Increasing women representation in Economics: A field experiment in academia

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Abstract

Despite increased efforts to improve women's representation in Economics, gender disparities persist across all academic levels. This study investigates internal barriers to women's participation in academic teaching roles, focusing on the case of the Department of Economics at Universidad de los Andes. Based on qualitative findings from structured focus groups, we designed a brief intervention aimed at enhancing female students' self-confidence and assertive communication skills. The intervention will be evaluated through a randomized controlled trial (RCT), with treatment participants receiving a two-session workshop on strategic communication and confidence-building techniques. We outline the experimental design, primary and secondary outcomes, and data collection strategies for the pilot phase, which will be conducted in the first semester of 2025. Our findings will inform the design of a larger-scale RCT and contribute to broader discussions on effective strategies to promote gender equity in academic pathways.

1 Introduction

Despite increased efforts to improve women's representation in Economics, women have been and remain a minority at every level of academic positions, from undergraduate students to full professors. According to the 2022 Report of the Committee on the Status of Women in the Economics

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Profession (CSWEP), the share of women in undergraduate economics majors remains well below parity (36% in 2022); "new doctorate students were 34.3% female, falling to 33.2% for assistant professors, 26.5% for tenured associate professors, and 17.8% for full professors" (Chari, 2023). Similar patterns of this "leaky pipeline" have been observed in Ph.D.-granting institutions outside the United States. For example, data from the Economics Department at Universidad de los Andes in Colombia show that in 2022, women accounted for 35% of undergraduate students, 37% of teaching assistants, 33% of master's students, and 26% of Ph.D. students. Women's representation falls further to 21% at the assistant, associate, and full professor levels.

Within Universidad de los Andes, the Department of Economics shows a significant decline in women's representation, particularly within pedagogical teams. These teams play a crucial role in supporting professors in undergraduate and graduate courses and consist of Senior and Junior Teaching Assistants (STAs and JTAs) and monitors. STAs are required to hold an Economics degree or a similar qualification and deliver academic lessons weekly. JTAs, who must also hold a professional degree, contribute to students' learning by conducting review sessions and grading assignments, although they do not deliver formal lectures. Additionally, undergraduate students may serve as monitors, primarily assisting with grading and administrative tasks without delivering academic content.

Recent data reveal a concerning statistic: although 46% of pedagogical teams comprise women, only 37% include a woman serving as an STA. This decline and significant underrepresentation could have detrimental effects on women's future careers, as employers often highly value teaching experience. Moreover, these disparities may contribute to women's broader underrepresentation and hinder advancement toward academic careers, where teaching experience is often considered a criterion for Ph.D. acceptance.

This paper reports on a series of focus groups conducted with undergraduate and graduate students in the Economics Department at Universidad de los Andes, aimed at understanding the decline in women's representation among STAs and exploring why women choose not to engage in or continue in these roles. Results revealed that a lack of self-confidence is one of the main reasons for women's low participation or reluctance to act as teaching assistants. Based on these findings, we designed a simple field experiment to improve confidence and assertive communication skills. A random sample of students will be invited to a two-session workshop providing tools and

techniques to strengthen assertive communication, including improving content synthesis, managing filler words, and enhancing vocal delivery. Another sample of students will be invited to attend a two-session "placebo" workshop on the importance of economic analysis in society, unrelated to confidence or communication skills.

We will evaluate whether the intervention increases the probability of applying for and accepting academic positions that require public speaking skills. We are also interested in measuring the intervention's effects on self-confidence, self-efficacy, career aspirations, and beliefs.

The pilot of this intervention will begin on April 29, 2025 with the first workshop session, and the second session will take place on May 6, 2025. The pilot will test the feasibility of the experimental design, interest in participation, logistics, content delivery, survey validation, and outcomes measurement. Although underpowered, the pilot will provide critical insights into potential impacts and variance estimates for calculating the required sample size for the full RCT. While the pilot will be implemented at Universidad de los Andes, we will explore the possibility of scaling the intervention to other elite public and private universities in Colombia.

This study contributes to a growing literature on interventions designed to increase the representation of women and minority groups in Economics. Prior interventions have primarily focused on encouraging women to major in economics, including classroom visits by female role models (Porter and Serra, 2020), mentoring programs, and the provision of additional information (Li, 2018). Similar approaches involving light-touch interventions, such as personalized letters and informal meetings, have also been employed (Bedard et al., 2021). Our project tests a similarly simple intervention but with a novel focus on strengthening confidence and assertive communication, addressing barriers women perceive when considering academic careers.

The paper is structured as follows: Section 2 describes the focus groups and presents key findings. Section 3 outlines the experimental design and intervention. Section 4 concludes and discusses next steps.

2 Focus Groups and Key Insights

To inform the design of the intervention promoting women's participation in academic teaching roles, a qualitative study was conducted at the Department of Economics at Universidad de los

Andes. The objective was to understand the reasons why women are less likely to become Senior Teaching Assistants (STAs) or to continue in these roles after initial experiences. Three structured focus groups were held with current and former STAs, research assistants, and undergraduate monitors, following IRB approval in August 2023. Discussions were analyzed using grounded theory principles, enabling a nuanced and iterative identification of common themes.

The study confirmed several of our initial hypotheses. First, motivation is shaped not only by intrinsic interest in teaching but also by early exposure to pedagogical roles and the presence of mentors—especially female role models. Women emphasized the importance of inspiring figures and supportive environments in envisioning academic careers. However, many also reported feeling ill-prepared or underqualified for teaching roles, likely biased beliefs, that lead to self-deselection from STA applications. Low self-confidence and limited tolerance for frustration, attributed to gendered socialization, further limited women's perceived readiness to assume visible teaching roles.

Second, the analysis highlighted multiple perceived barriers to academic engagement. Informal recruitment practices ("word of mouth") tend to favor male students. Gender dynamics and social norms create discomfort when teaching predominantly male classes. Women also reported experiencing symbolic violence (e.g., condescension, mansplaining, skepticism), unequal distribution of administrative tasks, and a poor cost-benefit ratio in terms of workload and pay. The maternity-career trade-off emerged as a recurrent concern, complicating long-term planning.

Finally, the study provided valuable anecdotal evidence on both challenges and transformative moments in academic pathways. Positive feedback and mentorship experiences were often cited as pivotal in reinforcing women's interest in academic careers. Teaching experience was consistently valued for its professional and personal development benefits.

These findings directly informed the structure of the brief experimental intervention to be tested between April and May 2025, and which we describe next. The intervention aims to build women's self-confidence and assertive communication skills to counter biased beliefs.

3 Experimental Design

3.1 Overview and Research Questions

Building on the qualitative insights from the focus groups, we designed a randomized controlled trial (RCT) to address the main barriers identified, particularly low self-confidence and perceived unreadiness for academic teaching roles. The intervention aims to provide students with practical tools to enhance self-confidence and assertive communication skills.

The RCT is designed to answer the following research questions:

1. Can a brief intervention focused on improving female students' confidence and public speaking skills increase applications to academic roles such as STAs, JTAs, monitors, or research assistantships?

2. To what extent does the intervention improve students' confidence in their ability and willingness to compete for academic roles?

3. To what extent does the intervention influence students' confidence regarding their future career prospects outside of academia?

4. To what extent does the intervention strengthen assertive communication skills related to their perceived ability to perform as STAs or JTAs?

3.2 Experimental Setup, Pilot, and Intervention

The target population for the pilot consists of female undergraduate students registered in the Uniandes ME-Lab database. Approximately 150 participants will be recruited for the pilot phase, representing around 30% of the female undergraduate student body in the Department of Economics. We aim to primarily recruit Economics students, but will expand to students from Government, Business, and related programs if necessary to reach the target sample size. Participants will be randomly assigned to one of two experimental conditions: treatment or control, with roughly 75 students in each group. Depending on the results of the pilot, additional participants may be recruited in future stages to expand the sample size, statistical power, and avoid peer effects, potentially extending to other universities.

Participants will be randomly selected and assigned to the treatment or control groups through the Uniandes ME-Lab platform. *Treatment Group:* Participants assigned to the treatment group will attend a two-session workshop led by Jennifer Sáenz, an expert in strategic communication with a legal background and a Master's degree in Journalism from Universidad de los Andes. Jennifer Sáenz is also the founder of *Elespik*, a communications consulting firm specializing in leadership and executive presence development across various industries. The workshop aims to equip students with practical tools to enhance assertive communication and boost self-confidence in academic contexts. Specifically, the sessions will focus on improving clarity, conciseness, and emotional resonance in communication; strengthening students' confidence in expressing their ideas and abilities; and providing strategies for clear and assertive message delivery.

The workshop will introduce the basic principles of structured and effective communication, emphasizing techniques for synthesizing complex content into coherent and impactful arguments. Particular attention will be given to managing filler words and strengthening vocal delivery to project confidence and maintain engagement during academic presentations and interactions.

Workshop activities will be highly practical and interactive. Sessions will begin with a diagnostic assessment of participants' baseline communication skills, followed by synthesis and argumentation exercises. Additional training activities will focus on identifying and reducing filler word usage and improving vocal control and presence. Participants will receive individualized feedback throughout the sessions to reinforce effective communication practices and internalize new skills.

Control Group: Participants assigned to the control group will attend a two-session placebo lecture delivered by José-Alberto Guerra, Associate Professor of Economics. The lecture will focus on the importance of economic analysis in society. It is designed to match the treatment group in terms of time commitment and academic value, without targeting communication or confidence-building skills. This design ensures that observed differences between groups can be attributed to the communication training rather than differential engagement levels or opportunity cost differentials.

The pilot intervention will be delivered as follows: the first session will take place on April 29, 2025, and the second session will take place on May 6, 2025.

This experimental setup will allow us to test the causal impact of the communication and confidence-building intervention on women's interest in academic roles and their perceived readiness

to pursue teaching or research assistanship opportunities. Results from the pilot will directly inform refinements for a scaled-up full RCT.

In what follows, we describe the compensation scheme designed to incentivize participation and accurate survey responses.

3.3 Payments and Compensation

All participants will receive a payment for attending both workshop sessions. This payment will be made upon completion of the two sessions. Additionally, participants will be eligible for a performance-based bonus, awarded in accordance with an incentive-compatible scheme. The bonus amount will vary based on participants' performance on a set of survey questions designed to assess perceptions of social norms and knowledge in economics.

Participants will receive a minimum payment of COP 45,000 for completing both sessions and the associated survey. Based on their performance on the incentive-compatible section, participants may earn an additional bonus of up to COP 45,000. Therefore, total compensation will range from COP 45,000 to COP 90,000.

3.4 Evaluation Design and Data Collection

The evaluation of the intervention's effectiveness will involve both direct behavioral outcomes and experimental follow-ups. The primary outcomes we aim to measure are the increase in the number of women applying for STA positions and the subsequent rise in the number of women serving as STAs within the Department of Economics. Information regarding TAships will be disseminated to students at the end of each academic semester, immediately following the announcement of grades and academic performance. We will collect data on TAship applications and take-up rates at the beginning of every academic term.

Additionally, we will construct standardized indices to measure secondary outcomes related to psychological and skill-based changes. Specifically, we will construct indices for self-efficacy and self-esteem, academic and career attitudes, and communication skills. These indices will be developed using survey data collected before and after the intervention, and we will detail their construction in Section 3.5.

Beyond these primary and secondary outcomes, a post-intervention evaluation phase will be implemented approximately one month after the workshops. Participants from both the treatment and control groups will be invited to respond to a series of calls for applications or vacancies to participate in additional experimental projects led by Uniandes ME-Lab. These calls will offer real academic or professional opportunities—such as roles as Experiment Assistants or Student Support staff in faculty courses. All applications will be submitted virtually, while tasks related to these roles will be carried out primarily in person.

The calls for participation in Uniandes ME-Lab experiments are structured around different types of tasks, varying key features in order to evaluate the impact of the intervention on participants' confidence and communication abilities:

- **Type 1: Variation in Group Size.** Participants will prepare and deliver instructions publicly. In the first version, they will present to a small group; in the second, to a larger audience, introducing different challenges related to public speaking.
- **Type 2: Gender Composition of the Setting.** Participants will complete tasks either in predominantly male environments or predominantly female environments, capturing potential effects of social context on performance.
- **Type 3: Level of Support Offered.** Participants will either complete a desk-based task individually or be assigned an assistant (male or female) to provide support during execution.
- **Type 4: Feedback Dynamics.** Participants will receive feedback from either a single instructor (male or female) or from both a male and female instructor, allowing comparison of perceptions across feedback sources.

The structure of the calls is designed to assess whether the intervention significantly influenced the likelihood of participants applying for academic roles that demand diverse skill sets and confidence to apply.

Data will be collected through application decisions, task performance observations, and post-task surveys. A comparative analysis will be conducted between the treatment and control groups. All evaluation activities will maintain strict ethical standards, ensuring participant confidentiality

and minimizing psychological risk. Informed consent will include information about the psychological services available through the University's Psychological Counseling Center (CAP) and the "Abuse, Harassment, Threats, and Discrimination" support protocol.[1] We already have approval from the Ethics Committee at the Department of Economics and are in the process of submitting the application to the broader ethics committee at Universidad de los Andes.

3.5 Outcomes and Measurement

Outcomes of interest will be collected using baseline and endline surveys. These surveys will gather demographic characteristics and measure key psychological and career-related constructs. The endline survey will also include questions designed to assess participants' personal beliefs about the academic environment. Responses to certain survey modules will be incentivized using an incentive-compatible payment scheme; that is, some participants will receive randomly assigned bonus payments based on the accuracy and honesty of their responses.

The main outcomes assessed through the surveys include changes in self-efficacy, perceptions of the glass ceiling effect, career preferences and aspirations, self-esteem, confidence levels regarding participation in academic environments, and beliefs about academic standards.

Below, we describe the relevance of each construct to our intervention goals:

Self-efficacy. Evaluating self-efficacy is critical to our experimental design, as it addresses the psychological mechanisms influencing students' engagement with academic opportunities, such as research assistantships and teaching roles. Following Bandura (1977, 1981) and Riggs and Enochs (1990), we focus on task-specific self-efficacy related to academic presentation and communication skills. The survey will assess participants' perceived ability to explain concepts clearly, respond confidently to questions, and effectively manage teaching responsibilities.

Perceptions of the Glass Ceiling. Assessing participants' perceptions of the glass ceiling effect, particularly resignation toward advancement barriers, is essential to understanding how internalized beliefs may influence behavior. We adopt items from the Career Pathways Survey (CPS) by Smith et al. (2012), focusing on the resignation subscale. These items measure the extent to which students

[1] MAAD in Spanish, see here https://ombudsperson.uniandes.edu.co/images/Documentos/PROTOCOLO_MAAD__2023.pdf.

believe systemic barriers discourage women from pursuing leadership positions. Identifying changes in these perceptions will help evaluate whether the intervention challenges resignation attitudes.

Self-esteem. Measuring self-esteem provides insights into how internal evaluations of self-worth affect motivation to pursue academic opportunities. We employ the Rosenberg Self-Esteem Scale (RSE) (Rosenberg, 1965), a widely validated instrument. Enhancements in self-esteem may mediate the relationship between confidence-building interventions and greater academic engagement.

Beliefs about Academic Standards. Assessing beliefs about academic standards and requirements is crucial for understanding how students perceive the prerequisites for achieving leadership roles in academia. These beliefs may shape aspirations and influence students' willingness to pursue academic opportunities. The survey measures participants' perceptions of academic performance thresholds and gender representation in leadership positions. To incentivize honest and thoughtful reporting, responses are evaluated using an incentive-compatible mechanism: a subset of questions is randomly selected, and participants receive additional payments based on the accuracy of their answers and estimates relative to actual values. This approach allows us to assess whether misperceptions about academic standards constitute barriers to engagement and leadership aspirations.

Ultimately, these dimensions—self-efficacy, perceptions of the glass ceiling, self-esteem and beliefs about academic standards —are central to understanding the psychological shifts the intervention seeks to foster. Through careful assessment of these factors, we aim to capture meaningful mechanisms underlying behavior change. We provide details on the questions in each module in Appendix 5

3.6 Estimation Methodology

Given the randomized controlled trial (RCT) design, we will use linear probability models (LPM) to identify the effect of the treatment on key outcomes. Specifically, we will estimate variations of the following regression model:

$$y_i = \beta_0 + \sum_t \beta_t \mathbb{1}[T_i = t] + X_i'\beta_2 + \varepsilon_i \tag{1}$$

where y_i is an indicator variable for whether student i applied to an STAship or continued as an STA, $\mathbb{1}[T_i = t]$ indicates the treatment assignment for student i, X_i is a vector of baseline control variables (such as demographic characteristics and initial confidence measures), and ε_i is the error term.

We anticipate the possibility of interaction between participants assigned to different groups, potentially causing spillovers. To mitigate these risks, once participants are pre-selected for the experiment, we will collect information on social connections among eligible students. This information will serve two purposes:

1. Assign students with strong social ties to the same treatment group whenever possible, minimizing cross-group contamination.

2. Use social network variables as controls in the empirical analysis to account for potential spillover effects.

If feasible, for future stages, we will consider expanding the sample to additional universities and randomizing at the university level to further minimize spillover effects and enhance external validity. Additionally, subject to funding availability, we plan to implement the intervention across multiple cohorts, ideally over at least three academic semesters.

4 Conclusion and Next Steps

This project addresses the persistent underrepresentation of women in academic teaching roles within the Economics discipline by targeting internal barriers such as self-confidence and communication skills. Drawing on qualitative evidence from focus groups, we designed a brief, scalable intervention that aims to strengthen participants' assertive communication abilities and encourage greater engagement with academic opportunities.

The pilot phase, to be implemented between April and May 2025, will allow us to test the feasibility of the experimental design, refine survey instruments, and gather preliminary estimates of intervention impacts. Although the pilot is not powered to detect small effects, it will provide valuable insights for planning the full-scale RCT. In line with best research practices, we are registering the RCT at the American Economic Association (AEA) RCT Registry. In parallel, we

are applying to the University's broad ethics committee to expand the potential pool of participants beyond the initial departmental list.

In future stages, we aim to expand the sample to additional universities and explore randomization at the university level to reduce potential spillover effects. Subject to funding availability, we also plan to implement the intervention across multiple cohorts over at least three academic semesters.

Ultimately, this study seeks to contribute both practical evidence for institutional initiatives promoting gender equity in Economics and broader insights into the design of interventions that address confidence gaps among underrepresented groups in academia.

5 Appendix: Survey Instruments

The survey instruments were designed to measure several psychological constructs, some of which are discussed in Section 3.5. Below, we list the survey modules corresponding to these constructs. For most modules, participants were asked to rate their level of agreement with a series of statements using a Likert scale, as specified. However, in some cases, participants were asked to select the option that best represented their opinion or provided numerical estimates for incentive-compatible questions.

Self-efficacy

Participants were asked to indicate their level of agreement with the following statements on a scale from 1 ("strongly disagree") to 5 ("strongly agree"):

- I ask questions during class.
- I explain topics to my friends.
- I express my opinion when I do not understand a class.
- I feel nervous when giving presentations.
- I understand economics concepts well enough to serve as a Senior Teaching Assistant.
- I would feel confident answering students' questions.

- I could serve as a Senior Teaching Assistant in a classroom where most students are men.

Additionally, participants were asked to answer the following multiple-choice questions:

- If given the opportunity, would you choose to become a Senior Teaching Assistant?

  a. Definitely not

  b. Probably not

  c. I am not sure

  d. Probably yes

  e. Definitely yes

- How would you rate your expected performance as a Senior Teaching Assistant?

  a. Outstanding

  b. Above average

  c. Average

  d. Below average

  e. Poor

Perceptions of the Glass Ceiling

Participants were asked to indicate their level of agreement with the following statements on a scale from 1 ("strongly disagree") to 7 ("strongly agree"):

- Female executives feel very uncomfortable criticizing team members.
- Female leaders experience more emotional distress than men during team crises.
- Women are more likely than men to be emotionally affected when taking major risks.
- Women feel they must make too many sacrifices to obtain high-paying positions.
- Coworkers' jealousy makes it difficult for women to seek promotions.
- Even successful women can quickly lose self-confidence.
- Women acknowledge that work is not the only source of happiness in life.

- When a woman is promoted, she might be accused of offering sexual favors.
- Intelligent women avoid careers that involve intense competition with colleagues.

Self-esteem

Participants were asked to indicate their level of agreement with the following statements on a scale from 1 ("strongly agree") to 4 ("strongly disagree"):

- On the whole, I am satisfied with myself.
- At times, I think I am no good at all.
- I feel that I have a number of good qualities.
- I am able to do things as well as most people.
- I feel I do not have much to be proud of.
- I definitely feel useless at times.
- I feel that I am a person of worth.
- I wish I could have more respect for myself.
- I tend to think that I am a failure.
- I have a positive attitude toward myself.

Beliefs about Academic Standards

Participants were asked to respond to incentive-compatible questions based on the major they reported in the baseline survey. One of their responses was randomly selected for an additional payment. If their response was within ± 5 percentage points of the correct value, they received a bonus. For each additional point outside that range, the bonus decreased progressively. No bonus was given if the error exceeded 20 percentage points.

- What percentage of academic monitors do you believe are women?
- In which percentile of the grade distribution do you think a man with a GPA of 4.5 is located?

- In which percentile of the grade distribution do you think a woman with a GPA of 4.5 is located?
- What percentage of female professors do you believe hold a tenured position?
- What do you estimate is the GPA of a female STA in your department?
- What do you estimate is the GPA of a male STA in your department?

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