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# GENDER AND THE DYNAMICS OF ECONOMICS SEMINARS

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This project reflects an unusual partnership with the Seminar Dynamics Collective, a group of 97 members of the economics community who collected and processed the data used in this study and are considered co-authors, including Corinne Andriola, Victoria Barone, Maryam Blooki, Stephanie Bonds, Nina Buchmann, Drew Burd, Anne Burton, Mrinmoyee Chatterjee, Vittoria Dicandia, Maria Dieci, Karl Dunkle Werner, Holly Dykstra, Luciana Etcheverry, John Fallon, Camille Falézan, Valeria Ferraro, Ellen Fu, Chelsea Garber, Shresth Garg, Anomita Ghosh, Laurie Hakes, Hyoyoung Han, Emma Harrington, Juan Herreño, Kelsi G. Hobbs, Lakshita Jain, Amna Javed, Michelle Jiang, Ariadna Jou, Catherine Michaud Leclerc, Domininkas Mockus, Erica Moszkowski, Philip Mulder, Tuan Nguyen, Urbashee Paul, Dev Patel, Grace Phillips, Xuechao Qian, Rizwanur Rob, Monica Rodriguez, Fernanda Rojas, Arvind Sharma, Rachel Schuh, Rachel Sederberg, Cory Smith, Rizki Nauli Siregar, Melissa Spencer, Anna Stansbury, Ishaana Talesara, Carly Trachtman, Francesca Truffa, Silvia Vannutelli, Joanna Venator, David N. Wasser, Melanie Wallskog, Ashley Wong and Alice Wu. Those not named have chosen to remain anonymous. Special thanks to Jim Poterba for providing coders with access to all of the sessions at the 2019 NBER Summer Institute. Our protocols were reviewed by the Institutional Review Boards at Northeastern University and NBER. The authors would like to acknowledge research funding from Stanford University's Department of Economics. In addition, we are grateful to seminar audiences at Boston University and the American Economic Association's annual conference for comments. The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

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## ABSTRACT

This paper reports the results of the first systematic attempt at quantitatively measuring the seminar culture within economics and testing whether it is gender neutral. We collected data on every interaction between presenters and their audience in hundreds of research seminars and job market talks across most leading economics departments, as well as during summer conferences. We find that women presenters are treated differently than their male counterparts. Women are asked more questions during a seminar and the questions asked of women presenters are more likely to be patronizing or hostile. These effects are not due to women presenting in different fields, different seminar series, or different topics, as our analysis controls for the institution, seminar series, and JEL codes associated with each presentation. Moreover, it appears that there are important differences by field and that these differences are not uniformly mitigated by more rigid seminar formats. Our findings add to an emerging literature documenting ways in which women economists are treated differently than men, and suggest yet another potential explanation for their under-representation at senior levels within the economics profession.



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# 1. Introduction

This paper represents the first systematic analysis of the culture of economics seminars. Specifically, we assess the extent to which women economists are treated differently than similarly situated men when presenting their research findings. This question seems particularly pressing, given both the distinctively aggressive culture of economics seminars, and the continuing under-representation of women among the senior ranks of the economics profession.

In winter, spring and summer 2019, we coded every interaction between a seminar speaker and their audience in 462 economics talks—including junior faculty recruitment seminars—across most leading economics departments, as well as nearly all talks at a leading annual economics conference. Our rich microdata record the time, duration, type and tenor of each interaction, including the gender and seniority of those making interjections, as well as the gender and many other attributes of the presenter and the research they are presenting. We use these data to explore gender differences in the frequency of questions and interruptions, the gender and seniority of those making interjections, the type of questions (e.g., comment, clarification, criticism, suggestion, follow-up), and the tone of questions (e.g., supportive, patronizing, disruptive, demeaning, hostile).

We find significant differences in how male and female economists are treated when presenting their work in otherwise quite similar economics seminars. Within a seminar series (that is, within a field of study within a specific university), women presenters are asked 3.3 additional questions compared to male presenters (a 12 percent increase). Accounting for the influence of a range of other factors about the coders, the audience, the presenter, and their paper yields similar estimates. Although research presentations given by women attract larger and more diverse audiences, the larger number of questions asked appears to be driven by men asking more questions. We also find that women receive a greater number of suggestions and clarifying questions as well as questions rated as patronizing or hostile.

Our sample includes a substantial number of "job market talks,"—the seminars that form an important part of the process by which departments recruit young economists—and our findings suggest that women are treated differently than men in these recruitment seminars. As such, it provides the first evidence of a potential link between two distinctive

features of economics: the aggressive seminar culture, and the persistent under-representation of women among the academic ranks of the economic profession.

This research can also be read as something of a progress report on whether the economics profession is living up to the ideals laid out in its recently adopted Code of Professional Conduct: to "conduct civil and respective discourse," where "each idea is considered on its own merits," and economists "create a professional environment with equal opportunity and fair treatment for all".[1]

Our data was collected as part of an unusual collaboration with the Seminar Dynamics Collective, a group of (mainly) graduate students who volunteered to analyze seminar dynamics and code relevant data. To some extent it is likely that these coders volunteered because they care about gender equity (as it was not possible to recruit "blind" coders). To the concern that this may yield somewhat biased results, we offer two responses. The first is rhetorical: These are the only available data on seminar dynamics. The second is quantitative: We document remarkably high inter-coder reliability, show that our results are robust to controlling for coder fixed effects, illustrate that coders do not have particularly progressive gender views, and find no evidence that coder characteristics shape our findings (we discuss all of this below.)

Before proceeding, it is useful to distinguish between two related research questions. Our analysis focuses on the question of *disparate treatment*, asking whether women are treated differently than men within otherwise-similar seminars. We distinguish this from an alternative—and equally important—question, which is whether seminar culture has a *disparate impact* on women economists, a question taken up by Boustan and Langan (2019). This distinction matters, because even a seminar culture which is gender-blind—that is, a culture that treats men and women equally aggressively—may have a disparate impact, if women find this aggressive or macho culture less welcoming than men do.

The rest of this paper is organized as follows. Section 2 provides some background that motivates our research and surveys the existing literature. Section 3 describes how our data were collected. Section 4 forms the analytic heart of the paper, describing our main findings. Section 5 analyzes a supplementary dataset collected during the NBER Summer Institute in 2019 that complements and enhances our main findings, albeit with less statistical precision in some instances. Section 6 concludes.

[1] The American Economic Association's Code of Professional Conduct was adopted on April 20, 2018. It can be found at this link: https://www.aeaweb.org/about-aea/code-of-conduct.

## 2. Some Background

Our research adds to an emerging literature that has documented that at virtually every margin that has been studied, women economists are treated differently than similarly situated men. Sarsons (2017) finds that women economists receive less credit than their male co-authors when assessed for tenure and promotion. Card et al. (2020) find that journal editors and referees are more likely to reject papers written by women economists than if they were seeking to maximize citations. Koffi (2021) shows that, within subfields, economics papers with female authors are less likely to be appropriately cited by related papers than papers with male authors. Hengel (2018) finds that women experience longer turn-around times and more stringent writing requirements from journal reviewers. Zacchia (2020) shows that some of the ranking methodologies for top economists systematically disadvantage women. And Wu (2020) finds that women economists have been systematically trivialized or even sexualized in online forums. Each of these factors likely contributes to the finding by Chen, Kim, and Liu (2017) that women economists are less likely to be promoted than men, and also to Ginther and Kahn (2004) finding that women are less likely to be promoted in economics than in other academic disciplines.

Another important motivation for the present study comes from the Code of Professional Conduct adopted by the American Economic Association in 2018. This code targets the profession's seminar culture, noting that the goal of "perfect freedom of economic discussion" imposes "a professional obligation to conduct civil and respectful discourse in all forums." It recognizes the importance of "equal opportunity and fair treatment for all economists, regardless of age, sex, gender identity and expression," and other personal characteristics, while it also articulates a professional responsibility to support "participation and advancement in the economics profession by individuals from all backgrounds, including particularly those that have been historically underrepresented." Yet, according to the recent AEA climate survey (Allgood et al. 2019), the degree to which one experiences this freedom is far from perfect and varies significantly across different groups. For example, nearly half (47 percent) of female respondents reported that they had not presented their question, idea, or view at their school or place of work to avoid possible harassment, discrimination, or unfair or disrespectful treatment compared to less than one-quarter (24 percent) of male respondents (Allgood et al. 2019). Similarly, 46 percent of women versus 18 percent of men said they had "not spoken at a conference or during a seminar presentation" to avoid those types of experiences.

These AEA survey results complement other recent studies that have focused more closely on seminars as a potential source of gender disparity in economics. Doleac, Hengel, and Pancotti (2020) have collected data documenting the share of economics seminars given by women or under-represented minorities across 44 leading economics departments. Boustan and Langan (2019) conducted structured interviews with a number of leading economic departments, finding that "departments with better relative outcomes for women are reported to have a less aggressive and more constructive climate in their research seminars."

Studies in other fields have also examined how women and men are treated differently when presenting their research, although none appear to be as large nor systematic as the present study. Blair-Loy et al. (2017) analyzed videotaped job talks across five engineering departments at two R1 designated universities, finding that women receive more questions, more follow-ups, and that more of their presentations are consumed by audience speech. Further, they found that the number of questions is related to actions the presenter took which revealed they were rushing to present their slides and complete the talk. Davenport et al. (2014) analyzed presentations at the annual meetings of the American Astronomical Society, finding that women were asked slightly more questions than men were.

Related research has also focused on who is more likely to ask questions in seminars. At the astronomy conference they studied, Davenport et al. (2014) found that women in the audience asked fewer questions than men did. Hinsley, Sutherland, and Johnston (2017) analyzed two international biology conferences, finding that men asked nearly twice as many questions per capita as women, but they found that this ratio was consistent across age groups. Carter et al. (2018) surveyed a convenience sample of the academic community ranging from undergraduates through graduate students, postdocs, and faculty, about the seminars they attended across a range of fields. Male respondents had a higher propensity to ask seminar questions than female respondents did. While men and women generally reported similar motivations for asking questions, men were twice as likely as women to report being motivated to ask a question because they felt they spotted an error. A majority (58 percent) of their sample – including a majority (60 percent) of women and a near majority of men (48 percent) reported that they believed that men were more likely to ask seminar questions than women were. In addition, their observation of biology and psychology seminars across a number of countries confirmed that men were more likely to ask questions than women were.

Other studies outside of economics suggest that seminar dynamics are somewhat path-dependent with women asking proportionately fewer questions when a man asked the first question, or there were fewer questions overall Carter et al. (2018). Other studies find that the gender of the chair or the overall composition of the audience are important moderators affecting the ratio of questions asked by male versus female audience members (Schmidt et al. 2017).

Finally, whether questions come in the form of structured interactions or interruptions merits further research. While there have been few studies on the occurrence of interruptions in conference settings, Miller and Sutherland's (2018) analysis of transcripts from Congressional hearings revealed that women were more likely to be interrupted than men were, and also that women were more likely than men to be interrupted by other women. Jacobi and Schweers (2017) reviewed Oral Arguments from the Supreme Court and found that women were interrupted more often than their male counterparts were, although seniority and political leaning also played a role. The authors note that female justices appeared to learn over time how to behave more like male justices, "avoiding traditionally female linguistic framing in order to reduce the extent to which they are dominated by the men."

## 3. Data Collection and Summary Statistics

Between January 9, 2019 and May 15, 2019, we collected data on presenter-audience interactions across 32 institutions, drawn from 84 distinct seminar series. Our data represent 462 unique talks presented by 338 presenters (115 females, 223 males). This sample includes 176 job market talks (38.0 percent) presented by 80 presenters (31 females, 49 males) across 26 universities including 20 of the top 30 economics departments.

We developed an online data collection tool that collected detailed information on each seminar, including every interaction between the presenter and the audience. We then recruited a team of coders who had both the expertise and capacity to code the seminars that occurred within their own departments. In the sections that follow, we first discuss the ethical and regulatory issues and the coder recruitment process. Next, we provide a detailed description of the data collection tool and present summary statistics for our sample. Finally, we offer two basic tests of inter-coder reliability and potential coder bias.

## 3.1. Ethical and regulatory issues

The most challenging part of this research came in the data gathering phase. We considered videotaping or audio recording seminars, but quickly learned that in many states this would require opt-in permission from those whose comments would be recorded. Not only did this present feasibility constraints given the scale of data collection involved, but the process of gathering such permissions could have led seminar attendees to alter their behavior. Moreover, it also presented political constraints, as the first few department chairs we approached perceived only downside risks to their individual departments from cooperating, even as they conceded that such research would be valuable for the broader profession. Thus, we were led to collect our data in real-time during seminars, coding each interaction as it occurred.

This strategy also presented fewer ethical and regulatory constraints. Research involving human subjects is governed by university Institutional Review Board (IRB) guidelines, and we were careful to obtain permission for all of our research in advance. This process was relatively straightforward, because in general, there is no expectation of privacy among seminar attendees. After all, anyone attending a seminar will observe fellow attendees taking notes, which may include details about what was said and by whom. Our research is simply a more structured form of such data collection. As such, as long as data from each seminar is collected by someone who would normally be invited to attend the seminar and make observations, the data collected is considered "exempt" under IRB guidelines, with no need to obtain informed consent from departments, presenters or seminar attendees.

Even so, we committed to a stronger set of privacy protections. We did not record the identity of audience members, coding only their gender, seniority, and the tone and type of their comments. We also do not reveal the identities of individual departments or programs when reporting our results. This is because our goal is to assess the state of economics culture across the profession rather than police behavior of any one individual or department. We also chose not to reveal the identities of coders without their explicit permission, even to other coders, to protect their anonymity and reduce the likelihood of retaliation, which was a concern that prevented some potential coders from participating in the study. Thus, the only personally identifiable information (PII) in our dataset is the presenter's name and the title of their talk, both of which were publicly available on the department web page listing the seminar schedule. Even then, we only use this

information to control for certain characteristics (e.g., home institution of the presenter and JEL code of the paper) that might differ across male and female economists, as well as to look up post-talk outcomes (such as paper publication and placement for the job market sample).

## 3.2. Coder recruitment

Our data were collected by a group of coders known as the Seminar Dynamics Collective to protect their anonymity. They were recruited via multiple channels. First, through an announcement made at a conference on diversity, attended by graduate students from over 30 institutions, where participants were able to sign up and recommend other students who might be interested. Second, through a convenience sampling of faculty in each university who suggested one or more graduate students that could be contacted by the research team.

Our recruitment process resulted in a pool of 77 coders, of whom 73 percent were female, 73 percent were in an applied micro field, and 36 percent were in the 4$^{th}$ year or higher in their Ph.D. program.[3] On one hand, one might be concerned that the high fraction of female coders or the non-blind recruitment process might make our observers more predisposed to note disparate treatment by gender. On the other hand, if we believe that economics indoctrinates one against disparate treatment, then we would expect coders in their later years to be less predisposed towards finding instances of differential treatment (Paredes, Paserman, and Pino 2020). Regardless of one's prior assumptions, our coders display a similar pattern of responses on the Harvard Implicit Assumption Test for the Gender Career Stereotypes compared to the distribution of all test takers, with the great majority being implicitly biased *against* career women (see Appendix Figure A1).[4] Nonetheless, we conduct several robustness checks at the end of this section to test both inter-coder reliability and potential bias. We also control for coder fixed effects in our subsequent analysis and explicitly test whether coder characteristics affect our results.

## 3.3. Data collection instrument and sample characteristics

To collect sufficiently granular data on seminar interactions, we developed an online tool

[3] We are missing coder characteristics for one coder who did not fill out the registration form.
[4] https://implicit.harvard.edu/implicit/education.html

in Qualtrics, a software platform that is commonly used for collecting survey data. The tool presents coders with a series of screens on which they can quickly register relevant observations using a combination of radio buttons with designated choices and comment boxes to fill in information that is more detailed. This tool was designed to be used on either a tablet or a laptop so as not to draw attention to the coder during the seminar and reduce the potential for Hawthorne effects.[5]

*Seminar characteristics*

Before the seminar begins, coders use the first page of the Qualtrics tool to record detailed information about the seminar including the time of the seminar, the title of the paper being presented, basic characteristics of the presenter (their name, gender, and home institution), characteristics of the seminar (duration, whether or not it was a job market talk, number of men and women in the audience, and any "rules" that governed asking questions). This information can also be used to collect additional characteristics about the speaker (e.g., publication record) and their paper (e.g., JEL codes) that can serve as additional controls.

Table 1 reports summary statistics that were collected about the presenters and the talks for the entire sample of seminars as well as the subset of job market talks, noting significant differences between the two. For example, the full sample of seminars has a lower share of female presenters (38.7 percent) than the job market talks (48.9 percent). However, both of these percentages overestimate the share of unique female presenters: only 34.0 percent of unique presenters and 38.8 percent of the subset of unique job candidates in our data are female.[6] Moreover, job market candidates are more likely to be from selective universities such that the job market talks represent a higher share of presenters from a top 20 economics department (81.3 percent) than the full sample (57.1 percent).[7] We will present results for both the full sample of seminars and also separately for job market talks to test whether these differences affect the results and the degree to which seminar dynamics for job market talks differ from those of regular seminars.

[5] Please see the coder guide in Appendix B for a more detailed description of the online Qualtrics tool, including screen shots of the different "pages" used to collect data.

[6] The fact that there are fewer women, but each is solicited more often than men are, suggests that the apparent increased representation of women in public talks compared to earlier periods may be driven by an elite group of women getting solicited more.

[7] Note that we are in the process of collecting a rich set of presenter characteristics including race/ethnicity, position (e.g., graduate student, post-doc, junior/senior faculty), and publication record.

Roughly, 61 percent of our seminars take place at a top 20 economics department with a higher share (73 percent) among the job market talks since selective institutions tend to have more job openings. Across the regular department seminars, the modal seminar duration is 90 minutes. Roughly three-quarters of the non-job market talks in our sample are in an applied micro field with 16 percent in macro and 7 percent in theory or econometrics. On average, 33 individuals attended each seminar (42 for job market talks)—and the audience was split roughly two-thirds men and one-third women. Only 6 percent of seminars had any rules in place such as not asking any questions during the first or last 10-15 minutes or only asking clarifying questions initially. Despite most of the seminar series falling under the applied micro category, Figure 1 shows that a wide range of topics were covered across the top-level JEL codes. Women were over-represented in giving papers that were categorized under Microeconomics and Public Economics, and under-represented in Macroeconomics, Financial Economics, Industrial Organization, and Urban/Real Estate/Transportation (see Appendix Table A1). Given the large degree of heterogeneity across seminar series within an institution and across topics discussed by presenters, we control for both seminar series and JEL code fixed effects in our regressions.

*Interaction-level data*

Using the online survey tool that we developed, data on each interaction during the seminar was collected in real-time. This included quantitative data such as the start and end time of each interaction, the number of interactions, who asked the question (e.g., male or female, professor or student), and whether the question was answered, deferred, ignored, or interrupted. We also collected qualitative data on each interaction including both the type of question (e.g., comment, criticism, suggestion, clarification, or follow-up) and the tone of the question (e.g., supportive, patronizing, disruptive, demeaning, or hostile).

Table 2 reports summary statistics for mean outcomes that were collected for the entire sample of seminars as well as the subset of job market talks, again noting significant differences between the two. On average, roughly 30 questions are asked during an economics seminar and 35 questions are asked during a job market talk. For a 90-minute seminar, this represents one interruption every 3 minutes—although interruptions are not uniformly distributed during the time allotted. Moreover, there is considerable heterogeneity with the number of questions ranging from a low of 5 to a high of 69 for any given seminar. There are 3.6 times as many questions from men as from women

during regular seminars—and more than 7 times during job market talks—despite men only outnumbering women 2 to 1 in attendance.

Very few questions are deferred or ignored, suggesting that questions can potentially take up a lot of time during a seminar. On average, it only takes about 7 minutes before the first question is asked with roughly two questions asked within the first 10 minutes. Overall, questions take up about 27 minutes during seminars and 31 minutes for job market talks. Again, for a typical 90-minute seminar, this represents about one-third of the time being taken up by questions, with this time more or less evenly split between the questioner and the presenter. In terms of the type of questions, roughly 36% of all questions are classified as clarifications, followed by another 15 percent that are classified as comments. Suggestions, follow-ups, and criticisms each account for just under 10 percent (9, 8 and 7%, respectively)—perhaps countering the reputation that economics is as an overly critical discipline.

What about the tone of the question? Here, we asked coders to assess the interaction towards the speaker. We specifically asked coders not to code the intention of the person asking the question, nor how it was taken by the speaker, but rather, their assessment of the tenor of the interruption in a scientific setting. Coders had the option to leave this assessment blank and were instructed to code the interaction only if they thought it was warranted. They could also code an interaction as having more than one tone. For example, an interaction could be supportive, patronizing, or both. As shown in the coder guide presented in Appendix B, we defined these terms for coders as follows:

- Supportive: For example, I provide the speaker with a great example they can use. Or provide an answer to a problem. Or I tell them why I find their insight useful.
- Patronizing: A question or comment that may be apparently kind or helpful, but betrays a feeling or sense of superiority over the speaker. A question or comment could be both supportive and patronizing if the interjection acts as if the speaker can't answer themselves.
- Disruptive: Here we think of interactions that disrupt the flow of the seminar, maybe shifting the talk into a completely different direction, away from the speaker and their research.
- Demeaning: A question or comment that – in some measure – causes the speaker to lose their dignity or the respect of others. A demeaning question or comment is less about the scientific point being made, and more about shifting the focus to the speaker and undermining their status as an expert.

- Hostile: A question or comment that is unnecessarily antagonistic, aggressive, confrontational or combative. Hostility describes an aggressive interaction, one that you may not want to encounter as a speaker. Hostility is not required to make a scientific point.

It is useful to note that according to Table 2, most interactions were not given a subjective assessment by the coder. Among rated interactions, 70 percent were coded as supportive, 16 percent as patronizing, 9 percent as disruptive, 3 percent as hostile and 2 percent as demeaning.

*Final observations*

At the conclusion of the seminar, coders are asked to report some final seminar-level observations using the last page of the Qualtrics tool. This includes using a Likert scale to assess both the degree to which the overall tone of the questions asked were unfair and whether the presenter seemed confident. Coders also assessed the degree to which attendance was lower or higher than usual as well as whether there were any particularly disruptive audience members and their gender. There was also an open-ended comment box for coders to note any further comments or impressions. Table 2 indicates that for one out of every 10 job talks, coders thought the questions were unfair overall. Even more striking is that roughly one in 5 job talks had a particularly disruptive audience member, one in 10 job talks had more than one disrupter in the audience, and the disrupters were mostly male.

## 3.4. Coder Reliability and Bias

Finally, we perform several robustness checks to assess the degree of coder reliability and bias. For example, Figure 2 shows the correlation between seminars with two coders (N=85) for the number of questions asked during the seminar. While there are some outliers, the degree of correlation between the first and second coder is quite high (correlation=0.92). In addition, Figure 3 shows the minute-by-minute seminar coding timeline for two seminars—one female and one male presenter—coded by the same two coders (one male and one female) at the same institution. The similarity of the timing of the speaker, the questions, the answers, and the back and forth across the two codes is striking, confirming that the gender of the coder is unlikely to affect our results.

### 3.5. Job market candidates: mid-term outcomes

We complement the dataset with mid-term outcomes data for the job market candidates. In December 2020, close to two years after the job market season considered, we checked the webpages of all job market candidates in our dataset and coded the candidate's placement, the ranking of their institution, whether they had received a post-doctoral fellowship prior to starting a tenure-track position, whether their job market paper was already published or at the "revise and resubmit" stage in a top journal, etc. We present those outcomes in Table A2. Female job market candidates appear to have had higher quality papers on average, if publication success is any indication (see bottom row), though the difference is not significant given the fairly limited sample size. We show in the analysis below that controlling for these measures of candidate and paper quality does not alter the results in any way.

## 4. Results from Departmental Seminars and Job Market Talks

We seek to explore the degree to which female presenters experience disparate treatment during seminars relative to males using the observational data collected on each interaction between the presenter and the audience members. Given that little is known about seminar dynamics in economics, we assess both objective (quantitative) as well as subjective (qualitative) indicators when assessing the degree to which women experience disparate treatment during economics seminars. In terms of quantitative outcomes, we examine the number of questions asked, how questions were handled by the presenter (e.g., answered, deferred, or ignored) and the total amount of time spent on questions during the seminar. In terms of qualitative outcomes, we assess the type and tone of the questions asked as well as the degree to which audience members were disruptive.

Given the considerable heterogeneity across presenters, seminar settings, and coders, we assess whether female economists experience disparate treatment during economics seminars using the following OLS specification:

$$Y_{p,s,c} = \alpha + \beta_1 Female\ Presenter_{p,s} + D_s'\beta_2 + \beta_3\delta_s + \beta_4\gamma_c + \beta_5\eta_p + JEL_{p,s} + \varepsilon_{p,s,c}$$

Where for presenter p, seminar series s, and coder c:

$Y_{p,s,c}$ = the outcomes of interest (e.g., number of questions asked)

Female $\text{Presenter}_{p,s}$ = dummy variable for whether the presenter is female

$D_s$ = a vector of talk level controls: dummy variables for official seminar duration in minutes (e.g., 60, 75, 80, 90 minutes) and whether the seminar is internal (presenter is from institution hosting the seminar).

$\delta_s$ = seminar series fixed effects (combination of seminar series title and institution)

$\gamma_c$ = coder fixed effects

$\eta_p$ = home institution group fixed effects

$JEL_p$ = paper JEL fixed effects

$\varepsilon_{p,s,c}$ = a stochastic error term

The coefficient of interest in equation (1) is $\beta_1$, which measures the differential outcome for female presenters, controlling for the duration of the talk as well as seminar series, coder, home institution group and JEL fixed effects. We have too many singletons in terms of presenter home institutions to include institution-specific fixed effects for all, so we instead create fixed effects for institutions with at least 10 unique presenters from that institution (the list is shown in Table A3), and group other institutions by type and rank, yielding 20 "home institution" groups that we include as fixed effects. If $\beta_1$ is positive and significant for an outcome such as the number of questions asked, this would indicate that women receive more questions than men do during economics seminars. Whether or not this is harmful to women remains an open question, but it would certainly be an indicator of *disparate treatment* of women presenters.

Note that our unit of observation is a talk-coder pair—a talk coded by an individual coder. In some cases, a talk may have been recorded by more than one coder (we have data on 462 talks over 579 talk-coder pairs). As such, we weighted each observation by the inverse of number of coders recording a given talk. For completeness, we present robust standard errors clustered in three distinct ways: the presenter level (since we have the same presenter, in fact typically the same paper, recorded in different institutions), the seminar institution level, and at the talk level (since we have some talks recorded twice by two different coders). We use OLS primarily, but as needed, we use an alternative nonlinear method to relax the linear functional form assumption.[10]

[10] To analyze differences in the number of questions asked—a count variable—we also use a Poisson quasi-maximum likelihood estimator (QMLE), reported in Table A4. The consistency of this estimator only requires the correct specification of the conditional mean, not the entire distribution.

## 4.1. Objective (quantitative) indicators

*Number of questions asked*

We start by analyzing the most straightforward outcome, which is the number of questions asked, on average, to women and men when presenting their research. On average, women receive roughly 3.5 more questions (3.6 when controlling for talk length) during a seminar compared to men and the effect is significant no matter how we cluster the standard errors (see Table 3). The gender gap remains significant and similar in magnitude when controlling for seminar series, coder, presenter's home institution groups, and JEL code fixed effects (column 6). In fact, the inclusion of the presenter's home institution group fixed effects increases the magnitude of the coefficient, reflecting that women in the sample are more likely to be from higher ranked institutions.[11] Excluding internal talks (speakers presenting at their home institution) leave the results unchanged (column 7). In the job market talks sample, the gap in the number of questions increases to 6 (column 8). [12] Using a Poisson Quasi-Maximum Likelihood Estimator (QMLE) instead of OLS yields nearly indistinguishable results (see Table A4 Panel A).

We perform several robustness checks to ensure that our results are not driven by outliers or coder bias. First, Figure 4 shows the distribution of the number of questions asked during a seminar for males versus females. In addition to exhibiting less variation overall, there is a clear rightward shift in the female distribution relative to that for males. Second, we test for coder bias across several characteristics including gender, year in the program, and primary field of study—the effects are fairly similar across all groups of coders (see Table A5).

Could the gap in the number of questions asked be driven by differences in the audience? Table A1 shows that talks by female speakers have higher attendance on average. In Table A4 Panel B, we add controls for total attendance. The magnitude of the coefficient on "female" decreases only slightly, suggesting that while the greater attendance may be one of the mechanisms (an extensive margin effect), most of the gender gap in questions asked seems to come from an effect on the intensive margin.

The results also hold within the job market talk sample when we include controls for

[11] In our sample of talks, 48.0 percent of female presenters are from a top 10 economics department compared to only 42.4 percent of male presenters. At the speaker level, however, 35.7 percent of female presenters and 35.9 of male presenters are from a top 10 economics department (see Appendix Table A1).

[12] There are 4 non-rookie candidates in the job market sample. Dropping them leaves the results unchanged.

"quality" of the candidate/paper, as measured by outcomes such as placement and publication status two years later (Table A6).

Does disparate treatment of women during seminars vary by field within the discipline? One might imagine that seminar culture in economics varies somewhat by field of study. For example, Figure 5 demonstrates that the number of questions asked during a seminar also varies across field with a significantly lower number of questions asked in econometrics or theory seminars. In our previous specifications, we have been implicitly controlling for both seminar institution and field by controlling for the seminar series at each institution. In Table 4, we test whether the gender disparity in the number of questions asked varies by micro versus macro versus metrics or theory versus job market seminars (typically attended by all fields). Given the relatively small number of talks in our sample (N=75, see the breakdown in Table A7) that are in a field other than micro, we are unable to detect heterogeneous effects by disciplinary field. The results in micro and for job market talks are fairly stable across all specifications, but the specifications with the full battery of fixed effects are not meaningful in other fields given the very small sample sizes (only 9 talks with female presenters in macro and 5 in theory and econometrics).

We note, however, that the disparity in the number of questions asked of female presenters in job market talks is, if anything, larger than that of regular department seminars (though not significantly: p-value is 0.150). This raises the concern that the seminar culture in economics may impact how the profession assesses candidates for hire.

*Other objective indicators*

Who is asking additional questions of female presenters during seminars? Figure 6 shows that female presenters draw a larger attendance of both men and women so that the total number of questions could reflect a combination of more attendees as well as more questions per attendee. For example, if more women attend seminars presented by female speakers and feel more comfortable asking questions of female speakers, then perhaps the gender disparity in the number of questions asked reflects more of an additional "service burden" for women rather than greater criticism or hostility.

In Table 5, we perform the same analysis as before where now the dependent variable is the number of questions asked by gender and seniority (e.g., male versus female faculty) of the asker. We find that essentially all questions are asked by faculty, and two thirds of the additional questions that female presenters receive are asked by men rather than

women (see rows 2 and 3) – this matches the overall composition of the audience (a third female, as shown in Table 1). For the job market sample, where the audience is 28% female, almost all of the extra questions are asked by male faculty.

Just because someone asks you a question does not mean that you have to answer it. If female presenters receive more questions during seminars than male presenters do, do they in fact answer more questions? Rows (6) through (8) in Table 5 show that the answer is clearly yes. Female presenters answer 3.3 (column 6) additional questions per seminar and 6.3 (column 7) additional questions per job market talk—as many (if not more) as the additional number that they are asked. Almost three quarters (63%) of these additional answers are in response to questions asked by men. Among the job market talks, roughly 94 percent of the additional questions answered are from men. Interestingly, although very few questions are ignored or deferred, female speakers are somewhat less likely to ignore or defer questions asked by other women compared to male speakers (see row 11). This suggests that there may also be significant gender disparities in how women audience members are treated by speakers of different genders during economic seminars, a finding that has been highlighted in prior studies of other disciplines.

If women are being asked and are answering more questions during seminars than men, does this add up to a greater share of time spent on questions during the seminar? This could be important if women are able to spend less time on highlighting key findings and/or appear rushed towards the end of their seminars—both of which could have a negative impact on the overall impression of their research and presentation skills. We show this analysis in Table A8. We find that women spend only about 2% more of their seminar time in questions. For the job market sample, the effect is smaller and not significant. This small impact on time taken by questions despite the greater number of questions suggests that some of the interruptions may have been quick clarifications that do not take long to address. We come back to this in the analysis of subjective outcomes below. Overall, what seems to be going on is that audience members are less likely to consolidate their comments/questions to female presenters than they are to male presenters, generating more interruptions during female presentations, for about the same total interruption time. A higher interruption rate has the potential to reduce the quality of the experience for both the presenter and the audience. These interruptions do not seem to come disproportionately early: women are not more likely to receive their first question earlier than men were and do not receive more questions in the first 10 minutes of the seminar compared to men (see Table A8).

## 4.2. Subjective indicators

Economics is known for its aggressive seminar culture and most economists can probably recall a particular seminar where they felt uncomfortable as either a presenter or an audience member. In this section, we measure the degree to which female presenters face harsher criticism and/or greater hostility from audience members compared to male presenters. We then assess whether this might affect how confident female presenters are perceived.

In terms of the type of questions, recall from Table 2 that roughly 36% of all questions are classified as clarifications, followed by another 15 percent that are classified as comments. Suggestions, follow-ups, and criticisms account for 9, 8 and 7%, respectively. Table 6 explores the degree to which female presenters are more or less likely to receive each of these question types. There is no evidence that women receive more criticism than men do. With the full battery of controls and fixed effects, female presenters are more likely to receive both suggestions and clarifications—about 0.5 additional suggestion and 1.7 additional clarifying questions. Among job market talks, female presenters are asked 1.3 additional questions rated as suggestions and 3.9 additional questions rated as clarifying. Clarifying questions, which seem to have yielded very short answers since total time spent answering questions is not greater for female presenters as discussed above, may well have been unnecessary interruptions to the flow of the presentation, since audience members seem willing to do away with them when listening to a male presenter.

What about the tone of the question? Table 7 assesses the degree to which female presenters are more likely to receive questions with supportive, patronizing, disruptive, demeaning, or hostile tones relative to male presenters. We find some evidence that women are more likely to receive patronizing questions. Women are also more likely to receive questions coded as hostile—even when controlling for seminar series, coder, home institution group, and JEL code fixed effects. Although the magnitude of the coefficient is even larger for job market talks, it is imprecisely estimated. Female job market candidates are also more likely to receive questions that are considered disruptive. Comments written by coders support this finding. One coder noted of a job market talk,

> "*Despite warning the room that she was running out of time, the questions continued. Nearing the end, one male professor insisted on an answer to a previous question with which he was unsatisfied, continued to speak over her for a time when she tried to move on, and instigated an entire corner of the room to talk over her. There was no*

*time left at the end for Q&A, and despite cheery responses and confidence throughout interruptions, this closing "question" (disruption) seemed especially demoralizing.*"

At the end of the talk, coders had to rate the overall fairness of the questions using a Likert scale. Figure 7 shows that female presenters are more likely to be asked questions that are considered overall to be "somewhat unfair" and less likely to be asked questions that are considered overall to be "somewhat fair"—particularly during job market talks, though the differences are not significant once we control for the full battery of fixed effects.

## 5. Evidence from the NBER Summer Institute

In the summer that followed our main data collection covering university seminars, we collected a supplementary dataset from the National Bureau of Economics (NBER) Summer Institute. The NBER is an important facilitator of economic debate, and arguably, the leading convener of top economists around the world, and the Summer Institute, which is a month-long series of invitation-only conferences, provides a useful lens into the culture of elite North American economics.

This supplementary dataset was collected by a different group of 29 coders, of which only 4 also coded university seminars. They were recruited from local Boston/Cambridge institutions. 52 percent of coders were female, 83 percent were specializing in an applied micro field and 31 percent were in 4th year of higher in their Ph.D program (see Appendix Table A9). This set of coders displayed a similar pattern of (biased) responses on the Harvard Implicit Assumption Test for the Gender Career Stereotypes compared to the distribution of all test takers and spring seminar coders (see Appendix Figure A1).

We obtained approval from NBER for coders to sit at the back of each program session to collect data. The tool we used was slightly modified in order to accommodate NBER's IRB requests that the data be even more comprehensively anonymized (so that individual presentations, presenters, and even workshop series are unidentifiable). We also agreed not to record potentially provocative information on the negative "sentiment" of the question or comment (patronizing, hostile, etc.). Instead, we were permitted to code whether the interaction generated by a question or comment was particularly collegial, constructive, or valuable.

Despite logistical constraints (we obtained approval only a week before the conference began), we were able to code presentations at 48 of the 51 program meetings, yielding a total of 443 talks, of which 122 (28 percent) had female presenters. These data were collected by a total of 29 different coders (all were graduate students ranging from their first to their sixth year in their Ph.D. program and half were female (see Table A9)).

The Summer Institute is run as a series of "program" meetings (e.g., "Monetary Economics"), but at the NBER's request, we did not record the specific program associated with each talk. As such, we lack the data to include the specific controls for each seminar series that would effectively hold the audience and seminar format constant. Instead, we were able to code whether each meeting was in one of three broad fields — micro, macro or finance — following the scheme compiled by Chari and Goldsmith-Pinkham (2017), and include these coarser controls.

Presentations and audience interactions at the NBER Summer Institute differ from those in the university department seminars that we analyzed, in several marked ways. While most university seminars are 90 minutes (or close to) in length, the presentation time at the Summer Institute varies dramatically across programs, with a mean of just 39 minutes (see Table 8). A number of programs include not only formal presentations but also formal discussants. In such cases, the presentation is shorter, and the audience tends to limit questions in order to avoid "stealing the thunder" of the discussant. Some programs make such restraints an official rule, postponing all but clarifying questions until a formal Q&A discussion period at the end. Other programs impose a moratorium on questions in the first 10 or 15 minutes (or up until the end of the introduction), and/or in the last 5 or 10 minutes. Such rules are more common than not: of the 447 talks coded in our data, only 36 percent have a regular university department seminar format (no discussant, no Q&A, and no moratorium on questions). Instead, 44 percent of NBER seminars have a discussant and Q&A session at the end. Another 7 percent have a Q&A without discussant and 5 percent have a discussant without Q&A. Only 10% have a moratorium on questions at the beginning but no Q&A.

In addition, all NBER Summer Institute participants were informed our study was taking place. Indeed, the week before the Summer Institute started, NBER President and CEO Jim Poterba emailed registered participants to raise "three conference-related issues." The first issue concerned Twitter, and the need for audience members to seek consent from presenters before distributing photos of slides. The two other issues were related to our project, one directly and one indirectly. Specifically, Poterba wrote:

"*A team studying seminar culture will be collecting data on presenter - audience interactions during Summer Institute sessions. The data collectors will be recording data on the timing and nature of questions and other interactions in an anonymized format. Prospective summary statistics will aggregate the findings from multiple meetings. This study has been reviewed by the NBER's Institutional Review Board, and I look forward to learning in a systematic fashion about this aspect of our conferences. Finally, please be mindful of the NBER's Conference Code of Conduct,*[15] *which is designed to foster the lively and productive exchange of scientific ideas in an environment that is free of harassment and discrimination.*"

In addition, program directors were free to make an announcement at the beginning of their program's conference to remind the audience of our data collection efforts, and coders noted that this occurred in at least two of the Micro programs.

Table 8 presents summary statistics for the talks in our NBER sample, as well as differences across the three broad fields. The first column shows the mean of each variable for the whole sample. Compared to the spring seminars sample, NBER talks were as likely to be given by scholars from top 20 institutions, but less likely to be given by women (28 percent compared to 39 percent in the spring seminars sample). NBER talks also have a larger audience. The average number of questions is considerably reduced, which is not surprising given the shorter duration and format constraints discussed earlier.

One distinct advantage of the NBER sample is the more balanced representation across the major fields, which can better support testing for differences in the disparate treatment of female economists compared to the spring seminars sample. To explore initial differences across our three field types, in Table 8 we regress the characteristics of interest (row titles) on dummy variables for both the Micro and Finance fields and find substantial differences within the NBER sample. We show the mean for the Macro talks in column 2, and the differences between Micro and Macro (Finance and Macro) in column 3 (4). We note that female and junior faculty representation is much higher in Micro (as in Chari and Goldsmith-Pinkham (2017)). In addition, Finance talks have a very different format than regular seminars, with all Finance talks having a discussant and/or a Q&A session. Interestingly, both Micro and Finance talks have significantly fewer questions

[15] https://nber.org/COI/ConferenceCodeofConduct.pdf. As far as we know, the NBER Conference Code of Conduct was written in anticipation of the 2019 Summer Institute, and had not been circulated prior to any other NBER conference. Building on this, at its September 2019 meeting, the NBER Board of Directors adopted a Code of Professional Conduct for NBER-affiliated researchers: https://nber.org/COI/CodeofConductPolicy0919.pdf

that are asked compared to Macro talks and the share of questions that are neither valuable, nor constructive, nor collegial is much lower for Micro talks.

Tables 9 and 10 present results of the analysis of talk differences by gender of the presenter using a regression format analogous to that used in the earlier analysis. The one exception is that we cannot control for program fixed effects to control for the specific audience, format and norms of particular programs as we did when using seminar series fixed effects in the spring seminars sample. Instead, we use a cruder set of controls for "Field × Format" fixed effects, which we construct as a saturated set of interactions of our three fields (Micro, Macro and Finance), whether the session was joint between multiple programs, and format variables based on whether there was a discussant, a Q&A session at the end, or a moratorium on questions at the beginning. This yields 15 categories associated with a specific field and format and with at least one female and one male presenter (with a mean of 26 observations).

Each row in Table 9 corresponds to an outcome of interest, the first being our primary outcome from before: the total number of questions asked of the presenter. Column (1) shows the overall mean and standard error, column 2 shows the coefficient on "Female Presenter" for the full sample, and columns (3) through (8) show results for subsamples, by field and presenter characteristics. For example, the estimate in row (1), column (2) of Table 9 shows that female presenters were asked an additional 1.3 questions on average compared to male presenters (p-value=0.156). This is quite comparable in magnitude to the effect observed in the spring seminars sample. Among the NBER talks, an additional 1.3 questions compared with a mean of 14 questions represents an increase of 9.3 percent, compared to the 12 percent increase (+3.5 questions compared with a mean of 30 questions) in the spring seminars sample. Analyzing instead the total time taken up with audience interactions (not including time taken by formal discussants), the coefficient is of a similar magnitude (+1.117 minutes compared with a mean of 12.1 minutes, a rise of 9.2 percent).

Comparing across fields in columns (3) through (5), we see that the gender disparity in the number of questions is driven by the Macro programs, which exhibit a very large gender gap where women are asked 4.4 more questions than men during an NBER talk. The other outcomes shown on Table 9 suggest that these additional questions in Macro talks are asked mostly by men, as was the case in the spring seminars sample. Moreover, the additional questions aimed at female Macro presenters start coming earlier in the talk (nearly seven minutes earlier) and at times before questions are even allowed. Indeed,

some of these additional questions are deferred by women, suggesting that they may not have been asked when appropriate during the talk. In fact, the norm that questions should be held until later is 23 percentage points more likely to be breached when a woman is presenting in a Marco talk compared to a man. Finally, the additional questions received by women in Macro talks are rated as neither valuable, nor constructive, nor collegial.

The other advantage of the NBER sample is the ability to test whether the differential treatment of presenters based on their gender can be mitigated by any specific format. Table 10 shows the same outcomes of interest, splitting the sample by program format. Surprisingly, we find that having a discussant and/or Q&A at the end does not mitigate the differential treatment of women presenters. Indeed, women receive more questions than men presenters even in those presentations that had formal discussants. This appears to at least partly reflect audiences being less likely to respect the formatting rules when facing female presenters: they are 8 percentage points more likely to ask a question before the official question time begins. The only mitigating factor appears to be the "moratorium" on questions in the first 5 or 10 minutes of the talk: with the caveat that this represents a very small sample of presentations (N=45), we find that the moratorium completely undoes (if anything, reverses) the gender gap. And this appears to be the result of fewer "clarifying" questions that end up being deferred anyway or followed up on later when asked too early.

Overall, the findings from the NBER Summer Institute results appear quite consistent with the spring seminar results presented earlier. Female presenters receive more questions that are not favorably rated, with the effects more pronounced in the Macro talks. While the results are at times imprecise, they are of roughly the same magnitude as those observed in the spring seminars where we are able better able to control for heterogeneity across audience and sub-fields. Moreover, these results shed light on the potential for different seminar formats to mitigate the disparate treatment of women during economics seminars.

## 6. Conclusion

Our analysis finds notable differences between how male and female presenters are treated during economics seminars, and these effects are evident in an array of both objective and subjective indicators. Moreover, these effects are robust to a range of

controls, and we obtain similar findings when analyzing data coded by people of different demographic groups.

What should we make of these results? One might respond that the differences in how women and men are treated, while notable—and in most cases, statistically significant—may not seem particularly large. Our own view is that we find the magnitudes difficult to evaluate, at least partly because it is hard to think about the long-term consequences of receiving 8-12 percent more interruptions throughout one's career or when on the job market. Moreover, we have focused on the measurable, rather than the unmeasurable. It might not be the magnitude of the questions that matters as much as the type or tone of the questions, particularly those that could be considered "demoralizing." Many of us have heard stories of friends and colleagues whose bad experiences in seminars have led them to re-evaluate whether a career in economics is really the best choice for them.

It seems unlikely to us that these findings reflect an explicit plan by seminar attendees to treat women differently. Instead, they may speak to implicit bias, or perhaps more darkly, an undercurrent of misogyny in a male-dominated culture (Wu 2020). As such, it seems likely that the same biases that lead women economists to be treated differently in the seminar room may also be evident in many other domains of their professional lives, perhaps shaping decisions about publication, hiring, promotions, tenure, the allocation of professional resources and so on. Indeed, one characterization of the emerging literature on gender biases within the economics profession is that every rock we look under reveals yet another way in which existing institutions are biased against women. (The exception is Donald and Hamermesh's (2006) finding that women are more likely to be elected to be officeholders of the American Economic Association—though this may itself be a tax on women's time rather than a career boost.) The cumulative effect of these various disadvantages may well be far greater than that of any individual bias considered in isolation.

Of course, some caveats are in order when generalizing our results to the entire profession. Our study is based on a convenience sample of seminars largely drawn from the top 30 economics departments in the United States, supplemented with a major elite-level conference. Seminar dynamics in other countries, other academic institutions, or other professional settings might operate quite differently.

Finally, the point of this investigation was to uncover ways that we could improve the climate within the economics profession for all under-represented groups. The AEA

Code of Professional Conduct clearly stated, "Economists have both an individual responsibility for their own conduct, and a collective responsibility to promote professional conduct" by "developing institutional arrangements and a professional environment that promote free expression." Our findings suggest that the current institutional arrangements do not serve women economists particularly well. We see some evidence of recognition of this fact, and over recent months, a number of leading economics departments have surveyed their members, discussed potential remedies, and set new ground rules for how they want their seminars to operate. These ground rules range from simple actions like no questions in the first ten minutes and raising one's hand to be called on by the presenter, to having a moderator who guides seminar interactions and maintains a professional environment. While such changes are useful, we would be more optimistic about making progress on this issue if they came coupled with an attempt at systematically evaluating their effects.

Finally, making appropriate professional conduct during seminars a part of how we train the next generation of economists will likely help perpetuate a better environment going forward. While none of these suggestions is likely to be a silver bullet, our hope is that by bringing attention to disparate treatment during economics seminars, the present study will spark discussions across the profession to set in motion a cultural shift towards a more inclusive and constructive environment.

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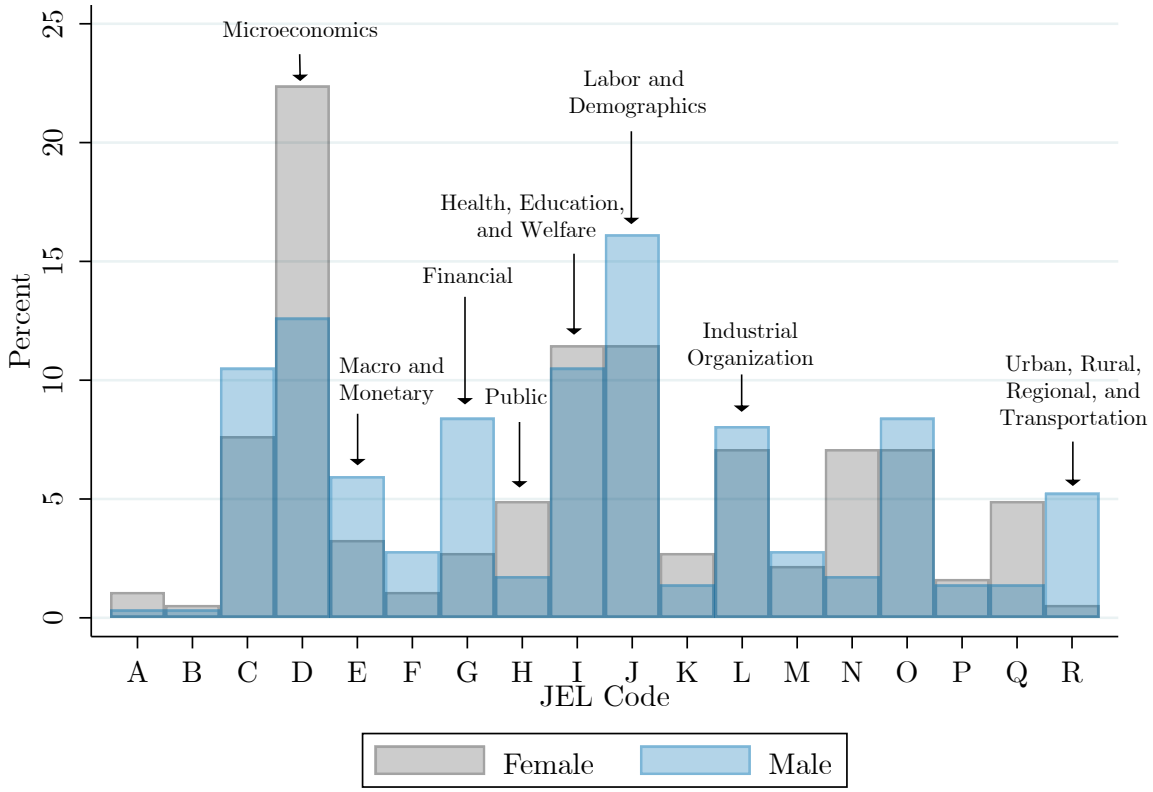
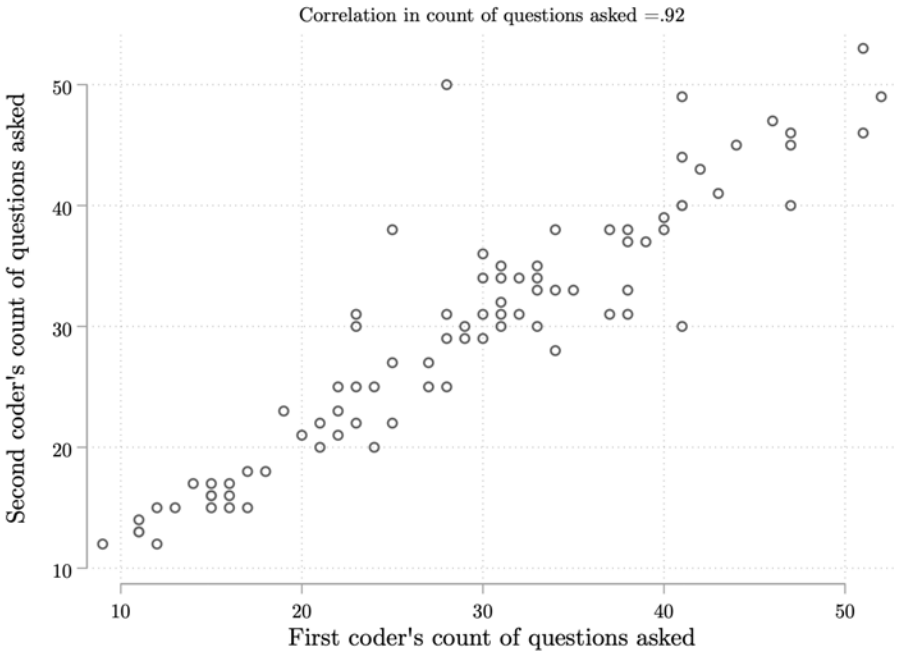
Figure 1: Distribution of JEL Paper Codes By Gender of the Presenter



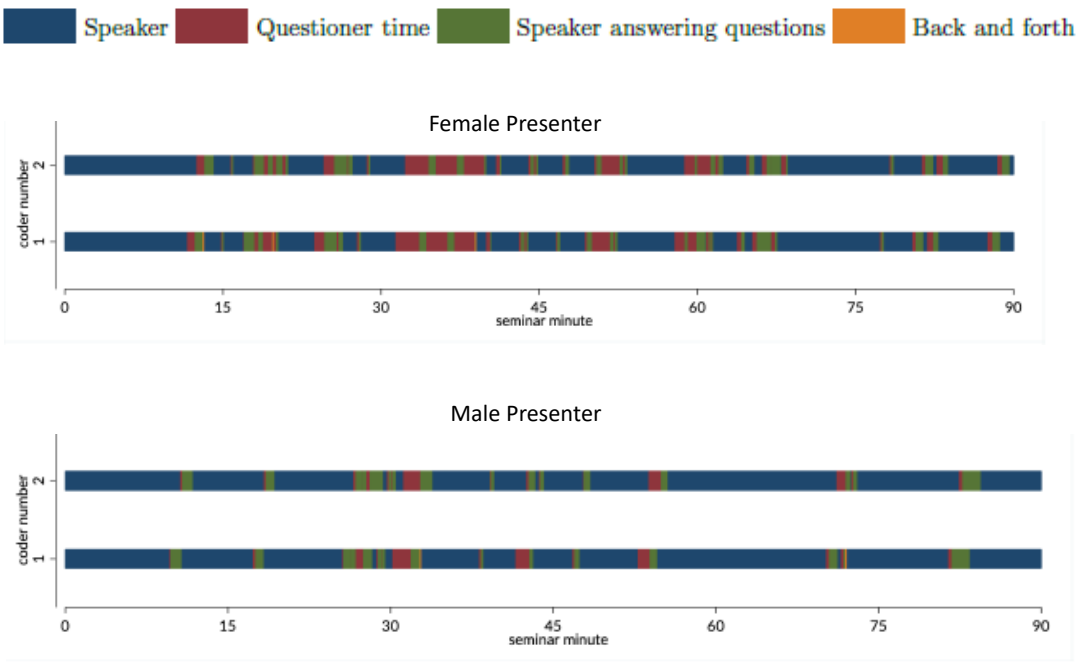

Source: Authors' calculations based on data collected by the Seminar Dynamics Collective between January 9th and May 15th, 2019.
Note: Sample is composed of N=462 seminars over 579 seminar-coder pairs. Among the 462 observations, a little over half (52 percent) had JEL codes that were specified by the author on the title page of their paper. If the JEL codes listed mapped to more than one top-level (single-digit ) code, then the most frequent JEL code was chosen. In the event of a tie, the most relevant JEL code was chosen. The remaining observations were assigned a top-level (single-digit) JEL code by the authors based on the abstract. Observations are weighted by the inverse number of coders for each talk.

Figure 2: Inter-Coder Reliability



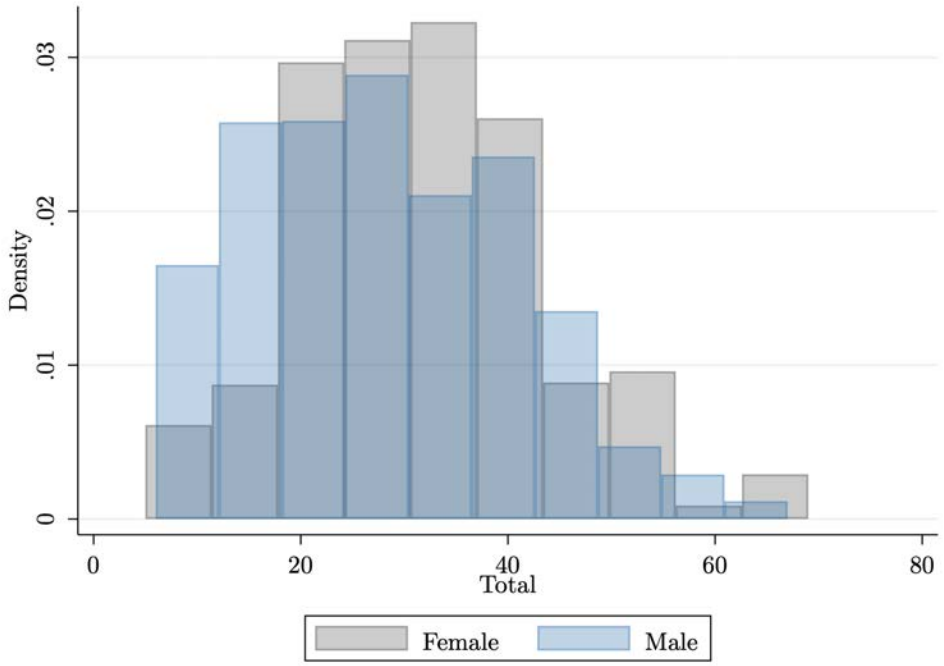

Source: Authors' calculations based on data collected by the Seminar Dynamics Collective between January 9 and May 15, 2019.
Note: Sample is composed of 85 seminars containing two coders.

Figure 3: Examples of Seminar Coding Timelines across Multiple Coders Same Two Coders (One Male, One Female) at the Same Institution



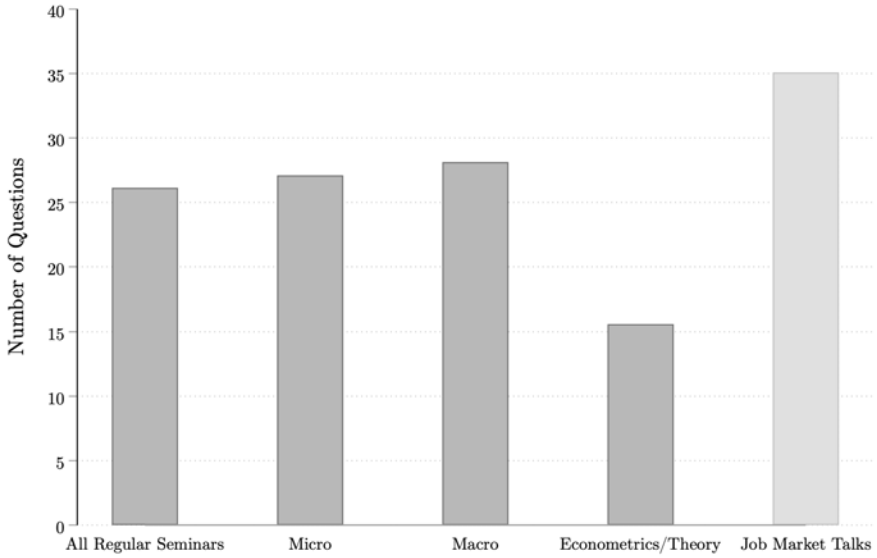

Source: Authors' calculations based on data collected by the Seminar Dynamics Collective between January 9 and May 15, 2019.

Figure 4: Density of Number of Questions Asked By Gender of the Presenter




Source: Authors' calculations based on data collected by the Seminar Dynamics Collective between January 9 and May 15, 2019.
Note: Sample is composed of N=462 seminars over 579 seminar-coder pairs. Observations are weighted by the inverse number of coders for each talk. P-value of Kolmogorov-Smirnov test of equality of the two distributions $\leq 0.001$.

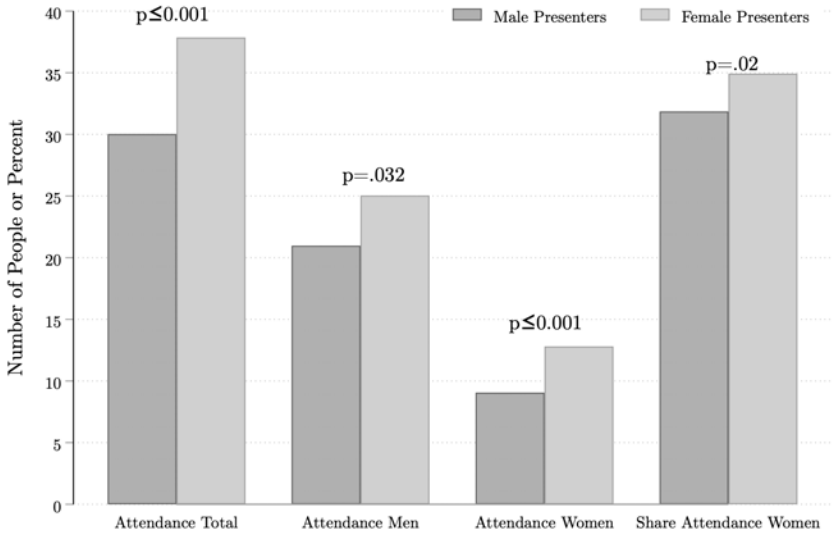
Figure 5: Number of Questions Asked in Seminar by Field of Study



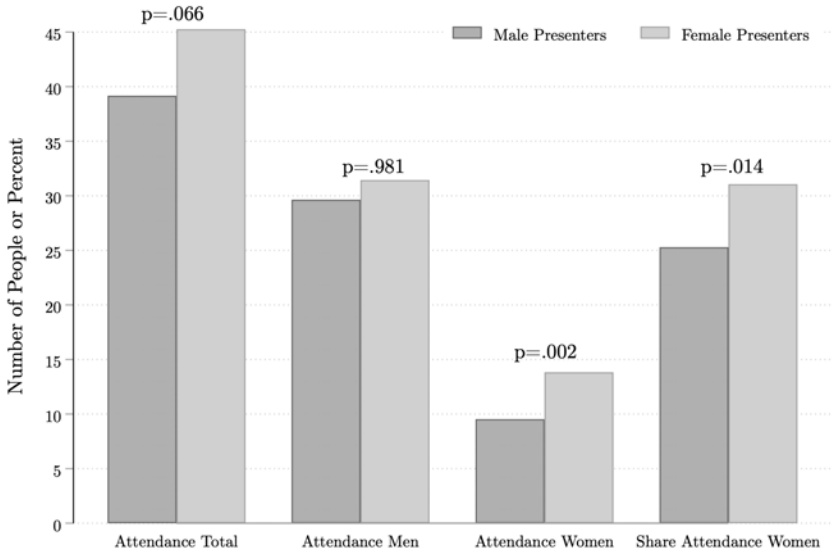

Source: Authors' calculations based on data collected by the Seminar Dynamics Collective between January 9 and May 15, 2019.
Note: Sample is composed of N=286 seminars over 339 seminar-coder pairs (non-JMT seminars only). Observations are weighted by the inverse number of coders for each talk.

Figure 6: Gender Differences in Attendance

(a) Pooled Sample of Seminars (N=579)



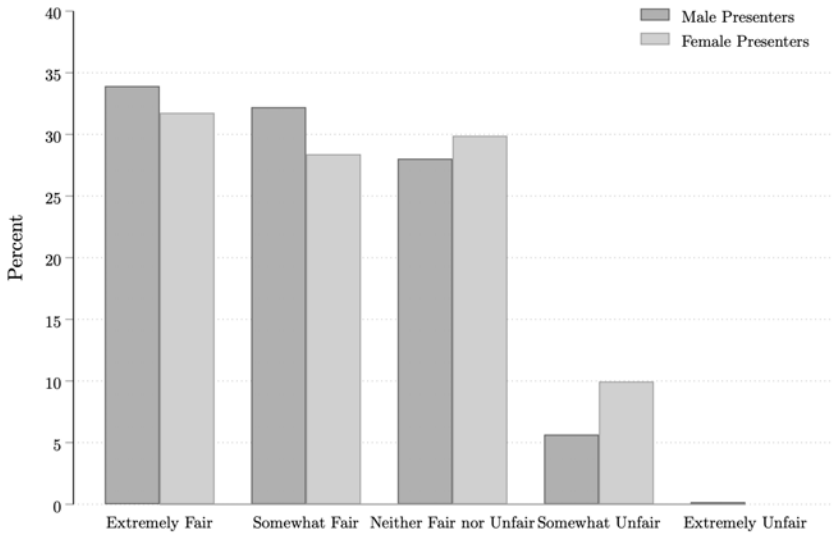

(b) Job Market Talks Only (N=240)



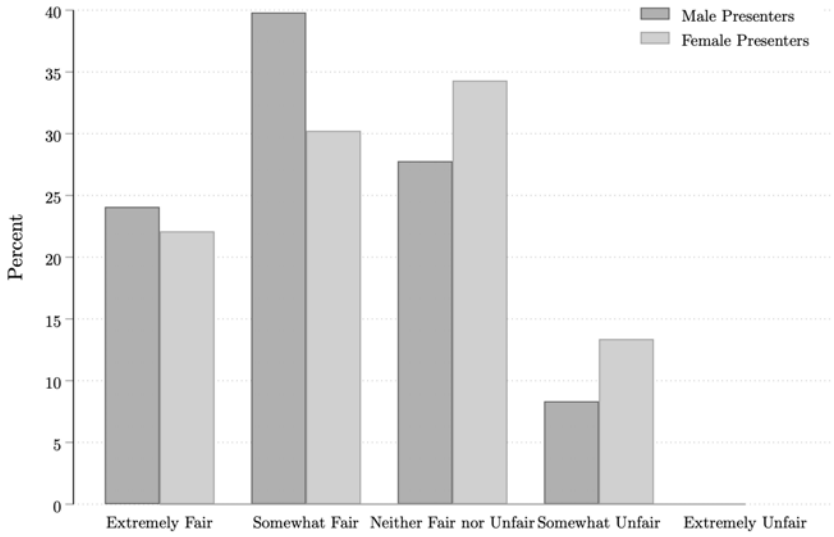

Source: Authors' calculations based on data collected by the Seminar Dynamics Collective between January 9 and May 15, 2019. Note: For the pooled sample, N=462 talks over 579 talk-coder pairs. For the job market talk sample, N=176 talks over 240 talk-coder pairs. Observations are weighted by the inverse number of coders for each talk. P-values reported on top of bars are from regressions with same controls as those in Table 3 Column 6 and show differences between male and female presenters.

Figure 7: Gender Differences in Fairness of Questions

(a) Pooled Sample of Seminars (N=579)




(b) Job Market Talks Only (N=240)




Source: Authors' calculations based on data collected by the Seminar Dynamics Collective between January 9 and May 15, 2019. Note: For the pooled sample, N=462 talks over 579 talk-coder pairs. For the job market talk sample, N=176 talks over 240 talk-coder pairs. Observations are weighted by the inverse number of coders for each talk. None of the differences by gender are significant when controlling for battery of fixed effects as in Table 3 Column 6.

Table 1: Summary Statistics for Talk Observations

| | All Talks | | Job Market Talks | | Difference (JMT-ALL) |
|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | |
| | (1) | (2) | (3) | (4) | (5) |
| **Speaker Characteristics** | | | | | |
| Female Presenter | 0.387 | 0.488 | 0.489 | 0.501 | 0.101*** |
| Top 10 Home Institution | 0.446 | 0.497 | 0.739 | 0.440 | 0.293*** |
| Top 20 Home Institution | 0.571 | 0.495 | 0.813 | 0.391 | 0.241*** |
| **Talk Characteristics** | | | | | |
| Lenght | | | | | |
| 60 minutes | 0.074 | 0.261 | 0.000 | 0.000 | −0.074*** |
| 75 minutes | 0.234 | 0.424 | 0.057 | 0.232 | −0.177*** |
| 80 minutes | 0.227 | 0.419 | 0.307 | 0.462 | 0.080*** |
| 90 minutes | 0.465 | 0.499 | 0.636 | 0.482 | 0.171*** |
| Seminar Institution | | | | | |
| Top 10 Seminar Institution | 0.403 | 0.491 | 0.375 | 0.485 | −0.028 |
| Top 20 Seminar Institution | 0.606 | 0.489 | 0.727 | 0.446 | 0.121*** |
| Field | | | | | |
| Applied Micro | 0.455 | 0.498 | 0.000 | 0.000 | N/A |
| Macro | 0.102 | 0.303 | 0.000 | 0.000 | N/A |
| Theory/Econometrics | 0.045 | 0.208 | 0.000 | 0.000 | N/A |
| Job Market Talk | 0.381 | 0.486 | 1.000 | 0.000 | N/A |
| Attendance | | | | | |
| Total | 33.050 | 17.001 | 42.143 | 19.245 | 9.093*** |
| Men | 22.548 | 13.316 | 30.516 | 15.417 | 7.968*** |
| Women | 10.500 | 6.843 | 11.627 | 7.842 | 1.128*** |
| Rules | | | | | |
| Any rules specified | 0.058 | 0.235 | 0.034 | 0.182 | −0.024* |
| No questions first 5-10 minutes or during introduction | 0.043 | 0.204 | 0.006 | 0.075 | −0.038*** |
| No questions last 5-10 minutes | 0.015 | 0.122 | 0.028 | 0.166 | 0.013** |
| **Coder Charactersitics** | | | | | |
| Female | 0.709 | 0.455 | 0.681 | 0.467 | −0.028 |
| Field is Applied Micro | 0.705 | 0.456 | 0.746 | 0.436 | 0.041* |
| Upper (4th-6th Year) PhD Student | 0.349 | 0.477 | 0.432 | 0.496 | 0.083*** |
| Non-PhD or Unknown Coder | 0.090 | 0.286 | 0.028 | 0.166 | −0.061*** |

*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' calculations based on data collected by the Seminar Dynamics Collective between January 9 and May 15, 2019.

Note: For the pooled sample, N=462 talks over 579 talk-coder pairs. For the job market talk sample, N=176 talks over 240 talk-coder pairs. Observations are weighted by the inverse number of coders for each talk. Ranking for top 10 and 20 institutions is from the US News and World Report 2017 Rankings. Observations are weighted by the inverse number of coders for each talk.

Table 2: Mean Outcomes for Talk Observations

| | All Talks | | Job Market Talks | | Difference(JMT-ALL) |
|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | |
| | (1) | (2) | (3) | (4) | (5) |
| **Quantitative Outcomes** | | | | | |
| Number of Questions Asked | | | | | |
| Total | 29.541 | 12.099 | 35.084 | 11.205 | 5.543*** |
| By Men | 24.631 | 12.148 | 30.957 | 11.156 | 6.326*** |
| Faculty | 22.779 | 12.678 | 29.920 | 11.208 | 7.141*** |
| Students | 1.852 | 2.627 | 1.037 | 1.794 | −0.815*** |
| By Women | 5.069 | 5.477 | 4.060 | 4.066 | −1.009*** |
| Faculty | 4.503 | 5.035 | 3.901 | 4.056 | −0.602** |
| Students | 0.566 | 1.410 | 0.159 | 0.498 | −0.407*** |
| Number of Questions in First 10 Minutes | 2.036 | 1.762 | 2.263 | 1.897 | 0.227** |
| Number of Questions Answered | 26.778 | 11.483 | 32.284 | 10.997 | 5.506*** |
| Number of Questions Deferred | 1.409 | 1.850 | 1.965 | 1.937 | 0.556*** |
| Number of Questions Ignored | 0.162 | 0.591 | 0.162 | 0.435 | 0.000 |
| Minutes | | | | | |
| Elapsed Until First Question | 7.215 | 4.829 | 6.979 | 4.664 | −0.236 |
| Taken Up by Questions | 27.014 | 9.195 | 31.450 | 8.069 | 4.436*** |
| Taken Up by Questioner | 10.878 | 5.890 | 14.186 | 6.418 | 3.309*** |
| Taken Up by Speaker Answers | 13.144 | 5.330 | 14.007 | 4.651 | 0.863*** |
| Taken Up by Back and Forth | 2.992 | 4.228 | 3.257 | 4.449 | 0.264 |
| **Qualitative Outcomes** | | | | | |
| Type of Question | | | | | |
| At least one question is a: | | | | | |
| Comment | 0.831 | 0.375 | 0.811 | 0.393 | −0.020 |
| Criticism | 0.543 | 0.499 | 0.666 | 0.473 | 0.122*** |
| Suggestion | 0.728 | 0.446 | 0.694 | 0.462 | −0.034 |
| Clarification | 0.934 | 0.249 | 0.940 | 0.237 | 0.006 |
| Follow-Up | 0.596 | 0.491 | 0.703 | 0.458 | 0.106*** |
| Number of Questions that are: | | | | | |
| Comment | 4.455 | 4.629 | 4.605 | 4.616 | 0.150 |
| Criticism | 2.132 | 3.421 | 2.841 | 3.506 | 0.709*** |
| Suggestion | 2.619 | 2.892 | 2.432 | 2.649 | −0.187 |
| Clarification | 10.598 | 8.996 | 12.889 | 10.648 | 2.291*** |
| Follow-Up | 2.337 | 3.153 | 3.123 | 3.504 | 0.786*** |
| Tone of Question | | | | | |
| At least one question is: | | | | | |
| Supportive | 0.424 | 0.495 | 0.420 | 0.495 | −0.004 |
| Patronizing | 0.219 | 0.414 | 0.326 | 0.470 | 0.107*** |
| Disruptive | 0.167 | 0.373 | 0.240 | 0.428 | 0.073*** |
| Demeaning | 0.064 | 0.245 | 0.114 | 0.318 | 0.050*** |
| Hostile | 0.069 | 0.254 | 0.119 | 0.325 | 0.050*** |
| Number of Questions that are: | | | | | |
| Supportive | 2.536 | 6.009 | 1.339 | 4.197 | −1.197*** |
| Patronizing | 0.592 | 1.877 | 1.054 | 2.635 | 0.462*** |
| Disruptive | 0.321 | 0.966 | 0.490 | 1.228 | 0.169*** |
| Demeaning | 0.096 | 0.419 | 0.162 | 0.521 | 0.066*** |
| Hostile | 0.102 | 0.466 | 0.195 | 0.681 | 0.093*** |
| Overall Questions were Unfair | 0.074 | 0.263 | 0.108 | 0.311 | 0.034** |
| Audience Member is Disruptive | | | | | |
| Any Disrupter | 0.183 | 0.387 | 0.203 | 0.403 | 0.019 |
| More than One Disrupter | 0.062 | 0.241 | 0.103 | 0.305 | 0.041*** |
| At Least One Male Disrupter | 0.172 | 0.378 | 0.203 | 0.403 | 0.030 |
| At Least One Female Disrupter | 0.032 | 0.177 | 0.023 | 0.149 | −0.010 |

*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' calculations based on data collected by the Seminar Dynamics Collective between January 9 and May 15, 2019.
Note: For the pooled sample, N=462 talks over 579 talk-coder pairs. For the job market talk sample, N=176 talks over 240 talk-coder pairs. Observations are weighted by the inverse number of coders for each talk.

# Table 3: Gender Differences in Number of Questions Asked during a Talk

| | Pooled Sample of Regular Talks Plus JMTs | | | | | | W/o Internal Talks | JMT Only |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Female Presenter | 3.522 | 3.631 | 2.585 | 2.461 | 2.645 | 3.286 | 3.494 | 6.129 |
| OLS SE | (1.077)*** | (1.013)*** | (0.909)*** | (0.948)*** | (1.008)*** | (1.047)*** | (1.114)*** | (1.961)*** |
| Cluster SE by Presenter | (1.235)*** | (1.202)*** | (1.046)** | (1.072)** | (1.153)** | (1.155)*** | (1.232)*** | (2.292)*** |
| Cluster SE by Talk Institution | (1.153)*** | (0.994)*** | (0.795)*** | (0.855)*** | (1.035)** | (1.048)*** | (1.122)*** | (2.257)** |
| Cluster SE by Talk | (1.124)*** | (1.063)*** | (0.965)*** | (1.017)** | (1.070)** | (1.100)*** | (1.180)*** | (2.043)*** |
| Talk length (total minutes) | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Seminar series fixed effects | No | No | Yes | Yes | Yes | Yes | Yes | Yes |
| Coder fixed effects | No | No | No | Yes | Yes | Yes | Yes | No |
| Presenter home institution fixed effects | No | No | No | No | Yes | Yes | Yes | Yes |
| JEL code fixed effects | No | No | No | No | No | Yes | Yes | Yes |
| Number of unique talks | 462 | 462 | 462 | 462 | 462 | 462 | 419 | 176 |
| Number of Talk-Coder pairs | 579 | 579 | 579 | 579 | 579 | 579 | 530 | 240 |

*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' calculations based on data collected by the Seminar Dynamics Collective between January 9 and May 15, 2019.

Note: All regressions include a dummy indicating if the talk was given at the speaker's home institution ("internal talk"). Column 7 reports results when excluding internal talks from the sample. Home Institution fixed effects include dummies for institutions with 10 or more speakers, for top 5-20 economics departments, for top 21-30 Economics departments, for top 30 or more Economics departments, for top 20 business schools, for top 20 public policy schools, for international economics departments, for other academic institutions and for non-academic institutions. Ranking for Economics departments is from the US News and World Report 2017 Rankings. Observations are weighted by the inverse number of coders for each talk. OLS SE are robust. Standard errors are in parentheses.

Table 4: Gender Differences in Number of Questions Asked, By Field

| | Pooled Sample of Regular Talks Plus JMTs | | | | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Female Presenter*Micro | 2.572* | 3.197** | 1.604 | 1.649 | 1.256 | 2.163 |
| | (1.414) | (1.395) | (1.374) | (1.432) | (1.525) | (1.641) |
| Female Presenter*Macro | 6.306 | 5.103 | -1.847 | -1.844 | -1.043 | -0.749 |
| | (6.132) | (5.552) | (3.930) | (4.128) | (3.999) | (3.897) |
| Female Presenter*Job Market Talk | 1.425 | 1.762 | 4.336*** | 4.078** | 5.373*** | 5.926*** |
| | (1.671) | (1.639) | (1.515) | (1.599) | (1.660) | (1.733) |
| Female Presenter*Other | 2.971 | 4.071 | 1.836 | 1.504 | -1.117 | -0.138 |
| | (2.635) | (3.739) | (2.354) | (2.459) | (2.370) | (3.089) |
| F-test p-value | 0.849 | 0.855 | 0.363 | 0.463 | 0.105 | 0.206 |
| T-test p-value | | | | | | 0.150 |
| Talk length (total minutes) | No | Yes | Yes | Yes | Yes | Yes |
| Seminar series fixed effects | No | No | Yes | Yes | Yes | Yes |
| Coder fixed effects | No | No | No | Yes | Yes | Yes |
| Presenter home institution fixed effects | No | No | No | No | Yes | Yes |
| JEL code fixed effects | No | No | No | No | No | Yes |
| Number of unique talks | 462 | 462 | 462 | 462 | 462 | 462 |
| Number of Talk-Coder pairs | 579 | 579 | 579 | 579 | 579 | 579 |

*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' calculations based on data collected by the Seminar Dynamics Collective between January 9 and May 15, 2019.

Note: Fields are non-JMT Applied Microeconomics, non-JMT Macroeconomics, Job Market Talk and Other, which includes non-JMT Theory and Econometrics. Fields are based on Seminar Series. There are few observations of Macroeconomics talks and only 9 observations of Macroeconomics talks given by female presenters. Regressions also include controls for baseline field group (e.g. Micro). The F-test p-value row reports the p-values of the F-test that all interaction coefficients are equal. The T-test p-value row reports the p-value of the T-test that the "Female Presenter*Micro" and "Female Presenter *JMT" coefficients are equal. All regressions include a dummy indicating if the talk was given at the speaker's home institution ("internal talk"). Home Institution fixed effects include dummies for institutions with 10 or more speakers, for top 5-20 economics departments, for top 21-30 Economics departments, for top 30 or more Economics departments, for top 20 business schools, for top 20 public policy schools, for international economics departments, for other academic institutions and for non-academic institutions. Ranking for Economics departments is from the US News and World Report 2017 Rankings. Observations are weighted by the inverse number of coders for each talk. Standard errors are clustered at the Talk level. Standard errors are in parentheses.

Table 5: Gender Difference in Number of Questions Asked, Answered, and Deferred/Ignored: By Gender and Seniority of the Asker

| | Coefficient on Female Presenter | | | | | | |
|---|---|---|---|---|---|---|---|
| | Pooled Sample of Regular Talks Plus JMTs | | | | | | JMT Only |
| Dependent Variable | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Number of Questions Asked | | | | | | | |
| Questions from All | 3.522*** | 3.631*** | 2.585*** | 2.461** | 2.645** | 3.286*** | 6.129*** |
| | (1.124) | (1.063) | (0.965) | (1.017) | (1.070) | (1.100) | (2.043) |
| Questions from Male Faculty | 2.154* | 2.218** | 1.137 | 1.101 | 1.449 | 2.062** | 5.812*** |
| | (1.195) | (1.121) | (0.875) | (0.938) | (0.991) | (1.030) | (1.825) |
| Questions from Female Faculty | 1.349*** | 1.393*** | 1.278*** | 1.194** | 1.187** | 1.204** | 0.750 |
| | (0.488) | (0.492) | (0.422) | (0.463) | (0.476) | (0.498) | (0.797) |
| Questions from Male Student | -0.125 | -0.117 | 0.201 | 0.186 | 0.123 | 0.153 | 0.058 |
| | (0.233) | (0.226) | (0.225) | (0.247) | (0.279) | (0.296) | (0.467) |
| Questions from Female Student | 0.189 | 0.190 | 0.192* | 0.208* | 0.201 | 0.217 | 0.101 |
| | (0.139) | (0.138) | (0.110) | (0.118) | (0.129) | (0.133) | (0.086) |
| Number of Questions Answered | | | | | | | |
| Questions from All | 3.711*** | 3.836*** | 2.535*** | 2.427** | 2.635*** | 3.289*** | 6.340*** |
| | (1.046) | (0.999) | (0.904) | (0.964) | (0.998) | (1.032) | (1.965) |
| Questions from Males | 2.261** | 2.347** | 1.383 | 1.240 | 1.490 | 2.088** | 5.932*** |
| | (1.055) | (1.006) | (0.850) | (0.916) | (0.934) | (1.000) | (1.785) |
| Questions from Females | 1.389*** | 1.425*** | 1.204*** | 1.220*** | 1.197** | 1.275** | 0.811 |
| | (0.487) | (0.487) | (0.418) | (0.457) | (0.474) | (0.502) | (0.742) |
| Number of Questions Deferred or Ignored | | | | | | | |
| Questions from All | -0.096 | -0.101 | -0.171 | -0.125 | -0.126 | -0.012 | 0.093 |
| | (0.196) | (0.192) | (0.206) | (0.218) | (0.241) | (0.251) | (0.447) |
| Questions from Males | -0.089 | -0.093 | -0.130 | -0.090 | -0.084 | 0.024 | 0.201 |
| | (0.187) | (0.184) | (0.199) | (0.207) | (0.231) | (0.243) | (0.435) |
| Questions from Females | 0.013 | 0.011 | -0.017 | -0.010 | -0.011 | -0.006 | -0.036 |
| | (0.045) | (0.044) | (0.051) | (0.057) | (0.059) | (0.061) | (0.116) |
| Talk length (total minutes) | No | Yes | Yes | Yes | Yes | Yes | Yes |
| Talk series fixed effects | No | No | Yes | Yes | Yes | Yes | Yes |
| Coder fixed effects | No | No | No | Yes | Yes | Yes | No |
| Presenter home institution fixed effects | No | No | No | No | Yes | Yes | Yes |
| JEL code fixed effects | No | No | No | No | No | Yes | Yes |
| Number of unique Talks | 462 | 462 | 462 | 462 | 462 | 462 | 176 |
| Number of Talk-Coder pairs | 579 | 579 | 579 | 579 | 579 | 579 | 240 |

*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' calculations based on data collected by the Seminar Dynamics Collective between January 9 and May 15, 2019.

Notes: Each coefficient is from a separate regression. All regressions include a dummy indicating if the talk was given at the speaker's home institution ("internal talk"). Home Institution fixed effects include dummies for institutions with 10 or more speakers, for top 5-20 economics departments, for top 21-30 Economics departments, for top 30 or more Economics departments, for top 20 business schools, for top 20 public policy schools, for international economics departments, for other academic institutions and for non-academic institutions. Ranking for Economics departments is from the US News and World Report 2017 Rankings. Observations are weighted by the inverse number of coders for each talk. Standard errors are clustered at the Talk level. Standard errors are in parentheses. Information on the characteristics of the person asking the question ("Male Faculty", "Female Faculty", "Male Student" and "Female Student") is imperfect (it is missing when coders did not know the seniority status, or at times two or more categories were selected for one question). Hence, these questions do not always exactly sum to the "Number of questions from all" variable.

Table 6: Gender Differences in Type of Questions Asked

| | Coefficient on Female Presenter | | | | | | |
|---|---|---|---|---|---|---|---|
| | Pooled Sample of Regular Talks Plus JMTs | | | | | | JMT Only |
| Dependent Variable | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Number of Questions that are a: | | | | | | | |
| Comment | -0.092 | -0.049 | -0.039 | 0.161 | 0.339 | 0.470 | 0.680 |
| | (0.440) | (0.439) | (0.406) | (0.419) | (0.444) | (0.473) | (0.761) |
| Clarification | 0.516 | 0.522 | 1.503** | 1.164** | 1.459** | 1.681*** | 3.861*** |
| | (0.848) | (0.850) | (0.618) | (0.549) | (0.569) | (0.590) | (1.224) |
| Criticism | -0.178 | -0.151 | -0.133 | -0.282 | -0.369 | -0.255 | 0.062 |
| | (0.316) | (0.313) | (0.263) | (0.245) | (0.270) | (0.262) | (0.535) |
| Follow-Up | 0.311 | 0.338 | 0.125 | 0.132 | 0.059 | 0.150 | 0.061 |
| | (0.290) | (0.287) | (0.249) | (0.236) | (0.258) | (0.263) | (0.633) |
| Suggestion | 0.312 | 0.360 | 0.500* | 0.587** | 0.571* | 0.528* | 1.346*** |
| | (0.263) | (0.264) | (0.260) | (0.275) | (0.295) | (0.314) | (0.477) |
| Talk length (total minutes) | No | Yes | Yes | Yes | Yes | Yes | Yes |
| Seminar series fixed effects | No | No | Yes | Yes | Yes | Yes | Yes |
| Coder fixed effects | No | No | No | Yes | Yes | Yes | No |
| Presenter home institution fixed effects | No | No | No | No | Yes | Yes | Yes |
| JEL code fixed effects | No | No | No | No | No | Yes | Yes |
| Number of unique talks | 462 | 462 | 462 | 462 | 462 | 462 | 176 |
| Number of Talk-Coder pairs | 579 | 579 | 579 | 579 | 579 | 579 | 240 |

*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' calculations based on data collected by the Seminar Dynamics Collective between January 9 and May 15, 2019.

Note: Each coefficient is from a separate regression. All regressions include a dummy indicating if the talk was given at the speaker's home institution ("internal talk"). Home Institution fixed effects include dummies for institutions with 10 or more speakers, for top 5-20 economics departments, for top 21-30 Economics departments, for top 30 or more Economics departments, for top 20 business schools, for top 20 public policy schools, for international economics departments, for other academic institutions and for non-academic institutions. Ranking for Economics departments is from the US News and World Report 2017 Rankings. Observations are weighted by the inverse number of coders for each talk. Standard errors are clustered at the Talk level. Standard errors are in parentheses.

Table 7: Gender Differences in Tone of Questions Asked

| | Coefficient on Female Presenter | | | | | | |
|---|---|---|---|---|---|---|---|
| | Pooled Sample of Regular Talks Plus JMTs | | | | | | JMT Only |
| Dependent Variable | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Number of Questions that are: | | | | | | | |
| Supportive | -1.122** | -1.018** | -0.147 | -0.275 | -0.324 | -0.508 | -0.249 |
| | (0.506) | (0.503) | (0.296) | (0.330) | (0.367) | (0.368) | (0.400) |
| Patronizing | 0.196 | 0.187 | 0.279** | 0.263* | 0.266 | 0.305* | 0.108 |
| | (0.178) | (0.181) | (0.135) | (0.146) | (0.163) | (0.183) | (0.322) |
| Disruptive | 0.009 | 0.014 | 0.051 | 0.071 | 0.078 | 0.123 | 0.355 |
| | (0.094) | (0.096) | (0.104) | (0.114) | (0.110) | (0.115) | (0.220) |
| Demeaning | 0.029 | 0.027 | 0.002 | 0.005 | -0.006 | 0.001 | 0.010 |
| | (0.039) | (0.038) | (0.041) | (0.047) | (0.051) | (0.053) | (0.086) |
| Hostile | 0.106** | 0.102** | 0.092** | 0.077* | 0.078* | 0.096** | 0.101 |
| | (0.047) | (0.046) | (0.045) | (0.039) | (0.041) | (0.042) | (0.114) |
| Talk length (total minutes) | No | Yes | Yes | Yes | Yes | Yes | Yes |
| Seminar series fixed effects | No | No | Yes | Yes | Yes | Yes | Yes |
| Coder fixed effects | No | No | No | Yes | Yes | Yes | No |
| Presenter home institution fixed effects | No | No | No | No | Yes | Yes | Yes |
| JEL code fixed effects | No | No | No | No | No | Yes | Yes |
| Number of unique talks | 462 | 462 | 462 | 462 | 462 | 462 | 176 |
| Number of Talk-Coder pairs | 579 | 579 | 579 | 579 | 579 | 579 | 240 |

*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' calculations based on data collected by the Seminar Dynamics Collective between January 9 and May 15, 2019. Note: Each coefficient is from a separate regression. All regressions include a dummy indicating if the talk was given at the speaker's home institution ("internal talk"). Home Institution fixed effects include dummies for institutions with 10 or more speakers, for top 5-20 economics departments, for top 21-30 Economics departments, for top 30 or more Economics departments, for top 20 business schools, for top 20 public policy schools, for international economics departments, for other academic institutions and for non-academic institutions. Ranking for Economics departments is from the US News and World Report 2017 Rankings. Observations are weighted by the inverse number of coders for each talk. Standard errors are clustered at the Talk level. Standard errors are in parentheses.

Table 8: Summary Statistics Across Fields, NBER SI Sample

| | Mean For: | | Coefficient on Dummy For: | |
|---|---|---|---|---|
| | Full Sample | Macro Talks | Micro | Finance |
| Dependent Variable | (1) | (2) | (3) | (4) |
| Characteristics of Presenter | | | | |
| Female | 0.275 | 0.187 | 0.163*** | 0.071 |
| | | | 0.045 | 0.067 |
| Junior | 0.445 | 0.368 | 0.150*** | 0.028 |
| | | | 0.050 | 0.075 |
| Student, Post-Doc, or Non-Academic Speaker | 0.199 | 0.251 | -0.093** | -0.062 |
| | | | 0.041 | 0.060 |
| Top 20 Institution | 0.526 | 0.503 | 0.044 | 0.014 |
| | | | 0.051 | 0.076 |
| Meeting rules/structure | | | | |
| Talk duration (min) | 38.651 | 46.249 | -10.340*** | -19.878*** |
| | | | 1.252 | 1.855 |
| Regular Seminar Format | 0.357 | 0.386 | 0.044 | -0.386*** |
| | | | 0.047 | 0.070 |
| Discussant | 0.490 | 0.374 | 0.126** | 0.419*** |
| | | | 0.049 | 0.073 |
| Moratorium | 0.102 | 0.158 | -0.074** | -0.158*** |
| | | | 0.030 | 0.045 |
| Q&A Session at the End | 0.508 | 0.386 | 0.086* | 0.614*** |
| | | | 0.047 | 0.070 |
| Audience | | | | |
| Number of Women | 17.997 | 12.047 | 11.470*** | 3.220* |
| | | | 1.272 | 1.883 |
| Number of Men | 45.409 | 40.383 | 5.748** | 17.177*** |
| | | | 2.251 | 3.335 |
| Total Number of Questions Asked | 14.385 | 17.287 | -3.759*** | -8.295*** |
| | | | 1.042 | 1.543 |
| Share of questions that are neither Valuable, nor Constructive, nor Collegial | 0.781 | 0.838 | -0.118*** | 0.004 |
| | | | 0.031 | 0.046 |

*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' calculations based on data collected by the Seminar Dynamics Collective between July 8 and July 26, 2019.

Note: There are 443 unique talks over 447 talk-coder pairs. Among macro talks, there are 171 unique talks over 173 talk-coder pairs. Each row is for a separate regression. N=447 for all regressions. Columns (1) and (2) report the mean of the dependent variable for all talks and only macro talks. Colunns (3) and (4) report the coefficients on the dummies for Micro talks and Finance talks for regressions of the dependent variable on both dummies. Observations are weighted by the inverse number of coders for each talk. Standard errors are in parentheses.

Table 9: Gender Differences in Number of Questions Asked during Talk, NBER SI Sample

| | | Coefficient on Female Presenter | | | | | |
|---|---|---|---|---|---|---|---|
| | Mean (SD) | All Talks | Finance Talks | Macro Talks | Micro Talks | Talks by Senior Presenters | Talks by Presenters not from Top20 Institution |
| Dependent Variable | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Total Number of Questions Asked | 14.385 | 1.263 | 0.890 | 4.367* | -0.332 | 1.340 | 1.474 |
| | (10.538) | (0.889) | (0.940) | (2.291) | (0.822) | (1.507) | (1.396) |
| Number of Questions Asked by Men | 11.720 | 1.067 | 0.612 | 3.641 | -0.166 | 1.286 | 1.174 |
| | (9.925) | (0.820) | (0.848) | (2.215) | (0.641) | (1.379) | (1.279) |
| Number of Questions Deferred | 3.179 | 0.456 | 1.982 | 0.852** | -0.047 | 0.916 | 0.225 |
| | (3.687) | (0.311) | (1.232) | (0.397) | (0.447) | (0.627) | (0.504) |
| Minutes Taken up by Questions and Answers | 12.145 | 1.117** | 0.903 | 1.900* | 0.677 | 1.378 | 1.266 |
| | (5.516) | (0.516) | (0.955) | (1.126) | (0.632) | (0.912) | (0.820) |
| Minutes Elapsed Until First Question | 18.243 | -1.132 | 0.100 | -6.766*** | 1.488 | -1.618 | -2.838 |
| | (15.210) | (1.259) | (3.439) | (2.368) | (1.588) | (2.368) | (1.999) |
| At least one question asked before Discussant/Q&A | 0.352 | 0.070 | 0.067 | 0.232** | 0.013 | 0.119 | 0.121 |
| | (0.479) | (0.054) | (0.105) | (0.114) | (0.077) | (0.089) | (0.089) |
| Number of Questions neither Valuable, nor Constructive, nor Collegial | 11.874 | 0.824 | 0.013 | 4.895** | -1.111 | 0.920 | 1.481 |
| | (10.836) | (0.962) | (1.089) | (2.412) | (0.939) | (1.675) | (1.504) |
| Share of questions that are Comments | 0.244 | -0.011 | -0.052 | -0.028 | 0.016 | 0.019 | 0.034 |
| | (0.233) | (0.025) | (0.064) | (0.042) | (0.035) | (0.049) | (0.040) |
| Share of questions that are Criticisms | 0.130 | -0.002 | -0.044 | 0.023 | -0.007 | -0.020 | -0.002 |
| | (0.150) | (0.016) | (0.049) | (0.035) | (0.018) | (0.031) | (0.029) |
| Share of questions that are Suggestions | 0.230 | 0.031 | -0.068 | 0.006 | 0.073** | 0.028 | 0.052 |
| | (0.217) | (0.022) | (0.066) | (0.039) | (0.029) | (0.042) | (0.038) |
| Share of questions that are Clarifications | 0.302 | -0.016 | 0.075 | -0.050 | -0.019 | 0.007 | -0.019 |
| | (0.265) | (0.026) | (0.065) | (0.053) | (0.032) | (0.043) | (0.041) |
| Share of questions that are Follow-Ups | 0.099 | 0.002 | 0.053 | 0.019 | -0.013 | 0.008 | 0.028 |
| | (0.146) | (0.015) | (0.035) | (0.031) | (0.019) | (0.023) | (0.025) |
| Total Attendance | 63.372 | 0.485 | 1.832 | -3.336 | 0.508 | 5.113 | 1.662 |
| | (28.832) | (2.594) | (7.860) | (3.695) | (3.865) | (5.089) | (3.928) |
| Number of Observations | 447 | 447 | 59 | 173 | 215 | 160 | 164 |

*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' calculations based on data collected by the Seminar Dynamics Collective between July 8 and July 26, 2019.

Note: Each cell shows the coefficient estimate on "Female Presenter" from a different regression. Regressions include Field x Format fixed effects (where Format can take 5 values: regular seminar format, seminar format with moratorium, Discussant without Q&A, Discussant with Q&A, Q&A only). There are 443 unique talks over 447 talk-coder pairs. Observations are weighted by the inverse number of coders for each talk. Standard errors in parentheses.

Table 10: Gender Differences in Number of Questions Asked, by NBER Talk Format

| | Coefficient on Female Presenter | | | |
|---|---|---|---|---|
| | Regular Seminar Format | Talks With Discussant | Talks with Q&A at the End | Talks with Moratorium |
| Dependent Variable | (1) | (2) | (3) | (4) |
| Total Number of Questions Asked | 1.404 | 1.661*** | 1.576*** | -2.704 |
| | (2.220) | (0.617) | (0.557) | (2.464) |
| Number of Questions Asked by Men | 1.484 | 1.324** | 1.189** | -1.732 |
| | (2.029) | (0.533) | (0.479) | (2.375) |
| Number of Questions Deferred | 0.128 | 0.907* | 0.906* | -1.361* |
| | (0.338) | (0.521) | (0.506) | (0.778) |
| Minutes Taken up by Questions and Answers | 0.997 | 1.048* | 1.225** | -0.515 |
| | (1.029) | (0.619) | (0.570) | (1.448) |
| Minutes Elapsed Until First Question | -0.605 | -2.297 | -1.492 | 0.562 |
| | (1.581) | (2.052) | (2.048) | (1.514) |
| At least one question asked before Discussant/Q&A | N/A | 0.081 | 0.085 | N/A |
| | | (0.060) | (0.058) | |
| Number of Questions neither Valuable, nor Constructive, nor Collegial | 1.416 | 1.116 | 0.879 | -2.767 |
| | (2.350) | (0.746) | (0.677) | (2.681) |
| Share of questions that are Comments | -0.014 | 0.006 | 0.004 | -0.067 |
| | (0.038) | (0.038) | (0.039) | (0.060) |
| Share of questions that are Criticisms | -0.010 | 0.001 | 0.012 | -0.067 |
| | (0.023) | (0.024) | (0.025) | (0.042) |
| Share of questions that are Suggestions | 0.023 | 0.033 | 0.042 | -0.040 |
| | (0.026) | (0.035) | (0.036) | (0.040) |
| Share of questions that are Clarifications | -0.021 | -0.004 | 0.007 | -0.191* |
| | (0.045) | (0.031) | (0.033) | (0.103) |
| Share of questions that are Follow-Ups | -0.019 | 0.034 | 0.044** | -0.156** |
| | (0.023) | (0.021) | (0.021) | (0.063) |
| Total Attendance | 0.592 | -0.496 | 1.682 | 0.726 |
| | (4.228) | (4.032) | (3.919) | (4.509) |
| Number of Observations | 159 | 220 | 228 | 45 |

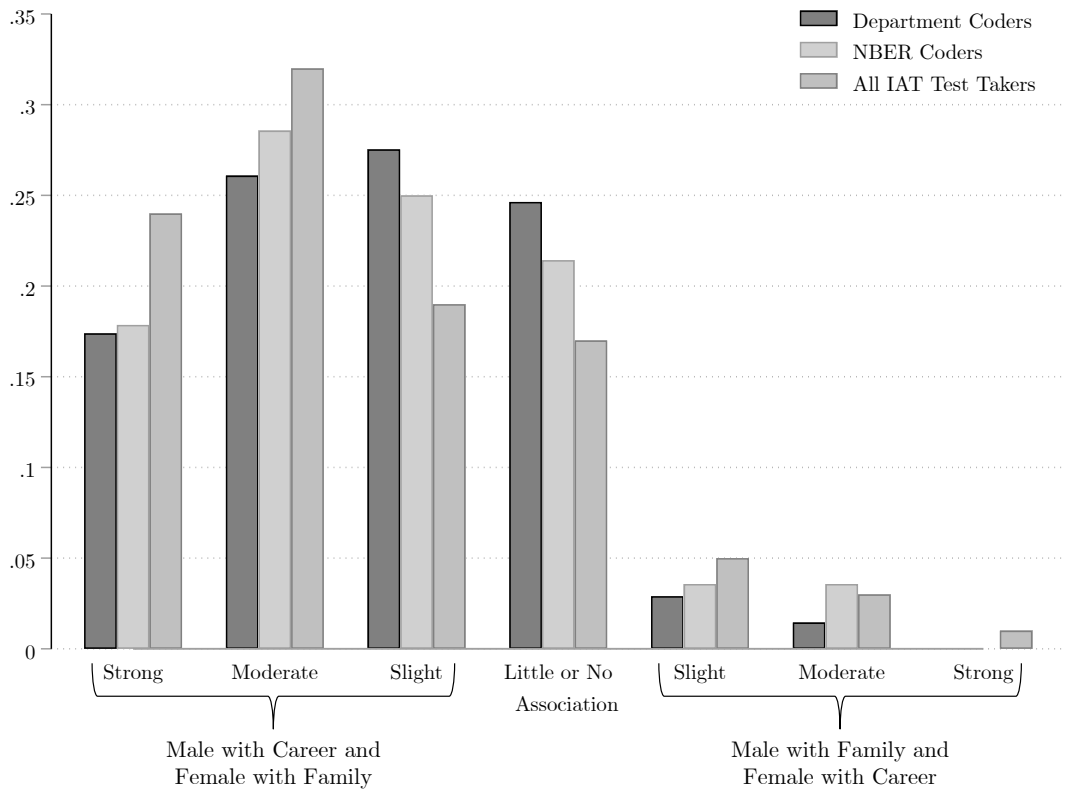
*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' calculations based on data collected by the Seminar Dynamics Collective between July 8 and July 26, 2019.

Note: Each cell shows the coefficient estimate on "Female Presenter" from a different regression. Regressions include Field x Format fixed effects (where Format can take 5 values: regular talk format, talk format with moratorium, Discussant without Q&A, Discussant with Q&A, Q&A only). There are 443 unique talks over 447 talk-coder pairs. Observations are weighted by the inverse number of coders for each talk. Standard errors in parentheses.

# Appendix A: Appendix Figures and Tables

Figure A.1: Implicit Association Test for Gender Career Stereotypes




Source: Authors' calculations based on data provided by the Seminar Dynamics Collective and Project Implicit at Harvard University (https://implicit.harvard.edu/implicit/takeatest.html).
N=69 out of 77 Department Coders, N=28 out of 29 NBER Coders. 3 Coders are in both samples.

Table A.1: Summary Statistics by Gender

| | **Female** | **Male** | **Difference (Female - Male)** | |
|---|---|---|---|---|
| | Mean | Mean | Mean | p-value |
| | (1) | (2) | (3) | (4) |
| **At the Talk Level** | | | | |
| **Seminar Field** | | | | |
| Applied Micro | 0.419 | 0.477 | −0.058 | 0.172 |
| Macro | 0.050 | 0.134 | −0.084 | 0.001 |
| Theory/Econometrics | 0.022 | 0.060 | −0.038 | 0.034 |
| Job Market Talk | 0.480 | 0.318 | 0.162 | 0.000 |
| **Seminar Institution** | | | | |
| Top 10 Seminar Institution | 0.436 | 0.382 | 0.054 | 0.196 |
| Top 20 Seminar Institution | 0.637 | 0.587 | 0.050 | 0.228 |
| **Talk Length** | | | | |
| 60 minutes | 0.084 | 0.067 | 0.017 | 0.455 |
| 75 minutes | 0.207 | 0.251 | −0.044 | 0.222 |
| 80 minutes | 0.251 | 0.212 | 0.039 | 0.271 |
| 90 minutes | 0.458 | 0.470 | −0.012 | 0.781 |
| **Attendance** | | | | |
| Total | 37.860 | 30.032 | 7.828 | ≤0.001 |
| Men | 25.043 | 20.977 | 4.066 | ≤0.001 |
| Women | 12.802 | 9.055 | 3.748 | ≤0.001 |
| Observations | 232 | 347 | 579 | |
| **At the Speaker Level** | | | | |
| **Home Institution** | | | | |
| Top 10 Home Institution | 0.357 | 0.359 | −0.002 | 0.968 |
| Top 20 Home Institution | 0.461 | 0.520 | −0.059 | 0.303 |
| **JEL Paper Codes** | | | | |
| A General Economics and Teaching | 0.017 | 0.004 | 0.013 | 0.232 |
| B History of Economic Thought, Methodology, and Heterodox Approaches | 0.009 | 0.004 | 0.004 | 0.634 |
| C Mathematical and Quantitative Methods | 0.096 | 0.094 | 0.001 | 0.965 |
| D Microeconomics | 0.200 | 0.135 | 0.065 | 0.117 |
| E Macroeconomics and Monetary Economics | 0.043 | 0.063 | −0.019 | 0.467 |
| F International Economics | 0.017 | 0.036 | −0.018 | 0.343 |
| G Financial Economics | 0.026 | 0.072 | −0.046 | 0.085 |
| H Public Economics | 0.061 | 0.022 | 0.038 | 0.071 |
| I Health, Education, and Welfare | 0.113 | 0.103 | 0.010 | 0.781 |
| J Labor and Demographic Economics | 0.148 | 0.152 | −0.005 | 0.910 |
| K Law and Economics | 0.026 | 0.009 | 0.017 | 0.218 |
| L Industrial Organization | 0.043 | 0.081 | −0.037 | 0.199 |
| M Business Admin and Business Econ, Marketing, Accounting, Personnal Econ | 0.026 | 0.022 | 0.004 | 0.834 |
| N Economic History | 0.026 | 0.022 | 0.004 | 0.834 |
| O Economic Development, Innovation, Technological Change, and Growth | 0.078 | 0.085 | −0.007 | 0.827 |
| P Economic Systems | 0.026 | 0.018 | 0.008 | 0.619 |
| Q Agricultural and Natural Resource Econ, Environmental and Ecological Econ | 0.035 | 0.018 | 0.017 | 0.336 |
| R Urban, Rural, Regional, Real Estate, and Transportation Econ | 0.009 | 0.058 | −0.050 | 0.030 |
| Y Miscellaneous Categories | 0.000 | 0.000 | 0.000 | N/A |
| Z Other Special Topics | 0.000 | 0.000 | 0.000 | N/A |
| Observations | 115 | 223 | 338 | |

Source: Authors' calculations based on data collected by the Seminar Dynamics Collective between January 9 and May 15, 2019.
Note: For the pooled sample, N=462 talks over 579 talk-coder pairs. For the job market talk sample, N=176 talks over 240 talk-coder pairs. Ranking for top 10 and 20 Institutions is from the US News and World Report 2017 Rankings. Observations are weighted by the inverse number of coders for each talk for outcomes at the talk level: Seminar Field, Seminar Institution and Talk Lenght outcomes.

Table A.2: Summary Statistics for Job Market Candidates by Gender

| | **Female** | | **Male** | | **All** | | **T-test** |
|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | p-value |
| **Placement** | | | | | | | |
| Tenure Track | 0.87 | 0.341 | 0.82 | 0.391 | 0.84 | 0.371 | 0.525 |
| Tenure Track Top10 | 0.19 | 0.402 | 0.16 | 0.373 | 0.17 | 0.382 | 0.732 |
| Tenure Track Top20 | 0.32 | 0.475 | 0.37 | 0.487 | 0.35 | 0.480 | 0.687 |
| Post-doc | 0.03 | 0.180 | 0.04 | 0.200 | 0.04 | 0.191 | 0.847 |
| Non-Academic Job | 0.10 | 0.301 | 0.06 | 0.242 | 0.07 | 0.265 | 0.562 |
| **Placement Institution** | | | | | | | |
| University | 0.90 | 0.301 | 0.90 | 0.306 | 0.90 | 0.302 | 0.940 |
| Government Agency | 0.00 | 0.000 | 0.04 | 0.200 | 0.03 | 0.157 | 0.260 |
| Private Sector | 0.03 | 0.180 | 0.02 | 0.143 | 0.03 | 0.157 | 0.745 |
| International Organization | 0.06 | 0.250 | 0.00 | 0.000 | 0.03 | 0.157 | 0.073 |
| Fed | 0.00 | 0.000 | 0.02 | 0.143 | 0.01 | 0.112 | 0.430 |
| Think Tank | 0.00 | 0.000 | 0.02 | 0.143 | 0.01 | 0.112 | 0.430 |
| **Paper** | | | | | | | |
| Applied Microeconomics | 0.74 | 0.445 | 0.48 | 0.505 | 0.58 | 0.496 | 0.021 |
| Econometrics | 0.06 | 0.250 | 0.12 | 0.334 | 0.10 | 0.304 | 0.391 |
| Macroeconomics | 0.10 | 0.301 | 0.15 | 0.357 | 0.13 | 0.335 | 0.528 |
| Theory | 0.10 | 0.301 | 0.25 | 0.438 | 0.19 | 0.395 | 0.092 |
| Published | 0.13 | 0.341 | 0.10 | 0.306 | 0.11 | 0.318 | 0.714 |
| Published Top 5 | 0.06 | 0.250 | 0.06 | 0.242 | 0.06 | 0.244 | 0.953 |
| R&R Top 5 | 0.16 | 0.374 | 0.12 | 0.331 | 0.14 | 0.347 | 0.628 |
| Published or R&R Top 5 | 0.23 | 0.425 | 0.18 | 0.391 | 0.20 | 0.403 | 0.651 |
| Observations | 31 | | 49 | | 80 | | |

Source: Authors' calculations based on data collected by the Seminar Dynamics Collective between January 9 and May 15, 2019. Placement and paper outcomes were handcoded expost in December 2020 by authors by looking at speakers' websites and online CVs. Job Market Paper Fields were handcoded expost by authors by looking at papers' abstracts.
Note: Ranking for top 10 and 20 Institutions is from the US News and World Report 2017 Rankings.

Table A.3: Home Institution Summary Statistics

| | Distinct Institutions Number | Talks in Sample Number | Female Speaker Share of Talks |
|---|---|---|---|
| **Individual Dummies (institutions with ≥ 10 observations)** | | | |
| Stanford University | 1 | 21 | 0.38 |
| Harvard University | 1 | 46 | 0.57 |
| MIT University | 1 | 42 | 0.55 |
| Princeton University | 1 | 16 | 0.19 |
| Yale University | 1 | 20 | 0.35 |
| Berkeley University | 1 | 36 | 0.47 |
| Northwestern University | 1 | 38 | 0.26 |
| Chicago University | 1 | 33 | 0.45 |
| Boston University | 1 | 22 | 0.32 |
| Duke University | 1 | 15 | 0.13 |
| Chicago Booth | 1 | 14 | 0.36 |
| London School of Economics | 1 | 32 | 0.81 |
| **Group Dummies (institutions with < 10 observations)** | | | |
| Other Top 5-20 Economics Departments | 12 | 72 | 0.24 |
| Top 21-30 Economics Departments | 12 | 49 | 0.29 |
| Top 30+ Economics Departments | 15 | 37 | 0.38 |
| Top 20 Business Schools | 8 | 23 | 0.39 |
| Top 20 Public Policy Schools | 5 | 10 | 0.90 |
| Other US Academic Institutions | 9 | 10 | 0.40 |
| Other International Academic Institutions | 26 | 81 | 0.57 |
| Non-Academic Institutions | 7 | 16 | 0.19 |
| Total | 104 | 579 | |

*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' calculations based on data collected by the Seminar Dynamics Collective between January 9 and May 15, 2019.

Note: Home Institution fixed effects include the dummies presented in the table above. Dummies were created for institutions with 10 or more speakers, for top 5-20 economics departments, for top 21-30 Economics departments, for top 30 or more Economics departments, for top 20 business schools, for top 20 public policy schools, for international economics departments, for other academic institutions and for non-academic institutions. Group dummies do not include institutions which already have individual dummies. Ranking for Economics departments is from the US News and World Report 2017 Rankings. Other US Academic Institutions include academic institutions not ranked in the US News and World Report 2017 Rankings (e.g: no Economics PhD program offered, etc.)

Table A.4: Robustness Analysis: Gender Differences in Number of Questions Asked

| | Pooled Sample of Regular Talks Plus JMTs | | | | | | JMT Only |
|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Panel A: Non-Linear Specification | | | | | | | |
| Female Presenter | 3.479*** | 3.574*** | 2.463*** | 2.345*** | 2.650*** | 3.030*** | 6.000*** |
| | (1.095) | (1.033) | (0.847) | (0.853) | (0.890) | (0.887) | (1.749) |
| Panel B: Controlling for Attendance | | | | | | | |
| Female Presenter | 2.304** | 2.535** | 2.001* | 1.958* | 2.098* | 2.899** | 5.665*** |
| | (1.146) | (1.092) | (1.032) | (1.078) | (1.133) | (1.175) | (2.056) |
| Talk length (total minutes) | No | Yes | Yes | Yes | Yes | Yes | Yes |
| Seminar series fixed effects | No | No | Yes | Yes | Yes | Yes | Yes |
| Coder fixed effects | No | No | No | Yes | Yes | Yes | No |
| Presenter home institution fixed effects | No | No | No | No | Yes | Yes | Yes |
| JEL code fixed effects | No | No | No | No | No | Yes | Yes |
| Number of unique talks | 462 | 462 | 462 | 462 | 462 | 462 | 176 |
| Number of Talk-Coder pairs | 579 | 579 | 579 | 579 | 579 | 579 | 240 |

*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' calculations based on data collected by the Seminar Dynamics Collective between January 9 and May 15, 2019.

Note: Observations are weighted by the inverse number of coders for each talk. In Panel A, all coefficients are marginal effects from a Poisson Quasi-Maximum Likelihood Estimator (QMLE). In Panel B, all coefficients are from OLS including a control for talks' total attendance.

All regressions include a dummy indicating if the talk was given at the speaker's home institution ("internal talk"). Home Institution fixed effects include dummies for institutions with 10 or more speakers, for top 5-20 economics departments, for top 21-30 Economics departments, for top 30 or more Economics departments, for top 20 business schools, for top 20 public policy schools, for international economics departments, for other academic institutions and for non-academic institutions. Ranking for Economics departments is from the US News and World Report 2017 Rankings. Standard errors are clustered at the Talk level. Standard errors are in parentheses.

Table A.5: Gender Differences in Number of Questions Asked, By Coder Characteristics

| | Pooled Sample of Regular Talks Plus JMTs | | | | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Gender | | | | | | |
| Female Presenter*Female Coder | 3.402*** | 3.601*** | 2.480** | 2.512** | 2.775** | 3.164** |
| | (1.298) | (1.246) | (1.129) | (1.220) | (1.272) | (1.270) |
| Female Presenter*Male Coder | 3.663 | 3.576* | 2.995* | 2.459 | 2.370 | 3.528* |
| | (2.262) | (2.078) | (1.646) | (1.659) | (1.681) | (1.803) |
| Year in Ph.D. Program | | | | | | |
| Female Presenter*Below 4th Year Coder | 3.576** | 3.357** | 2.351** | 2.222* | 2.433* | 2.984** |
| | (1.443) | (1.349) | (1.189) | (1.241) | (1.302) | (1.308) |
| Female Presenter*4th Year and Above Coder | 3.190* | 3.794** | 4.111** | 4.159** | 4.644** | 5.049*** |
| | (1.871) | (1.775) | (1.687) | (1.880) | (1.951) | (1.949) |
| Primary Field of Study | | | | | | |
| Female Presenter*Applied Micro Coder | 2.154* | 2.555** | 2.632** | 2.567** | 2.940** | 3.338*** |
| | (1.203) | (1.136) | (1.114) | (1.135) | (1.180) | (1.203) |
| Female Presenter*Other Field Coder | 6.898** | 5.805** | 3.473 | 3.509 | 3.250 | 4.010 |
| | (3.039) | (2.713) | (2.544) | (2.818) | (2.978) | (2.863) |
| Talk length (total minutes) | No | Yes | Yes | Yes | Yes | Yes |
| Seminar series fixed effects | No | No | Yes | Yes | Yes | Yes |
| Coder fixed effects | No | No | No | Yes | Yes | Yes |
| Presenter home institution fixed effects | No | No | No | No | Yes | Yes |
| JEL code fixed effects | No | No | No | No | No | Yes |
| Number of unique talks | 462 | 462 | 462 | 462 | 462 | 462 |
| Number of Talk-Coder pairs | 579 | 579 | 579 | 579 | 579 | 579 |

*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' calculations based on data collected by the Seminar Dynamics Collective between January 9 and May 15, 2019.

Note: Each characteristic (e.g. gender) is tested in a separate regression. Regressions also include controls for baseline coder group characteristic (e.g. Female coder and Male coder). Regressions also include a baseline coder group for "Other or Unknown Coder" (8 observations) and the corresponding interaction coefficient "Female Presenter*Other or Unknown Code", which is not displayed in the table due to the small number of observations in this group. All regressions include a dummy indicating if the talk was given at the speaker's home institution ("internal talk"). Home Institution fixed effects include dummies for institutions with 10 or more speakers, for top 5-20 economics departments, for top 21-30 Economics departments, for top 30 or more Economics departments, for top 20 business schools, for top 20 public policy schools, for international economics departments, for other academic institutions and for non-academic institutions. Ranking for Economics departments is from the US News and World Report 2017 Rankings. Observations are weighted by the inverse number of coders for each talk. Standard errors clustered at the talk level are shown in parentheses.

Table A.6: Gender Differences in Number of Questions Asked in JMT, Controlling for JMT Outcomes

| | Job Market Talks Only | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Female Presenter | 1.431 | 1.721 | 4.127*** | 5.833*** | 6.129*** | 6.230*** | 6.225*** | 6.329*** |
| | (1.657) | (1.611) | (1.479) | (1.610) | (2.043) | (2.077) | (2.049) | (2.078) |
| Talk length (total minutes) | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Seminar series fixed effects | No | No | Yes | Yes | Yes | Yes | Yes | Yes |
| Coder fixed effects | No | No | No | No | No | No | No | No |
| Presenter home institution fixed effects | No | No | No | Yes | Yes | Yes | Yes | Yes |
| JEL code fixed effects | No | No | No | No | Yes | Yes | Yes | Yes |
| Published or R&R in top 5 journal | No | No | No | No | No | Yes | No | Yes |
| Tenure track in top 10 institution | No | No | No | No | No | No | Yes | Yes |
| Number of unique talks | 176 | 176 | 176 | 176 | 176 | 176 | 176 | 176 |
| Number of Talk-Coder pairs | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 |

*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' calculations based on data collected by the Seminar Dynamics Collective between January 9 and May 15, 2019. Placement and paper outcomes were handcoded expost in December 2020 by authors by looking at speakers' websites and online CVs.

Note: Each column is a separate regression. All regressions include a dummy indicating if the talk was given at the speaker's home institution ("internal talk"). Home Institution fixed effects include dummies for institutions with 10 or more speakers, for top 5-20 economics departments, for top 21-30 Economics departments, for top 30 or more Economics departments, for top 20 business schools, for top 20 public policy schools, for international economics departments, for other academic institutions and for non-academic institutions. Ranking for Economics departments is from the US News and World Report 2017 Rankings. Top 5 Journals include Econometrica, QJE, AER, JPE and the Review of Economic Studies. Observations are weighted by the inverse number of coders for each talk. Standard errors are clustered at the Talk level. Standard errors are in parentheses.

Table A.7: Spring Seminars Sample Breakdown

| | Female Presenter | Male Presenter | Total |
|---|---|---|---|
| Job Market Talk | 117 | 123 | 240 |
| Regular Seminar | 115 | 224 | 339 |
| Regular Seminar, Applied Microeconomics | 96 | 160 | 256 |
| Regular Seminar, Macroeconomics | 9 | 39 | 48 |
| Regular Seminar, Theory | 5 | 12 | 17 |
| Regular Seminar, Econometrics | 0 | 10 | 10 |
| Internal Seminar | 18 | 31 | 49 |
| Observations | 232 | 347 | 579 |

*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' calculations based on data collected by the Seminar Dynamics Collective between January 9 and May 15, 2019.

Note: Fields are non-JMT Applied Microeconomics, non-JMT Macroeconomics, non-JMT Econometrics, non-JMT Theory and Job Market Talk. Fields are based on Seminar Series. Internal talks are talks given at the speakers' home institutions.

## Table A.8: Other Potential Outcomes of Interest

| | Coefficient on Female Presenter | | | | | | |
|---|---|---|---|---|---|---|---|
| | Pooled Sample of Regular Talks Plus JMTs | | | | | | JMT Only |
| Dependent Variable | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Timing of Questions | | | | | | | |
| Minutes Elapsed Until First Question | 0.193 | 0.190 | 0.032 | 0.077 | 0.330 | 0.028 | -0.844 |
| | (0.452) | (0.447) | (0.459) | (0.448) | (0.477) | (0.486) | (0.985) |
| Number of Questions in the First 10 minutes | 0.061 | 0.075 | 0.059 | 0.046 | 0.065 | 0.161 | 0.561 |
| | (0.170) | (0.169) | (0.173) | (0.189) | (0.198) | (0.209) | (0.374) |
| Number of Questions that Interrupt the Speaker | -0.464* | -0.462* | -0.261 | -0.292 | -0.424 | -0.318 | -1.190 |
| | (0.250) | (0.246) | (0.249) | (0.256) | (0.289) | (0.303) | (0.757) |
| Time Spent on Questions | | | | | | | |
| Percent Minutes Spent on Questions | 0.015 | 0.014 | 0.012 | 0.013 | 0.016* | 0.019* | 0.010 |
| | (0.010) | (0.009) | (0.009) | (0.009) | (0.010) | (0.011) | (0.016) |
| Percent Minutes Spent on Asking Question | 0.013** | 0.012* | 0.008 | 0.007 | 0.007 | 0.011** | 0.005 |
| | (0.006) | (0.006) | (0.005) | (0.005) | (0.005) | (0.006) | (0.013) |
| Percent Minutes Spent on Answering Question | 0.006 | 0.006 | 0.007 | 0.006 | 0.007 | 0.006 | 0.018* |
| | (0.006) | (0.006) | (0.006) | (0.006) | (0.006) | (0.007) | (0.011) |
| Percent Minutes Spent on Back and Forth | -0.004 | -0.003 | -0.003 | -0.000 | 0.002 | 0.002 | -0.013** |
| | (0.005) | (0.005) | (0.004) | (0.004) | (0.004) | (0.004) | (0.006) |
| Disruptive Audience Members | | | | | | | |
| Any Disruptive Audience Members | 0.008 | 0.014 | 0.040 | 0.029 | 0.048 | 0.064 | 0.105 |
| | (0.036) | (0.036) | (0.038) | (0.039) | (0.041) | (0.044) | (0.079) |
| Any Disruptive Audience Male Members | 0.016 | 0.021 | 0.039 | 0.027 | 0.046 | 0.059 | 0.105 |
| | (0.035) | (0.035) | (0.038) | (0.038) | (0.041) | (0.044) | (0.079) |
| Any Disruptive Audience Female Members | -0.030** | -0.029** | -0.022 | -0.025 | -0.028 | -0.025 | -0.007 |
| | (0.015) | (0.015) | (0.014) | (0.017) | (0.017) | (0.020) | (0.024) |
| Talk length (total minutes) | No | Yes | Yes | Yes | Yes | Yes | Yes |
| Seminar series fixed effects | No | No | Yes | Yes | Yes | Yes | Yes |
| Coder fixed effects | No | No | No | Yes | Yes | Yes | No |
| Presenter home institution fixed effects | No | No | No | No | Yes | Yes | Yes |
| JEL code fixed effects | No | No | No | No | No | Yes | Yes |
| Number of unique talks | 462 | 462 | 462 | 462 | 462 | 462 | 176 |
| Number of Talk-Coder pairs | 579 | 579 | 579 | 579 | 579 | 579 | 240 |

*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' calculations based on data collected by the Seminar Dynamics Collective between January 9 and May 15, 2019.

Note: Each coefficient is from a separate regression. All regressions include a dummy indicating if the talk was given at the speaker's home institution ("internal talk"). Home Institution fixed effects include dummies for institutions with 10 or more speakers, for top 5-20 economics departments, for top 21-30 Economics departments, for top 30 or more Economics departments, for top 20 business schools, for top 20 public policy schools, for international economics departments, for other academic institutions and for non-academic institutions. Ranking for Economics departments is from the US News and World Report 2017 Rankings. Observations are weighted by the inverse number of coders for each talk. Standard errors are clustered at the Talk level. Standard errors in parentheses.

Table A.9: NBER Coder Characteristics

| | Mean | SD | Number |
|---|---|---|---|
| Female | 0.517 | 0.509 | 15 |
| Field is Applied Micro | 0.828 | 0.384 | 24 |
| Upper (4th-6th Year) PhD Student | 0.310 | 0.471 | 9 |
| Observations | 29 | | |

*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' calculations based on data collected by the Seminar Dynamics Collective between January 9 and May 15, 2019.

Source: Authors' calculations based on data collected by the Seminar Dynamics Collective between July 8 and July 26, 2019.

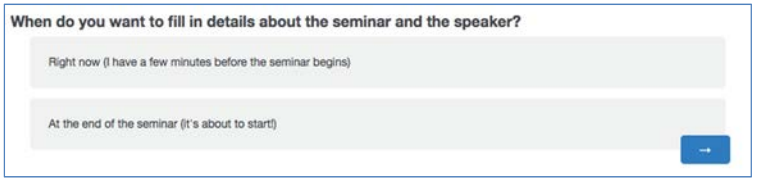
# Appendix B: Qualtrics Tool User Guide

We provide here the user guide for the qualtrics tool used by coders for the university seminar sample. The tool for the NBER summer institute meetings was identical except for the General Information section and the options for the "tone" of the questions, as discussed in the main text.

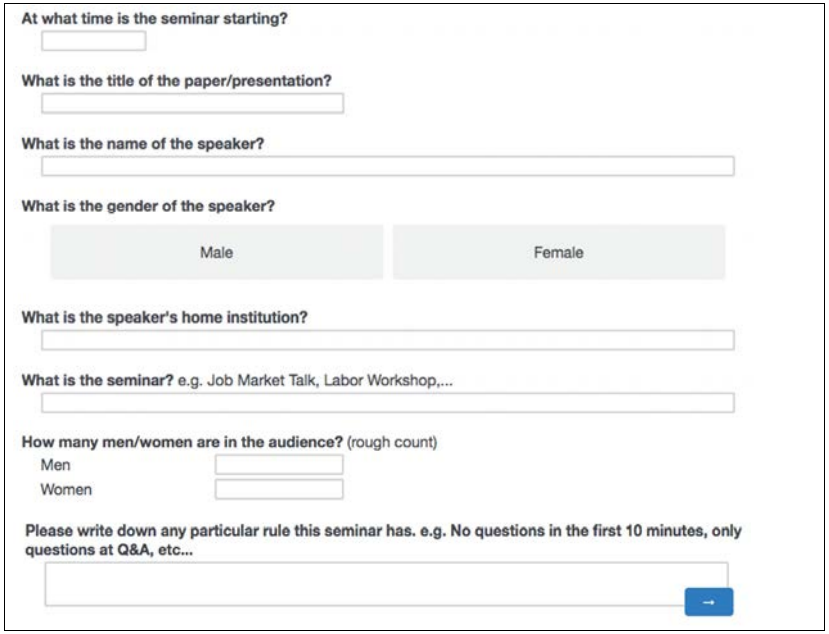
## Economics Seminar Dynamics - Qualtrics Tool User Guide

### A. Survey Start: General Information

After some general information, the first question you will be asked is:

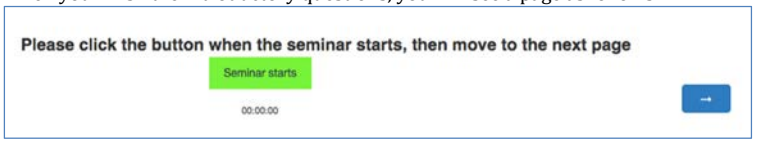



➔ If you do not have time right now, then you will get those questions at the end of the survey.
➔ If you answer right now, you will get to the following screen:

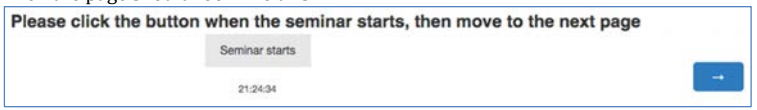



These questions should be self-explanatory. Do the best you can to be precise, please, but it is okay to approximate if you cannot count exactly how many people are in the room.

When you finish the introductory questions, you will see a page as follows:




When the seminar starts click the green button: You should click this after the speaker introductions. The seminar formally begins once the speaker takes over the floor. (Note: You may have to play a little with the mouse, only the top part of the "button" is clickable). Then the page should look like this:




I clicked the "Seminar Starts" button at 9:24 pm (21:24 for Europeans ;-). Then click the blue arrow button to get to the next page.[1]

[1] NOTE: you can click the blue button even if you didn't click the "Seminar starts" button. While we prefer you click the "Seminar starts" button for precise timing, don't worry if you forgot, we will then use the time you indicated on the first page as to when the seminar starts.

## B. Recording Timing Data on Questions during the Seminar

Here is a template Question page. Each page has two panels.

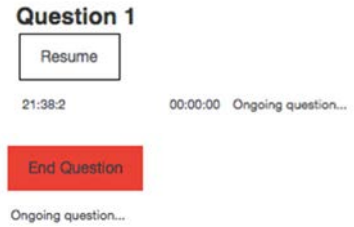

As a general rule, use the left panel only, and when you are done, click the blue arrow (12) to go to the next page that, again, will have a left and a right panel. The right panel is a shade darker, so that we don't get confused which button belongs where, while using all these buttons…

**What's the idea for the right panel?** The right panel is here in case one question follows another quickly, and you're still filling out stuff on the left panel, and had no time to finish and click the blue arrow button. It's almost like an "emergency" left panel. In general, you use the right panel just like the left panel. But don't make it a habit to always use it. The reason is that if you use the right panel even if you had ample time to move to the next page, then, in case there are two quick questions in succession, you won't have the right panel there to help you not lose track! You need not worry you'll run out of "Question" pages, we have plenty of those.

Now, let's move to how the Question panel is best filled out. I'll refer to the buttons through their red number in the Figure above.

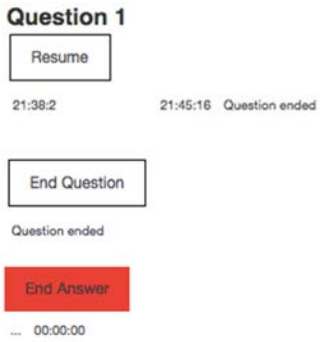
When a question is asked, click the green "Start" button.

Then two things happen as shown in the picture below:
**1)** The "Start" button (1) changes to a "Resume" button and turns White: Here, I clicked the button at 9:38 pm and 2 seconds.
**2)** The second change is the "End Question" Button (5) in the middle turns red. This alerts you that you are still in the Ongoing Question mode. Until you click End Question, we think the person who asked the question is still speaking (recall, the tool is collecting data both on how many questions there are, and how long those questions last).




When the question is over, click the Red "End Question" button.

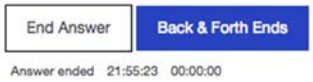
Then three things happen as shown in the picture below:
**1)** Below and next to the "Start" button (1), you see a time stamp and a "Question ended" text. Here, I clicked the button at 9:45 pm and 16 seconds (so the question looks like it lasted about 7 minutes).
**2)** The second change is the "End Question" Button (5) at the bottom turns white, and the text below turns to question ended.
**3)** The "End Answer" Button (9) at the bottom turns red. This alerts you that you are still in the Ongoing Answer mode, that is, until you click End Answer, we think the speaker is still answering the question. We set it up this way because we want to know how much time the speaker takes out of their seminar to answer a question. *We understand that this can feel somewhat subjective; simply use your best judgment when you think the answer is over.*




When the answer is over, click the Red "End Answer" button.

Then two things happen as shown in the picture below:
**1)** the "End Answer" Button (9) at the bottom turns white. This alerts you that the answer is over.
**2)** A new button appears next to the "End Answer" button, namely the blue "Back & Forth Ends" button. We will address this below.

Here, I clicked the end answer button at 9:55 pm and 23 s, so, about a 10 min answer.



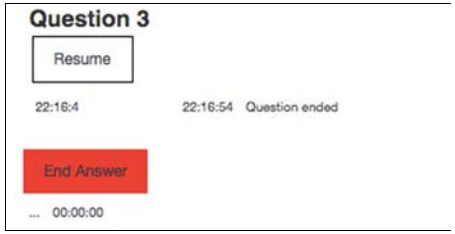

Before we go to the other buttons, and how to use them, let's consider some difficult cases on how people ask questions and answer them, let's call them Problem Cases.

## C. Timing of Questions: Problem Cases

1. The question ended, but then, suddenly, the question kept going.

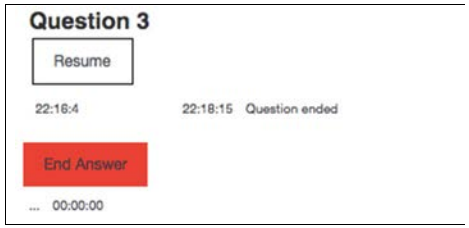
So, suppose you clicked the "End Question" button, but then the question kept going. This can also happen if you click the "End Question" button by mistake.

No worries: Simply click the "Resume" button.




Here I clicked the "Start" Question button at 22:16 and 4 seconds, and the "End Question" button 22:16 and 54 seconds: a very short 50 second question.


But then I noticed my mistake and clicked the resume button, and the "Question ended" text changes to "Ongoing question…" and the "End Question" button turns Red again to alert me to the fact that once more the question is ongoing. Furthermore, the "End Answer" button once more turns white, as we are back to the question mode rather than the answer mode.




Then I clicked the "End Question" button, here at 10:18 pm, and 15 s, a much more reasonable 2 min question. And apart from the "End Question" button turning white, the "End Answer" button turns red again.

2. Back and Forth

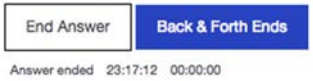
Sometimes there is not just one quick question, but there is a whole back and forth between the questioner and the speaker (potentially including several members of the audience who jump in on the same point)

If the person who asked the initial question follows up immediately with the speaker (or interrupts the speaker's response), then you can click the "Resume" button. When the speaker starts answering, click the "End Question" button again. You can do this repeatedly, so if there is a back and forth for a while you can keep hitting "resume" , "end question", "resume", "end question". At the very end of the interaction you can hit "End Answer". You do not need to hit the **Back & Forth Ends** in that case (though it's OK if you do for safety).

*Backup! If you are totally overwhelmed by the speed of question and answer so that the buttons simply seem too difficult to all fill out, or there are too many different audience members interjecting,* this is where the **"Back & Forth Ends"** button kicks in.

Here, I started the Question at 23:16:59 (pm) (so almost 11:17 pm) and ended is just a few seconds later.


Then I clicked the "End Answer" button at 23:17:12, so a little more than a minute after the question ended.




Then I was overwhelmed by the rapid question and answer back and forth, that at the end of this, I clicked the "Back & Forth Ends" button, at 23:20:58, so, almost another 3 minutes later. The "Back & Forth Ends" button keeps being blue, since, in case it still goes on, you simply click it, when you think it is really over, again.


And indeed, it went on, and I simply clicked it again when I thought it was over, now at 23 minutes and 23 seconds, so, about 2 minutes later.


And still ongoing, so I simply click it again when I think it is over, now at 23 hours, 24 min and 50s.


Since you can click the blue "Back & Forth Ends" Button as often as you need, you should feel free to press it as soon as you think the back and forth is over, since you can always come back and change your mind by clicking it again when it is now (maybe truly) over, etc. So, This should help you to not overestimate how long the back and forth takes. If you're not sure it's over, simply assume it is, and if it's not, simply click it again!

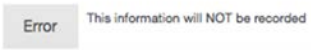
3. Someone quickly asks another question before I managed to fill out the whole left panel about the question and answer:

This is what the right panel is for, you can click the "Start" button (3) on the right panel, and your left panel is still "alive" that is you can still fill out whatever you need while the next question is happily under way on the right panel.

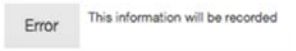
4. The whole Question was a mistake, there never was a question…

No worries, this is why we have the "Error" button at the very end.


When you click it, it will turn into:




So, the information will not be recorded.
But wait, wait… I clicked the error button by mistake!!! No worries, simply click it again, and voila, it turns into the following:

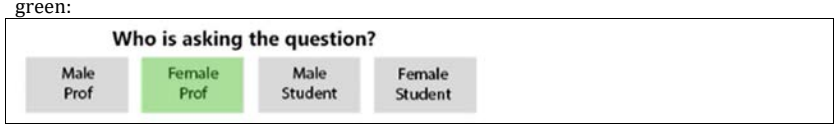



And so on and so forth….

## D. Recording Specifics on Questions

*You can enter information about the question during the question, answer, or after both have finished, but only before moving to the next page. Once you get to the next page, you can NOT return to the previous page.*

How to use those other buttons:
Here I thought a Female Prof was asking the question, so, I click that button and it turns green:




You can technically click as many buttons as you want, please only click one. We realize that at times you may not be sure who someone, but just use your best judgment. Classify post-docs as students, and visiting faculty as profs.

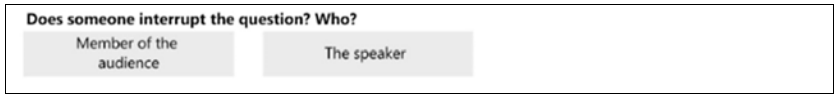
Next is the:


You should think of this as assessing the interaction towards the speaker. We aren't asking you to code the intention of the person making the comment, nor how it was taken by the speaker. But rather, it's your assessment of the tenor of the comment in a scientific setting. You may leave this blank for many interjections, only filling this up if you think it is warranted. *You can click as many buttons as you deem appropriate, so, an interaction can be, e.g. just supportive, just patronizing or both. Or nothing. Use your judgment.*

The options are:

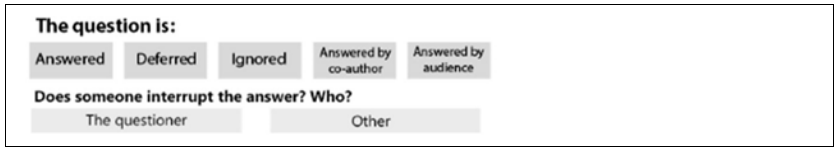
- **Supportive:** For example, I provide the speaker with a great example they can use. Or provide an answer to a problem. Or I tell them why I find their insight useful.
- **Patronizing:** A comment that may be apparently kind or helpful, but betrays a feeling or sense of superiority over the speaker. A comment could be both supportive and patronizing if the interjection acts as if the speaker can't answer themselves.
- **Disruptive:** Here we think of interactions that disrupt the flow of the seminar, maybe shifting the talk into a completely different direction, away from the speaker and their resarch.
- **Demeaning:** A comment that – in some measure – causes the speaker to lose their dignity or the respect of others. A demeaning comment is less about the scientific point being made, and more about shifting the focus to the speaker and undermining their status as an expert.
- **Hostile:** A comment that is unnecessarily antagonistic, aggressive, confrontational or combative. Hostility describes an aggressive interaction, one that you may not want to encounter as a speaker. Hostility is not required to make a scientific point.

Next is the:




This is pretty straightforward.

Then is the:




Again, pretty straightforward, and once more you can click as many as you feel apply.

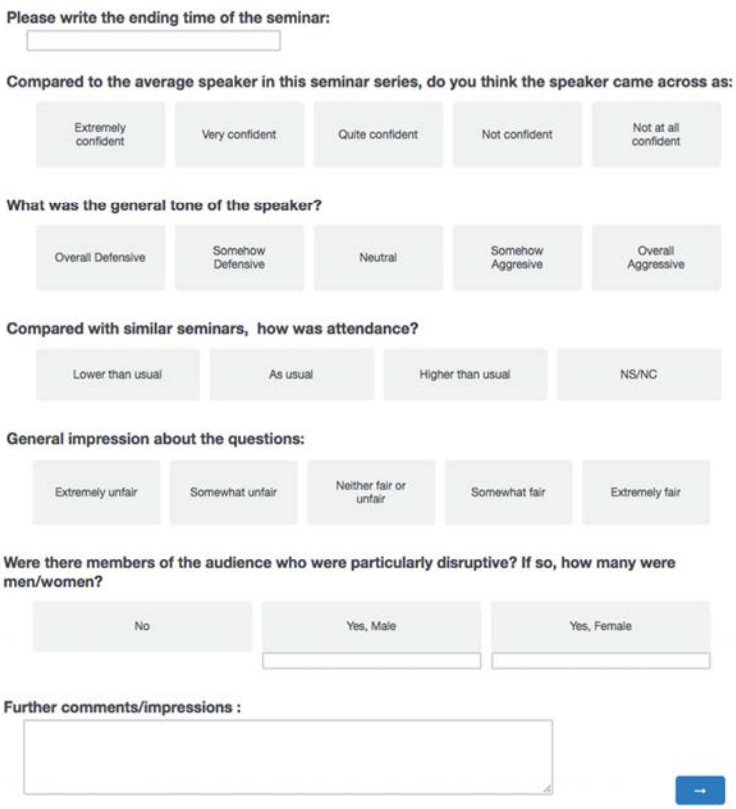
## E. Coding Q&A Sessions

Some seminar series have a Q&A sessions at the end. To deal with this, do as follows:

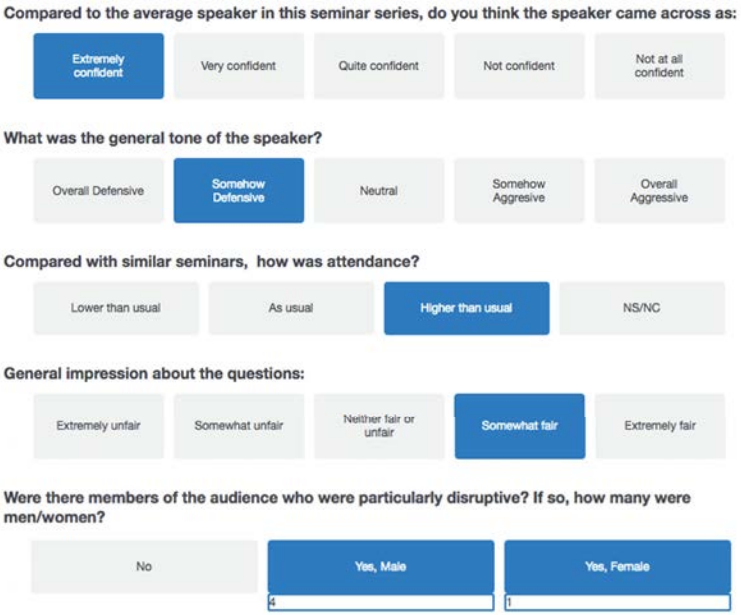
1. For the first question during the Q&A session, please write "Start of Q&A session" in the comment box.
2. Code questions as normal (as instructed above).

## F. Finally, the seminar is over, no more questions:

Simply click the blue Arrow button 3 times and you get to the following page:




You can use your local time for the beginning and end of a seminar. Here I filled it out randomly for demonstration purposes. The last two boxes indicate that 4 men and 1 woman were disruptive (it was a very disruptive imaginary talk).




Note: If you did not do so before the seminar, you may then get to a page that enables you to enter demographic information about the seminar (talk title, etc.)

Then click the blue Arrow button once more, and you are DONE!

Thank you!