Gender Dynamics in Entry into Competitive Careers: Evidence from Indian Civil Services*

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Abstract

We examine gender dynamics in entry into the Indian civil services, where placement depends upon succeeding in a highly competitive examination process. Using a unique dataset that covers the universe of applicants and their placement outcomes to civil service jobs in Tamil Nadu over eight years, we construct a cohort of first-time applicants and uncover several new facts about gender differences in participation and performance. Women constitute a majority of the applicant pool and perform better on average than men in their first attempt, though men are more likely to become top-scorers. Since success is rare in the first attempt, we examine reapplication behavior and performance over time. Women are more likely than men to *ever* reapply, but less likely to make consecutive attempts and to keep reapplying. Conditional on reapplication, women's performance is similar or better than men's; nevertheless, women are not necessarily more likely to become top-scorers. In the absence of the prevailing gender quota, these gender differences contribute to gender gaps in entry into the bureaucracy. Drawing on multiple data sources, including surveys and an information experiment with applicants, we provide evidence that marriage market pressures and lower household support significantly contribute to women's declining participation and success over time.

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Entry into prestigious, elite occupations often depends on succeeding in a competitive environment. Women tend to be underrepresented in such environments, e.g. in politics or in leadership positions in corporate firms. For organizations concerned with ensuring gender diversity for equity or efficiency reasons, it is crucial to understand how the recruitment process for such jobs shapes participation and performance by gender. Yet, given the decentralized, often opaque, nature of job search and hiring, it is usually challenging to track applicants along the hiring process and, hence, difficult to understand how men and women fare along the hiring pipeline in such competitive contests.

In this paper, we study how men and women compete for administrative civil service jobs, one of the most desirable careers in the Indian labor market. Hiring for civil service jobs typically occurs through centralized merit-based examinations and candidates often invest significant time and resources in preparing for these exams. Using anonymized administrative data on applications, test scores, and placement for state-level civil service recruitments conducted between 2012 and 2019 in Tamil Nadu, we adopt a pipeline approach to understand gender differences in participation and performance for entry into the civil services. Our setting and data allow us to map who selects into competition, how they perform, who persists in competition, and, ultimately, who succeeds in obtaining a highly coveted civil service job. Understanding entry into the profession is uniquely important in our context, as voluntary exits are incredibly uncommon.

The civil service bureaucracy performs core governance and public service delivery functions and improving women's representation in the bureaucracy is seen as a core policy objective. In the central bureaucracy, where data are readily available, women's representation has improved over time, but, as of 2022, women still constituted only 30% of the successful candidates entering the bureaucracy (UPSC, 2024). For state-level bureaucracies excluding Tamil Nadu, in the last decade, the share of successful female candidates has varied between 20% to 34%.[1] In Tamil Nadu, women's representation among new hires is nearly equal to men's, though we show that this is boosted by a gender quota for civil service jobs that has existed since 1989. In the absence of the quota but holding constant the selection of applicants to these exams, women would constitute about 40% of successful candidates.

Our analysis proceeds in two parts. In the first part, we leverage our unique administrative data from Tamil Nadu to construct and follow a cohort of first-time applicants over a six-year period. We document several facts about gendered competition for these jobs that, altogether, suggest that while women are extremely interested in these jobs, they are unable to persist in exam-taking over longer time horizons and, despite being better than male applicants on average, women struggle to reach the highest ranking performers in the exams. In the second part, we consider a range of mechanisms that could explain these gender differences, marshaling additional evidence from an original survey of applicants and an information experiment. While there are almost surely several factors at play, our evidence points to differential marriage market pressures and household support as factors that place

[1] These figures are compiled using publicly available annual reports published by state-level Public Service Commissions as well as news reports from five states (Assam, Odisha, Rajasthan, Maharashtra, and Uttar Pradesh) that handle recruitments for state-level civil service positions.

women at a particular disadvantage.

Successful entry into the civil services is incredibly competitive; the ratio of vacancies to applicants can be one to several hundreds or thousands of applicants. Interested applicants are therefore known to spend several years attempting exams in the hopes of landing one of these coveted positions, even though this may entail significant long-run costs (Mangal, 2024). In our data, among successful applicants, about 7% succeed in the first year of their attempts, while about 60% succeed only after four or more years of attempts. To understand barriers to success, therefore, necessitates tracking individual candidates over time.

Our administrative data come from the state Public Service Commission and cover direct recruitments for general administrative civil service positions, often referred to "Group exams," in the Tamil Nadu government.[2] Using these data, we construct a cohort of first-time applicants to Group exams. While the Commission does not directly track attempts over time, we use a proxy based on individual characteristics to match and track candidates over time.[3] We define a first-time applicant as an individual appearing for Group exams in 2014, who did not apply to any Group exam in the previous two years. In our preferred sample, we also restrict attention to the behavior of first-time applicants who are college graduates and under 30 years of age.

Tracking this sample over time, we report three main findings. First, women are a majority of first-time applicants and perform better on average in their first exam than men, though their performance lags at the very top. Women account for nearly 60% of first-time applicants; this level of participation by women suggests that women do not shy away from competing for these jobs. We also find no systematic pattern of advantage or disadvantage for either sex across a range of demographic and education variables available in the administrative data.[4] To get a more direct picture of applicant quality, we measure "baseline exam performance," defined as the percentile rank achieved by the applicant in their first exam. On average, women perform better than men by 2.4-2.6 points, even after controlling for observable characteristics. Since placement is heavily determined by exam performance, subject to reservation rules, this finding demonstrates that the applicant pools contain high-quality female applicants. Despite better average performance in the first attempt, women are less likely to be "top-scorers," defined as achieving a rank higher or equal to the number of vacancies in the recruitment.

Second, over a five-year period after the initial attempt, women are *more* likely to ever reapply, but less likely to reapply in consecutive years and to keep reapplying over time. As it is rare to succeed in the first attempt, we track unsuccessful candidates from the first year of attempts over the next five years. We document a positive relationship between baseline exam score and reapplication over time for both men and women, indicating dynamic selection by performance in applicant pools over time. Conditional on baseline score however, women

[2] A single recruitment combines vacancies across departments by educational qualification and pay grade and candidates apply to take the exams, rather than applying for specific positions.

[3] This proxy is an anonymized identifier based on individual name, parents' name, and date of birth.

[4] In fact, given that 1 in 4 college graduates in Tamil Nadu apply to these exams (Mangal, 2023), we likely observe a wide range of applicant quality among both men and women.

are less likely to reapply than men in the year following their first unsuccessful attempt. Measuring reapplication over consecutive years, we find that the reapplication gap by gender grows larger over time such that women are 25-30% less likely than men to have reapplied for five consecutive years. We also consider whether women reapply *at all*: Across the score distribution, women are *more* likely to reapply at least once or even twice, but this advantage disappears as we consider additional attempts. These results suggest that while women are more willing to compete in general, they do not *keep* competing at the same rates as men.

Third, conditional on reapplication, women's exam performance across attempts is either similar or better than men's, but this does not necessarily translate to women becoming top-scorers in exams. Our data allow us to observe six years of exam attempts and performance by first-time applicants in 2014. For this analysis, we compute the maximum percentile rank achieved by an applicant across exams in a given year of attempts. We compare how women's and men's performance varies across several years of attempts, controlling for baseline exam performance and the sequence of exams taken by the applicant. In their second year of attempts, women perform similarly to men, but across subsequent years, women perform significantly better than men by 0.5 to 1.8 percentile ranks. Despite these performance patterns, women do not necessarily become top-scorers. They are more likely to be top-scorers in the second year of attempts, but either less likely or similarly likely to be so across subsequent years. Given the extreme levels of competition, this analysis suggests that luck is an important factor in performance at the top of the distribution and, hence, in ultimately shaping hires. As women do not keep reapplying, initially top-scoring men are more likely to get lucky over time.

Across our sample period, women constitute 49.2% of hires, but only 39.5% of top-scorers. Our pipeline analysis suggests that, in the absence of the quota, women's lower persistence over time as well as their lower likelihood of reaching the highest ranks of performers contribute to gender gaps in entry into the bureaucracy.

While there are conceptually many possible drivers of these gender gaps, our preferred explanation centers the role of the marriage market and household support. Our qualitative fieldwork suggested that young women are more likely to face marriage market or other household pressures that limit their ability to persist in competition. Young men, on the other hand, may have a longer window of time to make attempts in order to secure a coveted public sector job. To quantitatively assess these and alternative hypotheses, we conducted an original survey of candidates who were actively studying for civil service exams. This survey provides rich information on personal and family background, investments in exam preparation, and marriage and labor market background, among other topics. Using these data and other approaches, we provide several pieces of quantitative evidence consistent with these qualitative insights.

First, our survey documents large gender differences in marriage market exposure faced by candidates and measures of household support for exam preparation. For example, women receive marriage proposals at much younger ages than men (20.9 vs 24.3 years) and marry earlier than men (22.1 vs 25.9). They also face greater conflict over the timing of mar-

riage with their parents. In terms of monetary support for exam preparation, men receive on average twice the amount of funds that women do and are more likely to be able to study outside the home. This occurs alongside gendered employment norms, which expect men to always work, but place harsher restrictions on women's employment. Women are 25-29 p.p. less likely to have ever been employed or be working at the time of the survey. Moreover, if they were not preparing for exams, 36% of women (vs only 13% for men) expect to be engaging in either unpaid work or not working. These figures are consistent with a wide-ranging literature documenting the role of gender norms in marriage and employment outcomes (Jayachandran, 2015). In comparison to these figures, gender differences across other domains— e.g. measures of risk or competition; knowledge or access to networks of other candidates or successful applicants; or differences in beliefs about success— are much smaller.

Second, motivated by these descriptive patterns, we examine heterogeneity in reapplication rates among our first-time applicant sample by sex and marital status as well as local marriage market variation. Reapplication rates are declining in age at first attempt for both single men and women; the decline is particularly pronounced for individuals younger than 24 years. Notably, single women are less likely to keep reapplying than single men across (most of) the age distribution. We also explicitly consider how reapplication varies by marriage markets. To do so, we compute district-level marriage rates for women aged 20-24 years in Tamil Nadu using the 2011 Census; this rate ranges from 42% to 76% across 32 districts. Then, using a difference-in-difference style approach, we compare reapplication rates between men and women younger than 24 years of age in districts where young women marry earlier or later. As most marriages occur within district boundaries, this variation suggests that young women may face more marriage pressure in districts where a greater fraction of their peers are getting married. Consistent with this hypothesis, as district-level female marriage rates increase, the probability of reapplying decreases for young, single women.

Finally, as part of our applicant survey, we embedded an information experiment that sought to shock beliefs about success and track gendered willingness to persist in the competition for civil service jobs. Specifically, we provided information about the distribution of total attempts made by successful candidates. We also cross-randomized the inclusion of a 'household prime' that asked respondents to consider five questions related to marriage, household responsibilities, and their potential effects on exam preparation before the information treatment. Our aim was to understand how priming people to imagine (or reminding them of) their married lives would affect attachment to civil service jobs. Our main outcome of interest is the maximum number of attempts candidates were willing to make, which we collect as part of a post-treatment survey module.

Receiving accurate information about the distribution of attempts required for success *reduces* the number of attempts respondents are willing to make.[5] Splitting our samples by gender and marital status, we find that single women respond much more strongly to the information treatment than single men (a decline of 15% relative to 5% for single men). This

[5]At baseline, two-thirds of respondents underestimate the sustained investments made by successful candidates, suggesting that treated individuals learned that success is more difficult on average that they imagined.

effect is stronger for single women who had already received a marriage proposal by the time of the survey; no such pattern exists for single men. In contrast, for married women, the information treatment alone does not affect willingness to make attempts; however, when they also receive the household prime, the marginal effect is significantly negative, suggesting that highlighting the tension between exam preparation and household obligations once women are already married reduces their willingness to continue with exam-taking. Similar to our other evidence, these experimental results are consistent with women facing differential marriage market and household pressures than men.

This paper makes several contributions to the study of gender inequality and personnel economics. First, we contribute to the literature examining gender differences in engaging in competitive behavior and reactions to failure. Evidence in this literature has come from lab experiments (e.g. Niederle and Vesterlund, 2007); sporting tournaments (e.g. Buser and Yuan, 2019); educational settings (e.g. Cai et al., 2019; Kang et al., 2024); or politics (Wasserman, 2023). Though not always the case, the evidence suggests that women are less willing to compete and enter tournaments and appear to react more negatively to failure than men leading to lower persistence in competitive settings over time. We contribute evidence from a high-stakes labor market setting, showing that women are willing to enter and even re-enter an extremely competitive tournament. Yet, women are unable or unwilling to keep competing, which is critical to success in our setting.

Second, we contribute to an extensive literature on gender inequality in job search and hiring. Both supply-side and demand-side factors are considered to play a role in explaining persistent gender gaps around the world (Heath et al., 2024). On the supply side, studies have considered several factors underpinning gender differences in labor market outcomes: commuting preferences (e.g., Le Barbanchon et al., 2021); language and framing of job postings (e.g., Abraham et al., 2024); or concerns regarding safety and harassment (e.g., Folke and Rickne, 2022). Recent work from contexts similar to ours also highlights demand-side barriers, e.g. the prevalence of explicit gender requests in jobs that disadvantage women (Gentile et al., 2023; Kuhn et al., 2020) or the role of discretionary screening practices (Mocanu, 2022). Many, though not all, of these studies use data and variation that make it difficult for researchers to follow the recruitment pipeline from applications to hires. Our data and context allow us to adopt a pipeline approach to understand where gender differences emerge in hiring for civil service jobs, one of the most coveted careers in the Indian labor market.[6]

Relatedly, our work also sheds light on how marriage markets shape women's labor market choices in lower-income countries. Our context is one of large employment gaps between men and women and conservative gender norms. Recent work from similar settings has documented that marriage markets shape women's educational outcomes (e.g., Ashraf et al., 2020; Andrew and Adams, 2022). There is also direct evidence suggesting that working women face penalties in the marriage market in India (Dhar, 2021; Afridi et al., 2023). We

[6]We note that journalists have reported on the gender diversity problem in the central bureaucracy using aggregate data published by the Union Public Service Commission (Bhatia and Chawla, 2022). These aggregate data also show lower number of attempts by women, but cannot tell us how attempts vary across the initial score distribution.

contribute to this literature by documenting that marriage market pressures shape young women's attachment to public sector careers.[7]

Third, our work contributes to literature on the personnel economics of the state. These papers focus on how monetary and non-monetary incentives or screening practices shape applicant pools, hiring, and match quality of public sector workers (Finan et al., 2017). A fundamental fact, especially in lower-income countries, is the immense desirability of and competition for public sector work, partly due to higher wage premiums and other non-wage amenities. We show that, in the absence of gender quotas, the years-long competition for these jobs affects the gender composition of civil service hires. This is true despite women making tremendous educational gains in the last few decades and being very interested in these jobs. To the extent that greater diversity can improve public service delivery (Rasul and Rogger, 2015; Xu, 2020) or is otherwise a policy objective, our results suggest that gender quotas may continue to be necessary to ensure women's equal representation in the bureaucracy in settings with more conservative gender norms and intense competition for jobs.

The rest of the paper proceeds as follows. Section 1 provides details on civil service recruitment in Tamil Nadu and the data that we use to study it. Section 2 follows applicants through the recruitment pipeline and establishes key facts regarding gender differences in participation and performance. Section 3 presents evidence on the drivers of gender differences in our context using surveys and an information experiment. Section 4 concludes.

1 Context and Data

1.1 Civil Service Recruitment in Tamil Nadu

The Tamil Nadu Public Service Commission (TNPSC) conducts direct recruitment for state-level civil service positions in the state of Tamil Nadu.[8] As elsewhere in India, this recruitment occurs through competitive exams. The TNPSC conducts exams for administrative civil service posts by combining groups of vacancies across government departments that have similar rank and educational requirements. These exams are collectively referred to as "Group exams" and are the focus of this paper. Group exams are extremely popular, inviting hundreds to thousands of applicants per vacancy.[9] We now describe the types of jobs covered by the Group exams, their eligibility criteria, and the accompanying recruitment process in greater detail below (see Appendix A.1 for a summary).

[7]This finding is consistent with evidence from the U.S. showing single women adjust their behavior in light of marriage market incentives (e.g., Bursztyn et al., 2017).

[8]The TNPSC is the oldest state-level Public Service Commission in India, established in 1929 as the Madras Public Service Commission.

[9]The TNPSC also handles recruiting for specialized and technical positions in the state government. In contrast to Group exams, these positions constitute a minority of vacancies and face much less competition.

1.1.1 Type and eligibility of jobs

Civil services jobs in Tamil Nadu fall into four broad categories: Group 1, Group 2, Group 2A, and Group 4. Group 1 posts correspond to the highest ranking posts in the state bureaucracy, followed by Group 2, Group 2A, and then Group 4. For example, job titles for Group 1 posts include Deputy Collector or Assistant Commissioner, and for Group 4 include Junior Assistant, Field Surveyor, or Village Administrative Officer (see Appendix A.1 for more examples).

Group exams feature eligibility restrictions based on educational qualifications and age. A college degree is required to participate in Group 1, 2 and 2A exams ("high-ranked posts"). Group 4 posts require only secondary school completion ("low-ranked posts"). Some posts may additionally require specific qualifications such as a Typewriting certificate. Generally, candidates for high-ranked posts must be a minimum age of 21 years, whereas candidates for low-ranked posts must be a minimum age of 18 years; these minimums may vary for some positions. The maximum eligible age also varies by posts, caste, and other reservation categories, though is always higher for reserved populations (ranging from 35 years to no maximum).[10] There are, however, no restrictions on the number of attempts over time.

TNPSC jobs are technically open to all Indian citizens. However, because exams include questions in the Tamil language, the share of applicants from other states is low (<0.1% in our sample).

1.1.2 Recruitment process

The recruitment process for Group exams has four distinct stages (see Appendix A.2 for a visual summary).

The recruitment process begins with a public notification of an exam released by the TNPSC (Stage I). This notification is followed by a registration period of about one month where candidates must complete a form online (Stage II). The information recorded on the registration form is considered official and failure to produce documents consistent with the form risks any job candidates may obtain. The agency also uses this information to confirm exam eligibility based on the criteria discussed above.

Competitive exams are then held (Stage III). All registrants deemed eligible can choose to take the exam. Group 1 and 2 recruitments involve multiple stages of selection, whereas Group 2A and 4 recruitments only have a single stage of selection.[11] The first (or the single) stage exam always features multiple choice questions.[12] Group 1 and 2 recruitments additionally feature two more stages: a written essay ('mains') exam and an interview stage. At each stage, only the top scoring candidates from the previous stage are eligible to move onto

[10]Over the sample period, the share of applicants from non-reserved categories is about 2% and, as such, the vast majority of applicants in our data have a 15-20 year window to apply to these exams.

[11]For Group 2A, this is only true during our sample period. Recruitment for Group 2A posts has now been combined with Group 2 posts and features multiple stages.

[12]In multi-stage exams, the first stage exam is also known as the preliminary ('prelim') examination.

the next round.[13]

Candidates are evaluated only according to their exam performance. For single stage exams, candidates are simply ranked based on their performance in the multiple choice exam.[14] For multi-stage exams (Group 1 and 2), only the last two rounds— the essay and the interview— contribute to the final ranking.

The final stage is the job placement process (Stage IV). Once the candidates' final ranks are calculated, TNPSC allocates candidates to vacancies through a "counselling" process, which is conducted in person in Chennai. Candidates are invited in rank order to choose from the set of available vacancies, based on their qualifications and reservation category. To ensure compliance with reservation policies and other job requirements, TNPSC usually invites top-scoring candidates at a ratio of 2-3 times the number of vacancies in the recruitment.

1.1.3 Reservation policy

Tamil Nadu has an extensive reservation policy that covers specific caste categories, women, persons who studied in Tamil, destitute widows, persons with benchmark disabilities, and ex-service personnel. Established in 1989, the official quota for women is 30% and applies to all Group exams. This quota sets a floor for representation as women are also eligible to compete for seats in the unreserved "general" category. Vacancies are allocated to reservation categories before applications are received and are either included in the initial notification for the exam or published shortly thereafter.

1.2 Administrative and Public Data on Civil Service Recruitment

We observe anonymized administrative data from the TNPSC that spans the recruitment process for all Group exams announced and conducted between 2012 to 2019. We describe these data below. A summary of data coverage over the years is available in Appendix A.3.

Registration: These data include registration information filled by candidates. We observe variables such as date of birth, gender, education, reservation status, and marital status.

Exam scores: These data record test scores at each stage of the recruitment process. This data is available for Group exams conducted between 2012 to 2019.[15] We use these data to construct who actually appeared for the exams, referring to these individuals as "applicants." For comparability across exams, we compute exam-level performance as a percentile rank, which varies from 100 (for the highest-scoring candidate) to 0 (for the lowest-scoring candidate).[16]

[13] TNPSC follows a fixed rule for the number of candidates invited to subsequent stages in multi-stage exams. The number of candidates invited to the essay stage is 10-20 times greater than the number of vacancies that need to be filled, depending on the Group exam. For the interview stage, the ratio of candidates invited is 2-3 times the number of vacancies, depending on the number of posts available by reservation status.

[14] Ties are broken based on educational qualifications, age, and, if necessary, the alphabetical order of the candidates' names.

[15] There are two exceptions: (i) We do not observe test scores from the 2012 Group 1 exam, and (ii) we do not observe scores from the first stage of the 2016 Group 1 exam, though we do observe who appeared for the exam.

[16] For multi-stage exams, we construct the percentile rank in two steps. First, we assign those who do not

Placement: These data record the final placement/hiring outcomes for Group exams between 2013 to 2019. We can observe the specific posts that applicants obtained and under which quota (if any).

Matching across datasets and exams: The anonymized data includes unique identifiers that allow us to match individuals (i) across the above mentioned datasets for each exam and (ii) across different exams over time. For a given exam, a unique identifier links registration data to exam scores to placement.[17] Since TNPSC does not officially track attempts over time, we use another unique identifier constructed using applicant details provided at registration to match across exams. This identifier is based on a combination of candidate's name, their parents' name, and their date of birth.[18]

In addition to these administrative data, we also use publicly available information regarding vacancies and eligibility criteria for the Group exams from 2012 to 2019. These data are compiled and coded from official notifications released by the TNPSC. For each Group exam, the notification serves as the official document and contains information on the number of vacancies, the types of vacancies, the eligibility criteria, and the tentative exam date.

1.3 Key Facts about Civil Service Recruitment

Using the data discussed above, we highlight several facts about the context that guide our empirical analysis.

Fact 1. There is severe competition for jobs.

TNPSC Group exams are very competitive. Table 1 documents applicants per vacancy and the placement rate for recruitments conducted between 2013-19.[19] Across these exams, there are, on average, 571 applicants per vacancy; the average placement rate, calculated as the number of individuals who obtained a job divided by the number of applicants, is 0.33%. Disaggregating by the type of Group exam, we note that Group 1 exams are the most competitive with a placement rate of 0.09%, followed by Group 2 at 0.25%. Groups 2A and 4 are similarly competitive with a placement rate of 0.45-0.47%. Notably, across every single Group exam, the placement rate is always lower than 1%.

qualify past the first stage to have a score of zero for the subsequent rounds. Second, since the first stage score does not matter for those who qualify for subsequent rounds (see section 1.1.2), we compute their total score by summing across the essay and the interview stages and adding a fixed value to account for their qualification past the first stage. These steps allow us to generate a final score for all applicants, which we then use to construct percentile ranks.

[17] We are unable to match 117 observations (out of over 13.6 million) and drop these from our analysis.

[18] Naming conventions in Tamil Nadu use initials that may differentially change for women upon marriage. The unique identifier we use avoids this concern by only using first names for candidates and their parents (father and mother). For applicants in a given exam, duplicates based on this identifier are extremely rare (less than 0.01% of the registrations). We drop all observations for those individuals tagged as duplicates in any given exam (322 out of over 13.6 million observations).

[19] Appendix Table A.4 shows the number of vacancies, applicants, and placements for each Group exam during this time. The number of vacancies and placements may not coincide because we use vacancy information from the Group notification first released by the TNPSC and vacancies can be adjusted over the course of the recruitment process. We also exclude 2012 since we do not observe placements in this year.

Fact 2. Success usually requires multiple attempts over time.

Using data from 9,865 successful candidates in the 2019 Group exams, we compute the number of prior years that these candidates attempted any Group exams.[20] Figure 1 plots this distribution. According to our data, only 6.8% of candidates had no prior attempts in other years, i.e. they succeeded in the first year of their attempts in 2019. The remaining 93.2% of successful candidates had attempted a Group exam in at least one prior year, with 42% of successful candidates attempting exams in at least four or more years.

Moreover, a majority of successful candidates continuously appear for Group exams over time, i.e. they reapply to Group exams in multiple consecutive years. We compute the maximum break (in years) in appearance by successful candidates from 2012 to 2019 and plot the distribution in Figure 2. Nearly 63% of these candidates never took a break in appearing for exams prior to their success and another 30% took a break of at most one year. This persistence among candidates suggests that re-application is a key feature of the recruitment process and success likely requires sustained, continuous investment in exam preparation over time.

Fact 3. Successful candidates perform well in their first attempt and are often college educated.

We compare successful applicants to the overall pool of applicants in 2019 across key demographic, participation, and performance variables (see Table 2). Consistent with the reapplication behavior documented above, successful candidates tend to be older than the overall pool of applicants (27.5 vs 26.0) and have made more exam attempts over time (3.2 vs 1.7). The average age at which individuals take their first exam attempt is 23.7 years old and, in fact, nearly 90% of individuals make their first attempt before the age of 30. Moreover, women constitute a majority (56%) of the applicant pool.

We also consider individuals' exam performance in their earliest exam attempt visible in our data. While the average percentile rank for the initial exam is 45.8 among all applicants, this is much higher (74.3) for successful candidates. Plotting the full distribution in Figure 3, we find that over 75% of successful candidates in 2019 were in the top 40% of scorers in their initial exam. This suggests that initial performance provides individuals with useful information on future performance and points to the likely presence of dynamic selection in applicant pools over time based on exam performance, which we further explore in section 2.5. Turning to educational qualifications, we find that, strikingly, 89.4% of successful candidates have a college degree, though only 56.5% of all applicants do.[21]

These statistics suggest significant heterogeneity in the likelihood of success of different types of applicants. Since success also requires sustained participation, they point to a need to pay attention to college-educated applicants and those who do well in their initial attempt.

[20] We choose 2019 as this allows us to consider the longest window of exam-taking behavior in our data.

[21] This is not unique to the year 2019. Across 2013-2019, 88% of successful candidates had a college degree, even as only 22% of the notified vacancies required applicants to have a college degree.

1.4 How successful are women in entering the civil services?

Table 1 presents two measures of women's success in the TNPSC Group exams. The first measure considers the share of female hires across 2013-19 Group exams. However, since Tamil Nadu has a 30% female quota, we also compute an alternate measure— the share of female top-scorers— that exclusively focuses on women's performance in exams. A 'top-scorer' is defined as an individual who achieves a rank in a given exam that is higher or equal to the number of notified vacancies in the recruitment.[22] The difference between the share of female hires and top-scorers provides a way to understand the boost in female representation due to the gender quota, holding constant the selection of participants.

Women account for 49.2% of all hires, but 39.5% of all top-scorers— that is, there is (near) gender parity in overall hires, but not among top-scorers. Breaking down the overall pattern by exam type, women outperform men in Group 1 exams and perform quite similarly to men in Group 2 exams, but their performance is lower in Groups 2A and 4 exams. The latter exams, however, represent 92% of the total notified vacancies from 2013-19, explaining the lower fraction of female top-scorers in the overall sample. This presents a curious situation where women do well in obtaining the most prestigious positions in the state bureaucracy, but lag behind in securing the more numerous, but still extremely competitive, jobs in the absence of quotas. To understand why women's overall performance lags that of men, we turn to examining the recruitment pipeline.

2 Gender Dynamics in the Recruitment Process

In this section, we construct and follow a cohort of first-time applicants to understand how men and women behave differently throughout the civil service recruitment process. Along the pipeline, we consider initial selection, baseline performance, reapplication behavior, performance gains over time, and, ultimately, job placement.

2.1 Sample construction

Using the administrative data described in section 1.2, we construct an applicant-level dataset that tracks annual participation and performance in Group exams. We consider an applicant to have participated in a given year if they appeared in *any* Group exam conducted by the TNPSC during that year.[23]

Definition of first-time applicant: The TNPSC does not officially track the number of attempts that candidates make. However, since we can match individuals across exams, our

[22] For the remainder of the paper, this measure will serve as our proxy for placement or hires as it is focuses solely on performance, allowing us to purge idiosyncratic selection rules related to reservation policy in Tamil Nadu.

[23] In multiple stage exams (Group 1 and 2), this refers to appearing for the prelim/first stage exam. Subsequent stages are not considered in this definition.

data allows us to construct a proxy. In our preferred approach, we define a first-time applicant as an individual appearing in a given year when they did not appear for any Group exams in the previous two years. The key trade-off in using longer look-back periods to define first-time applicant status is that we are restricted to considering shorter windows of future participation.

Preferred sample: Using the above definition, we construct a cohort of first-time applicants from the full set of applicants who appeared for a Group exam in 2014.[24] That is, a first-time applicant in our sample is defined as an individual who appeared for a Group exam in 2014, *but* did not appear in any Group exam in 2012 and 2013. There are 827,266 such individuals.

We make three further restrictions. First, we exclude applicants who already have a government job as reported in the registration data (1% of the initial sample). These individuals are likely taking these exams to place themselves in better positions within the bureaucracy, and their behavior may differ from those attempting to enter the bureaucracy. Then, we exclude individuals without a college degree and those 30 years or older. This restriction is motivated by Fact 3 in section 1.3, which notes that successful placement is dominated by college graduates and young applicants constitute the majority of all applicants. After these restrictions, our final analytical sample consists of 272,432 individuals.

2.2 Summary statistics

Our first step is to consider gender differences in covariates among our preferred first-time applicant sample. At the outset, women constitute a *majority* (59.4%) of these applicants. As these Group exams are widely acknowledged to be extremely competitive, this over-representation of women in initial participation suggests that, on average, women are extremely interested in these jobs and not eschewing competition at the start.

Table 3 summarizes gender differences across a range of demographic and educational variables. The average age of men and women is quite similar at 24 years old, though women are slightly younger by 0.3 years. While the vast majority of male and female applicants are unmarried, women are substantially more likely to be married than men (37.6% vs 9.2%). This difference in marital status despite similarity in age is consistent with women being married at younger ages in Tamil Nadu and elsewhere in India.[25] Women are also more likely to have a child than men (31% vs 7%). To the extent that marriage and children may curtail women's ability to invest in studying for competitive examinations (e.g. due to gendered norms around care or other household obligations), this highlights a potential source of disadvantage for women's success. In terms of location, applicants are overwhelmingly born outside of Chennai district, where the largest city in the state is located, but men and women are roughly equally likely to be born in Chennai.

[24] Choosing 2014 allows us to follow and track subsequent participation for this cohort over five years.

[25] As per the 2011 Census, in Tamil Nadu, among individuals aged 20-24 years, 59% of women are married, but only 16% of men are married. See Appendix A.6 for difference in marriage rates across other ages.

We also observe applicants' educational background in terms of the linguistic medium of instruction and type of undergraduate degree. Women are more likely by 2.8-4.4 percentage points (p.p.) to have completed their high school and undergraduate education in the state vernacular, Tamil. Within Tamil Nadu, educational instruction in Tamil is generally considered a marker of disadvantage in the labor market.[26] The fact that women are more likely to have received Tamil educational instruction could therefore either mean they come from poorer family backgrounds, receive relatively lower parental investments in their education, or have less inherent talent.

With respect to the type of undergraduate degrees, we do not see clear gender differences in the prestige of the undergraduate degree program completed by men and women. In India, one's choice of degree programs is generally determined by one's performance on school-leaving exams. Students who enroll in science-related programs (such as a B.Sc. or an engineering degree) tend to have the highest scores, while those who enroll in B.A. programs tend to have the lowest scores. Although women are less likely to have an engineering degree, they are more likely to have a science degree. On net, we see a wide range of applicant quality for both men and women.

2.3 Empirical approach

For our pipeline analysis, we typically estimate the following regression specification to capture simple differences by gender:

$$Y_i = \beta Female_i + \delta_e + \epsilon_i \tag{1}$$

Y_i denotes the outcome of interest for an applicant i. *Female* is an indicator variable for whether the applicant is female. δ_e denotes exam-type fixed effects for the first exam, referred to as "baseline" hereafter, taken by the applicant. Once we measure differences in exam performance in the first attempt, we subsequently modify this regression as follows, where $rank_i$ is the baseline percentile rank achieved by the applicant:

$$Y_i = \beta Female_i + rank_i + \delta_e + \epsilon_i \tag{2}$$

This modification allows us to present results conditional on the baseline exam performance of applicants. We also present results after controlling for additional baseline characteristics, which include marital status, caste categories, age, type of undergraduate degree and medium of educational instruction, and whether the applicant was born in Chennai district.

[26] In recognition of this fact, the TNPSC has a quota specifically for candidates who studied in Tamil medium.

2.4 Baseline exam performance

We now document how men and women perform in these competitive Group exams in the first year of their attempts. Recall that since our dataset tracks annual participation in any Group exam, for individuals who appear in multiple exams in their first year, we consider their baseline performance to be the percentile rank they achieved in their *first* exam and include fixed effects for their baseline exam type.

Table 4 presents our result. Women obtain an average percentile rank that is 2.4 points higher than men (column 1). This performance advantage remains after including a set of baseline controls for demographic and educational characteristics. We show the full distribution of exam performance separately by gender in Figure 4 and find that while women perform much better in their first attempt across much of the distribution, there is a reversal at the very top above the 90th percentile. In their first attempt, women are less likely to be in the top 5% of scorers in their first exam (Table 4, columns 3–4). Consistent with this, women are also less likely to be a 'top-scorer,' our placement proxy defined as achieving a rank that is higher or equal to the number of available vacancies in the recruitment (column 5–6).

While women do worse at reaching the top of the exam score distribution in their first attempt, recall that successfully entering the civil services generally requires multiple attempts (see Figure 1). We therefore turn to look at re-application behavior next.

2.5 Reapplication behavior

We now consider gender differences in the propensity to reapply for Group exams, conditional on baseline exam performance. Figure 5 plots non-parametric estimates of the fraction of first-time applicants that reapplied to exams conducted in 2015, conditional on not being selected in 2014. Re-application rates for both men and women are increasing in their baseline percentile rank, and steeply so in the top quartile, suggesting that candidates learn about potential success from their exam performance. Re-application rates look very similar for men and women for the bottom half of the distribution, but a gap emerges in the top half of the distribution with higher-scoring men more likely to reapply than similar women.

Table 5 shows gender differences in reapplication over longer time horizons for all individuals (Panel A) and for the top quartile of baseline scorers (Panels B and C). Motivated by the continuity in exam attempts by successful candidates (see Figure 2), we consider whether candidates reapplied in consecutive years from 2015 to 2019. For example, reapplication for two consecutive years would mean appearing in a Group exam in 2015 *and* 2016. The sample is always restricted to first-time applicants who were not hired in 2014.

Among our cohort, the share of men appearing in the year after their first attempt is 22.4%; this figure steadily declines over time, with just 4.4% of men appearing in exams for five consecutive years (Panel A). Relative to men, women are roughly 1 p.p. less likely to reapply for Group exams over time (columns 1–5). This translates to a 4.5% gap in the first year (column 1) and increases to a 25.9% gap in participation after five years (column 5).

These patterns are also evident and stronger for the top quartile of baseline scorers, where women are 30.7% less likely to have reapplied for five consecutive years than men (Panel B, column 5). Controlling for additional demographics shrinks the reapplication gap (see Panel C), particularly in the first two years after the initial attempt (columns 1–2). Yet, there is still a 16.7% gender gap in reapplication over five consecutive years (column 5).[27]

Finally, we consider an alternate measure of reapplication that considers whether candidates reapplied in *at least* one or four years over the five-year period. This measure allows respondents to take breaks between attempts. We find that women are actually more likely to reapply at lease once (column 6, Panels A–C), but less likely to reapply by 6-14% in at least four out of the five years (column 7, Panels A–C).[28]

These results document that women are *more* willing to re-enter competition in general, but less able or willing to *keep* re-entering over longer time horizons. Moreover, these reapplication gaps are typically larger for the top quartile of scorers, where the probability of success and eventual placement is the highest (see section 1.3).

2.6 Exam performance across attempts

We now examine how gender differences in exam performance vary over time, conditional on reapplication. We estimate a regression of the following form:

$$y_{ia} = \sum_{a=1}^{6} \left[\beta_a female_i \times 1(attempt_i = a) + \gamma_a 1(attempt_i = a) \right] + \alpha_g + rank_i + \epsilon_{ia} \qquad (3)$$

y_{ia} denotes our outcome of interest—either the maximum percentile rank achieved across exams or whether the applicant became a top-scorer in any exam—in the a-th year of attempts by applicant i. Under this construction, if a candidate applied for a post in 2014 and 2016, the attempt in 2016 would be counted as their second year of attempt. We will observe at most six years of attempts for our sample of first-time applicants from 2014 as our data goes up to 2019. α_g denotes fixed effects for the sequence g of Group exams candidates applied for from 2014 to 2019, controlling for the path of exam-taking behavior by applicants. We again control for $rank_i$, which is the baseline percentile rank of the applicant. Standard errors are clustered by applicant to account for serially correlated errors in exam performance.

Table 6 shows these results for all individuals in our first-time applicant sample as well as the top quartile of baseline scorers. For the full sample, in the first year of attempts, women obtain a higher maximum percentile rank of 1.1 points than men on average, consistent with our earlier results (column 1). This advantage shrinks by their second year of attempts, where the point estimate is negative but not significant. For the subsequent four years of attempts, women perform better than men in all years. Restricting the sample to those who were in the top quartile of scorers in their first exam, we note that women again have a slight advantage in the first year of attempts (column 3). This advantage disappears again in the

[27] See Appendix C.1 for reapplication rates across the performance distribution.
[28] Appendix C.2 shows the analogous results for reapplying in at least two or three out of five years.

second year of attempts but, thereafter, women's performance is again better than men's. This pattern remains the same after controlling for applicants' baseline characteristics (column 2 and 4). These changes in exam performance could either reflect selection into reapplication or differential returns to exam re-takes.

While women perform similarly or better than men upon reapplication in terms of the maximum percentile rank they achieve, this does not necessarily translate into becoming top-scorers, our proxy for placement in the absence of quotas (columns 5–8). As in Table 4, women are less likely to be top-scorers in the first year of attempts than men. They are more likely to be top-scorers than men in their second year of attempts, but not over subsequent attempts (columns 5–6). This pattern is similar for the top-quartile of baseline scorers, with one exception that participating women are somewhat more likely to be top-scorers in their sixth year of attempts. One possible explanation for these patterns is that while women's score gains are similar or better than men's over time, whether someone becomes a top-scorer is dependent on both ability *and* luck. This may be especially true at the top of the score distribution, since there is evidence to suggest exams are not adequately capable of discriminating among top candidates (Mangal, 2023). Another possibility is that our approach to exam attempts over time does not account for the fact that women are less likely to reapply continuously than men (see Table 5). If there are gains (however small) to continuously preparing for exam without breaks, then this could explain why women fail to become top-scorers even as they perform better than men on average.

2.7 Robustness to alternate definitions of first-time applicants

We now consider how our pipeline results on baseline performance and reapplication would change if we used alternate definitions to construct our cohort of first-time applicants. We either vary the length of the look-back period or the severity of the age restriction.

One-year look-back period: We now define our first-time applicants as those who applied in 2013 but did not apply in the previous year. While this risks greater misclassification of first-time applicant status than our preferred two-year look-back definition, it allows us to consider exam attempts over a period of seven years from 2013 to 2019. Appendix C.3 show these results. Our results are quite similar. Furthermore, these results confirm that our earlier finding that women are less likely to reapply in at least four out of five years is not driven by censored data. When we observe an additional year, women are still 6% less likely to have made attempts in least four out of six years attempts (see column 7), and this effect doubles for the top quartile of baseline scorers. Moreover, women continue to make fewer attempts over time as they are less likely to have reapplied for at least five (out of six) years.

Age restricted to under 24 years: College completion usually occurs between the ages of 20-22, depending on the length of the bachelor's degree. Our preferred look-back period is two years of not applying for Group exams. Under this look-back period and if we further

restrict to younger ages (under 24) for our sample, it should be very unlikely that we are misclassifying individuals as first-time applicants. Appendix C.4 show these results. We again find a similar pattern of results to our preferred sample.

2.8 Summary

Our pipeline results indicate that initial differences in application and performance contribute minimally to the observed gender gap in top-scorers documented in section 1.4. Instead, we find that a key source of leakage in the pipeline is that women are less likely to reapply continuously and persist in the recruitment process over longer time horizons, particularly beyond four years. This is important because a sizable percent (42%) of successful applicants in 2019 were, in fact, selected after four years of exam attempts. Moreover, even though women have either quite similar or better exam performance over time on average, they struggle to become top-scorers over time. The combination of lower reapplication rates as well as lower performance at the very top likely contribute most significantly to the observed gender gap in top-scorers.

3 What drives gender differences in persistence and performance?

In this section, we investigate the potential drivers of gender differences in exam persistence and performance that determine entry into these highly desirable civil service careers. Motivated by our own qualitative fieldwork and literature documenting gendered norms related to marriage and employment in our context (see e.g., Jayachandran, 2015, for a review), our preferred explanations center the role of the marriage market and household support in shaping men's and women's decision-making regarding the recruitment process. We provide empirical support for these mechanisms by combining evidence using our administrative data, an original survey and an information experiment with active TNPSC applicants. We first describe the survey in section 3.1 and then present evidence for our preferred explanation in section 3.2. We also consider alternative explanations such as gender differences in access to information or in behavioral factors (e.g., risk or feedback aversion) in section 3.3.

3.1 Surveys with TNPSC applicants

To better understand the background and experiences of applicants interested in TNPSC exams, we conducted surveys with men and women who were actively preparing to take Group exams in 2022.[29] As part of the survey exercise, we embedded an information experiment that sought to shock candidates' perceptions of success and track their behavior afterwards (discussed in section 3.2.4). While the survey data provide rich information on candidates, we are, unfortunately, not able to link survey responses to the administrative data.

[29]We also conducted several qualitative interviews with candidates in February 2022, which helped shape our data collection and experiment, and present anonymized quotes from these interviews as part of our discussion.

Sampling and recruitment: To ensure that we were surveying candidates at a time where exam preparation was salient to them, we timed our survey launch to a TNPSC Group exam announcement. In late March 2022, the TNPSC announced the Group 4 exam, with the registration period open until late April 2022, and the exam scheduled for late July 2022.[30] We fielded our survey from mid-May to mid-July.

We recruited individuals interested in taking upcoming TNPSC Group exams primarily through running Facebook advertisements across Tamil Nadu. Interested respondents who clicked on our ads were redirected from Facebook to an external website where they completed a survey on their own, either in Tamil or English. The survey collected information on candidates' personal and family backgrounds, labor market experiences, and beliefs and attitudes related to competitive exams, jobs, marriage, and gender. A total of 3,510 individuals successfully completed our survey.

Summary statistics: In Table 7, Panel A, we provide summary statistics on the personal and household background of our survey respondents. There are negligible differences between men and women in terms of age. As in Table 3, women are more likely to be married (41% vs 12%) despite the minor difference in age. Women are more likely to have a college degree (78% vs 64% for men) and less likely to study in the vernacular (74% to 86% for men). Women also performed better on average in their 10th grade exams.[31] As we lack data on TNPSC exam performance for survey respondents, we rely on these 10th grade exam scores as a proxy for ability in analyses using survey data.[32] In terms of household background, women and men appear to come from households with similar monthly earnings, but women's parents are more likely to have completed a 10th grade education.

To understand selection into the survey, we compare respondent demographics to the full set of applicants in 2019 available in Table 2. The average survey respondent is slightly younger, more likely to be a college graduate, and less likely to be from the SC/ST caste.

3.2 The Role of the Marriage Market and Household Support

3.2.1 Background

We documented earlier that a majority of college-educated first-time applicants pursuing civil service jobs are young and single.[33] For most applicants then, the decision to persist in the competitive recruitment process coincides with decisions regarding marriage or household

[30] As a result of delayed exams during COVID, it was also widely expected that the TNPSC would soon announce Group 1 vacancies, which ended up occurring in late July 2022.

[31] While we restrict the 10th grade exam score in the table to those who completed their secondary education under the Tamil Nadu State Board, the score difference among the rest also favors women.

[32] To the extent that ability is correlated over time and ability in 10th grade exams is predictive of TNPSC exam performance, we view these results as being informative of patterns of behavior between high and low-scoring individuals. Among a subset of survey respondents (N=398) who reported their previous Group 4 exam scores, we do indeed a positive relationship between 10th grade exam scores and TNPSC performance.

[33] More generally, Mangal (2024) shows that application rates relative to the population of college educated adults peak in the years immediately following graduation (ages 20-24).

formation as well as labor market entry (in the private sector). In these critical years, men and women face distinct norms regarding marriage and employment in our context.

While marriage is a near-universal phenomenon, women marry at much younger ages than men. As per the 2011 Census, 60% of women in Tamil Nadu between the ages of 20-24 are married, but only 16% of men are (see Appendix A.6). In fact, men's marriage rate does not reach 60% until after age 30.[34] This pattern suggests that women's (actual or perceived) costs of delaying marriage to pursue additional exam attempts is likely higher than men's. As families often play an influential role in marriage decisions, women likely face pressure to marry early as delays are believed to lower spousal quality (Vogl, 2013; Anukriti and Dasgupta, 2017; Andrew and Adams, 2022). Relatedly, families may also have lower willingness to invest in women's exam preparation than men's (Bharadwaj et al., 2014; Barcellos et al., 2014).

Qualitative evidence from in-depth applicant interviews and news reporting corroborate the idea that women have shorter windows to succeed in obtaining a civil service job before marriage.[35] Even if women could (and some do) apply to these jobs post-marriage, prevailing gender norms of patrilocality and care obligations may limit women's ability to participate and perform in these exams. Indeed, married female applicants shared with us that even if they have supportive husbands or in-laws, they are expected to prepare for exams only after household responsibilities are taken care of (see Appendix A.5).[36]

Men and women also face different realities in the private labor market. Whereas men are expected to be the primary breadwinner, women face greater restrictions and scrutiny over their employment choices (see e.g., Dhar, 2021; Jayachandran, 2021). Even among college graduates, there are large employment gaps by gender: Whereas 70% of men aged 25-29 have worked 6 or more months in the past year in 2011 Census, only 31% of women have (see Appendix A.6). Employment rates continue to be 40-50 p.p. lower for college-educated women than men between the ages of 30-39 and older. These employment expectations may, in fact, incentivize men to persist in competition longer than women, as civil service jobs feature a wage premium and better amenities than private sector options. While women also believe that a civil service job would raise their status in marriage and allow them to work, they must weigh this expected gain with the anticipated costs of delaying marriage.

[34] Among college graduates in Tamil Nadu, 35% of women aged 20-24 are married, increasing to 76% for women aged 25-29. While similar rates are not available for men, we would expect much lower rates for college educated men.

[35] For example, consider this account from Maharashtra: "Shama Shaikh, a 27-year-old MPSC aspirant from Pune says very few women find a supportive environment at home to stay focused and continue with their preparation. Women, she says, drop out sooner than men. 'After a few attempts, women are forced to get married and there end their dreams,' Shaikh says" (Shantha, 2021). See Appendix A.5 for more interview quotes.

[36] We note that married *men* are a small minority of applicants, suggesting that marriage also limits men's ability to participate. Yet, since men are able to marry later than women, our argument is that men do not face the same costs as women in delaying marriage.

3.2.2 Survey evidence

We now consider the relevance of these factors for the population of civil service applicants using our applicant survey (see section 3.1). Table 7, Panel C, summarizes gender differences in marriage market exposure and support for exam preparation in our survey sample.

First, we document that women's marriage market *exposure* occurs earlier than men. We asked respondents the age at which they received their first marriage proposal. Among those who had ever received a marriage proposal, women were 3.4 years younger in age at the time of the first proposal relative to men. To understand whether this difference reflects individual or parental preferences, we asked candidates to report the age at which *they* versus *their parents* would like them to marry. While both men and women would prefer to get married at older ages than their parents would prefer for them, this gap is larger for women than men. Women would prefer to delay marriage by an average of 1.6 years relative to their parents' expectations (vs 0.6 years for men). We also find that higher-ability women, as proxied by 10th grade exam scores, are actually more likely to have received a marriage proposal (see Appendix A.7, Figure A7.1).

Consistent with the aggregate marriage patterns presented earlier and our qualitative interviews, these differences imply that young single women applicants face significantly higher pressure to marry at younger ages than their male counterparts. Moreover, women also risk greater familial conflict over marriage than men.

We also collected measures of monetary investments made by candidates and the source of this support. A majority of candidates have spent money on exam preparation, including attending preparatory classes, purchasing study materials, or studying outside the home. Women are slightly less likely to have spent any money (53.5% vs 56.8% for men). About 10% of respondents stay outside their home while studying, but women are much less likely to do so than men (15.3% vs. 5.8%). Among those who have spent money on exam preparation, women are more likely to have relied on their families and friends for support, rather than their own income or savings.[37] Yet, women receive 40% less funding than men for exam preparation from family and friends (Rs.3,311 vs. Rs.5,654).[38] While higher-ability women receive more funding than lower-ability women, they nevertheless receive less support than similar men (see Appendix A.7, Figure A7.2).

3.2.3 Heterogeneity in reapplication by marital status and marriage markets

Our survey evidence points to women facing differential marriage market pressures than men. This pressure may limit women's ability to persist at the same rate as men after unsuccessful attempts, leading to the gender gaps in reapplication we documented in section 2.5. To offer direct evidence on how marriage market pressures may shape reapplication decisions,

[37] This is consistent with large (about 25 p.p.) employment gaps by gender in our survey sample. If women are less likely to work, they cannot use their own income to finance exam preparation.

[38] Conditioning on those who receive any support from family and friends reveals, these figures are even more stark: Rs. 10,448 for women vs Rs.21,773 for men.

we consider how reapplication decisions vary (i) by age and marital status and (ii) by local marriage markets. We examine this heterogeneity using our sample of first-time applicants from the administrative data, restricting to those who were unsuccessful in their first year of attempts.

By age and marital status: Marriage market pressures will be most salient for *young* and *single* women. In Figure 6, we show a binned scatterplot of reapplication rates by the age at first attempt for single men and women, controlling for baseline exam performance. We consider whether individuals have reapplied in at least 4 out of 5 years after their first attempt. We document two key patterns. First, reapplication rates are higher for single men and women who start taking exams at a younger age; there is a sharp decline in reapplication rates by age with rates stabilizing after age 24. Second, single women's reapplication rates are lower than single men's across most of the age distribution.[39] These patterns are consistent with reapplication decisions being driven by marriage market considerations.[40]

By district variation in female marriage rates: An alternate approach to assessing the effects of marriage market pressure is to leverage local variation in marriage markets within Tamil Nadu. Since most marriages in India occur intra-district (Augsburg et al., 2023), we compute *district*-level marriage rates for women aged 20-24 years old in Tamil Nadu from the 2011 Census. Across 32 districts in Tamil Nadu, marriage rate among young women ranges from 42% to 76% (as compared to 10% to 20% for men in the same age group).

This variation motivates the following difference-in-difference style specification, where we compare reapplication behavior between young men and women aged 24 years or less in districts with higher or lower marriage rates in Tamil Nadu:

$$y_{id} = \beta_1 female_i + \beta_2 marriagerate_d + \beta_3 female_i \times marriagerate_d + \mathbf{X'}_i\gamma + \epsilon_{id} \tag{4}$$

y_{id} is the reapplication outcome for individual i from birth district d. $marriagerate_d$ is the rate of marriage among women aged 20-24 years in the birth district of the applicant. $\mathbf{X}_i$ is a vector of applicant characteristics, including exam performance, exam type, age, type of undergraduate degree, caste, and whether the applicant completed 10th grade in Tamil. Standard errors are clustered at the district level. β_3 is our coefficient of interest.

Table 8 presents these results. As female marriage rates increase, the likelihood of reapplying next year is significantly lower for single women than single men (column 1). The same is true if we consider reapplying at least once in the subsequent two years after an unsuccessful attempt (column 3). Results are similar after adjusting for district characteristics that reflect demographic and socioeconomic conditions (columns 2 and 4).[41] In terms of mag-

[39] Single women's reapplication rate is higher only among those aged 27 or older. This sample is likely quite selected, since these women remained single at older ages relative to the population.

[40] In Appendix C.1, Figure C1.4, we show that married women's reapplication rates by age are usually lower than single men's and women's and exhibit less notable decline by age.

[41] These controls include the percentage of population that is literate, muslim, SC/ST; percent of employment

nitudes, these results suggest that a 10 p.p. increase in the marriage rate leads to 0.6 to 1.4 p.p. decline in the probability of reapplication for single women. In contrast, reapplication rates for single men are either increasing or not affected by the female marriage rate (see β_2 coefficient in columns 1–4).

These results also suggest that marriage market factors shape reapplication decisions for single women. Yet, a concern might be that there are gender-specific omitted factors that are correlated with early marriage rates, leading our estimates to be biased. To address this shortcoming, we now turn to our experimental evidence.

3.2.4 Experimental evidence

Design: As part of the applicant survey, we randomly provided respondents with truthful information about TNPSC Group exams and then gathered data on their subsequent attachment to the process. We either provided information about the number of participants in the most recent Group exam ('Control') or about the number of participants *and* the distribution of attempts by successful candidates in the most recent Group exams ('Treatment').[42] See Appendix B.1 for English-language visuals received by the treatment and control groups.

While news and government reports may publish information about the number of applicants, information about the number of attempts made by successful TNPSC candidates was, to the best of our knowledge, not available in the public domain. Consistent with this, over two-thirds of survey respondents underestimated the share of successful candidates who had made at least 3 exam attempts.[43] This suggests that, on average, respondents underestimated the sustained investment others make on the path to success.

We also cross-randomized whether respondents were shown a module of five questions regarding marriage, household responsibilities, and their potential effects on time for exam preparation *before* they saw the information treatments (see Appendix B.2 for the module). We refer to this variation as the "Household (HH) prime." This module was intended to differentially increase the salience of marriage and household responsibilities to assess whether such considerations would influence their responses to information.

Our final design therefore had four experimental groups: Information, HH prime, Information $\times$ HH prime, Control. Our central aim in carrying out this exercise was to shock respondents' beliefs about success in Group exams and then assess whether their attachment to TNPSC exams differed by gender and marital status.

in agriculture, services; and percent of workers who are female.

[42]Candidates were asked to select whether they planned on taking the Group 1 or 4 exams in the upcoming year. Based on their choice and random assignment, they were then shown information about the most recent Group 1 or 4 exam. If a respondent selected both options, we assigned them to receive information regarding the Group 4 exam since this exam was already scheduled and the information would be immediately pertinent; 90% of respondents were assigned to receive Group 4 information.

[43]Specifically, prior to treatment delivery, we asked respondents to answer the following question: Out of X successful candidates, how many do you think were selected only after 3 or more attempts?

Empirical approach: We implement the following intent-to-treat specification for our experimental analysis:

$$Y_i = \beta_1 Info_i + \beta_2 Info_i \times HHprime_i + \beta_3 HHprime_i + \gamma_s + \epsilon_i \quad (5)$$

Y_i is the outcome of interest for individual i. γ_s are fixed effects for the exam strata, i.e. whether the respondent was shown information about Group 1 or 4. $Info_i$ is an indicator for those who received information about the distribution of attempts made by successful candidates; $HHprime_i$ is an indicator for those who received the household prime module; and $Info_i \times HHprime_i$ is the interaction term. β_1 gives the effect of the information treatment, whereas β_2 gives the marginal effect of receiving the HH prime. Our primary coefficients of interest are usually β_1 and β_2, but we also show the effect of the HH prime on its own (β_3).

Results: Table 9 presents results for our main outcome of interest, the number of maximum attempts an individual is willing to make.[44] Our information treatment *reduces* the number of attempts individuals wish to make (column 1). Splitting the results by gender and marital status reveals interesting patterns (columns 2–4).[45] While the effect is negative for both single men and women, the size of the effect is much larger and significant for single women (14.4% reduction, p-value$<$0.01) compared to single men (5.8% reduction, p-val=0.125). There is no significant effect for married women at all.

Turning to the marginal effect of the HH prime for those who also received the information treatment, we again find notable heterogeneity. The coefficient is significantly positive for single women (column 3), suggesting that asking single women to consider their married lives reduces the impact of the information treatment as women may anticipate additional household obligations once married. In contrast to these results, we find a strong negative impact when the information is paired with the prime for married women. This suggests that reminding married women of their household responsibilities at the same time as providing information that success requires sustained investment reduces their willingness to pursue exam attempts. While there is no average effect of the prime on its own for single men and women, for married women, the HH prime alone *increases* the desired attempts women seek to make (column 4).

The pattern of results for single men and single women is consistent with our previous findings that marriage market pressures weigh more heavily on women than men. To further probe this claim, we also consider how our results vary among those who have already received (or not) a marriage proposal. Our hypothesis is that those who have already received a marriage proposal may face greater pressure to marry or may be more cognizant of the costs of delaying marriage. Appendix C.5 shows these results. Among single women, the negative treatment effects of information are twice as large for those who have received a marriage offer versus those who haven't; this pattern does not exist for single men. Given the smaller

[44] This variable was top-coded at 10 attempts in the survey.

[45] We omit married men since there are too few in the survey sample (N=197) and our administrative data also indicates that married men are a relatively small share of the applicant pool.

sample sizes in this analysis, we view this exercise as suggestive.

Altogether, our experimental results are consistent with marriage and household constraints playing a greater role in women's reapplication decisions than men. This is not to say that these factors do not matter for men's participation, just that, relative to women, men's ability to persist in the competition may be less elastic to these factors.

3.3 Alternative Explanations

We now discuss several other explanations that can also explain the gender differences in participation and performance in this context. We do not aim to definitively rule out these explanations, but only show that, relative to our preferred explanation, our evidence suggests these factors likely play a smaller role, if any.

3.3.1 Behavioral factors

A large literature has investigated gender differences in willingness to compete and the potential sources of these differences ranging from differences in risk-taking, confidence, feedback aversion to attitudes (see Niederle and Vesterlund (2011) for a review). In our context, women are willing to enter and even re-enter the tournament at rates similar, if not higher, to men. This suggests that women do not necessarily have a latent distaste for competition relative to men. Yet, we also find that women do not *keep* competing at similar rates to men. This subtle difference could still be related to gender differences in behavioral traits.

We asked survey respondents about their preferences for competition and risk (see Table 7, Panel D). For competition, we asked how well this statement— "Competition brings out the best in me."— described the respondent on a scale of 1 (not at all like you) to 7 (exactly like you). The average for men and women is quite similar at 5.02 and 5.14, respectively. For willingness to take risks, we asked respondents how willing they were to make a risky decision on a scale of 0 (completely unwilling) to 10 (very willing). Women appear to be slightly less risk-loving than men on average (6.1 vs 6.3), though this difference is only 0.06SD of the risk measure.

To understand whether these patterns hold for higher-ability men and women who are most likely to succeed, we plot these measures by marks obtained in the 10th grade, our proxy for ability in the survey.[46] There exists a positive relationship between ability and competition for women, but only a flat relationship for men (see Appendix A.7, Figure A7.3). High-ability women, in fact, are more competitive than similar men in this sample, suggesting that distaste for competition is unlikely to be a major factor driving lower reapplication rates for such women. Meanwhile, women are less risk-taking than men across the 10th grade score distribution, though this gender gap remains small (see Figure A7.4). Even if risk aversion plays a role in lower reapplication for women, this result suggests it is likely a minor one.

[46] We also control for age, board exam type, and whether the respondent has a college degree.

Another possibility highlighted in the literature is that women may respond more negatively than men to feedback about their performance or have lower confidence about their relative ability. Recall however that not only are women more likely than men to reapply at least once, this holds true across the initial score distribution (see Appendix C.1, Figure C1.2). This pattern is inconsistent with women reacting more negatively about their ability or skills relative to men.

3.3.2 Access to information and networks

Another possible explanation for differential reapplication rates could be that women simply have worse information about the degree of competition in this environment and hence the investments required for success. For example, since TNPSC releases limited details regarding successful candidates and their attributes, it could be that women's access to credible information is more limited. Women may be less likely to know successful candidates or have fewer opportunities to interact with and learn from other candidates.

In the survey, we collected individuals' prior beliefs about the distribution of attempts made by successful candidates in previous exams. The average belief is similar between men and women (see Table 7, Panel B). We also compute the distance between the truth and this prior belief and plot the distribution separately by gender in Figure 7. Women are more likely to underestimate this share than men (70.6% vs 65.5% for men), but there is substantial overlap in the distribution.

To understand differences in networks, we asked whether our survey respondents whether they personally knew anyone who had been selected for a TNPSC position. About one-third of respondents know someone who has been successful in TNPSC exams, with a small difference by gender (35% for men vs 33% for women). We also asked whether respondents knew other candidates they could rely on for support (e.g. sharing study materials). About 45% of men and 43% of women have such support networks.

Despite these differences however, our experimental evidence from Table 9 shows that providing women with more accurate information about the competitive environment actually leads them to *reduce* their number of desired attempts relative to men. Differences in the information environment are therefore unlikely to be a key factor driving differential reapplication behavior between men and women.

3.3.3 Outside options in the labor market

Another possibility is that women may be less interested in continuing to compete because they have better outside options in the labor market. Ex-ante, this explanation is hard to square with aggregate patterns of gendered employment documented in section 3.2.1 as well as evidence of gender wage gaps among salaried and highly-educated workers in In-

dia (Deshpande et al., 2018).[47] Still, it may be conceivable that since competition for desirable civil service jobs likely attracts particularly motivated and high-performing individuals, labor market options for this subpopulation is different.

Ideally, we would have data tracking employment outcomes of men and who just missed the selection cutoff. Unfortunately, we do not have this data. We can, however, use the applicant survey to understand employment experiences and options of candidates interested in TNPSC exams. Even in this sample, we find a 25 p.p. gap in employment between men and women: men are more likely to have ever worked and be currently working at the time of the survey (see Table 7, Panel E). We also asked respondents about their labor market options if they were not studying: 36% of women said they would be doing unpaid work or not working, while only 13% of men said the same. Among those who would be working, men reported higher potential earnings than women by about Rs.3,000. Moreover, in Appendix A.7, we show that these patterns are not substantially different for high-ability women, using again our 10th grade exam score as a proxy for ability. Relative to high-scoring men and low-scoring women, high-scoring women are less likely to have ever worked or to be currently working (see Figures A7.5 and A7.6). In terms of outside options if they were not studying, employment and earning gaps remain substantial between high-scoring men and women (see Figures A7.7 and A7.8). These patterns are unlikely to be consistent with outside options in the labor market being better for higher-ability women than men.

4 Conclusion

In this paper, we take steps towards understanding the under-representation of women in one of the most competitive careers in the Indian labor market. Despite applying in higher numbers and stronger initial test performance, we show that women would remain under-represented in hiring in the absence of female-specific quotas. Our analysis reveals that gender differences in reapplication rates over longer time horizons and performance at the top of the score distribution contribute to women's lower success rates. We show evidence that differential household support and marriage market pressures are particularly salient for women in our context, though we cannot definitively rule out behavioral or other explanations related to differential returns or costs from persistence in competition.

An important area for future work is to understand the gendered value of public sector work. If women are not able to find respectable employment opportunities outside the public sector, then selection into the civil services may also determine women's labor market participation and marriage outcomes.

[47] Our qualitative interviews also reveal that women in fact are particularly interested in these public sector jobs because (i) they believe these jobs are more valued by their in-laws who would not pressure them to quit these jobs as they would private sector options and (ii) these jobs will allow for better balancing of work and family responsibilities. See Appendix A.5 for direct quotations.

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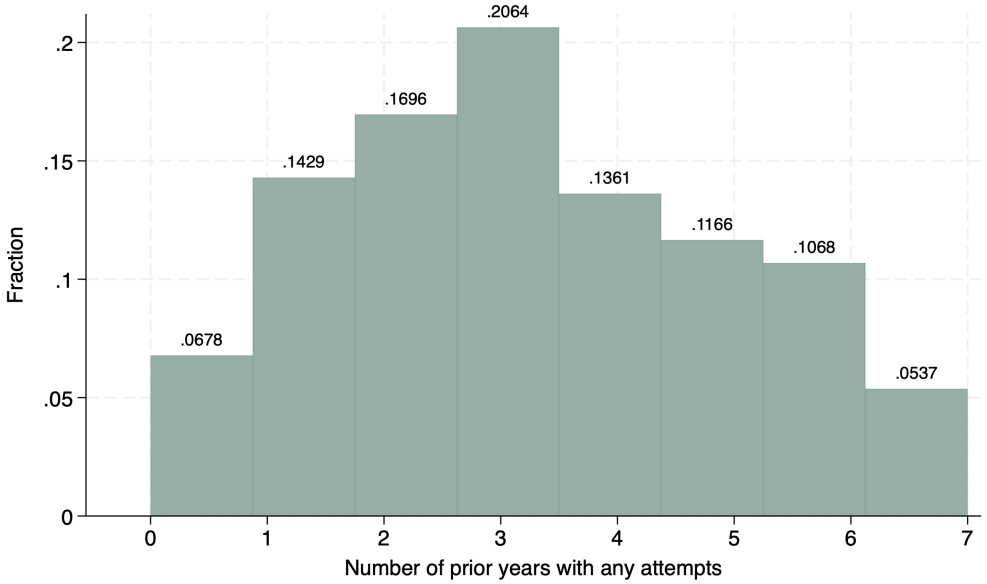
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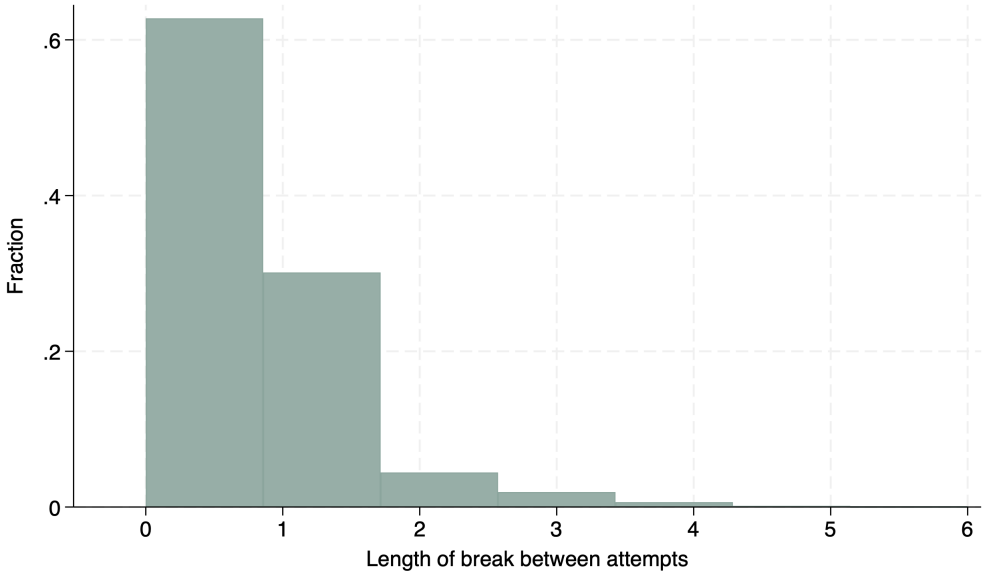
5 Figures

Figure 1: Number of prior years with any attempts by successful candidates in 2019



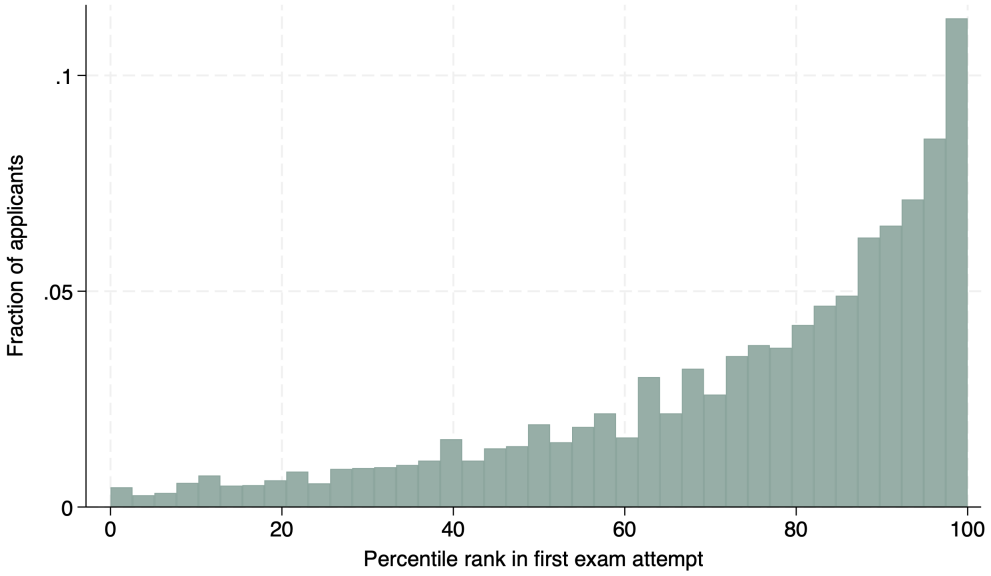
Notes: This figure shows the number of prior years in which successful candidates from 2019 attempted any Group exam from 2012 to 2018. There were 9,865 successful candidates in 2019. 0 means that a successful candidate did not attempt any Group exam between 2012 to 2018.

Figure 2: Break length between Group exams by successful candidates in 2019



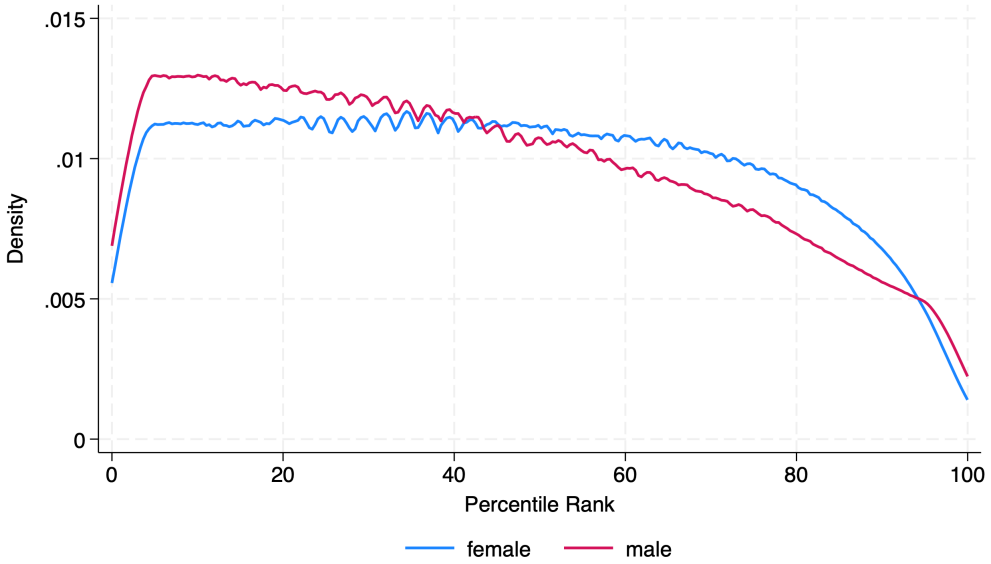
Notes: This figure shows the maximum length of any breaks, measured in years, in appearance for Group exams by successful candidates in 2019. A 'break' is defined as not appearing for the first or only stage of any Group exam in a calendar year. 0 means that the candidate did not take any breaks between attempts in our data.

Figure 3: Distribution of initial exam performance for successful candidates in 2019



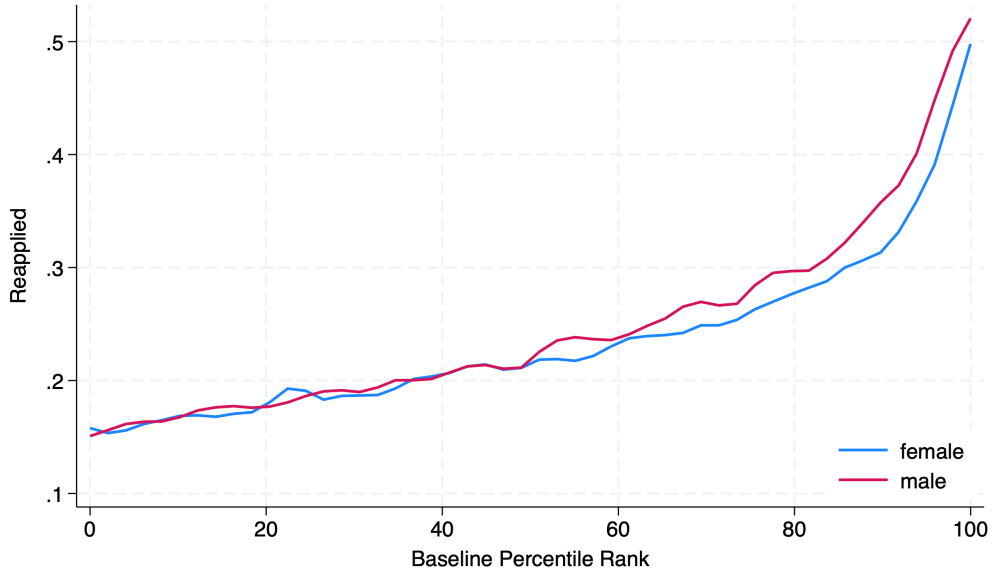
Notes: This figure plots the distribution of baseline exam performance of successful candidates in 2019. The initial exam performance is computed as the earliest exam score we have for the candidate in our data.

Figure 4: Distribution of baseline exam performance for first-time applicants in 2014



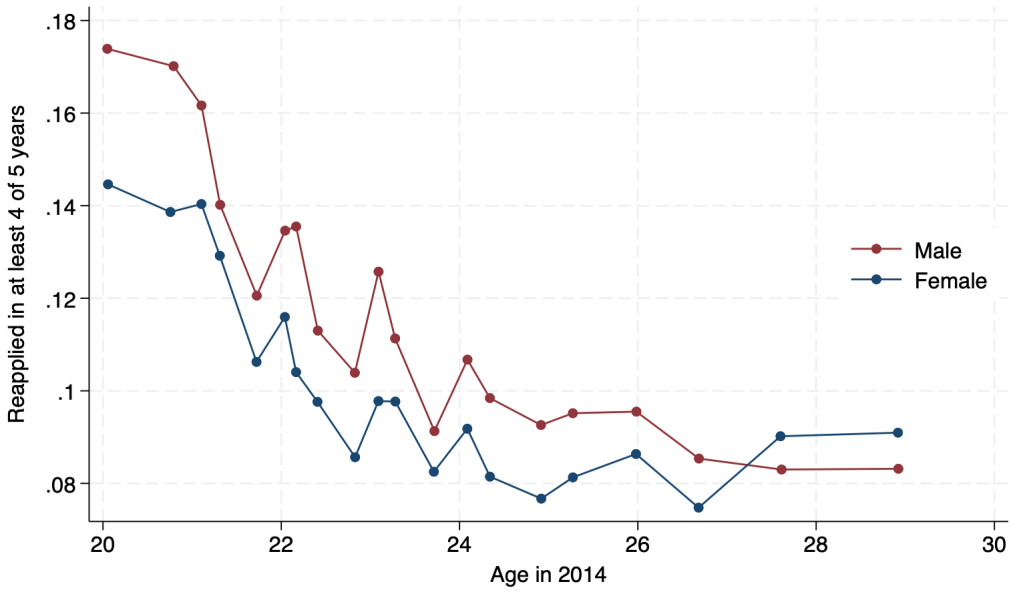
Notes: This figure shows the distribution of baseline exam performance separately by gender for our preferred first-time applicant sample. Our preferred sample is first-time applicants who are college graduates under the age of 30 and who do not already hold a government job. A 'first-time' applicant is defined as an individual in 2014 who did not appear for any Group exams in the previous two years (2012 and 2013). The "baseline" exam is the first exam the applicant took in 2014.

Figure 5: Reapplication in the next year of first-time applicants



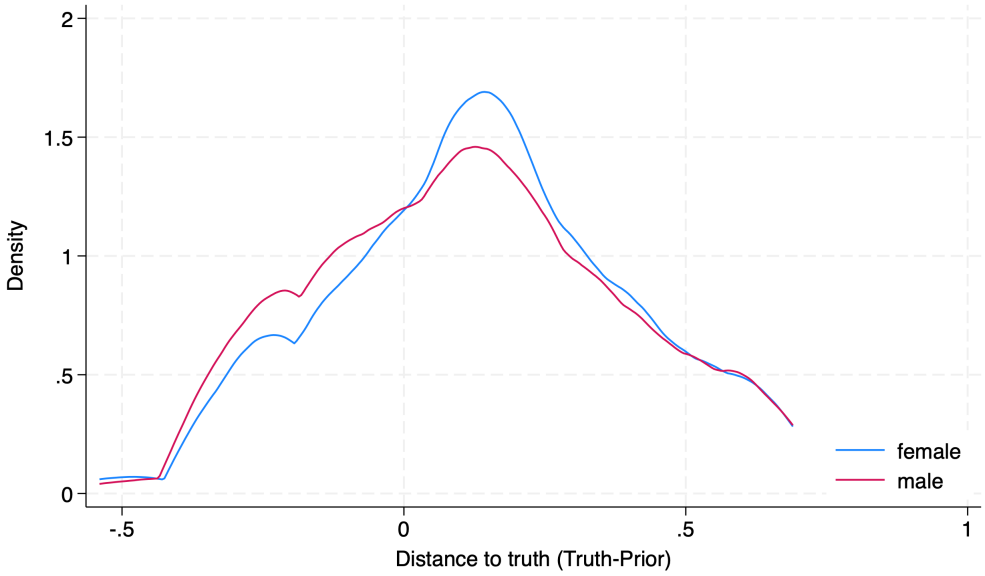
Notes: This figure plots non-parametric estimates of the fraction of first-time applicants from 2014 reapplying to any Group exam in 2015. The sample is restricted to those first-time applicants who were not selected in 2014. The x-axis shows the baseline percentile rank earned by candidates in their first exam in 2014. The y-axis shows the reapplication rates.

Figure 6: Reapplication by age for single men and women



Notes: This figure shows a binned scatterplot of the fraction of first-time applicants from 2014 reapplying in at least 4 out of the next 5 years from 2015 to 2019 by their age in 2014. We plot these estimates separately for single men and women, after controlling for their baseline exam performance.

Figure 7: Distance between truth and prior regarding difficulty of success



Notes: The figure considers how well men and women estimate the difficulty of success in Group exams. We asked respondents for their beliefs about the fraction of successful candidates who made three or more attempts. We then compute the distance to the truth as follows: truth-prior. If distance > 0, this means that respondents underestimate the difficulty of success and if it's < 0, it means they overestimate the difficulty of success.

6 Tables

Table 1: Competition and Female Representation, 2013-19

	Vacancies	Competition		Female Representation	
Exam type	Share of total	Applicants per vacancy	Placement (%)	Share hired	Share top-scorer
Group 1	0.01	1330	0.09	0.608	0.625
Group 2	0.08	413	0.25	0.543	0.529
Group 2A	0.14	274	0.47	0.401	0.350
Group 4	0.78	333	0.45	0.502	0.390
Overall	1	571	0.33	0.492	0.395

Notes: This table shows measures of competition and female representation in civil service recruitment in Tamil Nadu. It covers Group exams conducted between 2013-19. Information on vacancies are compiled from annual reports published by the TNPSC. Figures for competition These figures are computed for Group exams conducted between 2013-19 and use administrative data from the TNPSC and (ii) publicly available annual reports published by the TNPSC.

Table 2: Covariates of 2019 Applicants

	(1) All applicants	(2) Successful applicants
Age	25.988	27.525
Age at first attempt	23.729	23.867
# years with exam attempts	1.742	3.246
No previous exam attempts	0.35	0.068
Initial percentile rank	45.821	74.306
Female	0.558	0.525
Married	0.302	0.304
Caste is SCST	0.272	0.202
SSC completed in Tamil	0.747	0.852
Has college/UG degree	0.567	0.894

Notes: This table shows the average characteristics of applicants from the 2019 Group exams. Column 1 considers all applicants, whereas column 2 restricts to the sample of successful applicants in 2019. "Initial percentile rank" is the rank achieved by the applicant in the earliest exam score visible in our data.

Table 3: Gender Differences in Covariates of First-Time Applicants

	Men	Women	Difference (W-M)
	(1)	(2)	(3)
Panel A: Demographic covariates			
Age	24.438	24.108	-0.330
Married	0.092	0.376	0.284
Has a child	0.071	0.314	0.244
Caste is SC/ST	0.224	0.190	-0.034
Birth district is Chennai	0.044	0.042	-0.002
Panel B: Medium of Instruction			
Completed 10th in Tamil	0.746	0.784	0.038
Completed 12th in Tamil	0.749	0.777	0.028
Completed college in Tamil	0.109	0.154	0.044
Panel C: Type of college degree			
Has B.A. degree	0.125	0.217	0.092
Has B.Sc. degree	0.345	0.456	0.111
Has B.Commerce degree	0.227	0.201	-0.026
Has B.Engineering degree	0.286	0.113	-0.173
Has other degree	0.017	0.013	-0.004

Notes: This table shows gender differences in covariates of our preferred sample of first-time applicants from 2014. A first-time applicant in 2014 is defined as an individual who has not participated in any Group exam in the previous two years (2012 and 2013). We focus on first-time applicants who are college graduates under the age of 30 and who do not already hold a government job. Columns 1 and 2 show means for men and women. Column 3 reports the difference.

Table 4: Baseline Exam Performance of First-time Applicants

	Percentile Rank		Top 5%		Top-scorer	
	(1)	(2)	(3)	(4)	(5)	(6)
Female	2.4076***	2.5588***	-0.0064***	-0.0026***	-0.0011***	-0.0007***
	(0.105)	(0.110)	(0.001)	(0.001)	(0.000)	(0.000)
Exam Type FE	Y	Y	Y	Y	Y	Y
Demographic Controls		Y		Y		Y
N	272432	272432	272432	272432	272432	272432
Male Depvar Mean	42.465	42.465	0.023	0.023	0.002	0.002

Notes: This table considers gender differences in baseline exam performance for our sample of first-time applicants. The dependent variables are as follows: percentile rank in the first exam taken by the applicant (columns 1–2); whether the applicant reached the top 5% of scorers in their first exam (columns 3–4); and whether an applicant was a "top-scorer" in their first exam, defined as an applicant who achieved a rank higher or equal than the number of vacancies notified in the recruitment (columns 5–6). All regressions include baseline exam fixed effects, that account for the type of Group exam taken by applicants as their first term. Even numbered columns also demographic controls, which include: age; type of undergraduate degree; whether they completed their secondary, higher secondary, or undergraduate education in Tamil; has a permanent address in Tamil Nadu; and was born in Chennai district.

Table 5: Re-application Behavior of First-time Applicants

	Reapplied in consecutive years					Reapplied over 5 years	
	(1) 1 year	(2) 2 years	(3) 3 years	(4) 4 years	(5) 5 years	(6) $\geq$ 1 year	(7) $\geq$ 4 years
Panel A: All individuals							
Female	-0.0101***	-0.0061***	-0.0140***	-0.0127***	-0.0114***	0.0293***	-0.0095***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)
Baseline Rank	Y	Y	Y	Y	Y	Y	Y
Baseline Exam FE	Y	Y	Y	Y	Y	Y	Y
N	271936	271936	271936	271936	271936	271936	271936
Male Depvar Mean	0.224	0.154	0.067	0.067	0.044	0.467	0.104
Panel B: Top quartile of baseline scorers							
Female	-0.0310***	-0.0243***	-0.0349***	-0.0325***	-0.0276***	0.0209***	-0.0256***
	(0.005)	(0.004)	(0.003)	(0.003)	(0.003)	(0.005)	(0.004)
Baseline Rank	Y	Y	Y	Y	Y	Y	Y
Baseline Exam FE	Y	Y	Y	Y	Y	Y	Y
N	44613	44613	44613	44613	44613	44613	44613
Male Depvar Mean	0.345	0.247	0.133	0.133	0.090	0.553	0.182
Panel C: Top quartile of baseline scorers with demographic controls							
Female	0.0024	0.0020	-0.0148***	-0.0158***	-0.0153***	0.0325***	-0.0112***
	(0.005)	(0.005)	(0.004)	(0.004)	(0.003)	(0.005)	(0.004)
Baseline Rank	Y	Y	Y	Y	Y	Y	Y
Baseline Exam FE	Y	Y	Y	Y	Y	Y	Y
Demographic Controls	Y	Y	Y	Y	Y	Y	Y
N	44613	44613	44613	44613	44613	44613	44613
Male Depvar Mean	0.345	0.247	0.133	0.133	0.090	0.553	0.182

Notes: This table considers gender differences in reapplication behavior for our sample of first-time applicants. We define reapplication across consecutive years in columns 1–5 as follows: whether an individual reapplied in the next year after 2014 (column 1); in the next two consecutive years after 2014, i.e. in 2015 *and* 2016 (column 2); in the next three consecutive years after 2014, i.e. in 2015 *and* 2016 *and* 2017; and so forth. In column 6–7, we consider whether an individual has reapplied at least once in 5 years or at least 4 out of 5 years. Panel A considers all individuals in our preferred sample; Panel B considers the top-quartile of baseline scorers, i.e. those who achieved a percentile rank of 75 or higher in the first exam attempt; and Panel C re-runs Panel B including additional demographic controls. Regressions control for the baseline percentile rank and include baseline exam type fixed effects. Robust standard errors are in parentheses.

Table 6: Performance Gains of First-time Applicants

	Maximum Percentile Rank				Top-scorer			
	All applicants		Top-quartile of baseline scorers		All applicants		Top-quartile of baseline scorers	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female × Attempt 1	1.052***	1.094***	0.590***	0.425***	-0.001***	-0.001***	-0.006***	-0.005***
	(0.036)	(0.045)	(0.049)	(0.067)	(0.000)	(0.000)	(0.001)	(0.001)
Female × Attempt 2	-0.138	-0.155	-0.198	-0.201	0.002***	0.002***	0.014***	0.014***
	(0.117)	(0.117)	(0.208)	(0.208)	(0.000)	(0.000)	(0.002)	(0.002)
Female × Attempt 3	0.398**	0.352**	0.510**	0.496**	-0.007***	-0.007***	-0.023***	-0.023***
	(0.156)	(0.156)	(0.231)	(0.231)	(0.001)	(0.001)	(0.003)	(0.003)
Female × Attempt 4	1.590***	1.534***	1.695***	1.656***	-0.003***	-0.003***	-0.001	-0.002
	(0.210)	(0.209)	(0.283)	(0.282)	(0.001)	(0.001)	(0.004)	(0.004)
Female × Attempt 5	1.419***	1.359***	1.772***	1.738***	-0.013***	-0.013***	-0.017**	-0.018**
	(0.268)	(0.266)	(0.280)	(0.280)	(0.002)	(0.002)	(0.007)	(0.007)
Female × Attempt 6	1.721***	1.674***	1.693***	1.718***	0.001	0.001	0.017*	0.016*
	(0.416)	(0.411)	(0.412)	(0.409)	(0.004)	(0.004)	(0.010)	(0.010)
Baseline Rank	Y	Y	Y	Y	Y	Y	Y	Y
Exam Sequence FE	Y	Y	Y	Y	Y	Y	Y	Y
Demographic Controls		Y		Y		Y		Y
N	576562	576562	110648	110648	580287	580287	111819	111819

Notes: This table considers gender differences in performance gains in subsequent exam attempts over time for our preferred sample of first-time applicants. As per equation 3, attempts are measured annually (e.g., attempt 2 considers performance in the second year of attempts by the applicant). We observe a total of six year of attempts from 2014 to 2019. In columns 1–4, the dependent variable is the maximum percentile rank achieved by the applicant in the a-th year of attempts. In columns 5–8, the dependent variable is whether the applicant became a top-scorer in any exam in the a-th year of attempts, where "top-scorer" is defined as an applicant who achieved a rank higher or equal than the number of vacancies notified in the recruitment. Regressions always control for the baseline percentile rank and even-numbered columns also include additional demographic controls. All regressions include fixed effects for the exact sequence of Group exams taken by applicants. Standard errors are clustered at the applicant level.

Table 7: Gender Differences in the Survey Sample

	Men	Women	Difference (W-M)	N
	(1)	(2)	(3)	(4)
Panel A: Personal and household background				
Age	24.22	23.95	-0.26	3,503
Married	0.12	0.41	0.29	3,510
Caste is SC/ST	0.24	0.17	-0.07	3,510
Has college degree	0.64	0.78	0.14	3,510
Completed 10th grade in State Board	0.85	0.74	-0.11	3,510
10th grade exam score, State Board only	367.37	392.90	25.53	2,772
Household income $<$ Rs.20,000	0.85	0.83	-0.01	3,510
Father's education, less than 10th pass	0.70	0.61	-0.09	3,510
Mother's education, less than 10th pass	0.76	0.66	-0.10	3,510
Panel B: Information and networks				
Prior for share successful after 3+ attempts	0.55	0.53	-0.02	3,510
Knows a successful TNPSC applicant	0.35	0.33	-0.02	3,510
Has support of other TNPSC candidates	0.45	0.43	-0.02	3,510
Panel C: Marriage and household support				
Received marriage proposal, if never married	0.12	0.19	0.07	2,469
Age at first proposal, if ever received	24.27	20.91	-3.36	1,403
Ideal marriage age (own)	27.47	25.41	-2.06	2,463
Ideal marriage age (parents)	26.84	23.84	-3.01	2,464
Spent money on exam preparation	0.57	0.53	-0.03	3,510
Spent money staying outside home for exam	0.15	0.06	-0.09	3,510
Funding support received (Rs.)	21,782.58	10,447.76	-11,334.82	1,021
Panel D: Behavioral factors				
Risk, scale 0-10	6.28	6.10	-0.18	3,510
Competition, scale 1-7	5.02	5.14	0.11	3,510
Panel E: Employment and outside options				
Employed	0.52	0.23	-0.28	3,510
Employed ever	0.76	0.51	-0.25	3,510
Outside option: Unpaid work/Not working	0.13	0.36	0.23	3,510
Outside option: Income (Rs.) per month	16,524.99	13,493.21	-3,031.78	2,619

Notes: This table considers gender differences across a range of variables collected in the 2022 survey of applicants. All of these variables come from the pre-treatment modules of the survey. The number of observations vary across variable either due to item non-response or sample restrictions for certain variables. Panel A shares information about the personal and household characteristics of the sample. Panel B reports variables related to respondents' information about and networks for TNPSC exams. Panel C shows covariates related to marriage and other measures of household support. "Age at first proposal" was only asked of respondents who were married or never married but had a received proposal. Panel D considers behavioral measures. Finally, Panel E reports information on employment and outside option. For the outside option questions, respondents were asked to report their employment and income under the scenario that they were not actively preparing for the upcoming Group exam. Income per month is only available for those whose outside option involved paid work.

Table 8: Reapplication by District-level Female Marriage Rates

	Reapplied next year		Reapplied once in next 2 years	
	(1)	(2)	(3)	(4)
Female	0.0600***	0.0491**	0.1118***	0.0927***
	(0.0199)	(0.0196)	(0.0318)	(0.0309)
Marriage Rate	0.0032***	0.0004	0.0032***	-0.0011
	(0.0005)	(0.0010)	(0.0007)	(0.0014)
Female × Marriage Rate	-0.0007**	-0.0006*	-0.0014***	-0.0011**
	(0.0003)	(0.0003)	(0.0005)	(0.0005)
Baseline Rank	Y	Y	Y	Y
Baseline Exam FE	Y	Y	Y	Y
Demographic Controls	Y	Y	Y	Y
District Controls		Y		Y
N	120004	120004	120004	120004
Male Depvar Mean	0.250	0.250	0.436	0.436

Notes: This table shows how reapplication behavior varies by the district-level marriage rate of 20-24 year old women. Sample is restricted to unmarried first-time applicants under the age of 24 who were born in Tamil Nadu and were unsuccessful in their first year of attempts. We assign district-level marriage rates based on the birth district of the applicant. Columns 1–2 consider reapplication in the next year after Regressions control baseline exam percentile rank, baseline exam type, and baseline demographic controls, which include age, type of undergraduate degree, caste, and whether completed 10th grade in vernacular. Columns 2 and 4 also include controls for district characteristics measured in the 2011 Census, including percent of population that is literate, Muslim, SC/ST; percent of workers employed in agriculture, in services; and percent of workers who are female. include Standard errors are clustered at the district level.

Table 9: Treatment Effects on Desired Attempts

	(1) All	(2) Single men	(3) Single women	(4) Married women
Info	-0.488***	-0.360	-0.993***	0.174
	(0.151)	(0.235)	(0.273)	(0.312)
Info × HH prime	-0.083	-0.202	0.643*	-1.012**
	(0.216)	(0.340)	(0.384)	(0.448)
HH prime	0.163	0.220	-0.262	0.827***
	(0.152)	(0.248)	(0.260)	(0.316)
N	3510	1398	1126	789
Control Mean	6.511	6.173	6.862	6.476

Notes: This table considers treatment effects on the number of future attempts candidates are willing to make. Data come from the 2022 survey of applicants. The question is "Knowing what you know now, what is the maximum number of attempts you would be willing to make in the Group [1/4] exam?", where Group 1/4 is shown as per the exam strata assigned to the respondent. The variable was top-coded in the survey at a maximum of 10 attempts. Column 1 shows the effects on the full sample, whereas columns 2–4 further restrict samples by sex and marital status. The regression includes exam strata fixed effects. Robust standard errors are shown in parentheses.

APPENDIX

Gender Dynamics in Entry into Competitive Careers: Evidence from Indian Civil Services

Kunal Mangal and Niharika Singh

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A Additional Details on Context

A.1 Variation in attributes of Group exams

The table below provides a summary of attributes by type of Group exam during our sample period from 2012 to 2019.

Attribute	Group 1	Group 2	Group 2A	Group 4
Minimum age required	21	21	21	18
Minimum education required	College	College	College	10th pass
Exam stages	Multiple	Multiple	Single	Single

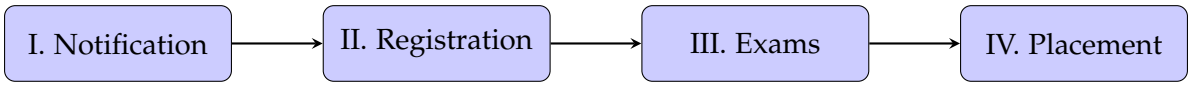
The table below shows job titles listed in a sample of Group exam notifications from 2014-15.

Group	Job titles
1	Deputy Collector
	Deputy Superintendent of Police
	Assistant Commissioner
	District Registrar
2	Deputy Commercial Tax Officer;
	Sub Registrar, Grade-II
	Probation Officer
	Assistant Inspector of Labor
	Junior Employment Officer
	Special Assistant
	Assistant Section Officer
	Special Branch Assistant
	Assistant Section Officer cum Programmer
	Assistant Inspector
	Audit Inspector
	Executive Officer, Grade-II
	Revenue Assistant
	Handloom Inspector
	"Supervisor / Junior Superintendent"
	Senior Inspector
	Supervisor of Industrial Co-operatives
2A	Personal Clerk
	Assistant
	Planning Junior Assistant
	Lower Division Clerk
	Junior Co-operative Auditor
4	Village Administrative Officer
	Junior Assistant
	Bill Collector, Grade-I
	Typist
	Steno-Typist, Grade - III
	Field Surveyor
	Draftsman

A.2 Recruitment process

The figure below shows the stages for a typical recruitment process for Group exams conducted by the TNPSC. In stage I, TNPSC issues a notification with its intention to conduct competitive examinations for a specific Group exam. Interested individuals then have roughly one month to register for the exam in stage II. Stage III is the actual examination; this can either be single-stage or a multiple-stage exam depending on the Group exam notified in stage I. Finally, stage IV is the placement stage, where the top-scorers select among the available jobs based on their rank order and reservation category.

Four stages of the recruitment process



A.3 Administrative data coverage

notification no.	exam year	exam type	registration	exam scores	placement
2012-14	2012	G4	x	x	
2012-26	2012	G4V	x	x	
2012-49	2013	G1	x		
2013-09	2013	G4	x	x	x
2013-14	2013	G2	x	x	x
2013-17	2014	G1	x	x	x
2014-01	2014	G2A	x	x	x
2014-07	2014	G4V	x	x	x
2014-18	2014	G4	x	x	x
2015-07	2015	G2	x	x	x
2015-09	2015	G1	x	x	x
2015-17	2016	G2A	x	x	x
2015-19	2016	G4V	x	x	x
2016-15	2016	G4	x	x	x
2016-19	2017	G1	x	x†	x
2017-10	2017	G2A	x	x	x
2017-23	2018	G4/G4V	x	x	x
2018-15	2018	G2	x	x	x
2019-01	2019	G1	x	x	x
2019-19	2019	G4/G4V	x	x	x

Notes: This table documents what we observe in the administrative data for each of stage of the recruitment process for Group level exams notified from 2012 to 2019. "Exam year" denotes the year that the first stage (or the only stage) of the recruitment is conducted.
† For this recruitment, we do not observe the test score for the first stage of the exam, but know who appeared for the first stage exam.

A.4 Competition across Group exams

(1) Notification No.	(2) Exam Level	(3) Vacancies	(4) Applicants	(5) Hired	(6) Applicants per vacancy	(7) Placement (%)
2013	G4	5566	1,222,268	5872	220	0.48
2013	G2	1064	498,471	1129	468	0.23
2013	G1	79	70,547	79	893	0.11
2014	G2A	2269	420,451	2784	185	0.66
2014	G4V	2342	763,880	2233	326	0.29
2014	G4	4963	1,061,045	5255	214	0.50
2015	G2	1241	478,266	1078	385	0.23
2015	G1	74	117,696	72	1590	0.06
2015	G2A	1863	654,322	2149	351	0.33
2015	G4V	813	770,860	812	948	0.11
2016	G4	5451	1,239,289	5132	227	0.41
2016	G1	85	137,855	86	1622	0.06
2017	G2A	1953	556,189	2343	285	0.42
2017	G4/G4V	9351	1,753,155	11949	187	0.68
2018	G2	1199	462,697	1330	386	0.29
2019	G1	139	168,549	181	1213	0.11
2019	G4/G4V	6491	1,366,548	9684	211	0.71

A.5 Selected quotes from qualitative sources

In this appendix, we provide selected quotes from (i) focus group interviews we conducted in February 2022 with female applicants to understand their participation in the TNPSC group exams and (ii) news reports and other internet sources. Our focus groups were conducted in Tamil and these quotes are translated and have been lightly edited for comprehension.

Marriage pressure: Quotes 1-4 are from female focus group participants in Tamil Nadu. Quotes 5-6 are quotes from a Reddit thread from September 1, 2024 on the UPSC exams, showing that these pressures are not unique to TNPSC exams.[1]

(1) "One friend shared with me that in order to avoid marriage proposal, she shaved her head fully suddenly without informing anyone, and thus the marriage was postponed."

(2) "I told my family to wait for another 1 year [for my marriage], but they did not want to saying that only after my marriage my elder and younger brother can get married so you have to marry soon. So I accepted to get married."

(3) "The marriage proposals have started and I could not avoid them. . . I want to study, and will tell my parents.. I tell them once my career is settled then whoever you ask me to marry, I will marry."

(4) "I am 23 now. Even if parents are ok, relatives are asking about getting me married. In fact girls younger than me have already gotten married. [...] if I had been a guy maybe I would have gotten an extra 4 to 5 years time."

(5) "Shaadi [trans. Marriage] ka added pressure – Hello all, I am 28(F), I will be giving my 2nd attempt next year, I am studying of course. But I am damn scared about, what if I am not successful. To add to that, my parents keep telling me, I am late in marriage market and good guys won't be available."

(6) "I'm 24 and my parents are after my life to get some govt job [by] 2026 max because they won't delay my marriage after 26 at any damn cost!"

Household chores and familial expectations after marriage

(1) "In my in-laws house, they ask me to study after finishing all my work."

(2) "[At our in-laws,] we can not expect support like parents. If I study in my parents' house, they allow me to study fully, i.e., from morning to till evening I sit in a place and they do not disturb me. I cannot be like [that] in my in-laws house, they expect to do their work first. We can not sit in one place for hours together. They support but not like parents support us."

(3) "Generally in-laws never say that we should not study. But they are concerned about family work first then only support our studies. It is difficult to clear

[1] Link here: https://www.reddit.com/r/UPSC/comments/1f6gyjs/shaadi_ka_added_pressure/ (Retrived September 2, 2024).

exams with all these disturbances."

(4) "Even if we have a condition [before marriage] that the groom's family should be supportive of education and stress it repeatedly, after getting [married] it won't be the same. [...] it will be just words, like words written in water. They will say you first finish the cooking and other works and then you can do your work."

Labor market options: Public vs private sector jobs

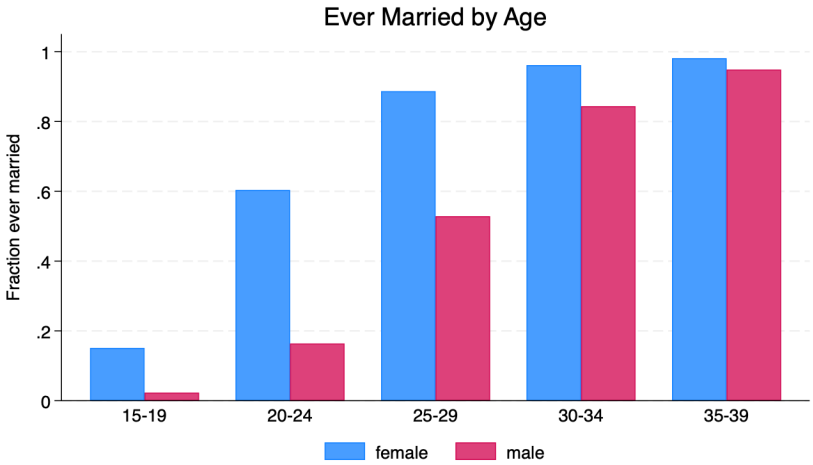
(1) "If I continue my private job even after my marriage, it won't [make] much difference for my in-laws. But if I get a govt job, they can't force me to leave or quit my job; hopefully no one will say that."

(2) "If we are in a govt job, then [in-laws] will only say it's ok, it's ok, she has a gov't job and has a financial stability and will adjust. In case I'm in a private job then definitely within 2 minutes they will ask me to leave the job and tell that family is important, family is our god."

(3) "I got selected for a private job in campus interview in my college which had 3 shifts including night shifts. So because of that parents were not willing to send me to work. But in the case of govt job, it's not like that. We only have to work in the morning and there is safety. We can also return from work and take care of the kids and family."

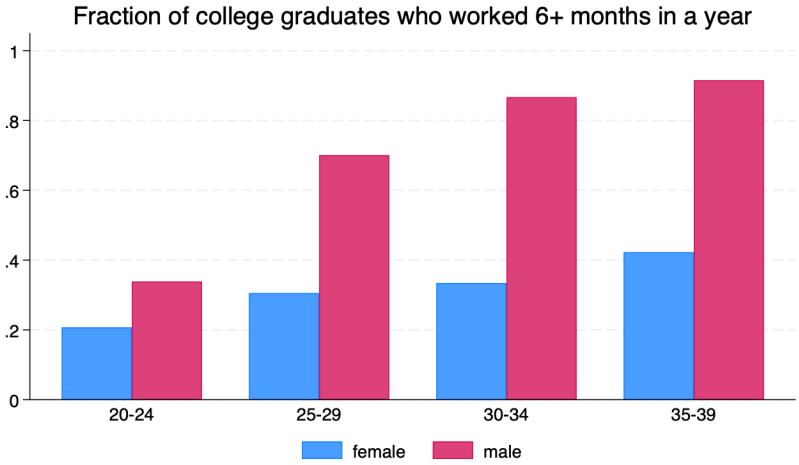
A.6 Census 2011 Figures

Figure A6.1: Marriage Rates by Age and Sex in Tamil Nadu



Notes: This figure shows the marriage rates of individuals in Tamil Nadu by age and sex. Data come from the 2011 Census. Ever married includes currently married, divorced, separated and widowed individuals.

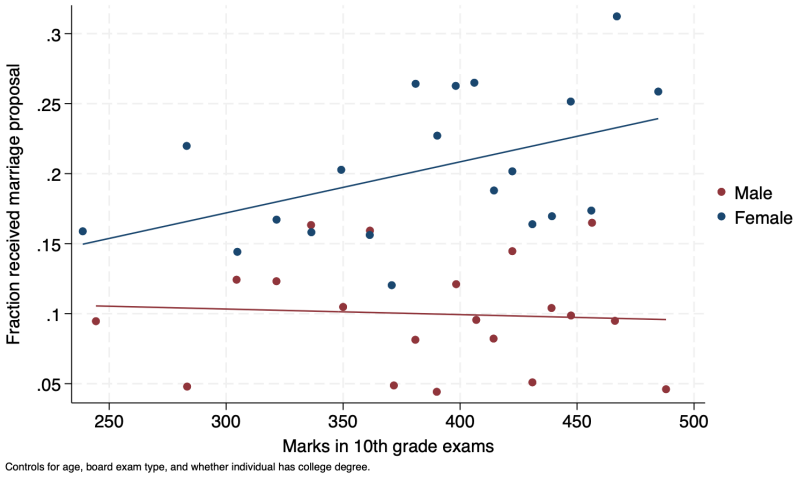
Figure A6.2: Employment Rates by Age and Sex for College Graduates in Tamil Nadu



Notes: This figure shows the fraction of college graduates in Tamil Nadu that worked for at least 6 months in the previous year by age and sex. Data come from the 2011 Census.

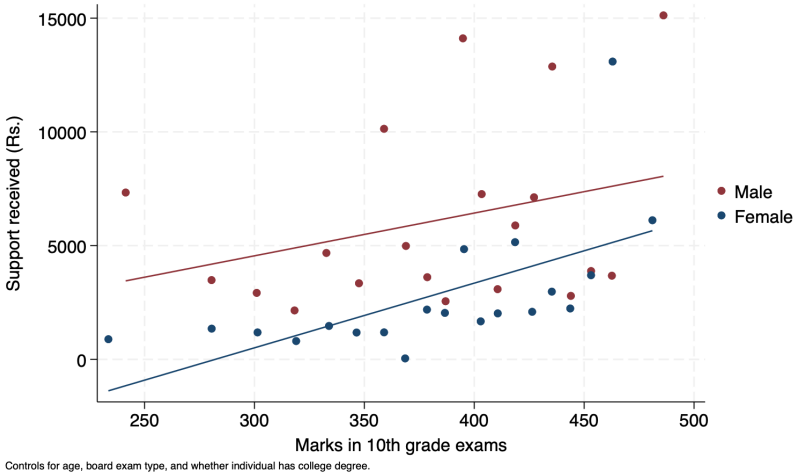
A.7 Figures from Survey Data

Figure A7.1: Marriage market exposure and 10th grade scores



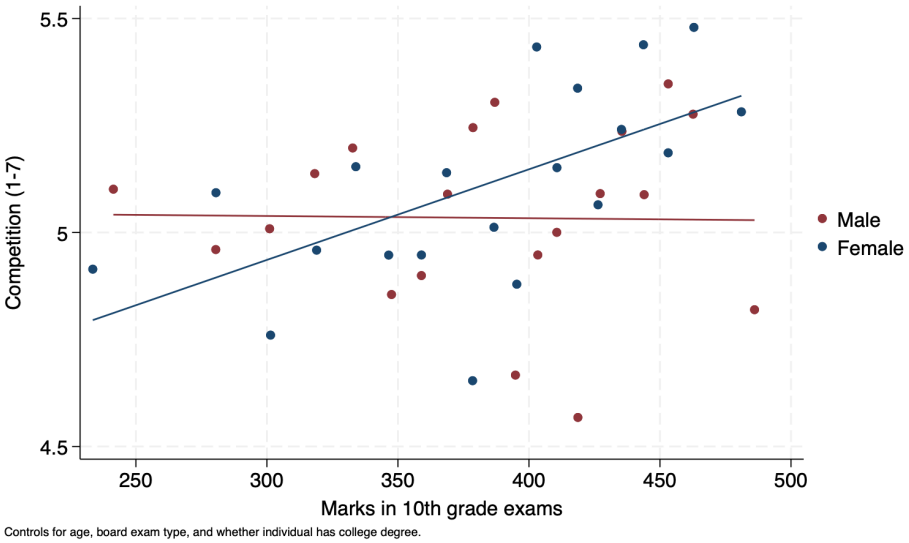
Notes: This figure shows a binned scatterplot of the fraction of individuals that have received a marriage proposal at the time of the applicant survey by their 10th grade exam scores. We control for age, 10th grade board exam type, and whether the applicant has a college degree.

Figure A7.2: Household support for TNPSC preparation and 10th grade scores



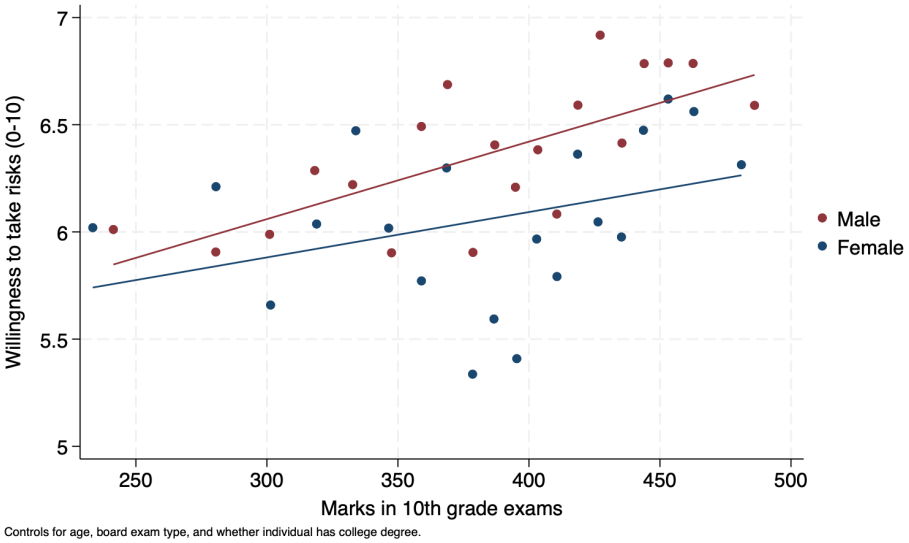
Notes: This figure shows a binned scatterplot of the monetary support received by candidates from friends and family for exam preparation by their 10th grade exam scores. We control for age, 10th grade board exam type, and whether the applicant has a college degree.

Figure A7.3: Competition and 10th grade scores



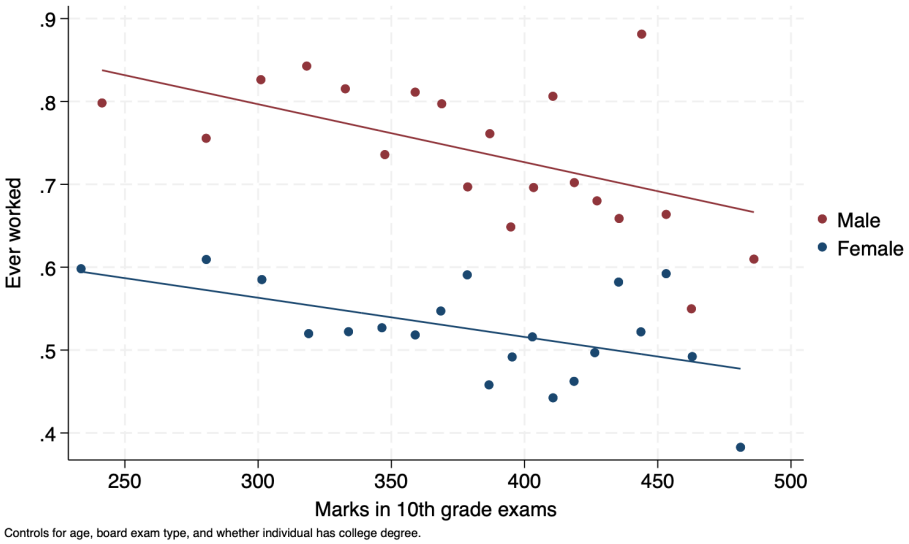
Notes: This figure shows a binned scatterplot of our competition measure by applicants' 10th grade exam scores. We control for age, 10th grade board exam type, and whether the applicant has a college degree. Competition is defined on a 7-point scale and asks respondents to consider how well the following statement describes them: "Competition brings out the best in me."

Figure A7.4: Risk-taking and 10th grade scores



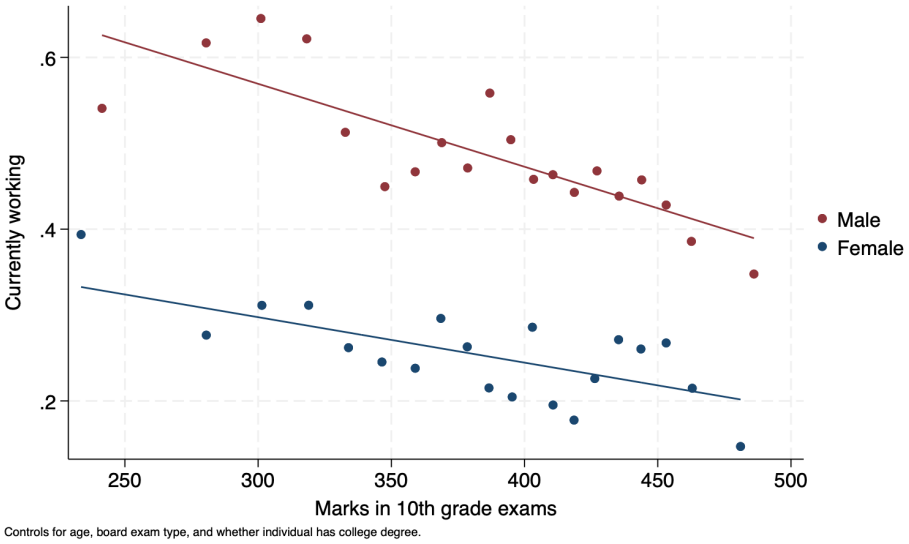
Notes: This figure shows a binned scatterplot of our risk measure by applicants' 10th grade exam scores. We control for age, 10th grade board exam type, and whether the applicant has a college degree. Risk is defined on a 11-point scale.

Figure A7.5: Any paid work experience and 10th grade scores



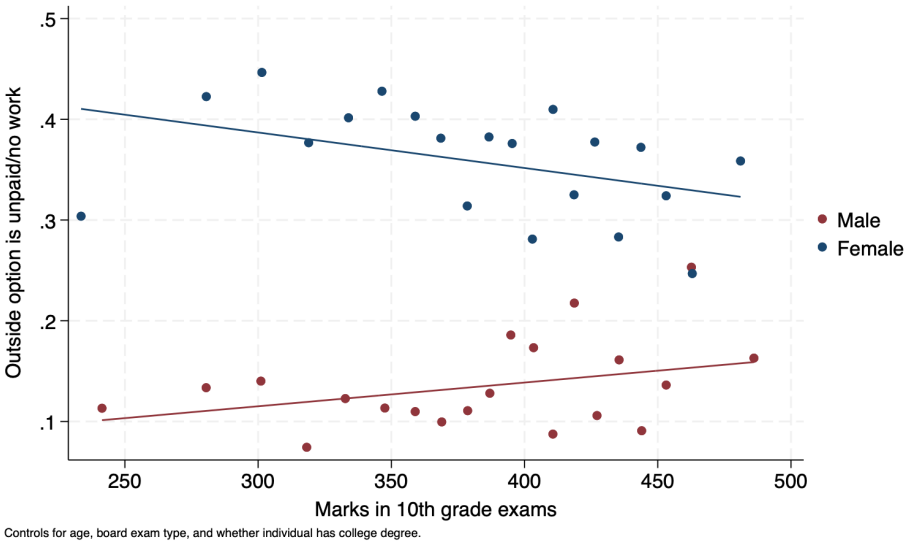
Notes: This figure shows a binned scatterplot of the fraction of respondents who have any paid work experience by their 10th grade exam scores. We control for age, 10th grade board exam type, and whether the applicant has a college degree.

Figure A7.6: Probability of current employment and 10th grade scores



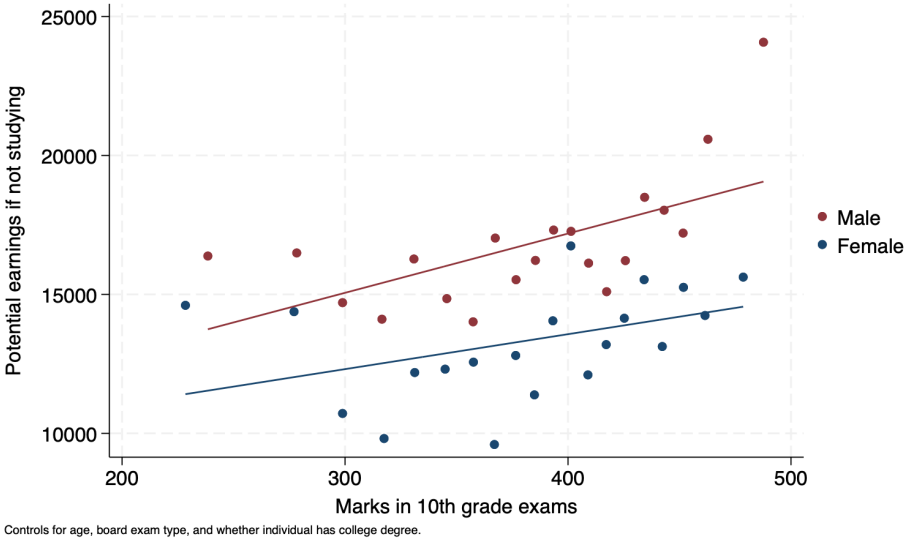
Notes: This figure shows a binned scatterplot of the fraction of respondents who are working at the time of the survey by their 10th grade exam scores. We control for age, 10th grade board exam type, and whether the applicant has a college degree.

Figure A7.7: Outside option of no paid work and 10th grade scores



Notes: This figure shows a binned scatterplot of the fraction of respondents saying their outside option is unpaid work (or no work) by their 10th grade exam scores. We control for age, 10th grade board exam type, and whether the applicant has a college degree.

Figure A7.8: Potential earnings and 10th grade scores

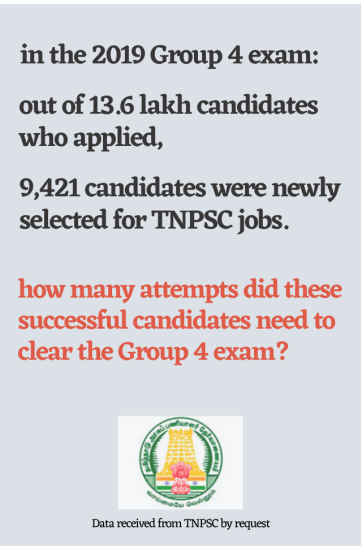


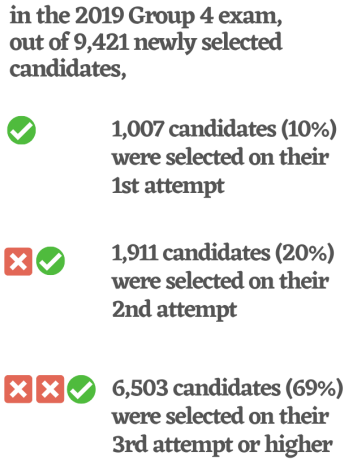
Notes: This figure shows a binned scatterplot of the potential earnings reported by survey respondents (if they were not studying) by their 10th grade exam scores. We control for age, 10th grade board exam type, and whether the applicant has a college degree.

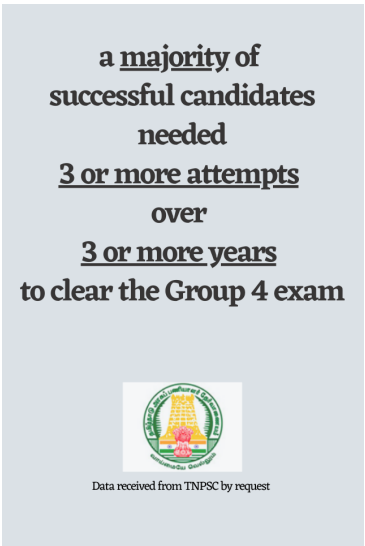
B Experimental Details

B.1 Visuals

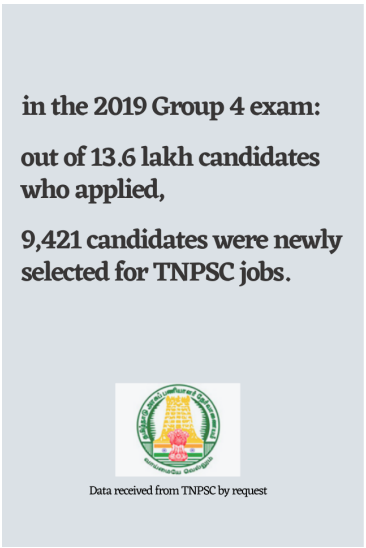
Panel A: Information Treatment







Panel B: Control



B.2 'Household Prime' Module

The following questions were randomly delivered to 50% of respondents, both men and women. They were shown prior to the delivery of the treatment or the placebo infomration. We altered the questions slightly depending on the marital status of the respondent.

For never married respondents:

1. You told us earlier your ideal marriage age is [response], while your parents' ideal marriage age for you is [response]. By what age are most [men/women] from your social and economic background married?
2. Do you think you will have any say in choosing your spouse?
    - I will have no choice, my parents/relatives will choose for me
    - My parents/relatives will choose, but I can reject or say no to someone
    - I will choose, but my parents/relatives will need to approve
    - My parents will support me, no matter who I choose to marry
3. Once you are married, how many hours per day do you think you would spend on household chores (e.g. paying bills, taking care of children or relatives, going to the market, cooking, and cleaning)?
4. Suppose you are not selected for TNPSC before marriage. If you want to study for TNPSC exams after marriage, how many hours do you think you will be able to study uninterrupted per day?
5. Do you think for someone like yourself it is easier to prepare for TNPSC Group exams before marriage or after marriage? Response options = [Before marriage; After marriage; Marriage does not make a difference]

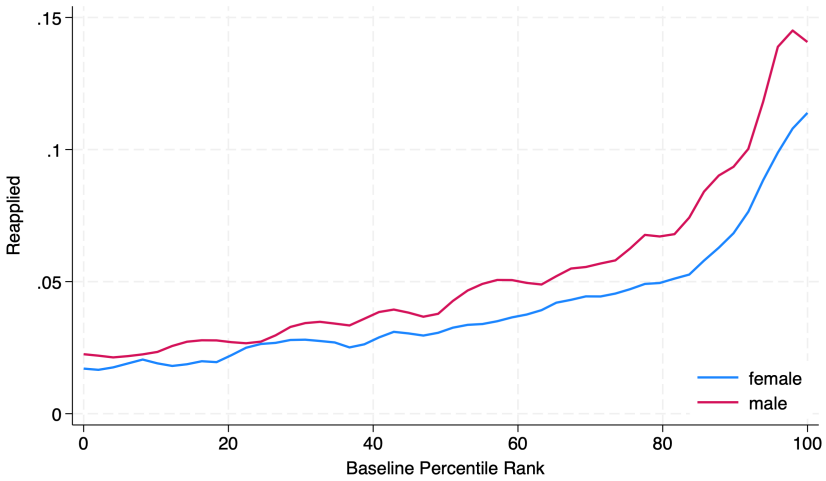
For married/divorced/widowed respondents:

1. You told us earlier you were married at age [response]. By what age are most men/women from your social and economic background married?
2. Did you have any say in choosing your spouse?
    - I had no choice, my parents/relative chose for me
    - My parents/relatives chose, but I had say in the choice
    - I chose, but my parents/relatives had to approve
    - I had complete choice, and my parents supported me
3. How many hours per day do you spend on household chores (e.g. paying bills, taking care of children or relatives, going to the market, cooking, and cleaning)?
4. How many hours are you able to study uninterrupted per day for your TNPSC exam preparation?
5. Do you think it is easier to prepare for TNPSC Group exams before marriage or after marriage? Response options = [Before marriage; After marriage; Marriage does not make a difference]

C Additional Figures and Tables

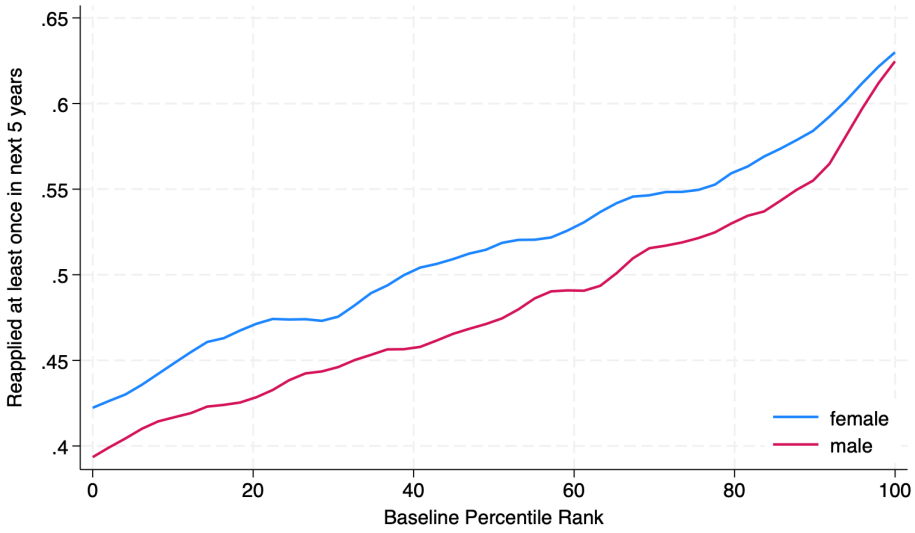
C.1 Reapplication graphs

Figure C1.1: Reapplication over five consecutive years



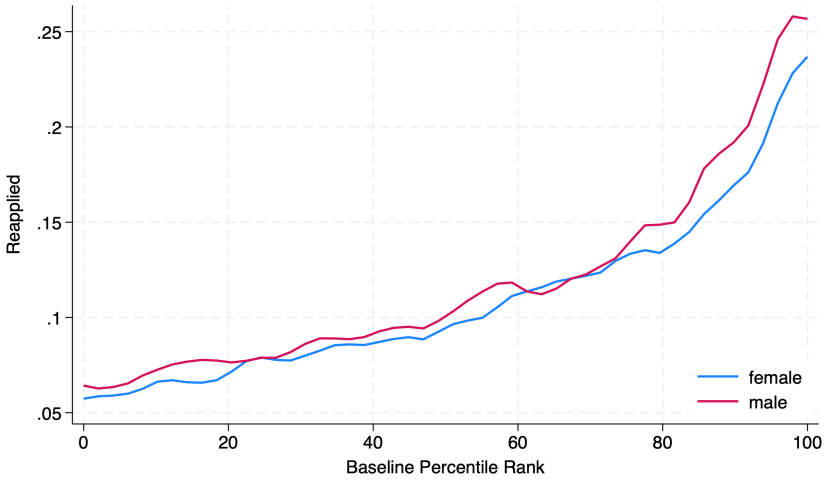
Notes: This figure plots non-parametric estimates of the fraction of individuals who reapplied for five consecutive years after their initial attempt. Our first-time applicant sample is restricted to only those individuals who were not selected in 2014. The x-axis shows the baseline percentile rank earned by candidates in their first exam in 2014. The y-axis shows the re-application rates.

Figure C1.2: Share reapplying in at least one out of next 5 years



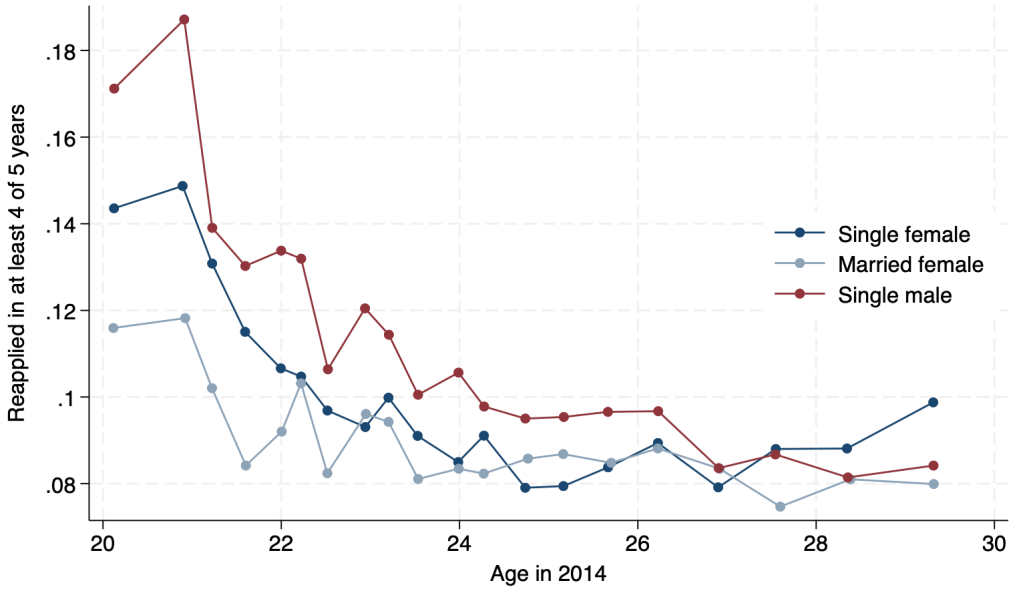
Notes: This figure plots non-parametric estimates of the fraction of individuals who reapplied at least once in the next five years after their initial attempt. Our first-time applicant sample is restricted to only those individuals who were not selected in 2014. The x-axis shows the baseline percentile rank earned by candidates in their first exam in 2014. The y-axis shows the re-application rates.

Figure C1.3: Share reapplying in at least 4 out of next 5 years



Notes: This figure plots non-parametric estimates of the fraction of individuals who reapplied at least four (out of five) years after their initial attempt. Our first-time applicant sample is restricted to only those individuals who were not selected in 2014. The x-axis shows the baseline percentile rank earned by candidates in their first exam in 2014. The y-axis shows the re-application rates.

Figure C1.4: Reapplication by age, separately by marital status and sex



Notes: This figure shows non-parametric estimates of the fraction of first-time applicants from 2014 reapplying in at least 4 out of the next 5 years from 2015 to 2019 by their age in 2014. We plot these estimates separately for single men, single women, and married women, after controlling for their baseline exam performance.

C.2 Re-application across years

	All applicants		Top-quartile	
	(1) $\geq$ 2 years	(2) $\geq$ 3 years	(3) $\geq$ 2 years	(4) $\geq$ 3 years
Female	0.0202***	0.0033**	0.0137***	-0.0044
	(0.002)	(0.002)	(0.005)	(0.004)
Baseline Rank	Y	Y	Y	Y
Baseline Exam FE	Y	Y	Y	Y
N	271936	271936	44613	44613
Male Depvar Mean	0.294	0.181	0.389	0.270

Notes: This table considers gender differences in reapplication behavior for our sample of first-time applicants. Reapplication is defined as appearing in at least two or three years out of 5 years, respectively. Columns 1–2 consider all applicants in our preferred sample, whereas columns 3–4 restrict the sample to the top quartile of baseline scorers. Regressions control for the baseline percentile rank and include baseline exam type fixed effects. Robust standard errors are in parentheses.

C.3 Alternate Definition of First-time Applicant: One-year Lookback Period

	Baseline performance		Reapplication in consecutive years			Reapplication over 6 years		
	(1) Pctl Rank	(2) Top-scorer	(3) 1 year	(4) 5 years	(5) 6 years	(6) $\geq$ 1 time	(7) $\geq$ 4 times	(8) $\geq$ 5 times
Panel A: All individuals								
Female	3.6710***	-0.0011***	-0.0218***	-0.0176***	-0.0152***	0.0044***	-0.0098***	-0.0156***
	(0.086)	(0.000)	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
Exam Type FE	Y	Y	Y	Y	Y	Y	Y	Y
Baseline Rank			Y	Y	Y	Y	Y	Y
N	430954	430954	429849	429849	429849	429849	429849	429849
Male Depvar Mean	45.899	0.003	0.464	0.070	0.048	0.592	0.171	0.171
Panel B: Top quartile of baseline scorers								
Female			-0.0497***	-0.0399***	-0.0333***	-0.0148***	-0.0320***	-0.0375***
			(0.003)	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)
Exam Type FE			Y	Y	Y	Y	Y	Y
Baseline Rank			Y	Y	Y	Y	Y	Y
N			96350	96350	96350	96350	96350	96350
Male Depvar Mean			0.561	0.121	0.087	0.670	0.249	0.166

Notes: This table considers our pipeline results under a modified definition of first-time applicants that only consider a one-year look-back period. Our sample is now a cohort of 2013 applicants who did not appear in any exams in 2012. Columns 1–2 consider measures of baseline performance, whereas columns 3–8 look at measures of reapplication behavior. Panel A includes all individuals. Panel B restricts to the top-quartile of baseline scorers, i.e. those who achieved a percentile rank of 75 or higher in the first exam attempt. Regressions in column 3–8 control for the baseline percentile rank and include baseline exam type fixed effects. Robust standard errors are in parentheses.

C.4 Alternate Definition of First-time Applicant: Younger than 24 years of age

	Baseline performance		Reapplication in consecutive years		Reapplication over 5 years	
	(1) Pctl Rank	(2) Top-scorer	(3) 1 year	(4) 5 years	(5) $\geq$ 1 time	(6) $\geq$ 4 times
Panel A: All individuals						
Female	0.7509***	-0.0012***	-0.0062***	-0.0162***	0.0244***	-0.0172***
	(0.147)	(0.000)	(0.002)	(0.001)	(0.003)	(0.002)
Exam Type FE	Y	Y	Y	Y	Y	Y
Baseline Rank			Y	Y	Y	Y
N	136562	136562	136349	136349	136349	136349
Male Depvar Mean	42.491	0.002	0.249	0.055	0.501	0.125
Panel B: Top quartile of baseline scorers						
Female			-0.0174**	-0.0279***	0.0143**	-0.0256***
			(0.007)	(0.004)	(0.007)	(0.006)
Exam Type FE			Y	Y	Y	Y
Baseline Rank			Y	Y	Y	Y
N			20029	20029	20029	20029
Male Depvar Mean			0.392	0.110	0.595	0.213

Notes: This table considers our pipeline results after further restricting our preferred sample to under 24 years of age. That is, the sample in this table is a cohort of 2014 applicants who did not appear in any exams in 2012 and 2013, hold a college degree, and are under 24 years of age. Columns 1–2 consider measures of baseline performance, whereas columns 3–6 look at measures of reapplication behavior. Panel A includes all individuals. Panel B restricts to the top-quartile of baseline scorers, i.e. those who achieved a percentile rank of 75 or higher in the first exam attempt. Regressions in column 3–6 control for the baseline percentile rank and include baseline exam type fixed effects. Robust standard errors are in parentheses.

C.5 Heterogeneous Effects on Future Attempts by Receipt of Marriage Proposal

	Single Women		Single Men	
	(1) Proposal=1	(2) Proposal=0	(3) Proposal=1	(4) Proposal=0
Info	-1.726***	-0.790**	-0.160	-0.390
	(0.643)	(0.314)	(0.683)	(0.251)
Info × HH prime	1.599*	0.449	0.132	-0.253
	(0.884)	(0.442)	(0.983)	(0.363)
HH prime	-0.243	-0.256	0.536	0.181
	(0.606)	(0.300)	(0.717)	(0.265)
R-Squared	0.09	0.04	0.01	0.01
N	200	873	162	1234
Control Mean	6.844	6.809	5.744	6.236

Notes: This table considers treatment effects on the number of future attempts candidates are willing to make for different sub-samples. Data come from the 2022 survey of applicants. The question is "Knowing what you know now, what is the maximum number of attempts you would be willing to make in the Group [1/4] exam?", where Group 1/4 is shown as per the exam strata assigned to the respondent. The variable was top-coded in the survey at a maximum of 10 attempts. Columns 1–2 show the effects on single women separately, whereas columns 3–4 consider single men. Columns 1 and 3 consider the effects for individuals who report having already received a marriage proposal at the time of the survey, whereas columns 2 and 4 restrict to those respondents who had not yet received a marriage proposal. The regression includes exam strata fixed effects. Robust standard errors are shown in parentheses.