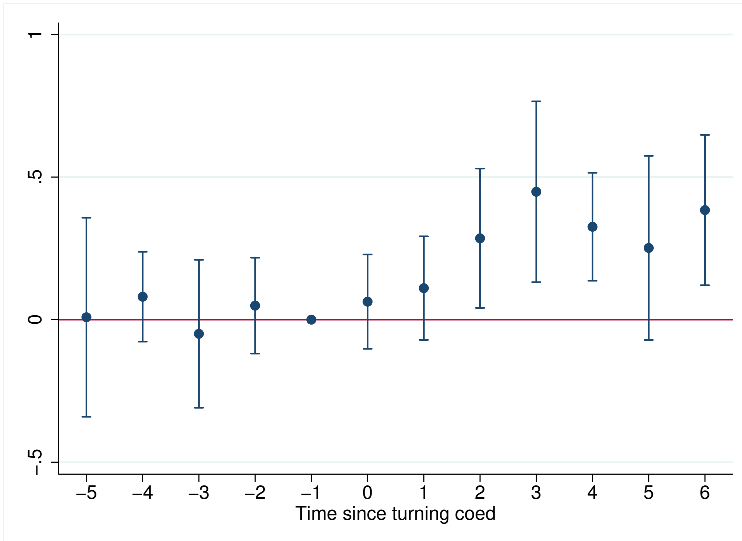
Notes: Figure 3 plots the event time coefficients and their 95% confidence intervals from estimating (1) for female share of bachelor's degrees awarded and log number of total bachelor's degrees awarded. Regressions are estimated using OLS. We include school fixed effects and year fixed effects. We cluster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

Figure 4: Trends in Number of Gender-Related Research Publications



Notes: Figure 4 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.

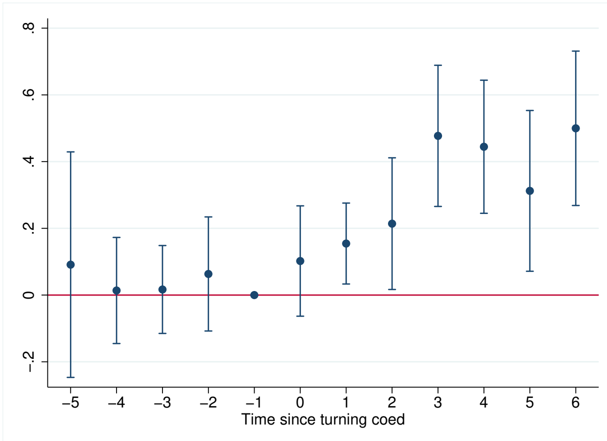
Figure 5: Effect of Turning Coed on Number of Gender-Related Publications



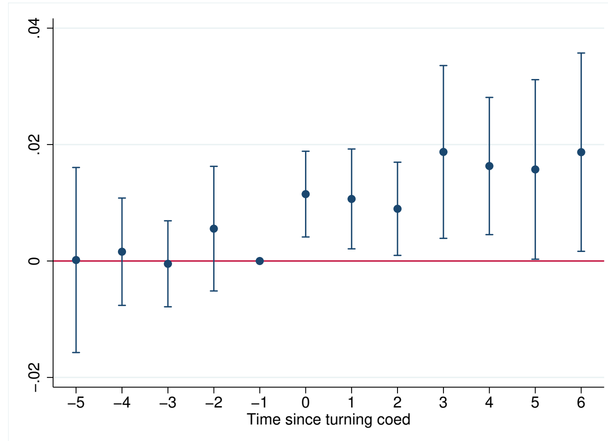
Notes: Figure 5 plots the event time coefficients and their 95% confidence intervals from estimating equation (1) for total number of gender-related research publications. The specification is estimated using a conditional fixed effects Poisson model. In the specification, we include school-subfield fixed effects, year fixed effects, and discipline-by-year fixed effects. We cluster at the school level.

Figure 6: Effect of Turning Coed on Gender-Related Research by Incumbent Researchers

(a) Number of Gender-Related Papers



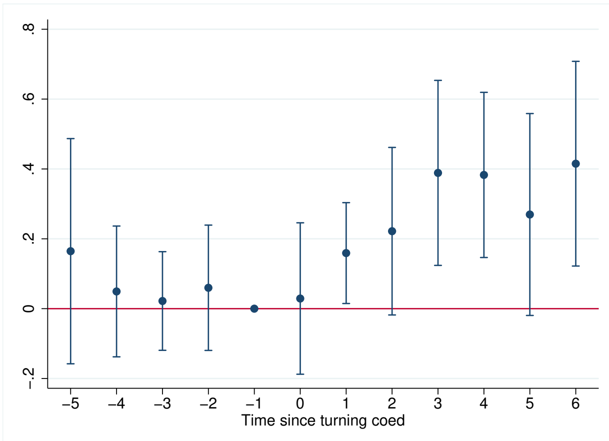
(b) Gender-Related Share



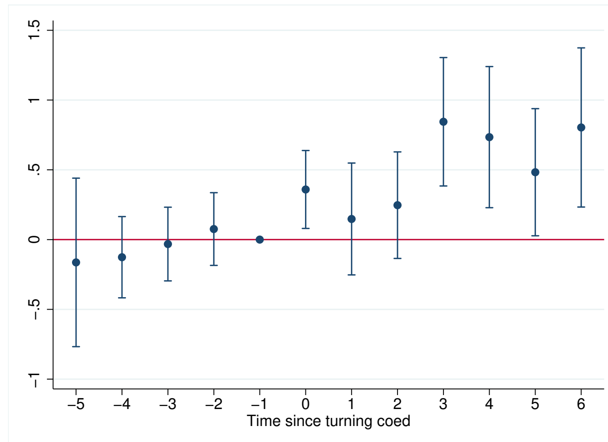
Notes: Figure 6 plots the event time coefficients and their 95% confidence intervals from estimating (1) for incumbent researchers, defined as researchers who have published one paper at the school prior to $\tau = -1$. The dependent variables are number of gender-related publications (Figure 6a) and share of papers related to gender (Figure 6b). 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. Standard errors are clustered at the school level.

Figure 7: Effect of Turning Coed on Gender-Related Research by Incumbent Researchers and Gender

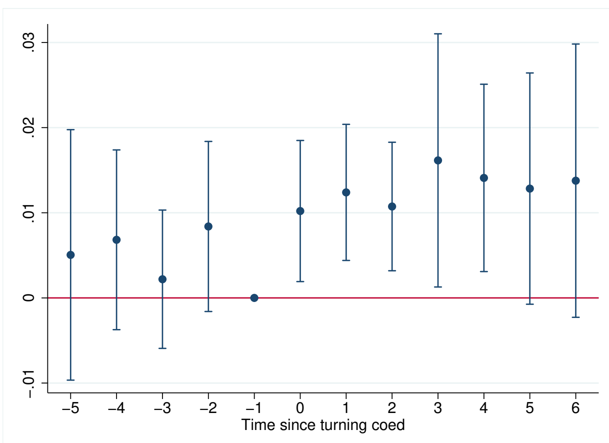
(a) Number of Gender-Related Papers (Males)



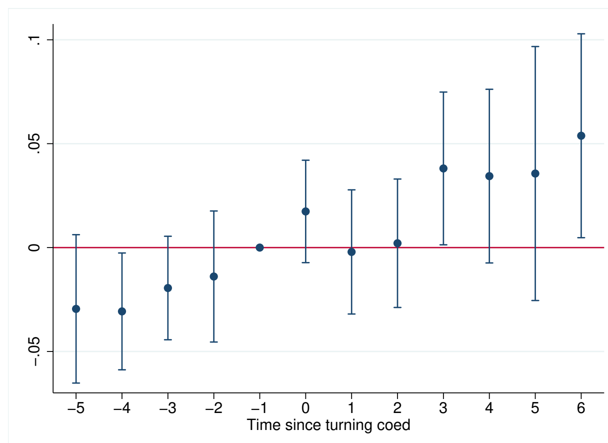
(b) Number of Gender-Related Papers (Females)



(c) Gender-Related Share (Males)



(d) Gender-Related Share (Females)



Notes: Figure 7 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 7a and 7b) and share of papers related to gender (Figures 7c and 7d). 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. Standard errors are clustered at the school level.

Tables

Table 1: 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	127.55	(336.77)	76
Number of Gender-Related Papers	4.04	(14.24)	76
Gender-Related Paper Share	0.03	(0.07)	67
Number of Gender-Related Papers (Gender-Related Fields)	3.96	(14.09)	76
Number of Researchers	199.72	(512.00)	76
Female Researcher Share	0.12	(0.17)	74

Notes: Table 1a 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.

Table 1: Summary Statistics – Continued

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

	Mean/SD
Number of Researchers	7.48
	(19.46)
Female Researcher Share	0.10
	(0.22)
Number of Papers	5.62
	(21.25)
Number of Gender-Related Papers	0.35
	(2.18)
Number of Gender-Related Papers (Titles)	0.12
	(0.76)
Number of Gender-Related Papers (Abstracts)	0.30
	(1.99)
Gender Paper Share	0.04
	(0.16)
School-Subfield Observations	3470

Notes: In Table 1b, we report summary statistics at the school-subfield level for the year prior to the first full year of coeducation. 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 1: Summary Statistics – Continued

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

	All	Male	Female
Years of Publication Experience	5.84	6.02	4.92
	(6.75)	(6.82)	(6.31)
Years at Turn Coed School	5.71	5.87	4.87
	(6.69)	(6.76)	(6.27)
Number of Papers	1.02	1.04	0.88
	(1.37)	(1.41)	(1.09)
Number of Gender-Related Papers	0.05	0.05	0.08
	(0.27)	(0.26)	(0.32)
Share of Gender-Related Papers	0.06	0.05	0.09
	(0.21)	(0.20)	(0.28)
Researcher Observations	8197	6881	1316

Notes: In Table 1c, 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 2: Effect of Turning Coed on Student Body

	Bachelor's Degrees Awarded		Fall Enrollment	
	(1)	(2)	(3)	(4)
	Female Share	Log Total	Female Share	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 2 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. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 3: 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	0.022	0.154	-0.020
	(0.100)	(0.165)	(0.093)
Years 0 to 2	0.153**	0.002	0.171**
	(0.077)	(0.104)	(0.087)
Years 3 to 6	0.353***	0.112	0.335**
	(0.131)	(0.164)	(0.160)
Baseline Mean	0.35	0.12	0.30
Observations	54233	45460	46385
Estimator	Poisson	Poisson	Poisson

Notes: Table 3 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. 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. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 4: Effect of Turning Coed on Gender-Related Research Accounting for Changes in Productivity

	(1) Gender-Related Papers	(2) Gender-Related Papers	(3) Gender-Related Share
Years -5 to -2	0.022	0.025	0.004
	(0.100)	(0.100)	(0.005)
Years 0 to 2	0.153**	0.148*	0.008
	(0.077)	(0.076)	(0.006)
Years 3 to 6	0.353***	0.350***	0.018***
	(0.131)	(0.128)	(0.006)
Baseline Mean	0.35	0.35	0.04
Observations	54233	54233	71414
Controlling for Total Papers?	No	Yes	No
Estimator	Poisson	Poisson	OLS

Notes: Table 4 reports the average effects from estimating equation (1) on gender-related research outcomes accounting for changes in productivity by adding total papers published at the school-subfield as a control or using the outcome share of publications that are gender-related as the outcome variable. 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 regressions include school-subfield fixed effects, year fixed effects, and discipline-by-year fixed effects. Columns (1) and (2) 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. Column (3) is estimated using OLS. Standard errors in parentheses are clustered at the school level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 5: 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 5 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. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 6: Effect of Turning Coed for Incumbent Researchers

	(1) Gender-Related Papers	(2) Gender-Related Share
Years -5 to -2	0.046	0.002
	(0.074)	(0.004)
Years 0 to 2	0.157**	0.010***
	(0.068)	(0.003)
Years 3 to 6	0.433***	0.017***
	(0.097)	(0.006)
Baseline Mean	0.06	0.06
Observations	60558	77545
Estimator	Poisson	OLS

Notes: Table 6 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. 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. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 7: 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	0.074	-0.061	0.006	-0.023*
	(0.080)	(0.123)	(0.004)	(0.014)
Years 0 to 2	0.137	0.251*	0.011***	0.006
	(0.094)	(0.142)	(0.003)	(0.011)
Years 3 to 6	0.364***	0.716***	0.014**	0.040*
	(0.124)	(0.221)	(0.006)	(0.021)
Baseline Mean	0.05	0.08	0.05	0.09
Observations	50304	10219	66537	11008
Estimator	Poisson	Poisson	OLS	OLS

Notes: Table 7 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. 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. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Appendix

A Acknowledgements

We are indebted to the library staff at the following universities for assisting us in accessing course catalogue data: Bowdoin College, Brown University, Case Western Reserve University, Catholic University of America, Centre College of Kentucky, College of Saint Thomas, College of The Holy Cross, Columbia University In The City of New York, Dartmouth College, Davidson College, Delaware Valley University, Fairfield University, Fordham University, Franklin And Marshall College, Hamilton College, Haverford College, John Carroll University, Johns Hopkins University, Kenyon College, La Salle University, Lafayette College, Loras College, Loyola College, Marist College, Mount St Mary's University, 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.

B Definition of Gender-Related Papers

B.1 Keywords-Based Approach

B.1.1 Set of Gender-Related Words

In what follows, we provide the full list of gender-related words we used in our textual analysis:

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 breastfeed 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

B.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.[69] 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 Becker and Pascali (2018) and Dittmar and Seabold (2015).

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

[69] 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".

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-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.[70] 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 Appendix B.2.1, we present the list of the 25 most common words in the paper titles of gender-related papers for each definition.

B.2.1 List of Most Common Words

1. woman
2. cancer
3. american
4. effect
5. pregnancy
6. infant
7. sex
8. breast
9. study
10. sexual
11. female
12. health
13. gender
14. review

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

15. human
16. child
17. new
18. social
19. risk
20. maternal
21. difference
22. fetal
23. family
24. history
25. birth

B.2.2 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 satisfaction 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

C 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 modelled as:

$$\mu_{it} = \exp(\alpha_i + \beta_t + \sum_{h \neq -1} \tau_h 1[K_{it} = h])$$

$$Y^p_{it} \sim Poisson(\mu_{it}) \tag{A2}$$

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 A30, 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.

D Interaction-Weighted Estimator

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.

E 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 A24, 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 94% (=$(e^{0.413}-1)/(e^{0.433}-1)$) 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 56% (=$(e^{0.265}-1)/(e^{0.433}-1)$) of the total effect even accounting for selective attrition.

We can use these results to conduct analogous computations in Section 6.3.3 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 42% in years 3 to 6 (See Section 3.3). Given that there were 3.96 total gender-related research publications at each university at baseline (Table 1), this implies a total increase of $.42 \times 3.96 = 1.67$ 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 51% $(e^{0.413} - 1) \times 100$. Exporting this treatment effect, we calculate that at least $.39 \times .51 \times 3.96 = .79$ papers, or 47%, can be explained by the treatment effect. Under the second assumption, we observe a treatment effect of 30% $(e^{0.265} - 1) \times 100$. In this case, at least $.39 \times .30 \times 3.96 = 0.46$ papers, or 28%, can be explained.

F Transitions from Women's Only Colleges to Coeducation

In this section, we investigate whether transitions from women's only colleges to coeducation also led to an increase in gender-related research. In Appendix Figure A34, we show the corresponding results for 57 colleges that switched from women's only to coeducation between 1960 and 1990. We find no evidence of an increase in gender-related research in these schools. This suggests that the increase in gender-related research for the male-only to coeducation universities is likely the result of the arrival of female students rather than a broader increase in gender diversity.

G 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 turns coeducational may start attracting scholars from local universities. This would lead to a fall in gender-related research at the surrounding universities.

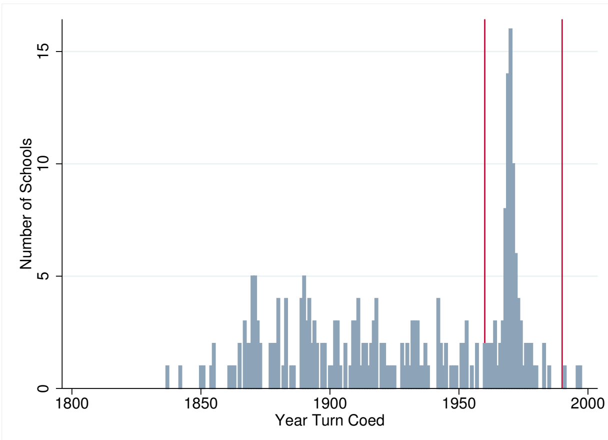
Appendix Figure A35a captures the spillover effects on gender-related research for 50 universities that were in the same city but did not turn coed between 1960 and 1990. We assign to these universities the earliest coeducation date of the schools that went coed in that same city. We find no evidence that local universities were affected by a neighboring university that switched to coeducation.

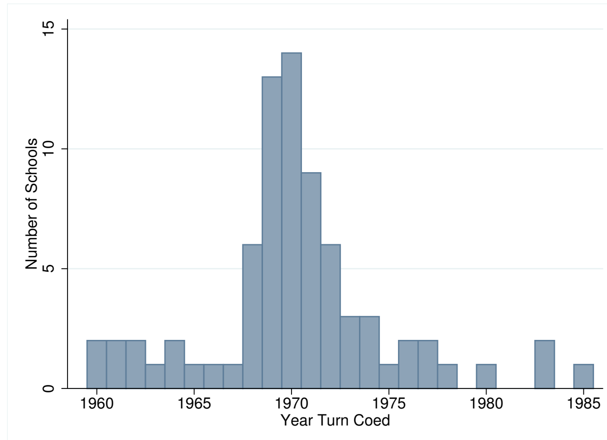
Second, we investigate whether there were spillover effects to universities with close collaboration ties with the schools that switched to coeducation. For each turn-coed university, we identify the top three most-connected universities among the universities that opened as coeducational or never turn until after 1990 based on 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 A35b reveals limited evidence that coeducation led to increases in gender-related research at these universities.

H Additional Figures

Figure A1: Distribution of Turn Coed Years

(a) All Years (b) Restricted to 1960-1990





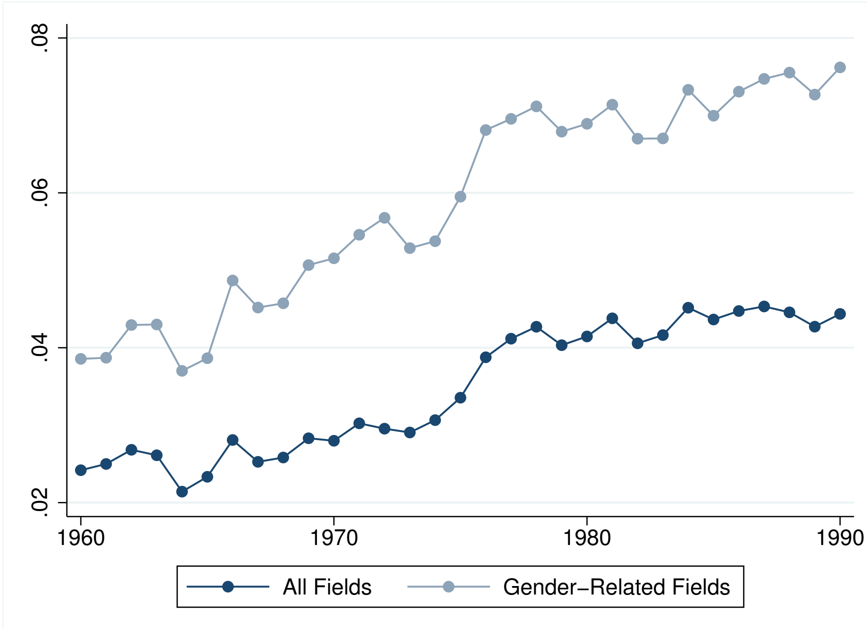
Notes: This figure plots the frequency of coeducation dates for all universities that transitioned from male-only to coeducation for all years from 1800 to 2000 and for the sample period from 1960 to 1990. Data comes from Coeducation College Database (Goldin and Katz, 2011).

Figure A2: Course Catalogue Amherst 1974-1975

4. *MEN AND WOMEN IN LITERATURE.* The course will concentrate on the fates of male and female writers and on the differing perspectives of each on male-female relationships. What special difficulties, if any, do women writers face? In what ways do male and female writers view coming of age, romantic love, marriage, political and social life? In what ways, if any, do the quality of their imagination, their style, their choice of form reflect their being male or female? Two class meetings per week. Elective for Sophomores (and Freshmen with the consent of the instructors). Limited to twenty men and twenty women.

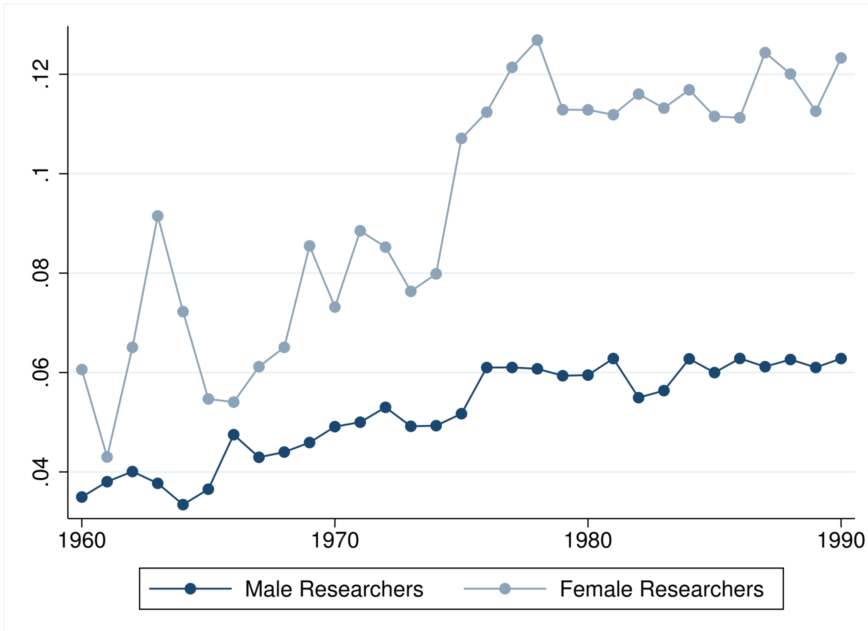
Notes: This figure shows an example course description from the course catalogue of Amherst College in 1974–1975.

Figure A3: Trends in Gender-Related Research, 1960–1990



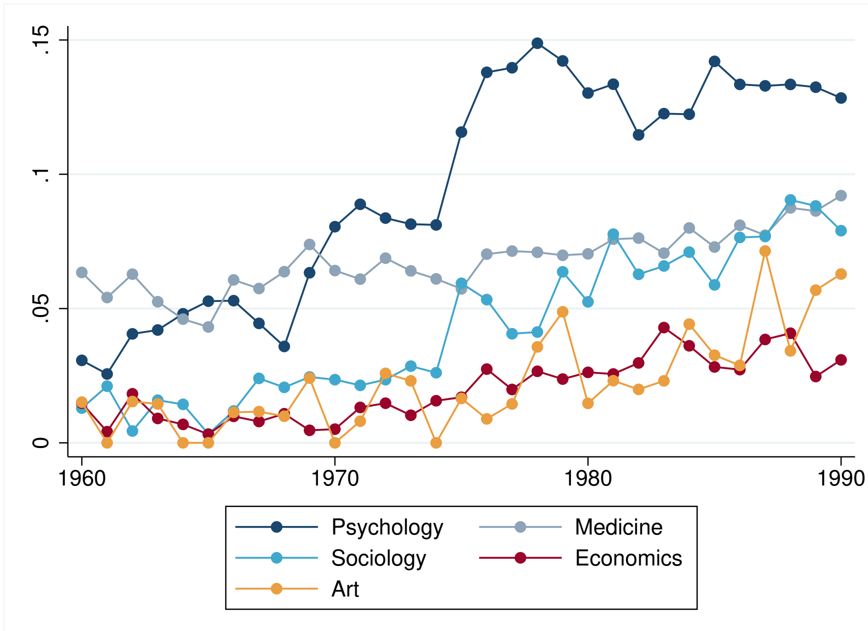
Notes: This figure plots the gender-related share of papers published in all fields and in the gender-related fields (i.e., medicine, sociology, psychology, biology, history, political science, art, philosophy, economics, environmental science, business, or geography) between 1960 and 1990. The sample is restricted to the universities that switched to coeducation between 1960 and 1990.

Figure A4: Trends in Gender-Related Research Among Gender-Related Fields, by Gender, 1960–1990



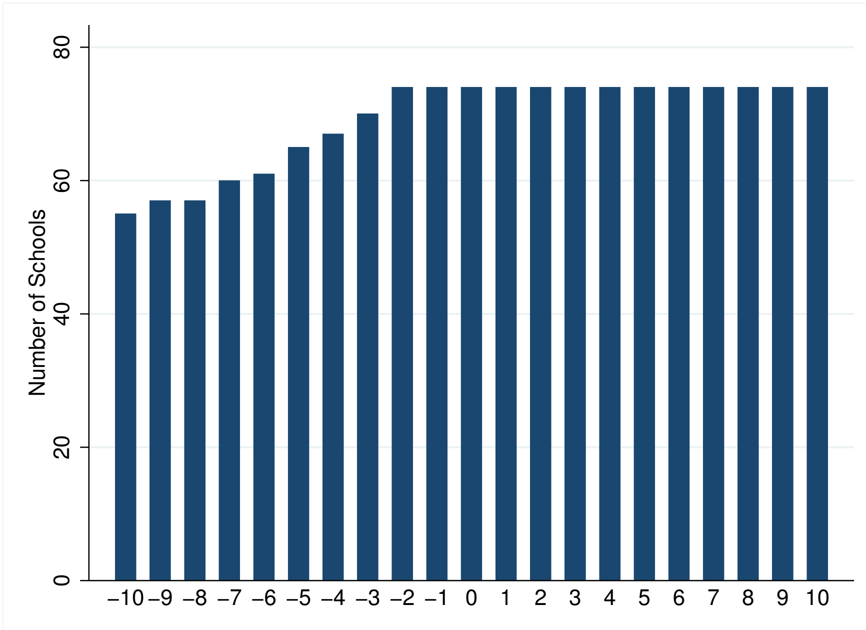
Notes: This figure plots the gender-related share of papers published by gender between 1960 and 1990. The sample is restricted to gender-related fields (i.e., medicine, sociology, psychology, biology, history, political science, art, philosophy, economics, environmental science, business, or geography) among the universities that switched to coeducation between 1960 and 1990.

Figure A5: Trends in Gender-Related Research Among Gender-Related Fields, by Field, 1960–1990



Notes: This figure plots the gender-related share of papers published in the fields, psychology, medicine, sociology, economics, and art between 1960 and 1990. The field, art, includes fine arts, literature, and other humanities studies. The sample is restricted to the universities that switched to coeducation between 1960 and 1990.

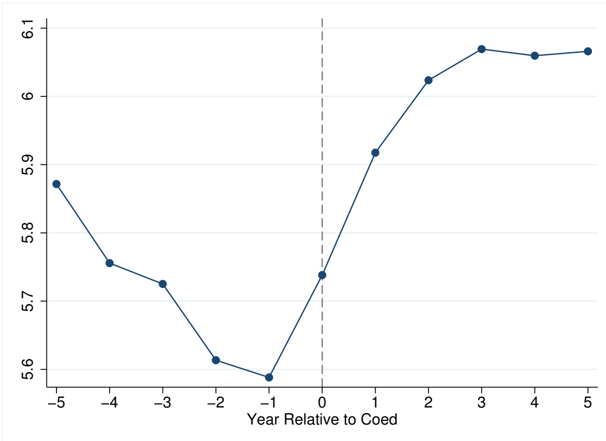
Figure A6: Number of Universities Observed by Year Relative to Coeducation, Microsoft Academic Graph



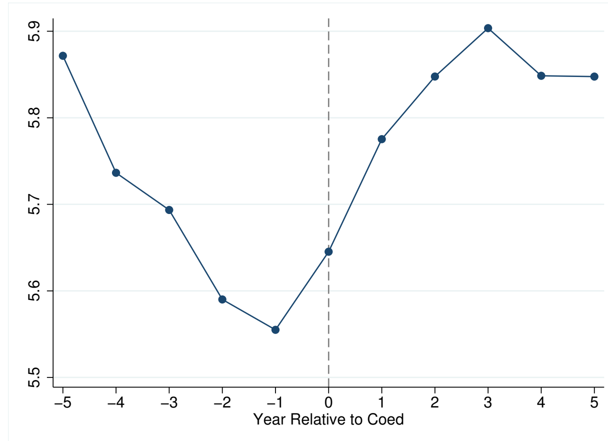
Notes: This figure plots the number of universities observed in the Microsoft Academic Graph in each year relative to coeducation. A university is "observed" if it has at least one publication written in a gender-related field in that year.

Figure A7: Descriptive Dynamics for Student Quality

(a) High School GPA

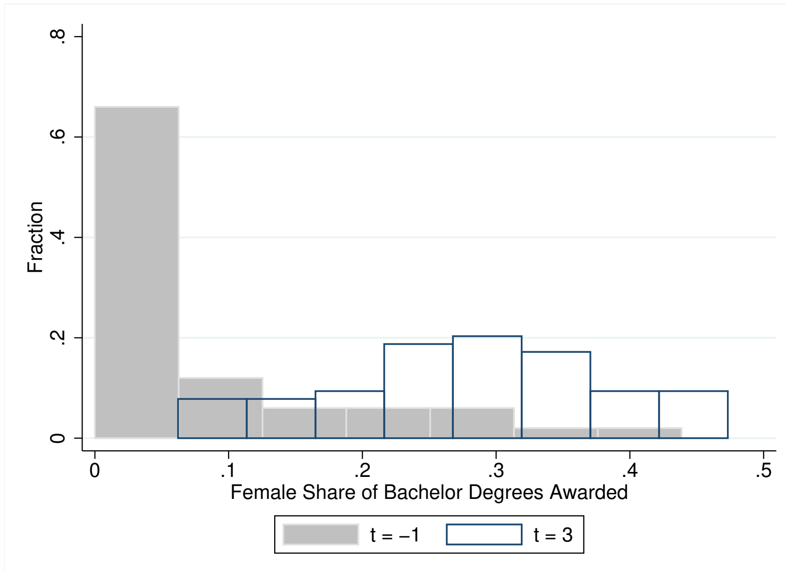


(b) High School GPA (Male Students Only)



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 A8: Distribution of Female Bachelor's Degrees Share Awarded

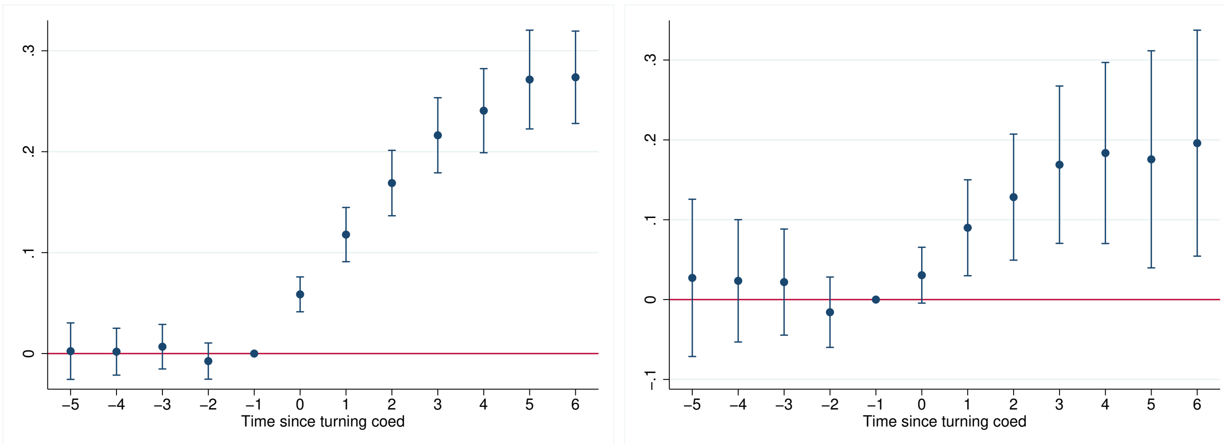


Notes: This figure plots the histogram for the female share of bachelor's degrees awarded at $\tau = -1$ and at $\tau = 3$. Data on bachelor's degrees awarded come from HEGIS/IPEDS data from 1965 to 1998.

Figure A9: Effect of Turning Coed on Enrollment

(a) Female Enrollment Share

(b) Log Total Enrollment

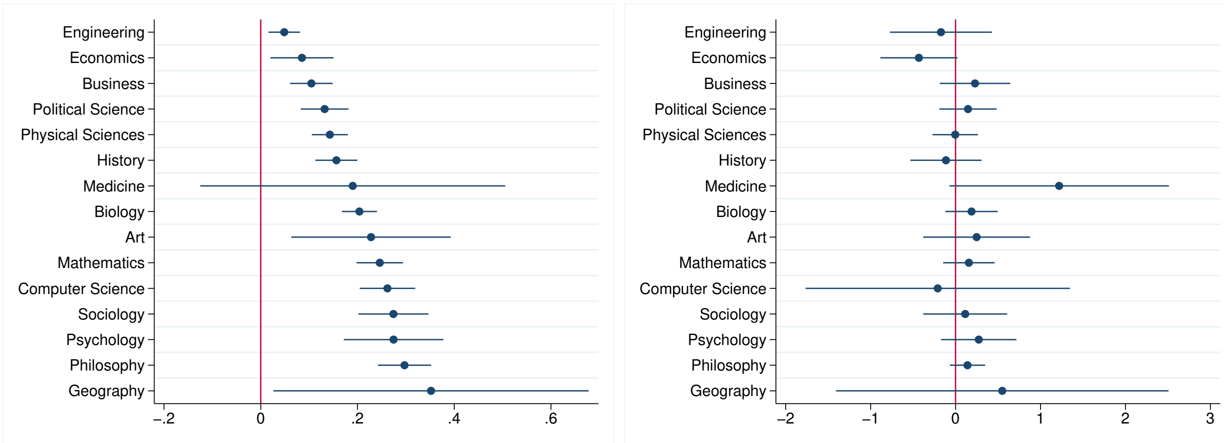


Notes: These figures plot the event time coefficients and their 95% confidence intervals from estimating equation (1) for the outcome variables, female share of enrollment and log total enrollment. All specifications are estimated using OLS. In the specifications, we include school fixed effects and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

Figure A10: Effect of Turning Coed on Bachelor's Degrees Awarded by Field

(a) Female Share of Bachelor's Degrees

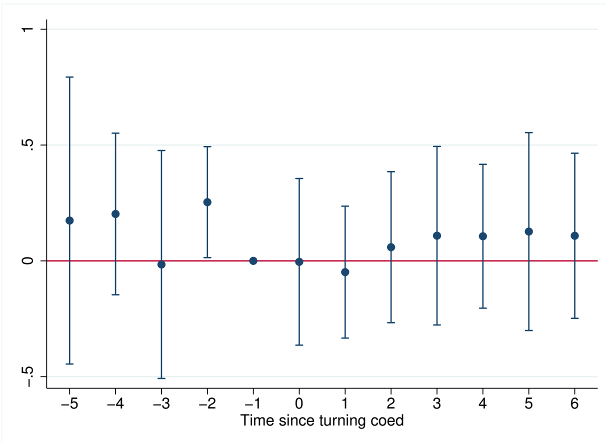
(b) Log Bachelor's Degrees Awarded



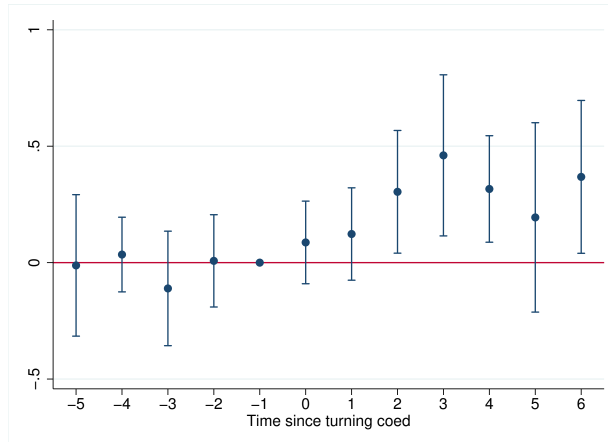
Notes: These figures plot average effects for years 3 to 6 and their 95% confidence intervals from estimating a modified version of equation (1) in which we interact the event time dummies with a categorical variable for each field of study. The outcome variables are the female share of bachelor's degrees 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.

Figure A11: Effect of Turning Coed on Gender-Related Publications by Subcomponents

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

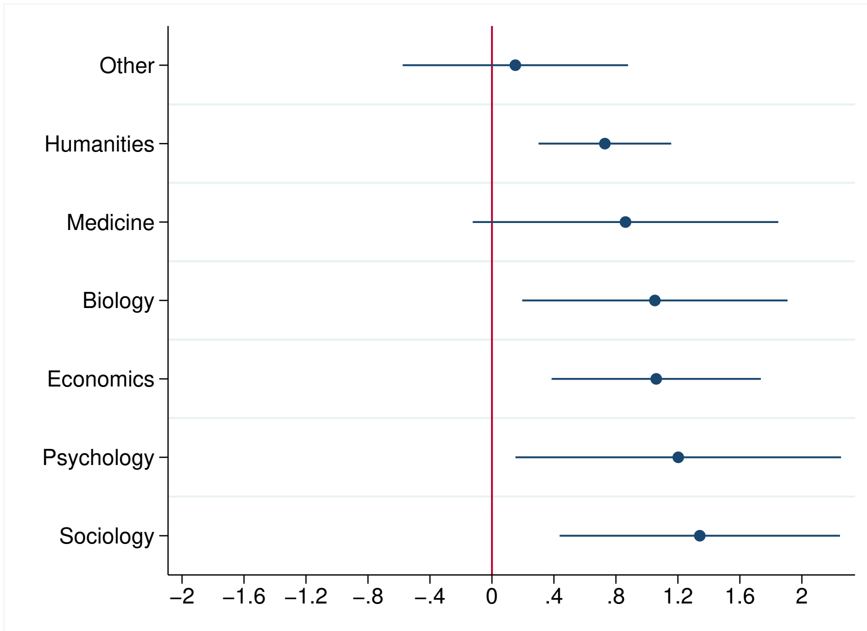


(b) Number of Gender-Related Papers (Abstracts)



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 A11a is the number of gender-related papers based on the titles and the outcome variable in Figure A11b 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 cluster at the school level.

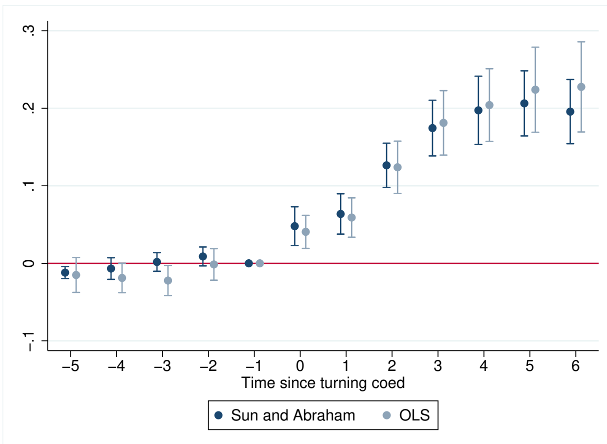
Figure A12: Effect of Turning Coed on Gender-Related Papers by Field



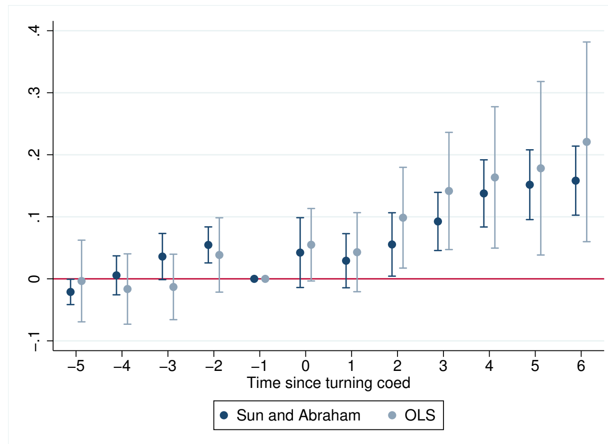
Notes: This figure plots the average effects for years 3 to 6 and their 95% confidence intervals from estimating a modified version of equation (1) in which we interact the event time dummies with a categorical variable for each field of study. The outcome variable is the number of gender-related papers.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

Figure A13: Robustness to Heterogeneous Treatment Effects: Interaction-Weighted Estimation (Sun and Abraham, 2020)

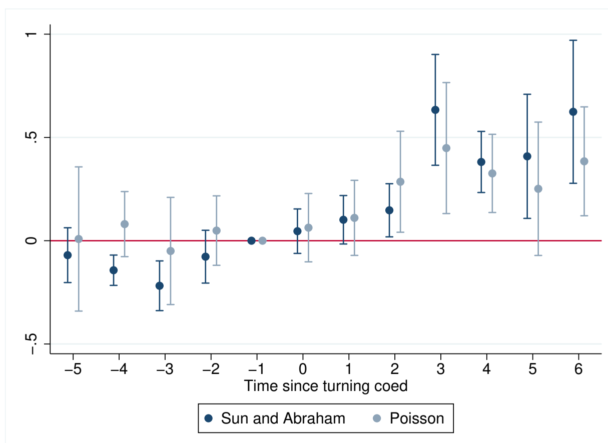
(a) Female Bachelor's Degrees Share



(b) Log Bachelor's Degrees Awarded

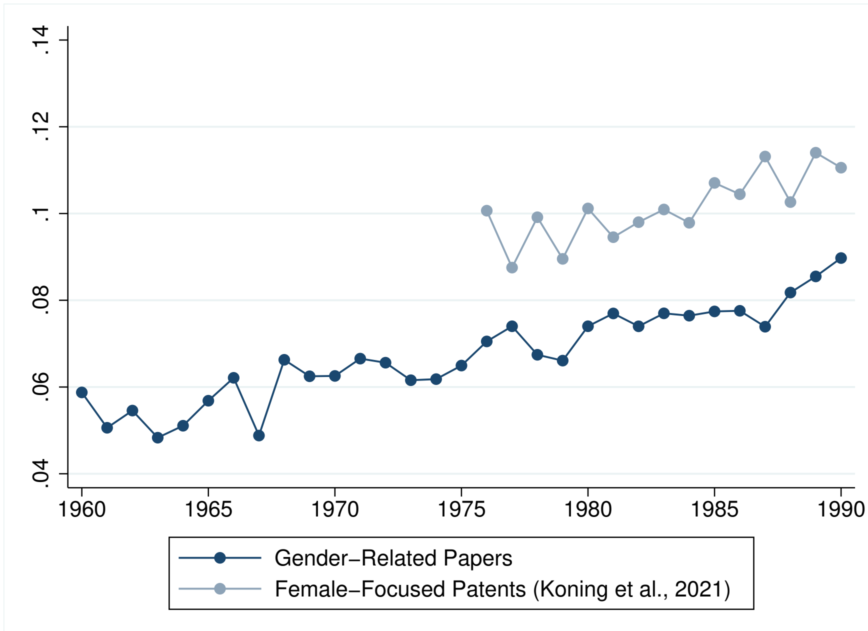


(c) Total Gender-Related Papers



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, log bachelor's degrees awarded and total gender-related papers. "Sun and Abraham" refers to using the interaction-weighted (IW) estimator proposed by Sun and Abraham (2020). Figures A13a and A13b 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 A13c compares the baseline estimates for total gender-related papers estimated using a conditional fixed effects Poisson model with the IW estimator. 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.

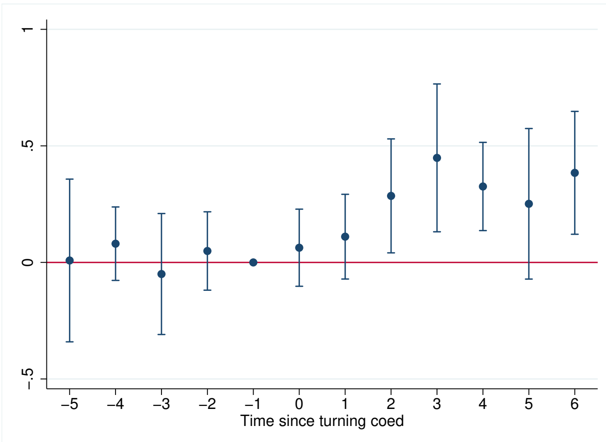
Figure A14: Comparison of Gender-Related Research Definition and Female-Focused Patents in Biomedicine (Koning et al., 2021)



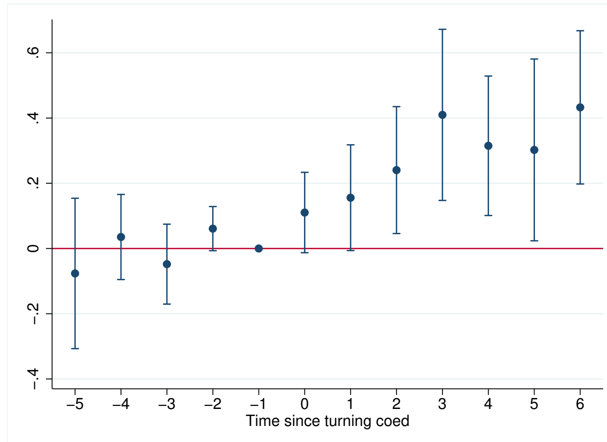
Notes: This figure compares the share of gender-related papers using our main definition for the field of medicine with the share of patent applications that are identified to be female-focused in Koning et al. (2021). The gender focus of the patent is identified by passing the patent text through the National Library of Medicine's Medical Text Indexer (MTI) which classifies "Male" or "Female" as one of the top Medical Subject Headings (MeSH). Data on female-focused patents were accessed via Harvard Dataverse `https://doi.org/10.7910/DVN/V8NJUV`.

Figure A15: Effect of Turning Coed on Gender-Related Publications

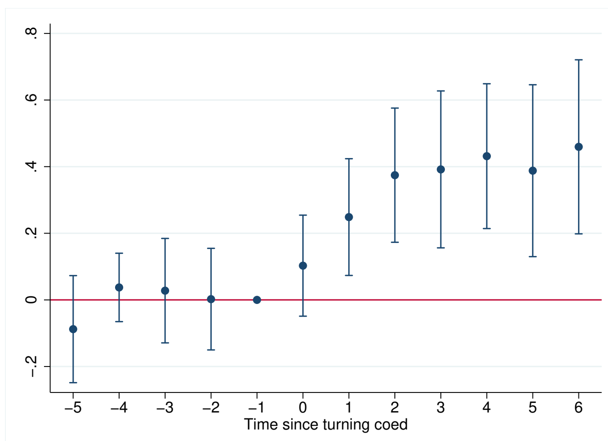
(a) Number of Gender-Related Papers (Baseline Definition)



(b) Number of Gender-Related Papers (Keywords Broad)

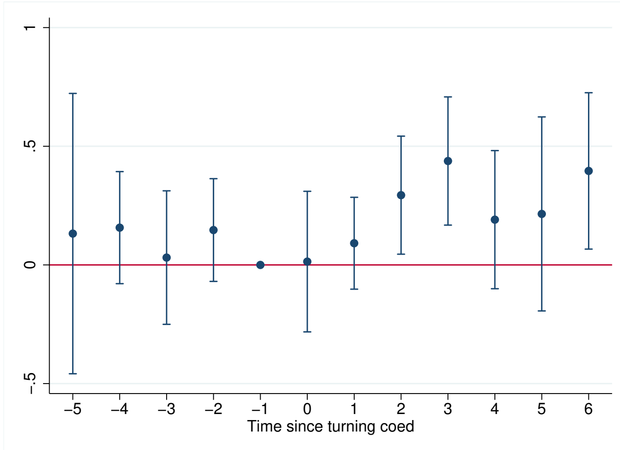


(c) Number of Gender-Related Papers (ML Naive Bayes)



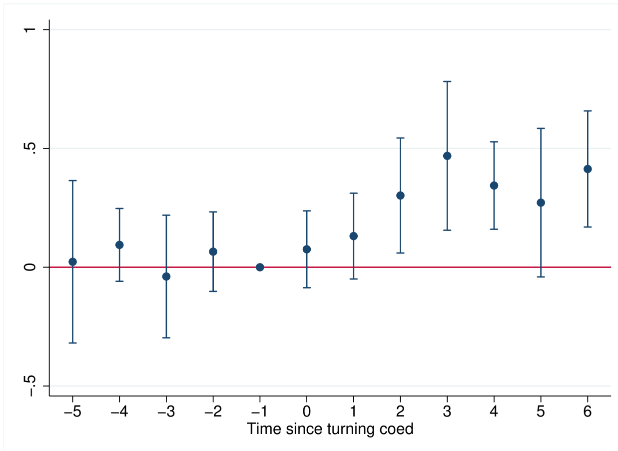
Notes: These figures plot the event time coefficients and their 95% confidence intervals from estimating equation (1) for the number of gender-related research publications using alternative definitions. The outcome variable in Figure A15a is the baseline definition of gender-related research. Figure A15b uses a broader set of keywords. The outcome in Figure A15c is gender-related research using the Machine Learning Naïve Bayes model. All specifications are estimated using conditional fixed effects Poisson models. In the specifications, we include school-subfield fixed effects, year fixed effects, and discipline-by-year fixed effects. We cluster at the school level.

Figure A16: Effect of Turning Coed on Number of Gender-Related Words in the Title or Abstract



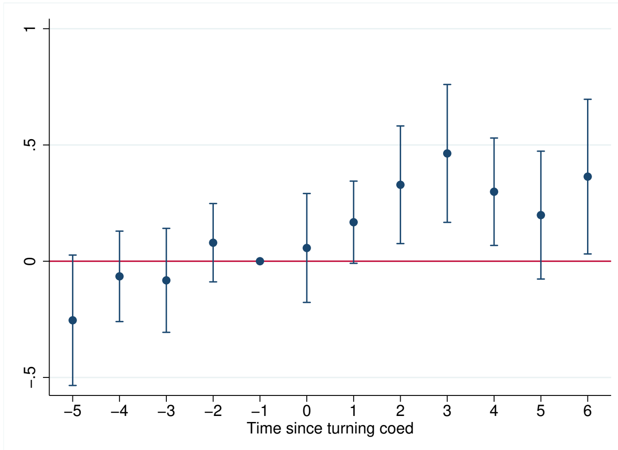
Notes: This figure plots the event time coefficients and their 95% confidence intervals from estimating equation (1) for total number of gender-related words in the title or abstract. The specification is estimated using conditional fixed effects Poisson models. In the specification, we include the school-subfield fixed effects, year fixed effects, and discipline-by-year fixed effects. We cluster at the school level.

Figure A17: Effects of Turning Coed on Gender-Related Papers Using Additional Controls



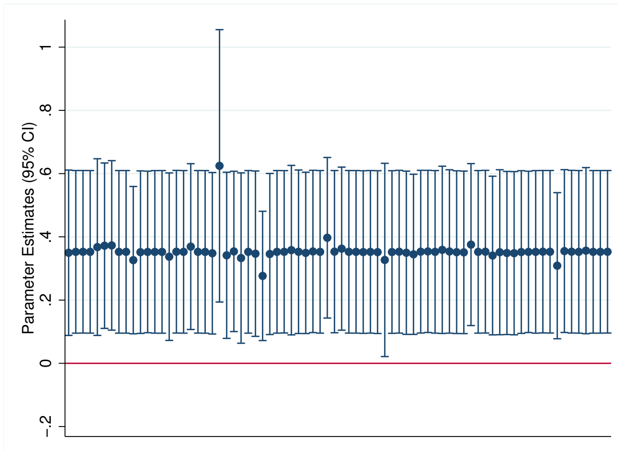
Notes: This figure plots the event time coefficients and their 95% confidence intervals from estimating equation (1) for total number of gender-related research. The specification is estimated using conditional fixed effects Poisson models. In the specification, we include school-subfield fixed effects, year fixed effects, and discipline-by-year fixed effects. We 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.

Figure A18: 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 region represents the nine U.S. Census divisions. We cluster at the school level.

Figure A19: Effects of Turning Coed on Gender-Related Papers Leaving Out One University at a Time

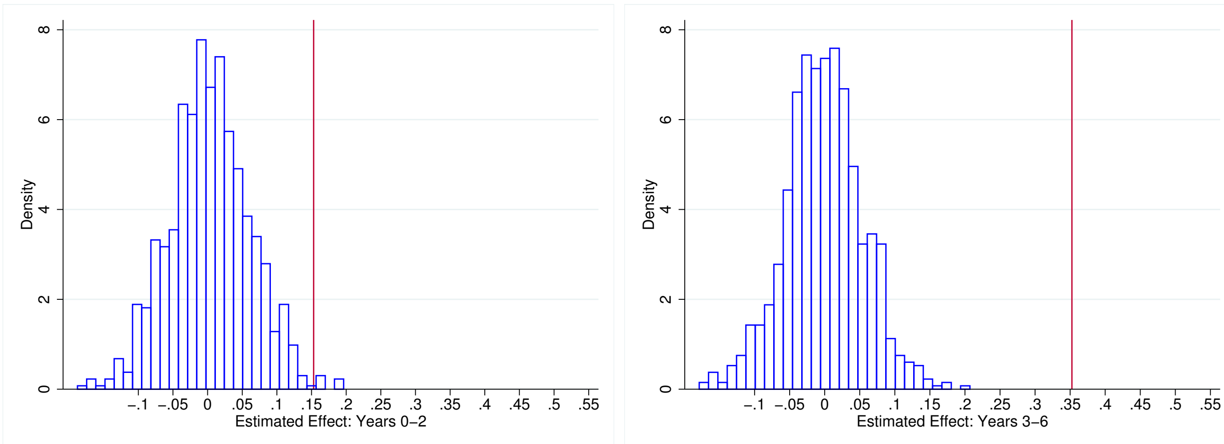


Notes: We estimate equation (1) for our main outcome variable, number of gender-related papers 76 times. In each iteration, we successively drop one university from the sample and plot the average effect for years 3 to 6.

Figure A20: Effects of Turning Coed on Gender-Related Papers Using Placebo Treatment Dates

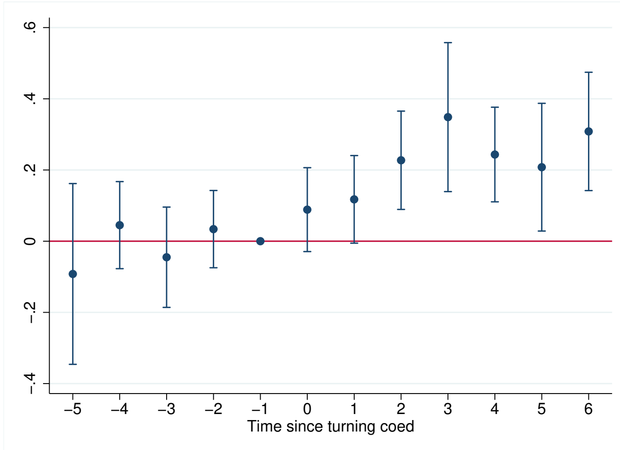
(a) Estimated Effect in Years 0-2

(b) Estimated Effect in Years 3-6



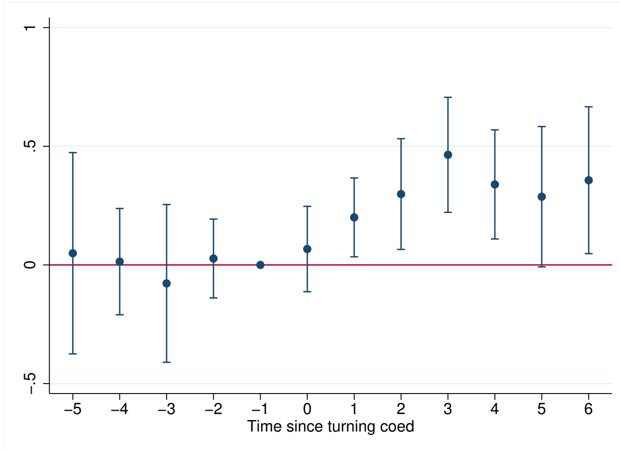
Notes: This figure plots the distributions of the placebo treatment effects computed using a randomization test as follows: We assign to each school without replacement a placebo turn-coed date from the actual distribution of coed dates with uniform probability. We conduct this 1,000 times and in each 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.

Figure A21: Effect of Turning Coed on Number of Gender-Related Papers, Restricting to Journal Articles



Notes: This figure plots the event time coefficients and their 95% confidence intervals from estimating equation (1) for total number of gender-related research, restricted to only journal articles. 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 cluster at the school level.

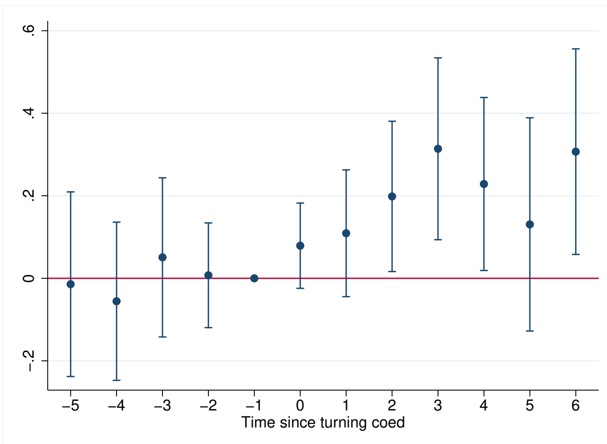
Figure A22: Effect of Turning Coed on Number of Gender-Related Papers, Excluding Publications in Medicine



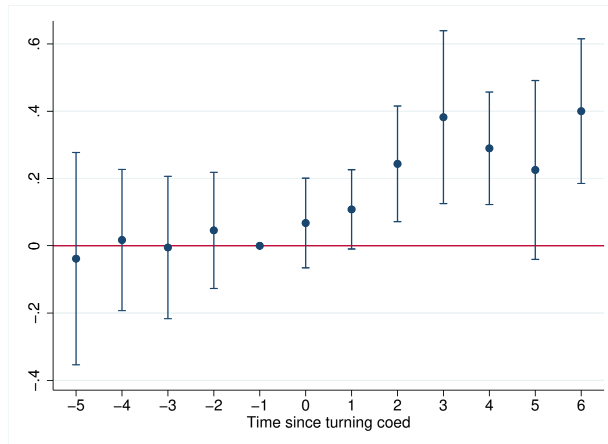
Notes: This figure plots the event time coefficients and their 95% confidence intervals from estimating equation (1) for total number of gender-related research, excluding publications in medicine. The specification is estimated using a conditional fixed effects Poisson model. In the specification, we include school-subfield fixed effects, year fixed effects, and discipline-by-year fixed effects. We cluster at the school level.

Figure A23: Robustness to Estimation at Different Level of Observations: Number of Gender-Related Papers

(a) School Level

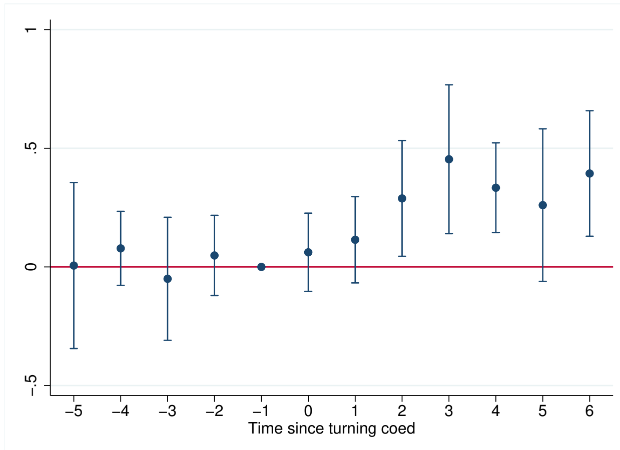


(b) School-Field Level



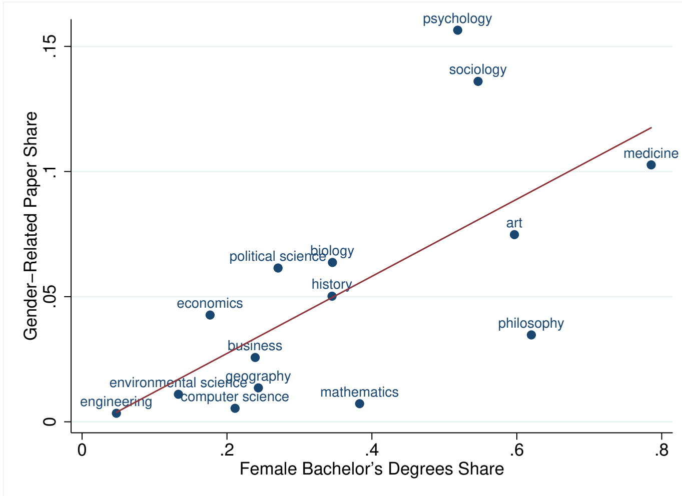
Notes: This figure plots the event time coefficients and their 95% confidence intervals from estimating equation (1) for total number of gender-related research at different levels of analysis. Figure A23a presents the result at the school level. Figure A23b is at the school-field level, where the field is at one level of aggregation higher than the subfield (e.g. arts, biology, economics). The specification is estimated using conditional fixed effects Poisson models. In both specifications, we include year fixed effects. The specification for Figure A23a includes school fixed effects, while the one for Figure A23b includes school-field fixed effects. We also include discipline-by-year fixed effects for Figure A23b. We cluster at the school level.

Figure A24: Robustness to Estimation with Field-by-Year Fixed Effects: Number of Gender-Related Papers



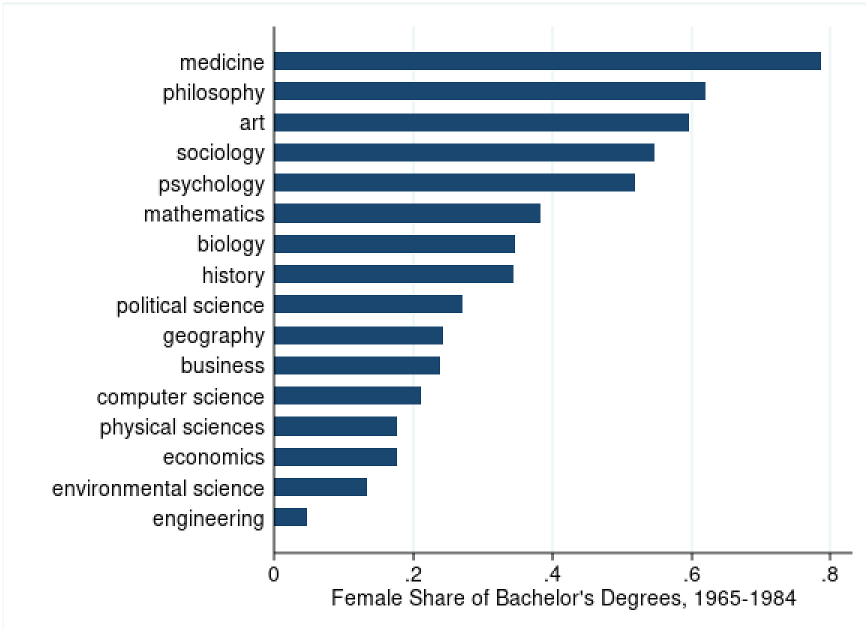
Notes: This figure plots the event time coefficients and their 95% confidence intervals from estimating equation (1) for total number of gender-related research. The specification is estimated using a conditional fixed effects Poisson model. In the specification, we include school-subfield fixed effects and year fixed effects. Instead of discipline-by-year fixed effects as in the baseline specification, we include field-by-year fixed effects. 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. We cluster at the school level.

Figure A25: Relationship between Female Bachelor's Degrees Share and Share of Publications Related to Gender Across Fields of Study



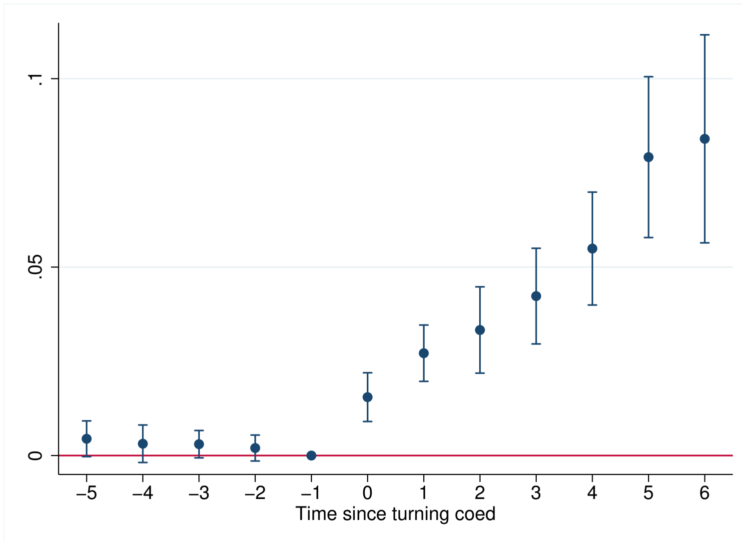
Notes: This figure plots the relationship between female bachelor's degrees share and share of publications related to gender across fields of study. The sample period is from 1950-2005 and the data sample consists of universities that were already coed or never turned coed.

Figure A26: Female Degrees Share by Field



Notes: This figure plots the share of women majoring in each field between 1965 and 1984 in the sample of schools that were already coeducational prior to our sample period. Note that medicine includes both pre-medical and nursing programs.

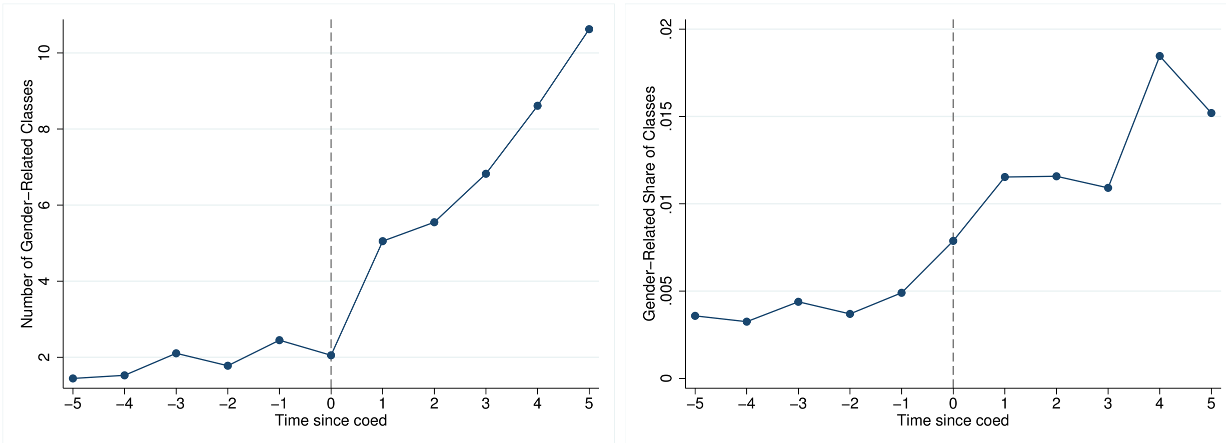
Figure A27: Likelihood of Prior Interests in Gender Topics



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 A28: Trends in Course Offerings Related to Gender

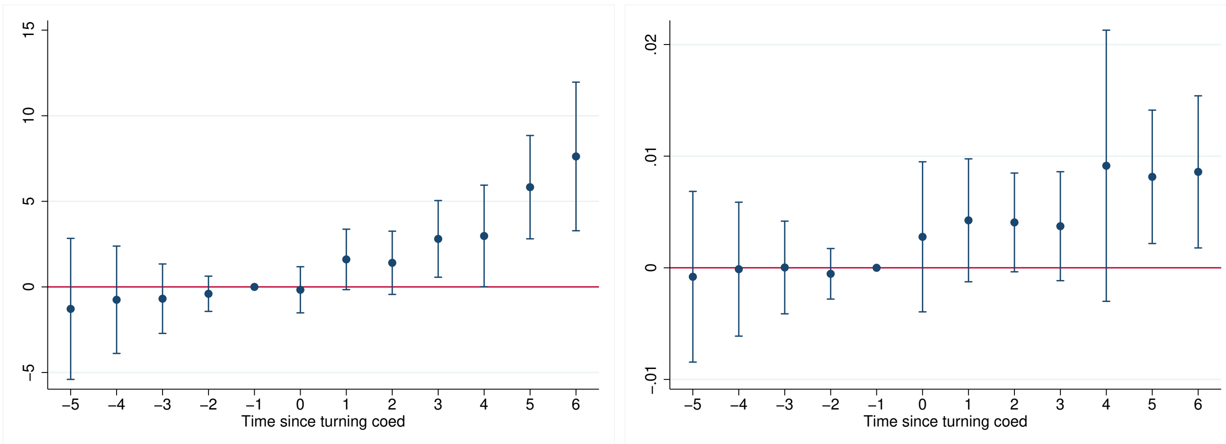
(a) Number of Gender-Related Classes (b) Gender-Related Share of Classes



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.

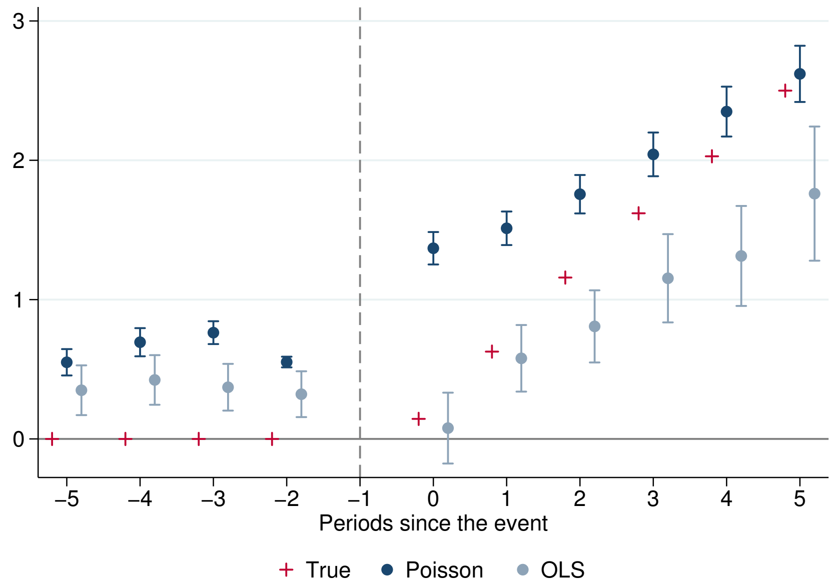
Figure A29: Effect of Turning Coed on Class Offerings Related to Gender

(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.

Figure A30: 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.

Figure A31: Share of Papers in the Top 10% of the Field-Year Citation Distribution

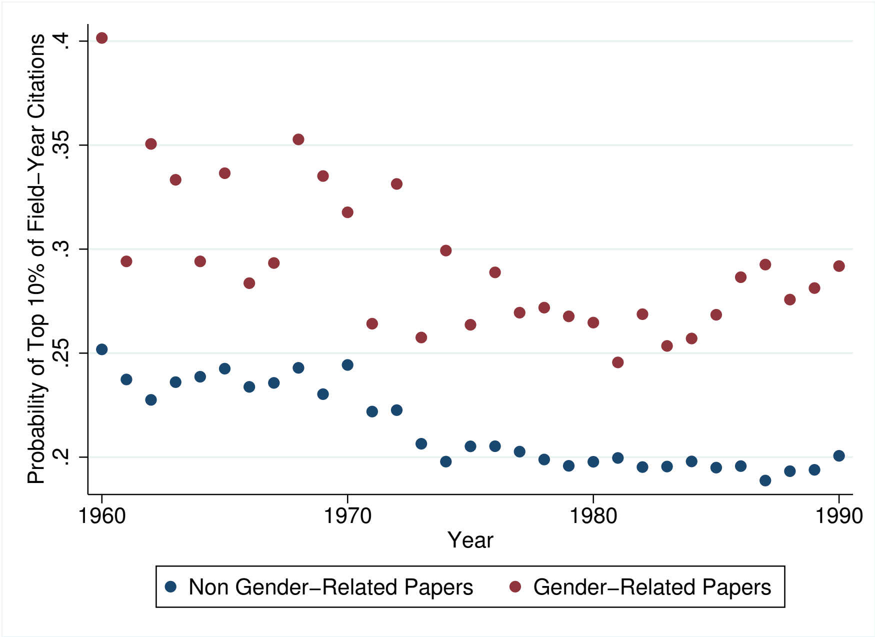
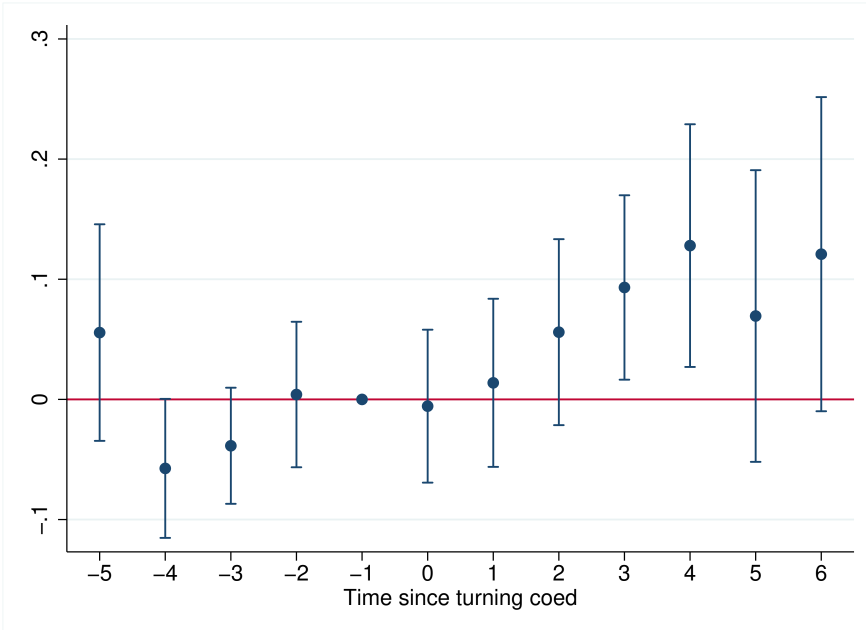
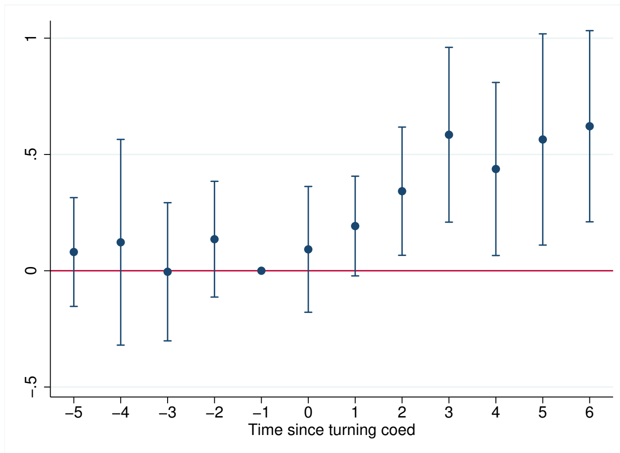


Figure A32: Effect of Turning Coed on Quality of Research at the School-Field Level



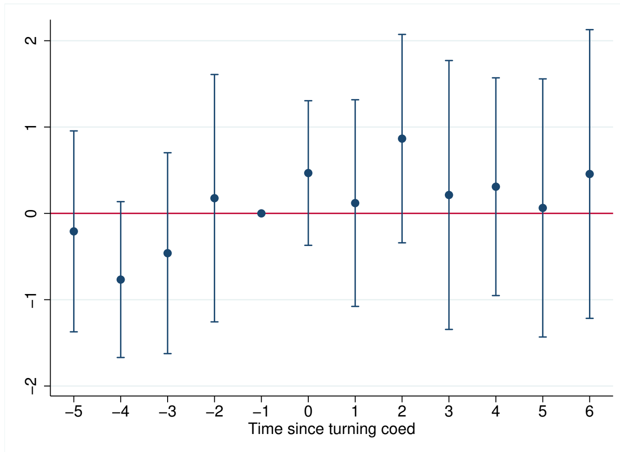
Notes: The figures plots the event time coefficients and their 95% confidence intervals from estimating equation (1) for total number of papers in the top 10% of the citation distribution among papers published in that field and year. The specification is estimated using a conditional fixed effects Poisson model. We cluster at the school level.

Figure A33: Effects of Turning Coed on Total Female-Focused Medical Papers



Notes: This figure plots the event time coefficients and their 95% confidence intervals from estimating equation (1) for total number of female-focused medical papers. To identify female-focused medical research, we use the National Library of Medicine's Medical Text Indexer (MTI) to obtain the top ten Medical Subject Headings (MeSH) for all papers in the field of medicine in our sample. We classify a paper as female-focused if MTI applies the heading "Female" (Unique ID D005260) in the top ten terms, which is any research that covers "female organs, diseases, physiologic processes, genetics, etc.; do not confuse with WOMEN as a social, cultural, political, economic force." The specification is estimated using a conditional fixed effects Poisson model restricted to the field of medicine. We cluster at the school level.

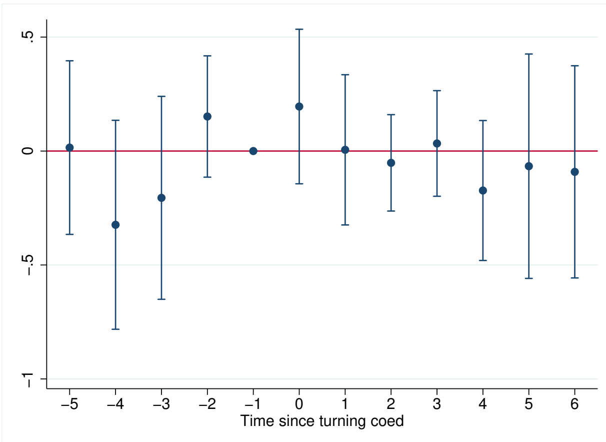
Figure A34: Effects of Turning Coed from Women's Only on Gender-Related Papers



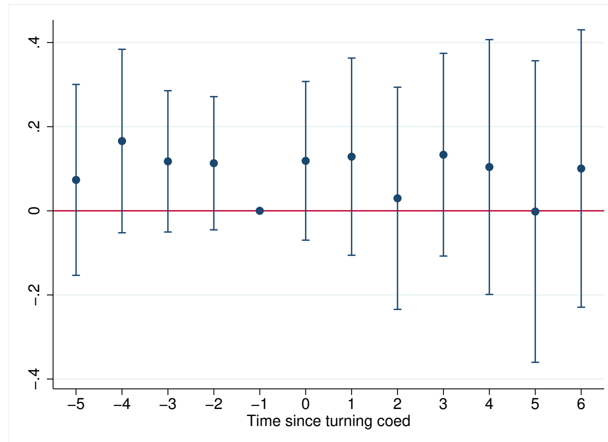
Notes: This figure plots the event time coefficients and their 95% confidence intervals from estimating equation (1) for total number of gender-related research for 56 colleges that transitioned from women's only to coeducation between 1960 and 1990 and had written a publication in one of the gender-related fields prior to coeducation. The specification is estimated using a conditional fixed effects Poisson model. We cluster at the school level.

Figure A35: 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 A35a 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 A35b 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 cluster at the school level.

I Additional Tables

Table A1: List of Schools that Turned Coed

	School	Year Turn Coed
1	Saint Francis College	1960
2	Case Western Reserve University	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	University Of San Francisco	1964
9	Brown University	1964
10	Saint Martin's College	1965
11	Saint Peter's College	1966
12	University Of New England	1967
13	Marist College	1968
14	John Carroll University	1968
15	Babson College	1968
16	Siena College	1968
17	Regis College	1968
18	Villanova University	1968
19	Rockhurst College	1969
20	Yale University	1969
21	Xavier University	1969
22	Franklin And Marshall College	1969
23	Georgetown University	1969
24	Saint Mary's College	1969
25	Princeton University	1969
26	Kenyon College	1969
27	Tulane University Of Louisiana	1969
28	Wesleyan University	1969
29	Washington & Jefferson College	1969
30	Trinity College	1969
31	University Of The South	1969
32	Saint Mary's College Of California	1970
33	Boston College	1970
34	Union College	1970
35	Providence College	1970
36	Saint Michael's College	1970
37	Fairfield University	1970
38	University Of Virginia-Main Campus	1970
39	Williams College	1970
40	La Salle University	1970

Table A1: List of Schools that Turned Coed – Continued

	School	Year Turn Coed
41	Saint Edward's University	1970
42	Lafayette College	1970
43	Saint Joseph's University	1970
44	Colgate University	1970
45	Rutgers University New Brunswick	1970
46	Lehigh University	1971
47	Stevens Institute Of Technology	1971
48	Randolph-Macon College	1971
49	Loras College	1971
50	Loyola College	1971
51	St John's University-New York	1971
52	Mount St Mary's University	1971
53	Bowdoin College	1971
54	Saint John Fisher College	1971
55	Davidson College	1972
56	Johns Hopkins University	1972
57	College Of The Holy Cross	1972
58	Dartmouth College	1972
59	University Of Notre Dame	1972
60	Wofford College	1972
61	Manhattan College	1973
62	University Of Scranton	1973
63	Loyola Marymount University	1973
64	Norwich University	1974
65	Saint Anselm College	1974
66	Fordham University	1974
67	Amherst College	1975
68	United States Military Academy	1976
69	United States Naval Academy	1976
70	Hamilton College	1977
71	College Of Saint Thomas	1977
72	United States Coast Guard Academy	1978
73	Haverford College	1980
74	Saint Vincent College	1983
75	Columbia University In The City Of New York	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 A2: 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)
Total Papers (1960)	0.003	(0.005)
Total Gender-Related Papers (1960)	0.175	(0.166)
Female Paper Share (1960)	-0.483	(3.360)
Total Researchers (1960)	0.002	(0.004)

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. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A3: Comparison of Gender-Related Research Production Across School Types

	(1) Gender-Related Share	(2) Gender-Related Share
Turned Coed from All-Male	-0.0115***	-0.00989**
	(0.00372)	(0.00385)
Always-Coed Mean	0.0778	0.0778
R^2	0.0245	0.0291
N	10826	10790
Year FE	Yes	Yes
Carnegie Classification	No	Yes

Notes: Each column reports estimates from a separate regression where the dependent variable is the share of papers related to gender among the gender-related fields at the school level. The independent variable is an indicator for whether the school turns coeducational from all-male. The omitted category refers to schools that opened as coeducational prior to 1940. All specifications are estimated over the years from 1960 to 1990 and include year fixed effects. In Column (2) we additionally control for the Carnegie school classification categories. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A4: 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. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A5: 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. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A6: Effect of Turning Coed on Gender-Related Papers by Field

	(1) Years 0 to 2	(2) Years 3 to 6
Humanities	0.410	0.729***
	(0.407)	(0.218)
Biology	1.197**	1.052**
	(0.594)	(0.437)
Medicine	1.008*	0.862*
	(0.595)	(0.503)
Psychology	1.291**	1.202**
	(0.530)	(0.536)
Sociology	1.024*	1.341***
	(0.588)	(0.462)
Economics	1.076***	1.060***
	(0.406)	(0.344)
Other	0.063	0.151
	(0.787)	(0.371)

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. 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. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A7: 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	0.146
	(0.158)
Years 0 to 2 × Above Median	0.372**
	(0.167)
Years 3 to 6	0.186
	(0.415)
Years 3 to 6 × Above Median	0.482*
	(0.259)
Baseline Mean	0.353
Observations	42587
Estimator	Poisson

Notes: This table reports the average effects from estimating equation (1) on 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-year 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. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A8: Effect of Turning Coed on Gender-Related Publications Using Alternative Definitions

	Number of Gender-Related Papers		
	(1)	(2)	(3)
	Baseline Definition	Alternative Gender-Related Keywords	ML (Naive Bayes)
Years -5 to -2	0.022	-0.007	-0.005
	(0.100)	(0.050)	(0.037)
Years 0 to 2	0.153**	0.169**	0.242***
	(0.077)	(0.074)	(0.079)
Years 3 to 6	0.353***	0.365***	0.418***
	(0.131)	(0.122)	(0.115)
Baseline Mean	0.35	0.79	0.39
Observations	54233	61412	59231
Estimator	Poisson	Poisson	Poisson

Notes: This table reports the average effects from estimating equation (1) for alternative definitions of gender-related research. Each column reports estimates from a separate regression. The outcome variable in Column (1) is the baseline definition of gender-related research. Column (2) uses a broader set of keywords. The outcome in Column (3) is gender-related research using the machine learning Naïve Bayes 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 $\tau = 6$. All regressions include school-subfield fixed effects, year fixed effects, and discipline-by-year 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. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A9: Robustness to Different Thresholds in Machine Learning Definition

	Number of Gender-Related Papers (Naive Bayes)		
	(1) Predicted Probability $\geq$ 75%	(2) Predicted Probability $\geq$ 80%	(3) Predicted Probability $\geq$ 90%
Years -5 to -2	-0.005	-0.033	0.003
	(0.037)	(0.050)	(0.057)
Years 0 to 2	0.242***	0.258***	0.298***
	(0.079)	(0.089)	(0.101)
Years 3 to 6	0.418***	0.453***	0.577***
	(0.115)	(0.124)	(0.141)
Baseline Mean	0.39	0.36	0.26
Observations	59231	57647	52933
Estimator	Poisson	Poisson	Poisson

Notes: This table reports the average effects from estimating equation (1) for alternative definitions of the machine learning Naïve Bayes definition using different cutoffs. Each column reports estimates from a separate regression. The outcome variable in Column (1) uses the baseline threshold and considers only papers with a predicted probability at least 75% as gender-related research. Column (2) uses the threshold of 80%. Column (3) uses the threshold of 90%. 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. 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. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A10: Robustness to Restricting to Different Event Time Horizons

	(1) Baseline Sample -20 to 20	(2) All Observations -35 to 44	(3) Restricted to -25 to 25
Years -5 to -2	0.022	0.038	0.036
	(0.100)	(0.099)	(0.097)
Years 0 to 2	0.153**	0.119	0.115
	(0.077)	(0.086)	(0.090)
Years 3 to 6	0.353***	0.275*	0.286*
	(0.131)	(0.147)	(0.156)
Baseline Mean	0.35	0.35	0.35
Observations	54233	97419	68862
Estimator	Poisson	Poisson	Poisson

Notes: This table reports the average effects from estimating equation (1) for outcome variable total number of gender-related papers varying the time horizon in the analysis sample. Each column reports estimates from a separate regression. Column (1) is the baseline sample and keeps only observations from $-20 \leq \tau \leq 20$. Column (2) uses all available observations from $-35 \leq \tau \leq 44$. Column (3) uses all available observations from $-25 \leq \tau \leq 25$. 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. 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. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A11: Effect of Turning Coed on Total Faculty and Researchers

	(1) HEGIS Total Faculty	(2) MAG Total Researchers
Years -5 to -2	-47.348	5.403
	(67.422)	(10.621)
Years 0 to 2	-18.744	-1.713
	(21.594)	(10.167)
Years 3 to 6	-2.898	0.151
	(25.605)	(35.182)
Baseline Mean	191.62	193.63
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. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A12: Effect of Turning Coed on Share of Researchers in Female-Dominated Fields

	(1) Share of Researchers in Female-Dominated Fields
Years 0 to 2	0.021
	(0.024)
Years 3 to 6	0.048
	(0.039)
Baseline Mean	0.417
Observations	2680
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. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A13: Effect of Turning Coed on Total Active Researchers by Field

	(1) Years 0 to 2	(2) Years 3 to 6
Physical Sciences	9.881*	22.814
	(5.625)	(14.853)
Psychology	0.908	-2.884
	(1.374)	(5.025)
Political Science	0.072	-0.138
	(0.630)	(1.539)
Mathematics	0.079	-0.605
	(0.945)	(2.504)
Environmental Science	-0.515	-0.668
	(0.795)	(1.270)
Computer Science	-6.194	-11.982
	(4.361)	(9.434)
Medicine	-3.536	-5.086
	(12.909)	(28.156)
Biology	-1.889	0.991
	(4.046)	(9.736)
History	0.370	0.681
	(0.257)	(0.565)
Engineering	0.039	-0.536
	(0.953)	(2.181)
Philosophy	-0.378	-0.618
	(0.388)	(1.035)
Art	-0.312	-0.374
	(0.492)	(1.240)
Sociology	0.059	0.854
	(0.505)	(0.987)
Business	-0.703	-0.671
	(0.711)	(1.143)
Economics	-0.809	-2.206
	(1.811)	(4.653)
Geography	0.192	0.578
	(0.396)	(0.572)

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 total active researchers. We identify active researchers based on the first and last publication date at the university. 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. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A14: 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	-0.005
	(0.014)
Years 3 to 6	0.017
	(0.024)
Baseline Mean	0.90
Observations	476408
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. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A15: 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	0.003	-0.011
	(0.015)	(0.019)
Years 0 to 2	-0.005	-0.005
	(0.014)	(0.014)
Years 3 to 6	0.021	0.011
	(0.030)	(0.047)
Baseline Mean	0.90	0.90
Observations	307977	168429
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. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A16: Effect of Turning Coed on Gender Composition of Researchers (MAG)

	(1) Female Researcher Share	(2) Female Young Researcher Share
Years -5 to -2	-0.00449	-0.00657
	(0.00679)	(0.0105)
Years 0 to 2	-0.007	-0.010
	(0.011)	(0.014)
Years 3 to 6	0.001	0.010
	(0.021)	(0.026)
Baseline Mean	0.11	0.13
Observations	15834	13902
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. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A17: Effect of Turning Coed on Probability of Having Prior Interests in Gender

	(1) Any Prior Interest in Gender-Related Topics
Years 0 to 2	0.025***
	(0.004)
Years 3 to 6	0.065***
	(0.009)
Baseline Mean	0.026
Observations	126679
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. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A18: 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	-0.781	-0.000
	(1.280)	(0.002)
Years 0 to 2	0.949	0.004
	(0.734)	(0.003)
Years 3 to 6	4.808***	0.007**
	(1.445)	(0.003)
Baseline Mean	2.45	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. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A19: Gender-Related Research in Psychology

	(1) Gender-Related Papers
Years 0 to 2	-0.165
	(0.183)
Years 0 to 2 × Experimental	0.864***
	(0.176)
Years 3 to 5	-0.254
	(0.262)
Years 3 to 5 × Experimental	0.644***
	(0.154)
Baseline Mean	0.56
Observations	15267
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. 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. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A20: 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	-0.000	0.003	-0.021	-0.001	0.000	-0.009
	(0.006)	(0.006)	(0.016)	(0.004)	(0.004)	(0.008)
Years 0 to 2	0.014***	0.013**	0.019	0.002	0.001	0.005
	(0.005)	(0.005)	(0.014)	(0.002)	(0.002)	(0.011)
Years 3 to 6	0.023***	0.018**	0.064***	0.010**	0.008**	0.014
	(0.008)	(0.008)	(0.020)	(0.005)	(0.004)	(0.014)
Baseline Mean	0.08	0.07	0.12	0.02	0.01	0.03
Observations	77545	66537	11008	77545	66537	11008
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 coauthored 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 researcher fixed effects and year fixed effects fixed effects. All regressions are estimated using OLS. Standard errors in parentheses are clustered at the school level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A21: 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	0.007	0.006	0.007
	(0.006)	(0.006)	(0.016)
Years 0 to 2	0.005	-0.002	0.053*
	(0.007)	(0.007)	(0.027)
Years 3 to 6	-0.004	-0.013	0.059*
	(0.010)	(0.011)	(0.034)
Baseline Mean	0.16	0.15	0.20
Observations	77545	66537	11008
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 researcher fixed effects and year fixed effects fixed effects. All regressions are estimated using OLS. Standard errors in parentheses are clustered at the school level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A22: Effect of Turning Coed on Co-Authorship with Female Incumbent Researchers among Incumbent Researchers

	Probability of Co-Authoring with an Incumbent Female Researcher			Probability of Co-Authoring a Gender-Related Paper with an Incumbent Female Researcher		
	(1)	(2)	(3)	(4)	(5)	(6)
	All	Male	Female	All	Male	Female
Years 0 to 2	-0.064***	-0.067***	-0.052**	-0.006***	-0.004**	-0.012
	(0.007)	(0.007)	(0.021)	(0.001)	(0.002)	(0.008)
Years 3 to 6	-0.132***	-0.131***	-0.146***	-0.009***	-0.008**	-0.015**
	(0.010)	(0.010)	(0.027)	(0.003)	(0.003)	(0.007)
Baseline Mean	0.16	0.15	0.20	0.02	0.01	0.03
Observations	77545	66537	11008	77545	66537	11008
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 research paper co-authored with an incumbent female researcher 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 coauthored with an incumbent 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 researcher fixed effects and year fixed effects fixed effects. All regressions are estimated using OLS. Standard errors in parentheses are clustered at the school level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A23: Effect of Turning Coed on Co-Authorship Among Incumbent Researchers

	Probability of Co-Authoring		
	(1)	(2)	(3)
	All	Male	Female
Years -5 to -2	0.008	0.006	0.020
	(0.006)	(0.006)	(0.020)
Years 0 to 2	0.001	-0.007	0.062***
	(0.008)	(0.007)	(0.021)
Years 3 to 6	-0.014	-0.027*	0.085**
	(0.016)	(0.015)	(0.041)
Baseline Mean	0.56	0.55	0.60
Observations	77545	66537	11008
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 written a paper with a female researcher in that year. Each column reports estimates from a separate regression. Column (1) includes the full sample of incumbent researchers. Column (2) is restricted to only male incumbent researchers. Column (3) is 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 researcher fixed effects and year fixed effects fixed effects. All regressions are estimated using OLS. Standard errors in parentheses are clustered at the school level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A24: 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	0.157**	0.146**	0.053
	(0.068)	(0.067)	(0.050)
Years 3 to 6	0.433***	0.413***	0.265***
	(0.097)	(0.095)	(0.064)
Baseline Mean	0.06	0.06	0.06
Observations	60558	61306	62178
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. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.