Breaking Glass-ceiling for Women using Vertical Ties

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Breaking glass-ceiling for women using vertical ties: evidence from Indian garment manufacturing*

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Abstract

Large manufacturing factories rely heavily on referral for promoting workers to managerial roles. Since these roles require skills which are not directly observable to the management, supervisors invest costly (production time) resources to observe and make referrals. This practice creates barriers for historically disadvantaged groups as they are less likely to be observed for these qualities and hence are less likely to be referred. However, our theoretical model shows that 'suitable' workers from this disadvantaged group can engage in costly signalling and gain referrals. We test these predictions by incorporating elements from experimental methods to overcome data limitations in the context of Indian garment manufacturing factories. We find that women are less likely to be referred for high-valued managerial roles, however, equally likely for less-valuable promotions. Further, women with larger vertical networks are more likely to be referred. Our results are driven by the fact that signaling is costly for women (i.e., forging heterophilous informal vertical ties due to strict cross gender interaction norms) and only suitable women incur this cost. Our results are robust to consideration of other factors such as aspiration levels, other types of ties, out-of-factory networks, and supervisor's characteristics. We conclude that women can break the 'glass ceiling' by having larger informal vertical

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networks. Further, management can provide *protected* formal avenues for cross-gender interactions as a step forward in addressing gender gaps at managerial levels in the short run.

KEYWORDS: workplace ties, gender, referrals, signaling, garment manufacturing, India

JEL CLASSIFICATION: D22, D91, M510, M540, Z130

1 Introduction

Generally, the transformation from a blue collar to a managerial level requires a worker to acquire a vast set of skills that are quite different from worker's routine tasks. Further, these skills are either costly to observe in real production time or imperfect to assess by the management, especially in manufacturing sector. One way around this problem for management is to rely on referrals of existing intermediate managers who work most closely with the workers. In such settings, having ties with seniors (i.e. *vertical ties*) play an important role in career advancement of a worker as vertical ties provide access to non-redundant information, advice, influence and instrumental resources (Ibarra (1993)). However, referral based promotion and hiring practices have a tendency to create barriers for the historically disadvantageous groups due to either favoritism, homophily, stereotypes or discrimination (Kanter (1977), Brass (1985)).

Our study focuses on large organised garment manufacturing factories in India where use of referrals for hiring and promoting workers is quite widespread (Afridi et al. (2020)).[1] Historically, Indian garment manufacturing sector has employed women at blue collar level and men at monitoring and supervisory roles (Krishna (1987), Chakravarty (2004)). This trend continues even today as women acquire 0-15% of managerial positions despite comprising 60-90% of labor force with huge regional variation across India (Ranganathan and Shivarama (2017)).[2]

The garment factory set-up gives us a nice setting to understand and explain why

[1] Afridi et al. (2020) note that 64% (71%) of workers (supervisors) using the informal channel for job information came to know about their current job opening through a factory employee in industrial hubs of NCR.

[2] Existing literature across developing countries in this context has mainly focused on supply side constraints. Training programs by government and NGO partners aimed at preparing women for monitoring roles have failed to increase the female representation at the managerial level in Indian garment factories (BSR (2017)). An extensive experimental study from Bangladeshi garment factories by Naeem and Woodruff (2014) found that female trainees (for the supervisory role) were half as likely as men to be hired as supervisors despite doing better in training skill tests and staying longer in the factories.

such a pattern persists. Given the large number of workers on the factory floor, and the fact that skills required for managerial positions are not directly observable, managers and supervisors have to spend costly resources (production time) to identify suitable future supervisors. Here manager use their prior beliefs to undertake observational effort allocation. Existing intermediate managers focus on male workers and as a result mostly males get referrals (and subsequent promotion). Women do not get observed to that extent for possible referrals, without any evidence of being unsuitable for the role. However, we find that women can signal their suitability by undertaking costly signaling activities. Since most of the seniors for women workers are men, forming informal ties with senior is costly, due to the presence of cultural barriers around cross gender interactions. Since this varies across women workers, those with suitable skills for managerial positions have lower costs (as we later explain in detail). Hence there exists a separating outcome where some women workers form cross gender vertical ties and do receive referrals. Thus women can break the glass ceiling by investing in informal ties with seniors.

Our mechanism is similar in spirit to *the invisibility hypothesis* where workers from disadvantageous groups can become visible by networking (Milgrom and Oster (1987)). However, unlike the invisibility hypothesis where managers benefit from keep a group invisible- here women are initially invisible because of the nature of costly screening. Visibility is gained through costly signaling. Still not many would undertake such tie formation because the net gains would be less for those with high costs. A higher cost of signalling for the disadvantageous group makes our model and analysis unique.

Workplace organization literature from white collar job settings from developed countries show that women workplace ties differ structurally from men's and may result in career immobility and inequality within an organization (Ibarra (1997)).

Granovetter (1973) highlighted the strength of weak ties in his seminal work and since then this concept has been used widely in labor economics to show (theoretically and empirically) how smaller and tighter network density (i.e. fewer and stronger ties) can lead to unfavorable labor market outcomes for women (Montgomery (1990), Ioannides and Loury (2004), Calvó-Armengol and Jackson (2004), Mortensen and Vishwanath (1994), Lalanne and Seabright (2016)), Horvath and Zhang (2018), Lindenlaub and Prummer (2017)).

Our paper makes this literature more inclusive by extending this work to blue collar-developing countries settings. To our best knowledge, the only other complementary study in garment manufacturing factories context is by Sharma (2021). It examines the structure of workplace ties by gender and concludes that workplace ties structures of women are not geared towards career advancement. Our paper extends this work by looking at the relationship between probabilities of promotions and vertical ties.[3]

The primary issue with any study attempting to understand relationship between woman's characteristics and career advancement in the manufacturing sector is the absence of enough sample size. A panel study is not helpful either, as there have been no significant changes in the gender composition of the intermediate managers over past three decades (Chakravarty (2004)). Our study overcomes this challenge by adopting elements from lab-in-the-field experiments. We strategically primed gender identity to the existing intermediate managers for recommendations for promotions during formal interactions that were conducted as in-house HR activity. We treat

[3]There is indirect evidence from other contexts highlighting the disadvantages women face when information flows or is accessed through ties. For example, using experimental data from Malawi, Beaman et al. (2018) shows that men refer men despite knowing qualified women (due to strong gender homophily). However, women do not refer more qualified women (due to competition) for jobs. Further, Beaman and Dillon (2018) use social ties data from villages in Mali and find that women are less likely to receive valuable information regarding agricultural technology because they are away from influential nodes in the network. In another Malawi-based study on information diffusion, Yishay et al. (2020) show that women are perceived to be less efficient in male-dominated roles even though no difference exists in the knowledge they possess.

getting a recommendation (equivalent to getting a real referral) as the outcome variable because recommended workers have a higher probability of getting screened and promoted than other factory workers.[4] We surveyed these set of workers along with a random sample drawn from remaining worker who are less likely to obtain in-house promotion for the final data analysis.

Our analysis shows that women are lesser likely to receive recommendations even after we control for interpersonal characteristics, workplace related characteristics and different type of networks. Women are 0.38 pp lesser likely to be recommended for promotion. This difference in probabilities is around 0.59 pp when we consider supervisory promotion. However, there is no significant difference in the recommendation probabilities if we look at grade promotions. It is to be noted that unlike skills required for supervisor's roles, the skills required under different grades are perfectly observable and verifiable making cost of screening lower in real production time. Our data also shows that the probability of receiving a recommendation increases with the size of informal vertical network but only for women. In line with our theoretical model we provide *suggestive* evidence that referred women are indeed suitable as recommended women have more experience, higher education level, undergone skill training, along with having larger informal vertical networks – referred women have significantly higher number of informal ties ($p < 0.01$). Overall, men have larger informal networks than women and there are no significant differences in the size of the informal networks of men by recommendation status. Gender homophily makes it costless for men to forge ties with seniors and thus are of no signalling importance. Interestingly, referred women are no worse than referred men on the set of observables. Infact, referred women are faring better on certain observables like skill

[4] As Table A.1 shows, around 60% of supervisors had used ties to advance in their careers, of which 89% were from the workplace.

training. Thus, supervisors are capable of screening women workers but needs to be asked explicitly about it.

Our paper contributes to the existing literature in multiple ways. First, it shifts the focus from supply to the demand generation process for female managers - an approach that is limited due to data paucity. Generally, gender gaps in monitoring roles are dismissed as supply bottlenecks (e.g. due to lack of aspirations, unwillingness to stay for longer hours, burden of household responsibilities, etc.). We collected information on these elements through our primary survey and control for them in our final analysis. Second, our study is first to take workplace ties literature to a blue collar-developing country job setting. Third, our theoretical model is unique to show that vertical ties can help in updation of existing beliefs/breaking of stereotypes regarding the historically disadvantageous group. Our sample consists of workers who have already entered the job markets and made investment in education, training programs and overcome cultural barriers to some extent, thus, highlighting short run solution to disadvantageous groups' career immobility.[5] Fourth, our paper extends the suggestive literature from lab-in-the-field experiments from developing countries and is applicable to a variety of context. Our study holds importance as it not only provides low cost solution to narrow gender gaps in labor market outcomes but also addresses structural challenges that developing economies need to overcome by hiring more women at monitoring roles in garment factories as men shift away to more lucrative sectors.[6]

Widening of gender gaps as one moves along a career trajectory exists across a wide range of labour markets – from tenured positions in academia to CEOs of multi-

[5]Long term issues in form of outside labor market discrimination such as disparity in investment in education and health, cultural norms regarding gender roles in household, mobility constraints have been well documented and used extensively to explain differences in entry and earnings in labor market by gender.

[6]`https://voxdev.org/topic/firms-trade/\breaking-gender-barriers-how-women-are-becoming-managers`

national companies. Thus, scope of our paper extends beyond garment manufacturing or India as many export-oriented industries(sectors) in developing countries employ women at low-paying low-skilled jobs with little or no avenues for career growth. This study also offers insights into workplace settings with a history of dominance of a particular group at positions of power in the prevalence of informal channels for accessing information.

The remainder of the paper is organized as follows. Section 2 describes the context and setting of this study and we take this set up to develop our theoretical framework in section 3. Section 4 discusses the survey design and the sample. Section 5 summarizes the data set and describes measurement variables. Section 6 presents the data analysis. Section 7 discusses the results and provides robustness checks, and 8 concludes.

2 Context and background

2.1 Women in garment manufacturing

Globally, women represent 68% of the workforce in garment manufacturing with huge inter and intra-country variations. A job in the apparel sector could be the first formal employment opportunity for many women in developing countries (ILO (2017), BSR (2017)). The most common stylized fact in garment manufacturing across developing countries is that 10-20% of men from workforce fill up 80-90% of intermediate managerial positions. This trend has been consistent over decades and often, lack of education, cultural barriers and aspiration are cited as the reason for this skewed representation (Chakravarty (2004)). Women's docility, lack of resistance to lay off, lesser probability of membership of a union and strikes made them the preferred choice for labor force (Chakravarty (2004) reviews this literature). Trade liberalization in 1980s further expanded women's participation in the organized formal manufacturing sec-

tor, albeit with no significant impact on women's representation at managerial roles (Krishna (1987), Chakravarty (2004)). Presently in India, women represent 0-15% of managerial roles with huge regional variation (Ranganathan and Shivarama (2017)). It is indeed puzzling that a pool of 10-20% of the male workforce fills up 90% of the managerial positions in garment manufacturing units in developing countries (Naeem and Woodruff (2014)).

Indian garment manufacturing employs a population of 12.3 million (2018). It provides employment opportunities to millions of underprivileged individuals from the country's most backward parts (GOI (2018)). Women comprise around 60% of the workforce in garment manufacturing with huge regional variation (BSR (2017)). Despite being in the majority and more productive as skilled operators, women in garment manufacturing face numerous challenges such as over-representation in low-paying and low-skilled tasks, under-representation at managerial positions, wage-gaps, unsupportive norms and power dynamics (ibid). In past decade, Indian government and NPOs have taken many initiatives to increase women representation at supervisory roles (ibid). However, we are yet to see any drastic impact of these training programs.

2.2 Importance of vertical ties at the factory

Production in garment factories takes place in assembly-lines across multiple floors, which is called the sewing or stitching department (or production floors).[7] Majority of workers in the production lines are operators (involved in sewing the garment, sitting on stitching machines one behind the other), followed by helpers who do complementary jobs of folding, pressing, and marking intermediate garments pieces for operators. Apart from these, a line also has writers and feeders (responsible for

[7]For details on production floor organization and process, refer to Afridi et al. (2020) which covers the same set of factories.

recording line and task output), checkers (checking the quality of output). A line may also have a few thread cutters and a needle keeper. All these workers fall into different skill-grade levels that determine their salaries and position in the career trajectories. Operators' jobs involve more skilled tasks than helpers. Different grade levels in progression are 1.) Unskilled (mostly helpers, type C tailors), 2.) Semi-skilled A, 3.) Semi-Skilled B, 4.) Skilled A, 5.) Skilled B and 6.) Highly Skilled. These grades depend on the worker's role, experience, and performance in the entry-skill tests at the hiring time. A worker moves along these grades according to the performance on the production floor and the intermediate managers' recommendations. With experience, performance and seniors' support, a worker can move out of the workforce and become a supervisor (of course, when demand for such roles arises, which does not follow any pre-specified time-line).

This study focuses on the workers' vertical ties because vertical ties have been shown to be an important source of information, mentorship, and access to influence and thus career advancement (Ibarra (1993)). In our context, vertical ties would mean a worker having connections or interactions with anyone from the managerial staff, e.g., supervisors (their immediate monitor/mentor), floor in-charges, floor managers, etc.[8]

Discussions with the management of the sampled factories revealed no fixed time-bound promotion system. The hiring of supervisors takes place through an internal promotion process or referrals as and when need arises. Moreover, recommendations of existing supervisors and floor in-charge play a significant role in screening and men-

[8]The supervisory position is the first entry-level managerial post at the factory. Hierarchically, line in-charge, floor in-charge, and production-head succeed supervisor. The factory head is the top production managerial position and deals directly with CEOs and factory owners. In the sampled factories (similar to the garment factories in the developing countries), men dominate almost all the managerial positions except for some intermediary HR positions. For a worker, ties with any of these seniors can be a key to career advancement. **??** depicts the hierarchy structure of production department at a typical garment production unit

toring workers for grade promotions, assistant supervisory and supervisory roles. One must note that the competition for supervisory positions is very intense, especially for women.[9] For the same qualification and ability, a potential candidate with access to referrals from these vertical ties is more likely to be hired for a factory position.[10]

The importance of workplace ties becomes evident when we look at a typical supervisor's career trajectory (refer Table A.2). Around 68% of supervisors used their ties to access job opening information, of which around 50% originated at the workplace. Not surprisingly, 96% of male supervisors ties are men whereas for women this percentage is around 44%. Around 60% of supervisors contributed their career advancement to a mentor/motivator, with 91% (56%) of female(male) supervisors giving credit to their seniors. Around 89% of these mentor/motivators are males. This highlights the importance of the gender-heterophilous ties for women's career advancement, unlike men. Women have a significantly higher number of seniors in their workplace networks, but there are no differences in the size of friendship networks at the workplace or ties they access outside the factory for career advice.

Using this context, we develop a theoretical framework below.

3 Theoretical framework

Consider N workers employed to perform various tasks on the factory floor. We shall focus on two subgroups, as per gender (f & m),female (f) members outnumber the male (m) members, $N_f > N_m$ where $N_f + N_m = N$. We shall use N_g to denote the set of $g - type$ workers, as well its cardinality. These workers are managed by intermediate managers, who can refer one (or more) worker for promotion to a

[9]For instance, in our sample worker to supervisor ratio is around 68:1

[10]Intermediate managers' monthly salaries include the variable element that depends on the line-level performance, so their incentives to refer efficient workers are high. Also, since intermediate managers themselves depend on factory management for their career growth (i.e., their vertical ties), they need to recommend highly efficient workers for maintaining their reputation and influence with the higher management.

supervisory role. We do not specify the gender of the manager, but note that the managerial hierarchy is mostly male. For the purpose of the model, we consider it to be exclusively male. We discuss the implications of relaxing this later.

Suitability is a function of various attributes such as leadership skills, aspirations, and flexibility (work hours, time demands). Leadership skills refer to an individual's ability to communicate across the workplace. We assume that workers make investment in attaining this suitability. This could be making arrangements at home to do flexible hours, to cut down on social time to communicate with team members, to take part in training activities. A worker's cost of this investment is $\underline{a} \leq a \leq \overline{a}$ distributed according some function (uniform distribution). This distribution is same across both groups. While output at the shop floor is observable, suitability is not. This investment makes a worker suitable (s), in the absence of investment the worker is unsuitable (u). Since we want to focus on pure incentive issues - we have ignored some inherent skills which would make someone suitable.[11]. Hence the worker can be of two types, $\tau = s, u$. Let θ denote the prior belief of the manager regarding a worker being suitable for referral/promoted role: $\Pr(i \text{ is suitable}|\ i \in N_f) = \theta_f < \theta_m$.

3.1 Worker's Decision Problem

Workers can form *vertical ties* t, $\overline{t} \geq t \geq 0$. Note that t can encompass both the number of ties, and the depth of each tie. For the moment we abstract from these and assume it captures both. While one may derive direct utility from these ties, our focus is more on purely professional ties, unlike horizontal ties where members derive direct benefits (social interactions). This means that these ties are costly to form, $C(t, \tau)$, with C increasing in the first argument and $C(t, s) < C(t, u)$. We assume the standard conditions on the cost functions so that single-crossing condition is satisfied.

[11]We can modify it to include that even if someone is inherently suitable, they need to 'signal' it, given established referral practices in our context

We can restrict attention to the simple linear case $C(t,\tau) = c_\tau t, c_s < c_u$.

The direct benefit of t is given by $B(t,g)$, with $B^{/} > 0, B^{//} \leq 0$. In general, direct social benefits will depend on whether ties are homophillic or heterophillic. Hence, in our context, given the all male vertical hierarchy assumption, $B(t,f) = 0, B(t,m) > 0$.

3.2 Female worker's decision problem

Then why would the female workforce be interested in forming any vertical ties at all? This is where, one of the key contributions of this paper lies. We argue that t can act as a signal of a female worker's suitability for supervisory role. If identified as suitable, the worker gets promoted (can be modified to include the case where promotion is with some probability) and gets a higher wage $W_s > W_o$ where W_o is the current (ordinary worker) wage. It is worth noting that supervisory wages are 3-4 times higher.

We consider a scenario where the cost of forming ties with a supervisor of different gender is higher.[12]. Assume $C_{he}(t,\tau) > C_{ho}(t,\tau)$. We can take $C_{he}(t,\tau) = c_\tau t$ and $C_{ho}(t,\tau) = C_m(t,\tau) = hc_\tau t, h < 1$.[13] This means that female workers face higher cost of of forming vertical ties, $C_{he}(t,\tau) = C_f(t,\tau) = c_\tau t$. Additionally, the $s - type$ has lower costs because they have better communication skills and they have already benefited from increased communication and adaptability. Likewise, raising the level of ties would also mean greater demands on time and effort- hence costs are higher.

A choice of t determines the probability that the worker is promoted, here we take referral to mean promotion. This can be relaxed and we can consider where the referred worker gets promoted with probability δ. A typical female worker will

[12]The garment industry is unique in the sense (or not) that the supervisory cadre is mostly male and the workers on the factory floor are mostly female. Hence, the cost of forming a vertical tie will be different for male and female.

[13]We can also consider a case where cost of forming ties in a homophiliy setting is zero

maximize $EU(t)$, expected wage minus the cost $W_s - W_o - C_f(t, \tau)$.

3.3 A separating outcome

Can the $s - type$ female worker signal her type to the intermediate manager by a suitable choice of t? Given the conditions on C and the fact that W_s is high, it is reasonable to expect the existence of such a level of t, call it t^*. So the intermediate manager, who is making the referral, believes after observing $t \geq t^*$ that the probability that the worker is $s - type$ is 1. More specifically, consider an equilibrium where $s - type$ chooses t^* and the $u - type$ chooses $t = 0$, and manager's belief after observing t is $\rho(i = s \mid t \geq t^*) = 1$ & $\rho(i = s \mid t < t^*) = 0$.

$$W_s - c_u t^* = W_0, t^* = \frac{\triangle W}{c_u}, \text{ where } \triangle W = W_s - W_o$$

It is easy to check that $W_s - c_s t^* > W_0$.

There are two points to be noted. First, such a t^* may not exist, in that case we won't see any vertical tie formation, because in any pooling equilibrium, there is no incentive to choose any positive level of ties.Second, because of gender heterophylly, the cost to the $s - type$ is high and net benefit from being suitable is not substantial (at least compared to someone who does not have to incur this cost).

Assuming such a separating equilibrium exists, net benefit from being suitable will be given by

$$\triangle W(\frac{c_u - c_s}{c_u}) = \triangle W\lambda = G_f, \lambda < 1$$

This means only those female workers with $a \leq G_f$ will choose to make the early investment to be considered for promotion to supervisory role or become $s - type$.

Proposition 1 *For certain parameter values, there is an equilibrium* (θ_f^*, t^*) *such*

that $\theta_f^* = \frac{G_f(t*)-\underline{a}}{\triangle a}, \triangle a = \overline{a} - \underline{a} > 0$. θ_f^* *is increasing in* W_s *but decreasing in* c_s.

If we consider the observed levels of ties to be equilibrium ties, t^* is rising in W_s but decreasing in cost parameter c_u.[14] It is possible to have a case where t^* is high, but due to high costs, θ_f^* is low.

Corollary 1 *Assuming such an equilibrium exists, female workers with vertical ties will be referred.*

3.4 Male worker's decision problem

It would be interesting to contrast the above with the decision problem facing the male workers. Note two key differences to start with: (1) male workers derive positive benefit from vertical ties (because of gender homophily) and (2) cost of forming vertical ties is small. Hence vertical ties don't have such signalling role any more. We do not offer a formal demonstration of this but now for a separating equilibrium the $s-type$ male worker will have to choose a much higher level of t to separate. Now, if t^* exists, it will be given by $t^* = \frac{\triangle W}{hc_u}$, $h < 1$.[15] To distinguish from the previous case, call it $\widehat{t}$. Clearly, $\widehat{t} > t^*$. If costs associated with this are very low, $h \to 0$, then $\widehat{t}$ will be substantially higher and we may have a situation $\widehat{t} > \overline{t}$. To simplify the analysis we make an addition assumption $C_m(t,\tau) = C_m(t,s) = C_m(t,u) = hct$.

But will male workers choose to have no ties at all? No, since there is direct benefit, a male worker will maximize $B(t,m) - hct$. This leads to a positive level of t but since it is a pooling equilibrium, referral does not depend on the level of ties.

Claim 1 *Male workers pool at* $t = t^{**}$, *which is high if costs are low, but referrals are not linked to ties for male workers.*

[14] We can enrich the model to include other variable which will impact t^* or θ^*.

[15] This is assuming equal benefits, to all male workers. In reality, direct benefits may not be same for different workers.

Same time, it is easy to what happens to the incentives of the male workers. In the light of Lemma 1, a male worker does not have to incur any cost to signal his type. Even when we assume the same cost distribution for acquisition of supervisory skills, more male members will choose to invest. $\theta_m^* = \frac{\triangle W - \underline{a}}{\triangle a}$. The higher the value of λ, greater is the difference between proportion of potential referral candidates.

3.5 Costly Information Acquisition and Existence of Stereotypes

As we have seen in our survey, intermediate managers do derive some benefit from referring suitable candidates. Hence, rather than pick someone at random, the manager can use resources to gather information (use observations, check records) regarding suitability. This is likely to be costly. If this information acquisition cost is a per-worker fixed cost $d > 0$, the manager would try to acquire information regarding a subgroup, and in our context – it is the male group. Recall that manager has a prior belief that $\theta_f < \theta_m$. Hence it cannot be the case that any female worker is being monitored. The same amount can be shifted to a male worker, with a higher probability of finding a suitable candidate.[16]

It does not matter, whether the manager takes this decision after observing vertical ties or not. But we prefer an extensive form where the manager chooses its information acquisition strategy before ties are formed.

Claim 2 *If the manager has to choose a sample of workers to seek information, of given size $x < m$, $X \subset N_m$*

Now, it is easy to what happens to the incentives of the male workers. In the light of Lemma 1, a male worker does not have to incur any cost to signal his type. Even

[16]We may obtain similar set of results even if we assume that there are no priors but the historically disadvantageous group needs to signal strongly to be visible. However, as we show later that the existing supervisors do have strong beliefs/priors regarding suitability of men and women for supervisory roles, we built our model using prior narrative.

when we assume the same cost distribution for acquisition of supervisory skills, more male members will choose to invest. $\theta_m^* = \frac{\triangle W - a}{\triangle a}$. The lower is the value of λ, greater is the difference between proportion of potential referral candidates. We summarize this:

Proposition 2 *Male workers are referred in larger numbers than their female counterpart, and unlike the female workers, male workers do not have to incur any cost to signal their suitability. In equilibrium, $\theta_m^* > \theta_f^*$ and this justifies the manager's strategies regarding information acquisition and referrals.*

It is interesting to note that having a female intermediate manager is not going to change anything. She will also hold similar beliefs- as these are verified in equilibrium.

Some verifiable results: 1. Existence of commonly held belief that females are less suitable for supervisory jobs

2. Both groups will form vertical ties, male possibly higher (depending on the cost).

3. Females will be referred less

4. Vertical ties are related to referrals for female workers but not for male workers

We take this model to the data in the following sections. While result 1 and 2 come directly from the setting and data description, we use regression analysis to provide empirical evidence for the result 3 and 4.

4 Survey design and sample

4.1 Survey design

Our sample consists of three ready-to-wear apparel manufacturing factories under the same exporting enterprise - two factories located in Faridabad, Haryana and one factory located in Bangalore, Karnataka. Since these factories are under the

same business house, they are similar in broad macro managerial practices, policies, incentive schemes, salary structures and production processes. The micro differences come from state governments' policies (e.g. minimum wage laws, the definition of skill-grade level, etc.). However, these differences do not pertain to hiring and promotion rules and practices or gender representation requirements (as per the interviews with HRMs). [17]

Our data collection process was facilitated by the HR department of the factories. Survey was pitched like an HR activity to ensure reliability and took place in two stages. In stage 1, we interviewed supervisors and floor in-charges from the sewing department via telephone. The interaction lasted for 45 minutes to one hour. The interview consisted of four major sections - 1.) Basic demographics, 2.) Professional characteristics 3.) Professional networks, 4.) Hypothetical situations asking for recommendations. Section (1) consisted of questions regarding personal characteristics like age, education qualification, marital status, native village, etc. Section (2) asked questions on work experience, career trajectories, training programs, etc. Section (3) consisted of questions on ties that helped the respondents at different stages of their career and current workplace ties that help them at the workplace.

In section (4), respondents were asked sequentially to recommend workers for (a.) Grade promotion, (b.) Supervisory promotion.[18] In the second situation, respondents

[17] In the pilot stage of the survey, Human resource managers across different regions of India (North, South, West, and Center) belonging to a different type of garment manufacturing factories like knitwear, woolen wear, protective wear, etc. were interviewed through a detailed questionnaire on factory profile, gender composition at different hierarchy level, production process organization, hiring and promotion policies. These discussions revealed similar trends in terms of gender representation at different hierarchy levels and recruitment policies. To increase the study's precision, I approached factories manufacturing ready-to-wear apparel for the international market requiring similar skill sets and production set up to be a part of this study.

[18] Grade promotion means a worker rising from lower-skill grade level to higher skill grade level, involving an increase in designation and salary; supervisory promotion means a worker becoming supervisor i.e., entry-level staff position. Since supervisors may feel threatened by supervisory promotion questions, they were asked about grade promotion as well. A similar questionnaire (but shorter due to time constraints) was administered with floor in-charges to mitigate the bias in recommending workers due to the competition channel.

were asked to refer people from their social networks (workers not employed in their factories). The third and fourth situations we primed the gender identity by asking for women and men workers from the current factory for both types of promotions, respectively. After noting down all the recommendations, for each recommended worker, a series of questions captured productivity, nature of ties, informal and formal interactions, etc. This section also had some generic perception-based questions. The questionnaire design and data collection process took the utmost care to finish stage 1 interviews speedily to avoid discussion among respondents that may influence their responses in section (4). After the end of the interviews, unique worker IDs were collected for the recommended workers (through follow-up calls) to map them with the workers' Human Resource list.

We call these workers 'High potential workers' (HPW) as they have higher probability of promotion from the given pool of the workers at the time of our study. A random sample of similar proportions (i.e., the proportion of recommended workers out of the production department's population) from each production line was created after removing HPW from the production department population. These workers have a lower potential to get promoted (low potential workers i.e., LPW) compared to the recommended workers, whatever may be the reason for the workers' recommendation.

In stage 2, we interviewed all the HPW and LPW to collect information on their personal characteristics (in section 1), professional characteristics (in section 2), workplace ties and interactions with seniors, social networks, and aspirations (in section 3).

All the surveys took place after working hours (6:30 pm to 10 pm and 9:30 am to 7:00 pm on Sundays) using the contact numbers present in the HR records, to avoid disturbance during working hours. Further, we took the help of the HRD to

get in touch with workers who did not have a personal phone or had invalid numbers. Worker surveys took around 20 minutes to complete. All the data was collected digitally in a uniform template using SurveyCTO application on android phones.[19]

4.2 Sample

Table 1 describes the sample. Our sample comes from three different factories labeled as - F0, F1 and F2. F0 and F1 are from Faridabad, Haryana (North India) and F2 from Bangalore, Karnataka (South India). We interviewed 120 intermediate managers and 1098 workers through study design. The final sample becomes 102 intermediate managers and 1076 workers.[20] Across these three factories, our final sample comes from 106 production lines that span over 13 production floors (sub-units).

As mentioned earlier, all three factories are under one enterprise with no difference in gender-specific promotion policies. Still, we observe some variation in the hierarchy structures as given by Table 1. F0 has only male supervisors and floor in-charges, F1 has around 20% of supervisors as women and F2 has 15% and 11% as female supervisors and floor in-charges, respectively. It is in complete contrast with the gender composition of the labor force with women forming almost 90% of the workforce. The proportion of sampled women workers ranges from 78% to 89% across three factories due to survey design. Gender priming helps in covering a notable proportion of HPW women that one would certainly miss out if looking at the sample of promoted workers alone. We received around 526 recommendations that map into 404 unique workers. The survey of these workers (HPW) was supplemented

[19] Approval for the survey and questionnaire comes from IFMR Human Subject Committee (September 2020).

[20] We drop around 2% of 1098 interviewed workers from the analysis as they belonged to male-dominated departments such as packing, sampling, inventory management (with female participation <20%) to avoid supply constraints concerns. Some supervisors listed as supervisors in the production/sewing department but managed sub-divisions that hardly had female workers drop out from the analysis.

by including a randomized sample of workers (LPW).[21]

64% of the sample is from the North Indian factories with almost equal shares of F0 and F1. The mix of workers is similar in factories in Faridabad as they are located within a radius of two kilometers. The majority of workers in F0 and F1 are migrants from the northern state of U.P and the eastern state of Bihar and speak mostly Hindi-based dialects. Majority of workers in F2 are migrants from other districts within Karnataka, followed by a significant proportion coming from the eastern states of Odisha and Jharkhand (14%). Respondents in F0 and F1 were interviewed in Hindi by a mix of male and female surveyors. Respondents in F2 were interviewed according to the language of their preference, with 71% (98%) of workers (intermediate managers) interviewed in Kannada by a mix of male and female surveyors.

Women's dominance in the sewing department of North Indian factories is relatively a newer trend than the industrial hubs of South India (but fairly older in both). Besides that, North Indian society is relatively more patriarchal than South Indian society. However, in this study's experience, it meant little for gender interaction norms as we found that a minor proportion of F2 workers (but larger than North Indian workers) was uncomfortable with being interviewed by the surveyor of the opposite gender. They were re-assigned surveyors accordingly.

Our primary analysis uses workers' sample as the gender variation in the existing intermediate managers' population is insufficient.[22] Insights from supervisors' interviews have been used throughout the paper, and supervisor characteristics have been

[21]The randomization was done at line level. First we calculated average proportion of workers referred per lines conditional on receiving at least one referral. Some supervisors were new hires and thus refrained from recommending any factory worker. We drew the calculated proportion of workers from each line (including those without any referrals as well) after removing HPW from the HR line-workers list. Details are given in Panel B of Table 1.

[22]Only 10% of intermediate managers are women.

summarized in the appendix (see Table A.1, Table A.2). Our outcome variable, i.e., getting referrals (i.e., recommendations), comes from these interviews. Intermediate managers gave recommendations across different lines and around 24% of intermediate managers did not give any recommendations for supervisory promotions.

The following section summarizes the main data set used in the analysis.

5 Data, summary statistics and measurement variables

5.1 Data and summary

Data analysis pools together data of all the workers. Similar to the overall gender composition of the garment sector, 82% of our sample consists of women workers. Out of 1076 workers, 36% (382) of workers are HPW. Due to our survey design, we have 282 recommended women (HPW). These women have higher career advancement probabilities as compared to other women in the factories.

The study also uses data collected from the human resource department to control some of the structural variables like the size of the production line, the proportion of females in the line, assigned line, and skill-grade. The average size of the line is around 47 workers with the proportion of females around 0.90. On average, this study covered ten workers from each line (consisting of HPW and LPW).

Table 2 describes characteristics of a typical worker. A typical garment manufacturing worker is likely to be a migrant married Hindu woman, 32 years old, belonging to a nuclear family having slightly above than secondary education level. Column 4 shows that men and women differ significantly across various demographics. Men have higher education levels, more likely to be migrants from other states, and the family's sole bread earner. The household chores responsibility mostly falls on women, and they are more likely to be older, married, and living in joint families.

Panel B depicts differences in professional characteristics. Women are more likely

to have undergone stitching training (through training centers before entering factories) and are first-time employees with slightly but significantly lower salaries. They are more likely to be operators but at significantly lower skill-grade rank.[23] Men have significantly higher total experience in garment manufacturing but not within the same factory. Interestingly, these differences do not appear between male and female supervisors (refer Table A.1).[24]

Panel C shows differences in the ties used for accessing job information. Around 70% of the workers used a tie to access job opening information in the current factory. Both men and women used homophilous (by gender) ties for accessing information, with men using kinship ties more.

5.2 Measurement of outcome variables

As explained earlier, our outcome variable, which reflects the potential for future career growth (i.e., referrals), uses recommendation data obtained from the supervisors and floor incharges' interviews. Measures of this potential are - 1.) Recommended, *viz.*, a worker receiving a recommendation from any intermediate manager for any type of promotion (supervisory or grade, before or after gender priming), 2.) No. of times recommended, *viz.* sum of recommendations received from unique intermediate managers, irrespective of the type of recommendation, 3.)'Recommendation score' is a weighted sum of different type of recommendations with a score of 4 assigned if a worker receives recommendation without gender priming for a supervisory position, 3 if receives recommendation after gender priming for a supervisory position, 2 if receives recommendation without gender priming for grade promotion, 1 if receives recommendation after gender priming for grade promotion. In addition

[23] One must note that a significant proportion of men are already on career progression track (around 43% of them are already being tried as substitute-supervisors against 8.5% of women).

[24] Due to sample size issues, I compare all the supervisors interviewed irrespective of the department. This table does not use floor in-charge data as there is only one female floor in-charge.

to this a score of one is added if this recommendation comes from the floor in-charge. For instance, a worker receiving the recommendation for 'supervisor promotion after gender priming' by the floor in-charge gets a score of 4 (3+1). This score is an increasing function of the number of recommendations, the value of the recommendations, and the hierarchy status of the referee. Panel A of Table 3 shows that despite only forming 10-20% of the workforce, men are significantly more likely to be recommended, recommended more numbers of times, and have a higher recommendation score. Figure 1 demonstrate the stark gender gaps in the proxies of career mobility.

5.3 Measurement of explanatory variables

In this study, we are interested in workplace ties due to the well established importance of referrals in the hiring process. From the existing supervisor's interviews (conducted in stage 1 of the survey, refer Table A.1), we observe that around 60% of the supervisors had relied on a mentor for career advancement and this figure goes to 90% for the women supervisors. Further around 55% (70%) of these mentors are current factory senior for the overall (women) sample. These numbers suggest that 'official support i.e. vertical ties' are critical for career growth, especially of women.[25] Thus, we focus on vertical ties of workers, namely, *informal* and *formal*. Formal vertical ties for a worker *'i'* is the sum of number of seniors she interacts to discuss work related issues, factory related news, understanding tasks or career related advice. Similarly, informal vertical ties is the sum of number of seniors a worker *'i'* interacts for discussing personal experiences, problems or family matters or approaches for help.

Panel B of Table 3 shows vertical network size by gender. Average formal vertical network size is as much as four times larger than the informal vertical networks

[25]It is also worth noting that current workplace ties do not differ for supervisors for either of the gender.

probably because work arrangement makes formal interactions as part of the system and routine thus requiring lesser investment from worker's or senior's side. While there are no significant differences in formal vertical network size by gender, men have significantly larger networks when it comes to informal vertical ties. On an average men interact with half a senior informally, more than double of womens' informal vertical network size.

Panel C, Table 3 shows possible ties that can exists between seniors and workers due to familiarity of social characteristics like *jati*, caste, current locality, and native district or state. We observe that a small proportion (<4%) of seniors and workers share same *jati* or current locality (the narrowest categories of social connection).[26] Around 40% of the workers share same caste as their supervisors and around 38% come from the same state. We check if these type of ties are instrumental in career advancement using methodology as discussed in the following section.

6 Methodology and results

6.1 Methodology

We pool HPW and LPW data from all three factories to analyze relationship between receiving recommendations and worker's characteristics using following equation.

$$Y_i = \beta_0 + \beta_1 Gender_i + \beta_2 \mathbf{T}_i + \gamma \mathbf{X}_i + \delta \mathbf{W}_i + \epsilon_i \quad (1)$$

where, Y_i is the measure of *referrals* as described in section 5.2. $Gender_i$ takes value 1 if female, T_i is measure of vertical ties. We also control for other types of possible instrumental ties like if 'Used social ties for current job (=1)' and social ties (like

[26]These type of connection are more prevalent at horizontal level (Afridi et al. (2020)).

relatives, kins, childhood friends, neighbors, etc.) in garment manufacturing sector. X_i is a set of variables measuring inter-personal characteristics as described in Table 2. Our regression controls for Age, Age-sq, Education above higher secondary level (=1), Married (=1), Sole earner (=1), Lives in joint family (=1), No. of children, Caste categories (L=benchmark), Religion (Hindu=1), if migrant to factory state (=1), Experience in garment industry (in years) and square term, current designation Operator(=1), skill-grade level. W_i are workplace-related measures such as number of recommendations for worker i's line, the proportion of females in worker i's line, factory dummy or factory-floor FE. Standard errors are clustered at factory-line level. Our desired specification is uses probit model with factory-floor fixed effects.[27]

β_i's give us the coefficients of interest and help us understand the barriers or pathways to career advancement.

6.2 Results

Table 4 gives results for running probit model on receiving at least one recommendation (col (1), (2)), supervisory recommendation (col (3), (4)), grade recommendation (col (5), (6)). Even after controlling for a variety of covariates that are likely to explain under-representation of women at supervisory roles, we see that gender bias remains. As shown by coefficient against $Female$ (i.e., β_1) women are less likely to be recommended for promotions. However, there is no significant difference if we look at recommendations for grade promotions (less-valuable as compared to supervisory promotion). This validates our result 3, i.e., *females will be referred less.* Results hold with factory-floor fixed effects. Details on other covariates are given in Table A.3 for the strictest specification (see col (1), (4), and (7) for col (2), (4), and col(6) of Table 4).

[27]Since some of the lines have no HPW (because none were recommended from those line), we cannot use factory-line fixed effects. Also, since recommendations mostly came within the same floor (but across line), using factory-floor fixed effects makes more sense.

We break the sample in Table 4 by gender in Table 5. We find the having a larger number of informal vertical ties increases probability of receiving a recommendation for women, whereas no such relationship exists for men. For women, vertical network size matters even for grade recommendation, thus, validation our result 4 - *Vertical ties are related to referrals for female workers but not for male workers.* Col(2), (5) and (8) in Table A.3 show details for other covariates for women subsample. Unlike coefficients on other covariates, β_2 is consistent in sign and significance for womens' subsample. As discussed in the model and validated by the context of our study, formal ties are an integral part of workplace-production process management and lesser costly to forge/maintain. Therefore, they do not have signalling value in theoretical sense. Nevertheless, Table A.4 shows results after including measurement of formal vertical networks in the overall and by gender baseline specifications. Estimates of β_1 and β_2 are strong and consistent with Table 4 and Table 5. Infact, the results reinforce that informal interactions are crucial for women to signal their suitability for jobs that involve directly unobservable/non-routine tasks attributes (see col(5), Table A.4).

In Table 6 we look at other measures of probabilities of career advancement – recommendation frequency (number of recommendation per worker) and total recommendation scores (weighted sum of type of recommendation, see table end notes for details). Again, we see significant gender bias in both the outcomes and a larger informal vertical network increases women's probabilities of career advancement. [28]

[28] For rest of the analysis we focus on specification used in Table 4 and Table 5. We also check for an alternate measure of informal vertical network *viz.* weighting ties according to the hierarchical status and then creating a composite index for vertical network size. We see similar point estimates of β_1 and β_2 in terms of magnitude and significance in Table A.5.

6.3 Robustness checks

6.3.1 Other type of possible informal vertical ties

One may argue that instead of useful information exchange, informal vertical ties may be purely based on social affinity arising from other types of social connections like caste, region or residential cluster. This would imply that results for informal vertical ties may may be driven by favoritism/in-group altruism (etc.). Thus, we check our baseline specification by introducing possibilities of such ties in Table 7. We use a comprehensive index for *jati*, current residential cluster and native district. We find that results on informal vertical ties are quite robust. Moreover, coefficients on *'possible vertical-social ties'* are insignificant emphasizing that results are driven by gender homophily.[29]

6.3.2 Aspiration levels

Women are generally perceived as having low aspirations and men having higher aspirations. Thus, one could argue that the gender bias term that we saw earlier may be masking a lower aspirations (supply side constraints) rather than a manifestation of demand process. Even though, we have controlled for various observables (see list of covariates in Table A.3) that directly or indirectly shape up one's aspiration, we refine our analysis by using *Aspiration index*. *Aspiration index* is based on the responses from a series of questions gauging aspiration levels directly (see table end notes for details). Again, we observe that our baseline results are consistent (refer Table 8). β_1 falls but remains significant and considerable in magnitude. Interestingly, aspiration levels are not significant for men (who have significantly higher aspirations than women to begin with – around 80% higher aspiration than women (see table end notes)) and grade promotions.

[29]Results are robust to using these variables separately. Results are also robust to using native state and same caste, instead.

7 Discussion

Our data analysis highlights the gender bias in recommendations for promotions for supervisor level even after controlling a host of observables, other type of social ties and measures of aspiration levels. The bias does not exist for grade promotions that involves assessment of suitability on directly observable attributes like productivity. Women need to rely on informal vertical ties for supervisory promotions (more valued promotions) while both formal and informal ties may be instrumental for advancement across grades. We have yet not discussed the validity of our theoretical claim that it is the suitable women engage in informal interactions or that the recommended workers are better. Figure A.2 shows that recommended women are better on observables like experience, education level, participation in training programs and in taking initiatives to lead as compared to non-recommended women. Even though, the main focus of our study is women's career trajectories, for completeness sake we look at recommended men's characteristics in Table A.5. As indicated by column (4), recommended men and women have similar experience timelines and in fact women are more likely to have undergone training. Thus, male supervisors are capable of identifying equally capable women if explicitly asked for. Hence, the silver lining for women career mobility comes in two ways – 1.) Women may engage in informal interactions to break the glass ceiling and 2.) Management should pay attention to classic observables to identify suitable women as they probably do for men.

One may argue that since promotion to supervisory roles requires mentoring on the shop floor which is costly in real production, management doesn't want to invest in training women simply because they might get married and leave or may take long leaves for child birth or elderly care. So, even if management has evidence that women may be 'suitable to get the work done', mentoring or promoting them would

be expensive if they are more likely to take longer leaves or withdraw from labor markets after marriage or child birth. Thus, gender bias may actually be the term due to broader gender norms or higher absenteeism (or expected absenteeism) rather than perceptions of the managers. However, using data from Afridi et al. (2020) that uses similar set of factories we know that absenteeism doesn't vary by gender. Also, 79% of women in our sample are already married (therefore less likely to migrate away) and 95% of them have children. Therefore, it is unlikely that absenteeism explains the gender gaps for supervisory recommendations.

We cannot rule out higher bargaining power of men (probably due to their historical advantage) resulting in higher proportion of recommendation. As data shows, women are more likely to stick around within same factory (around 58% women said current job was their first job as opposed to 28% of men in our sample with men having significantly higher industry experience). Managers might not be biased towards hiring women but favor men to keep their attrition low by recommending them for promotion. Women may not need such incentives due to various constraints like lack of time or networks to find new jobs, apprehension of joining at new place, higher travelling time, etc. (basically due to cultural and mobility constraints). In this scenario, if firms decide to promote women (and not be myopic) then it could actually reduce bargaining power of men, equalizing the returns from labor market participation to both genders and eventually containing men's attrition.

Our model begins with the existence of beliefs emanating from stereotypes or historical disadvantage or/and *role congruity theory* regarding women in leadership position (Eagly and Karau (2002)). I use Figure A.3 to validate our assumption regarding prior beliefs of the intermediate managers. Existing managers believe that we see fewer women at supervisory roles because women have higher burden of household responsibilities, lower aspirations, and are unfit as supervisors. The beliefs' distribu-

tion is somewhat similar across female and male supervisors. We have abstained from discussing the other reasons for these beliefs, e.g in-group favoritism or taste based discrimination against female employees. If these were indeed the underlying reasons for the gender bias then we shouldn't be seeing significant formation of informal vertical ties and recommendation of women employees in the data. Also, it is of lesser worry if we assume that firms/management are not myopic (let's say unlike intermediate managers).

8 Conclusion

This study attempted to use cross-section data to answer some of the questions about the barriers women face in career growth in the manufacturing sector, where promotions take place majorly through recommendations/mentoring. We find that in the short run, women can break these barriers by having larger informal vertical networks. We do not claim that the causal impact of having larger vertical networks is higher probability of promotion. Instead, our focus is information element embedded in informal interactions that are of signalling value. From a policy perspective, we suggest that creating *protected* avenues for interactions and encouraging male supervisors to mentor female workers could increase women's representation at the managerial levels. One may worry about sexual harassment at workplace regarding this policy measure and that's why we emphasize that it has to be in protected formal environment under the supervision of the HR. Also, as emphasized by Figure A.2 it should be supplemented by standard observable qualities.

Markets itself will not correct the stereotypes due to information asymmetries and sticky cross gender interaction norms. Therefore, directed attempts to increase women's representation at supervisory roles will go a long way to address gender disparity in and out of labor markets.

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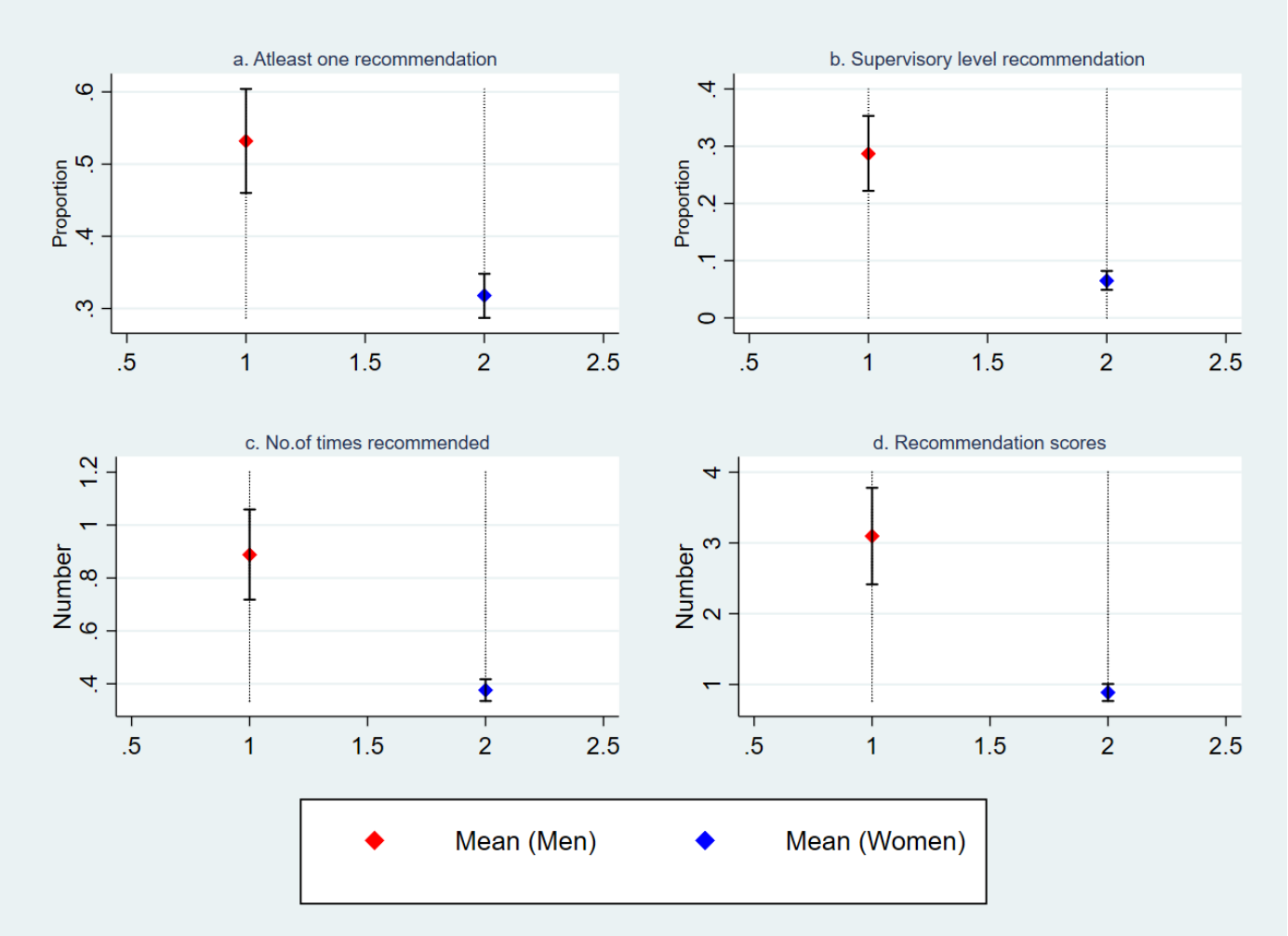
Figure 1: Gender gaps in proxies of career mobility



Note: No. of intermediate managers = 102 (10 females, 92 females). Respondents could give multiple reasons for skewed gender distribution. Source: Factory supervisors' survey, Sep 2020-Dec 2020.

Table 1: Sample: exports oriented garment manufacturing factories

	Factory 1 (F0)	**Factory 2(F1)**	**Factory 3(F2)**	**Total**
	(1)	(2)	(3)	(4)
A. Factory profile				
Location	Faridabad	Faridabad	Bangalore	India
Size of "Stitching Department"	2604	2087	1511	6202
Number of Production floors/units	5	3	5	13
Number of Production lines	40	38	28	106
Average strength per line	56	34	50	56
Proportion of females (sewing department)	0.889	0.881	0.934	0.898
Proportion of operators	0.65	0.79	0.83	0.76
Proportion of helpers/pressman*	0.19	0.15	0.15	0.16
B. Survey profile				
No. of supervisors	26	32	23	81
No. of female supervisors	0	6	3	9
No. of floor/finishing incharges**	7	9	9	25
No. of recommendations from factory***	163	186	152	526
No. of unique workers (HPW)	133	137	112	404
No. of recommendation outside factory	24	7	44	75
Prop. per line	0.10	0.09	0.12	0.10
No. of randomly selected workers(LPW)	262	197	235	694
Total sample size	395	334	347	**1076**
Prop. of women (in sample)	0.80	0.78	0.89	**0.813**

Note: F0: base factory, located in Faridabad (Haryana, North India) with no female supervisors or floor in-charges; F1: factory located in Faridabad (Haryana, North India) with 20% of supervisors as women; F2: factory located in Bangalore (Karnataka, South India) with 15% and 11% as female supervisors and floor in-charges, respectively. *Other workers on stitching floors (not assigned fixed positions on within production line) are checkers, writers, feeders, assistant supervisors and needle keepers etc. **Sample consist of only one woman floor in-charge (F2). ***Total recommendations by factory are 174,208,172; approximately 5% of HPW could not be interviewed as they either left the factory and refused to participate or could not be reached by telephone despite our best efforts and coordination with the HR. Total worker interviewed were 1098, but 2% of HPW were from male dominated departments (female proportion<0.2) like packing, sampling so dropped from the sample. Source: Factory data provided by HRD, Survey data (September 2020-January 2021).

Table 2: Worker characteristics by gender

	Production			
	Overall	**Male**	**Female**	**Diff**
N	1076	188	888	
	(1)	(2)	(3)	(4)
A. Demographics				
Age (years)	32.548	31.412	32.858	**-1.310*** **
Mean education level[a]	3.058	3.346	2.3	**0.348*** **
Proportion married	0.771	0.681	0.791	**-0.110*** **
Number of children	1.70	1.340	1.776	**-0.436*** **
Joint Family	0.311	0.362	0.301	**0.061***
Sole earner	0.248	0.553	0.184	**0.370*** **
Onus of household chores	0.460	0.319	0.490	**-0.171*** **
Proportion Hindu	0.936	0.936	0.936	
Proportion H	0.371	0.319	0.382	**-0.064***
Proportion M	0.434	0.463	0.428	0.034
Proportion L	0.194	0.189	0.218	0.029
Migrant from other states	0.724	0.888	0.689	**0.199*** **
B. Work profile				
Stitching training	0.466	0.388	0.482	**-0.094*** **
First time employee	0.581	0.287	0.581	**-0.294*** **
Current salary (INR)	9052.823	9226.85	9015.98	**210.87** *
Prop. Operators	0.636	0.367	0.693	**-0.327*** **
Prop. assistant supervisors	0.145	0.426	0.86	**0.340*** **
Skill-grade rank[b]	3.6168	3.561	3.878	**3.616*** **
Participated in training programs at factory	0.431	0.314	0.456	**-0.142*** **
Experience in current designation (yrs)	3.541	3.359	3.54	-0.22
Experience in current factory (yrs)	5.267	5.662	5.183	0.478
Experience in garment industry(yrs)	7.794	9.535	7.425	**2.110*** **
C. Job Information Networks				
Used ties for current job info	0.706	0.697	0.708	-0.011
Tie was a female[c]	0.65	0.145	0.755	**-0.610*** **
Tie was a neighbor(post migration)[c]	0.405	0.229	0.442	**-0.213*** **
Tie was a relative/family member[c]	0.230	0.359	0.201	**0.158*** **
Current strong social ties in garment industry[d]	1.314	1.398	1.296	0.103

Note: Col (4) based on *t*-test for differences in mean. [a]Education level categories: 0(Illiterate), 1(Literate but no schooling), 2(Upto primary level), 3(Upto secondary level),4(Upto Senior Secondary), 5(Graduate), 6(Masters), 7(Professional training like ITI, Diploma). [b] Skill-grade=1 if "Unskilled", 2 if "Semi-Skilled A", 3 if "Semi-Skilled B", 4 if "Skilled A", 5 if "Skilled B", 6 if "Highly skilled". H (General), M (OBC), L (SC/ST) are administrative caste categories created after mapping reported *jati* and native state using government prescribed lists. Stitching training includes training at stitching training centers or apprenticeship at a relative's shop. [c] Conditional on mobilization of ties for job information in the current factory. [d]Sum of affirmative responses to having 1.) spouse/parents, 2.) immediate family member/close relative, 3.) current immediate neighbors, 4.) childhood friends working in the garment industry. Source: Factory survey data, September 2020 - January 2021. Standard errors not reported due to space constraint. Significant at *10%, **5% and ***1%.

Table 3: Referrals and workplace ties

	Overall	**Male**	**Female**	Diff
N	1076	188	888	
	(1)	(2)	(3)	(4)
Panel A. Referrals				
Recommended	0.355	0.532	0.318	**0.214*** **
	(0.015)	(0.036)	(0.016)	(0.038)
Recommendation for supervisory level	0.104	0.287	0.065	**0.222*** **
	(0.009)	(0.008)	(0.033)	(0.024)
Recommendation for grade level	0.251	0.245	0.252	-0.007
	(0.013)	(0.031)	(0.015)	(0.035)
No. of times recommended	0.466	0.888	0.376	**0.512*** **
	(0.024)	(0.086)	(0.021)	(0.060)
Recommendation score	1.272	3.096	0.886	**2.209*** **
	(0.083)	(0.346)	(0.061)	(0.207)
Panel B. Vertical ties at workplace				
Formal vertical ties	1.139	1.207	1.125	0.082
	(0.020)	(0.050)	(0.022)	(0.052)
Informal vertical ties	0.267	0.479	0.222	**0.267*** **
	(0.017)	(0.551)	(0.017)	(0.045)
Panel C. Possible Social-Vertical ties at workplace				
Same *jati*	0.033	0.032	0.033	-0.001
	(0.005)	(0.013)	(0.006)	(0.005)
Same caste	0.406	0.362	0.416	-0.054
	0.015	0.035	0.017	0.039
Same current locality	0.033	0.011	0.037	**-0.027***
	(0.005)	(0.007)	(0.006)	(0.014)
Same native district	0.032	0.034	0.021	-0.013
	(0.005)	(0.006)	(0.011)	(0.014)
Same native state	0.383	0.399	0.309	**-0.039** **
	(0.015)	(0.016)	(0.034)	(0.039)

Note: A worker i is 'Recommended' if recommended by at least one intermediate manager, irrespective of the category of promotion. *jati* data missing for 7 workers. 'No. of times recommended' is sum of recommendations a worker i received from all intermediate supervisors, irrespective of the category of promotion. 'Recommendation score'=sum of different type of recommendations; a score of 4 assigned if recommended without gender priming for supervisory position, 3 if recommended after gender priming for supervisory position, 2 if recommended without gender priming for grade promotion, 1 if recommended after gender priming for grade promotion plus 1 if referral was given by floor in-charge. Formal vertical ties for a worker *'i'* is the sum of number of seniors she interacts to discuss work related issues, factory related news, understanding tasks or career related advice. Similarly, informal vertical ties is the sum of number of seniors a worker *'i'* interacts for discussing personal experiences, problems or family matters or approaches for help. Source: Factory survey data, September 2020 - January 2021. Standard errors not reported due to space constraint. Significant at *10%, **5% and ***1%.

Table 4: Probability of receiving recommendation and gender

	Recommendation		**Supervisory recommendation**		**Grade recommendation**	
	(1)	(2)	(3)	(4)	(5)	(6)
Female (β_1)	**-0.293****	**-0.377*****	**-0.535*****	**-0.586*****	0.079	0.002
	(0.123)	(0.122)	(0.152)	(0.159)	(0.145)	(0.147)
Informal vertical ties (β_2)	0.225***	0.222***	0.158	0.175	0.154**	0.139**
	(0.062)	(0.063)	(0.100)	(0.107)	(0.066)	(0.065)
Used ties for job information	-0.126	-0.123	-0.190	-0.180	-0.049	-0.042
	(0.109)	(0.113)	(0.125)	(0.125)	(0.108)	(0.112)
Social ties in garment industry	0.086	0.080	-0.118	-0.095	0.127	0.109
	(0.131)	(0.129)	(0.231)	(0.240)	(0.127)	(0.126)
Characteristics controls	Yes	Yes	Yes	Yes	Yes	Yes
Line level controls	Yes	Yes	Yes	Yes	Yes	Yes
Factory-floor FE	No	Yes	No	Yes	No	Yes
Constant	-1.280	-3.858***	-2.679*	-5.354***	-1.013	-2.394*
	(1.349)	(1.165)	(1.557)	(2.024)	(1.310)	(1.395)
N	1076	1076	1076	1076	1076	1076
Pseudo R-sq	0.142	0.160	0.273	0.311	0.057	0.075

Note: Dependent variable takes value 1 in col (1), col (2), and col (3) if worker *'i'* received at least one recommendation for promotion (irrespective of type of promotion), supervisory recommendation, and grade recommendation, respectively . Includes controls for Age, Age-sq, education above higher secondary level (=1), Married (=1), Sole earner (=1), Lives in joint family (=1), No. of children, Caste categories (L=benchmark), if migrant to factory state (=1), Used social ties for job information for current job (=1), Experience in garment industry and square term, First time employee (=1), Current designation Operator(=1), Skill-grade rank, Participated in skill training program (=1). Detailed results shown in **??**. Line level controls include line strength, no. of recommendations per line and proportion of women in the line. Standard errors clustered at factory-line level in parentheses. Source: Factory worker survey, Sep 2020-Jan 2021. Significant at *10%, **5% and ***1%.

Table 5: Probability of receiving recommendation and informal vertical ties (by gender)

	Recommendation		**Supervisory recommendation**		**Grade recommendation**	
	Female	Male	Female	Male	Female	Male
	(1)	(2)	(3)	(4)	(5)	(6)
Informal vertical ties (β_2)	**0.267*** **	-0.032	**0.293*** **	0.004	**0.159** **	-0.023
	(0.069)	(0.162)	(0.104)	(0.248)	(0.076)	(0.172)
Used ties for job information	-0.166	-0.002	-0.270*	-0.142	-0.079	0.166
	(0.127)	(0.324)	(0.164)	(0.327)	(0.122)	(0.253)
Social ties in garment industry	0.051	0.797*	-0.016	-0.348	0.047	0.558
	(0.142)	(0.481)	(0.232)	(0.579)	(0.138)	(0.378)
Characteristics controls	Yes	Yes	Yes	Yes	Yes	Yes
Line level controls	Yes	Yes	Yes	Yes	Yes	Yes
Factory-floor FE	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-3.245**	-11.119***	-5.764**	-11.345**	-2.340	-3.688
	(1.295)	(3.658)	(2.443)	(4.435)	(1.487)	(3.178)
N	888	188	888	188	888	18
Pseudo R-sq	0.138	0.345	0.249	0.424	0.088	0.142

Note: As elucidated in above table.

Table 6: Recommendation frequency, scores and informal vertical ties

	Recommendation frequency			Recommendation scores		
Overall	Female	Male	Overall	Female	Male	
	(1)	(2)	(3)	(4)	(5)	(6)
Female (β_1)	-0.314***			-1.399***		
	(0.076)			(0.310)		
Informal vertical ties (β_2)	0.102**	0.119***	-0.043	0.296*	0.280**	-0.046
	(0.042)	(0.035)	(0.132)	(0.163)	(0.108)	(0.534)
Used ties for job information	-0.058	-0.077	0.091	-0.163	-0.225	0.356
	(0.049)	(0.051)	(0.203)	(0.161)	(0.149)	(0.866)
Social ties in garment industry	-0.010	-0.027	0.051	-0.092	-0.120	-0.065
	(0.054)	(0.053)	(0.310)	(0.175)	(0.139)	(1.193)
Characteristics controls	Yes	Yes	Yes	Yes	Yes	Yes
Line level controls	Yes	Yes	Yes	Yes	Yes	Yes
Factory-floor FE	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.987**	-0.602	-3.683*	-3.300*	-1.553	-14.515*
	(0.463)	(0.434)	(2.107)	(1.857)	(1.620)	(8.456)
Mean	0.465	0.376	0.888	1.272	0.886	3.095
N	1076	888	188	1076	888	188
R-sq	0.230	0.170	0.329	0.257	0.176	0.329

Note: As elucidated in above table. 'No. of times recommended' is sum of recommendations a worker i received from all intermediate supervisors, irrespective of the category of promotion. 'Recommendation score'=sum of different type of recommendations; a score of 4 assigned if recommended without gender priming for supervisory position, 3 if recommended after gender priming for supervisory position, 2 if recommended without gender priming for grade promotion, 1 if recommended after gender priming for grade promotion plus 1 if referral was given by floor in-charge.

Table 7: Probability of receiving recommendation, informal vertical ties and other possible ties (by gender)

	Recommendation		**Supervisory recommendation**		**Grade recommendation**	
	Female	Male	Female	Male	Female	Male
	(1)	(2)	(3)	(4)	(5)	(6)
Informal vertical ties (β_2)	0.264***	-0.033	0.269**	0.007	0.167**	-0.025
	(0.069)	(0.162)	(0.107)	(0.250)	(0.075)	(0.174)
(Possible) vertical-social ties index	-0.048	-0.027	-0.249	0.271	0.017	-0.498
	(0.154)	(0.438)	(0.276)	(0.441)	(0.157)	(0.518)
Used ties for job information	-0.153	0.004	-0.224	-0.132	-0.079	0.178
	(0.130)	(0.325)	(0.176)	(0.332)	(0.125)	(0.256)
Social ties in garment industry	0.055	0.782*	-0.004	-0.328	0.041	0.488
	(0.141)	(0.459)	(0.237)	(0.584)	(0.136)	(0.373)
Characteristics controls	Yes	Yes	Yes	Yes	Yes	Yes
Line level controls	Yes	Yes	Yes	Yes	Yes	Yes
Factory-floor FE	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-3.157**	-11.005***	-5.321**	-11.212**	-2.405	-3.372
	(1.294)	(3.695)	(2.401)	(4.361)	(1.486)	(3.219)
N	882	187	825	187	882	179
Pseudo R-sq	0.141	0.341	0.260	0.424	0.088	0.145

Note: As elucidated in above table. "(Possible) vertical-social ties" is sum of different type of possible social ties between assigned intermediate managers and worker 'i', viz., 1.)same jati, 2.)same current residential colony, 3.)same native district. Results are robust to using these variables separately. We lose 7 obs due to missing *jati* information. Results are robust to using native state and same caste as well.

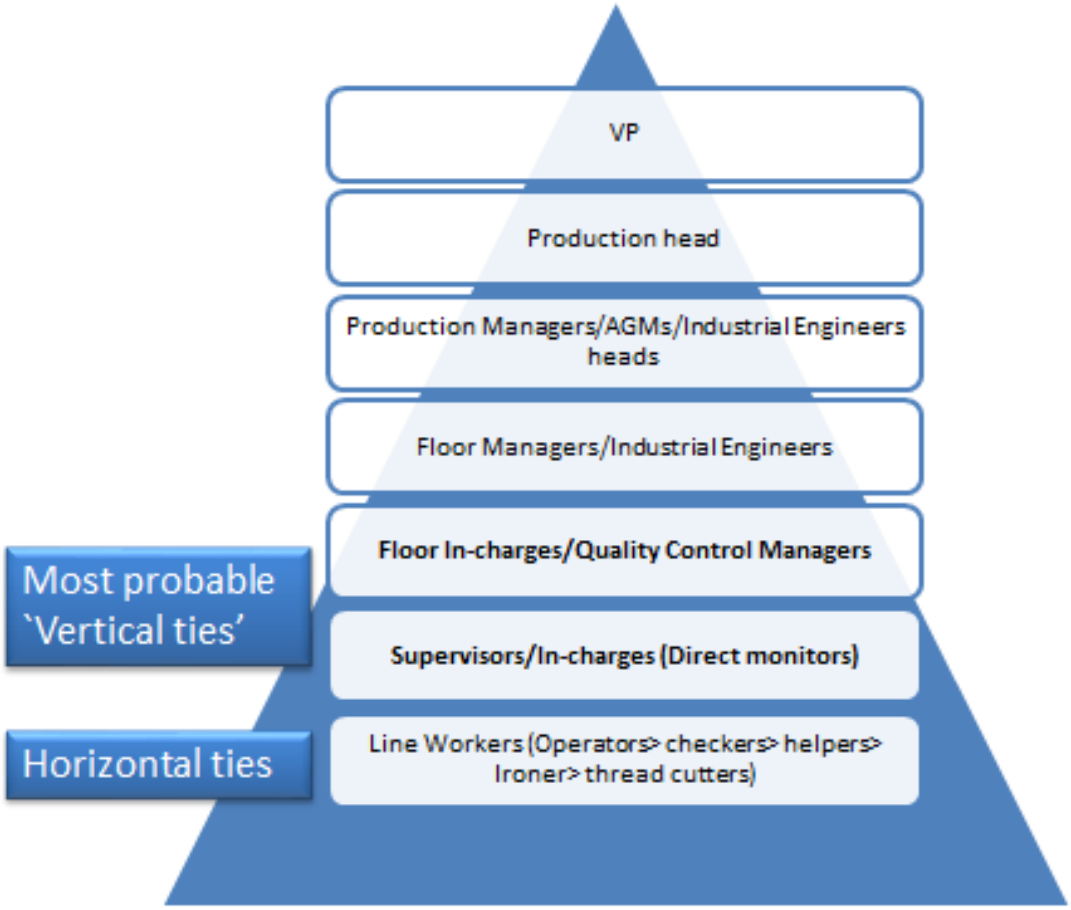
Table 8: Recommendation type, informal vertical ties and aspiration levels

	Recommendation			*Supervisory recommendation*			*Grade recommendation*		
	Overall	Female	Male	Overall	Female	Male	Overall	Female	Male
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Female (β_1)	-0.277**			-0.482***			0.033		
	(0.125)			(0.172)			(0.148)		
Informal vertical ties (β_2)	0.216***	0.262***	-0.057	0.160	0.285***	-0.029	0.137**	0.158**	-0.026
	(0.063)	(0.071)	(0.155)	(0.105)	(0.108)	(0.240)	(0.066)	(0.076)	(0.171)
Aspiration index	0.149***	0.117**	0.269*	0.260***	0.312***	0.200	0.043	0.008	0.063
	(0.049)	(0.057)	(0.147)	(0.074)	(0.086)	(0.194)	(0.048)	(0.056)	(0.155)
Used ties for job information	-0.141	-0.177	-0.115	-0.189	-0.253	-0.186	-0.047	-0.080	0.153
	(0.115)	(0.129)	(0.328)	(0.133)	(0.181)	(0.331)	(0.112)	(0.122)	(0.257)
Social ties in garment industry	0.083	0.054	0.784	-0.126	-0.043	-0.425	0.108	0.047	0.546
	(0.130)	(0.142)	(0.485)	(0.240)	(0.229)	(0.562)	(0.126)	(0.138)	(0.377)
Characteristics controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Line level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Factory-floor FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-3.916***	-3.195**	-11.187***	-5.649***	-5.776**	-12.108***	-2.409*	-2.336	-3.637
	(1.186)	(1.306)	(3.722)	(2.028)	(2.470)	(4.467)	(1.402)	(1.490)	(3.237)
N	1076	888	188	1076	888	188	1076	888	18
Pseudo R-sq	0.166	0.142	0.356	0.328	0.276	0.429	0.075	0.088	0.143

Note: As elucidated above. Aspiration score is sum of responses to questions- 1.)Do you wish to be supervisor in future? (Yes=1); 2.) Have you ever taken initiative to manage line in the absence of supervisor? (Yes=1); 3.) If you ever get a chance to do overtime, will you do it? (Yes I will/Yes I have done it in past too=1). Mean aspiration score=1.419 (overall); 1.248 (women); 2.229(men).

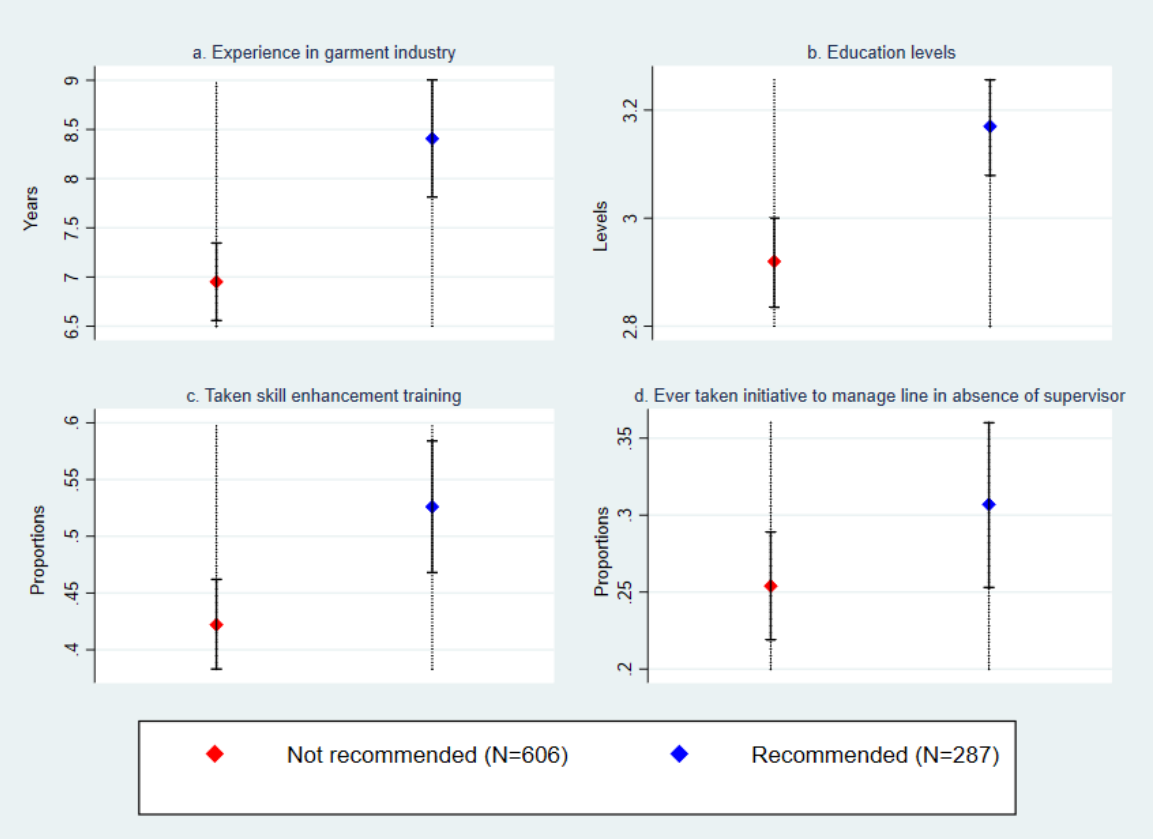
APPENDIX A. Additional Results

Figure A.1: Hierarchy structure at a typical garment factory



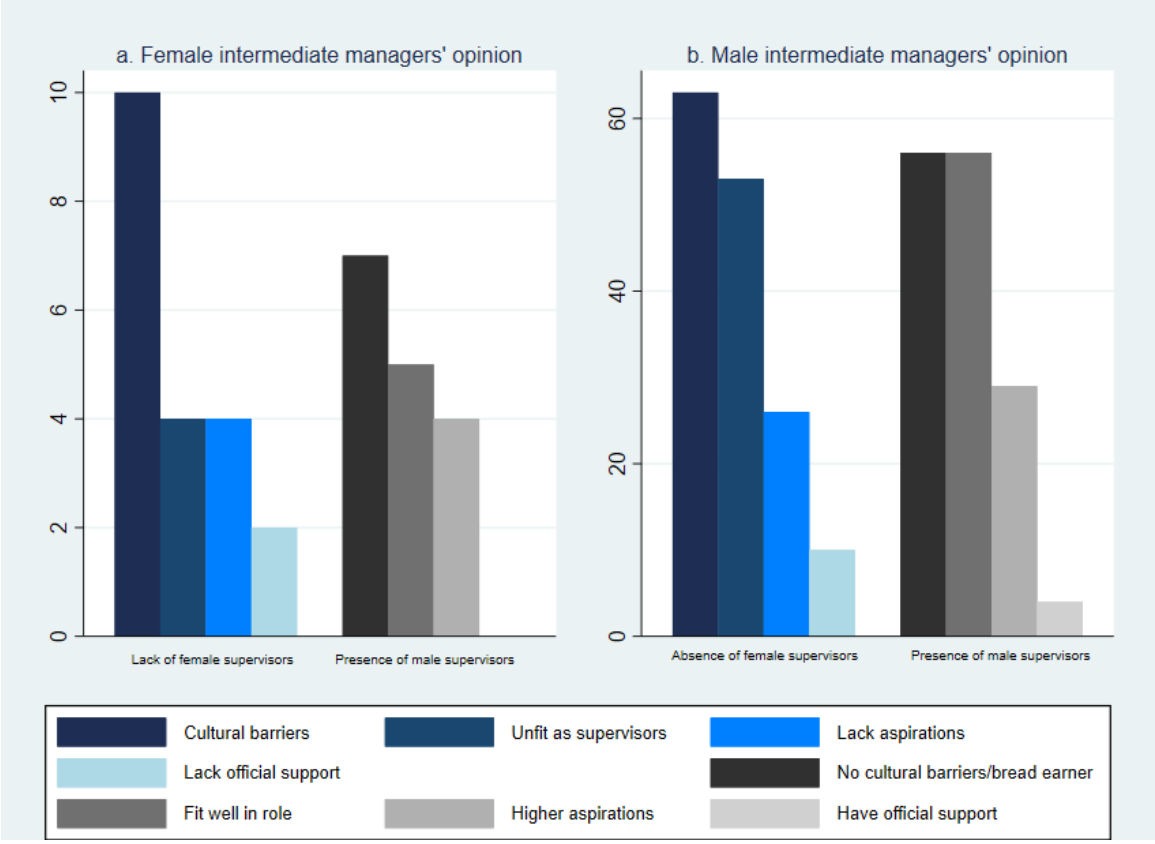
Note: Holds for factories in organized sectors. In our sample (similar to national scenario), only 12% of decision making positions are held by women..

Figure A.2: Observable characteristics of women by recommendation status



Note: Source: Factory supervisors' survey, Sep 2020-Dec 2020.

Figure A.3: Intermediate managers' opinions regarding skewed gender distribution at supervisory level



Note: No. of intermediate managers = 102 (10 females, 92 males). Respondents could give multiple reasons for skewed gender distribution. Source: Factory supervisors' survey, Sep 2020-Dec 2020.

Table A.1: Intermediate managers characteristics

	Overall	**Male**	**Female**	**Diff**
	(1)	(2)	(3)	(4)
	96	**85**	**11**	**(2)-(3)**
A. Demographics				
Age (years)	37.17	37	38.54	-1.54
	(0.680)	(0.734)	(1.786)	(2.141)
Proportion married	0.89	0.87	1	-0.129
	(0.033)	(0.037)	(0.0)	(0.102)
Proportion Hindu	0.843	0.835	0.909	-0.074
	(0.037)	(0.040)	(0.090)	(0.037)
Prop. of migrants from Bihar	0.25	0.259	0.182	0.077
	(0.004)	(0.048)	(0.122)	(0.140)
Mean education level	3.813	3.788	4	-0.212
	(0.117)	(0.123)	(0.381)	(0.368)
Proportion H	0.543	0.536	0.6	-0.064
	(0.052)	(0.055)	(0.163)	(0.168)
Proportion M	0.34	0.345	0.3	0.045
	(0.340)	(0.052)	(0.153)	(0.160)
Proportion L	0.117	0.119	0.1	0.019
	(0.033)	(0.035)	(0.1)	(0.109)
B. Work Profile				
Current salary (INR)	20423.21	20676.75	18464	2212.753
	(526.435)	(572.776)	(1117.374)	(1645.781)
Total experience in current	7.208	6.776	10.545	**-3.769*** **
factory	(0.620)	(0.642)	(1.983)	(1.919)
Total experience in garment	15.406	15.377	15.636	-0.259
manufacturing	(0.737)	(0.810)	(1.562)	(2.327)
Started career from	0.083	0.047	0.364	**-0.317*** **
the current factory	(0.028)	(0.023)	(0.152)	(0.083)
Stitching training (formal	0.406	0.4	0.454	-0.055
or informal)	(0.050)	(0.053)	(0.050)	(0.159)
Special skills training by	0.667	0.671	0.636	0.034
the management	(0.048)	(0.051)	(0.152)	(0.153)

Note: Col (5) is based on *t*-test for differences in mean. # Conditional on being married. H (General), M (OBC), L (SC/ST) are administrative caste categories as reported by the respondents, 2 respondents said "Don't know" (N=94). Education level categories: 0(Illiterate), 1(Literate but no schooling), 2(Upto primary level), 3(Upto secondary level),4(Upto Senior Secondary), 5(Graduate), 6(Masters), 7(Professional training like ITI, Diploma). Stitching training includes training at stitching training centers or apprenticeship at a relative's shop . Source: Factory survey data, September-December 2020. Standard errors in parentheses. Significant at *10%, **5% and ***1%.

Table A.2: Instrumental Networks of existing intermediate managers

	Overall	**Male**	**Female**	**Diff**
	(1)	(2)	(3)	(4)
	96	**85**	**11**	**(2)-(3)**
A. Ties used for information in past				
Used ties for job in current factory	0.687	0.671	0.8184	-0.148
	(0.048)	(0.051)	(0.122)	(0.149)
Tie is a woman	0.106	0.035	0.556	**-0.520*** **
	(0.038)	(0.025)	(0.176)	(0.009)
Tie is a prior co-worker	0.545	0.596	0.222	**0.374** **
	(0.061)	(0.066)	(0.147)	(0.175)
Ties is an older friend	0.242	0.263	0.111	0.152
	(0.053)	(0.059)	(0.111)	(0.155)
Used tie for guidance to become	0.60	0.565	0.909	**-0.344** **
supervisor (mentor)	(0.050)	(0.090)	(0.564)	(0.154)
Mentor is a woman	0.103	0.08	0.2	-0.117
	(0.040)	(0.040)	(0.133)	(0.107)
Mentor is a prior co-worker	0.344	0.354	0.3	0.054
	0.063	0.153	0.070	0.168
Mentor is a current factory senior	0.55	0.521	0.7	-0.179
	(0.066)	(0.073)	(0.153)	(0.174)
B. Current ties				
No. of factory ties for professional	1.885	2.363	1.823	-0.54
advice/help (seniors)	(0.089)	(0.088)	(0.388)	(-0.189)
No. of ties outside factory for	0.510	0.727	0.482	-0.245
professional advice/help	(0.069)	(0.072)	(0.237)	(0.218)
No. of factory ties for personal	0.469	0.447	0.636	-0.189
advice/help (co-workers)	(0.088)	(0.088)	(0.388)	(0.280)

Note: Col (5) is based on *t*-test for differences in mean. Source: Factory survey data, September-December 2020. Standard errors in parentheses. Significant at *10%, **5% and ***1%.

Table A.3: Probability of recommendations and worker characteristics (details)

	Received recommendation			*Supervisory recommendation*			*Grade recommendation*		
	Overall	Female	Male	Overall	Female	Male	Overall	Female	Male
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Female (β_1)	-0.377***			-0.586***			0.002		
	(0.122)			(0.159)			(0.147)		
Age (in yrs)	0.103*	0.126*	0.076	0.040	0.052	0.208	0.066	0.105	-0.002
	(0.056)	(0.065)	(0.160)	(0.093)	(0.096)	(0.167)	(0.055)	(0.064)	(0.157)
age-sq	-0.002**	-0.002**	-0.002	-0.001	-0.001	-0.005**	-0.001	-0.002*	
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)
Education (Higher secondary & above)	0.237*	0.156	0.675***	0.437***	0.406**	0.747***	0.027	0.018	0.063
	(0.125)	(0.140)	(0.220)	(0.132)	(0.177)	(0.280)	(0.123)	(0.142)	(0.238)
Married (=1)	-0.236*	-0.435***	0.121	-0.066	-0.222	0.193	-0.316**	-0.411***	-0.115
	(0.129)	(0.150)	(0.335)	(0.186)	(0.202)	(0.308)	(0.124)	(0.152)	(0.335)
Sole earner	-0.043	-0.190	0.395	0.212	-0.009	0.540	-0.184	-0.177	0.062
	(0.122)	(0.148)	(0.377)	(0.164)	(0.203)	(0.367)	(0.132)	(0.152)	(0.360)
Joint family	0.195*	0.199*	0.001	0.093	0.152	-0.021	0.150	0.168	0.033
	(0.109)	(0.116)	(0.279)	(0.136)	(0.157)	(0.278)	(0.106)	(0.120)	(0.285)
Migrant from other state	0.058	-0.059	0.685	0.291	0.051	1.316*	-0.133	-0.139	-0.480
	(0.146)	(0.168)	(0.491)	(0.244)	(0.226)	(0.786)	(0.136)	(0.155)	(0.482)
Hindu	-0.056	-0.015	-0.645	-0.095	-0.252	0.388	-0.018	0.073	-0.489
	(0.145)	(0.166)	(0.506)	(0.325)	(0.377)	(0.693)	(0.154)	(0.175)	(0.419)
Unreserved	0.017	0.080	-0.382	-0.185	-0.132	-0.552	0.114	0.127	-0.146
	(0.119)	(0.129)	(0.415)	(0.163)	(0.237)	(0.400)	(0.120)	(0.132)	(0.315)
OBC	0.013	0.072	-0.346	-0.218	-0.039	-0.754**	0.145	0.083	0.155
	(0.146)	(0.144)	(0.418)	(0.159)	(0.202)	(0.348)	(0.149)	(0.149)	(0.346)
Used ties for job information	-0.123	-0.166	-0.002	-0.180	-0.270*	-0.142	-0.042	-0.079	0.166
	(0.113)	(0.127)	(0.324)	(0.125)	(0.164)	(0.327)	(0.112)	(0.122)	(0.253)
Informal vertical ties (β_2)	0.222***	0.267***	-0.032	0.175	0.293***	0.004	0.139**	0.159**	-0.023
	(0.063)	(0.069)	(0.162)	(0.107)	(0.104)	(0.248)	(0.065)	(0.076)	(0.172)
Social ties in garment industry	0.080	0.051	0.797*	-0.095	-0.016	-0.348	0.109	0.047	0.558
	(0.129)	(0.142)	(0.481)	(0.240)	(0.232)	(0.579)	(0.126)	(0.138)	(0.378)
Experience in garment industries (yrs)	0.084***	0.072*	0.125	0.129***	0.120**	0.163	0.055*	0.052	0.020
	(0.032)	(0.037)	(0.095)	(0.045)	(0.059)	(0.100)	(0.033)	(0.039)	(0.083)
Experience in garment industries (yrs)-sq	-0.002*	-0.002	-0.002	-0.003**	-0.003	-0.002	-0.002	-0.001	-0.001
	(0.001)	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)	(0.001)	(0.002)	(0.003)
Skill-salary grade	0.151***	0.112**	0.321***	0.377***	0.355***	0.691***	-0.038	-0.036	-0.133
	(0.050)	(0.055)	(0.123)	(0.077)	(0.081)	(0.214)	(0.054)	(0.063)	(0.103)
Operator	-0.511***	-0.369**	-0.912**	-0.816***	-0.804***	-1.120***	-0.011	0.035	-0.016
	(0.158)	(0.159)	(0.369)	(0.143)	(0.182)	(0.349)	(0.134)	(0.153)	(0.282)
Paricipated in special training prog.	0.107	0.190*	-0.174	0.126	0.185	0.092	0.080	0.148	-0.218
	(0.093)	(0.100)	(0.294)	(0.131)	(0.174)	(0.268)	(0.095)	(0.105)	(0.257)
No. of recommendations from line	0.108***	0.115***	0.097*	0.060**	0.060**	0.128**	0.088***	0.105***	0.043
	(0.011)	(0.012)	(0.052)	(0.025)	(0.025)	(0.056)	(0.013)	(0.012)	(0.041)
Proportion of females in line	2.255***	0.948	10.606***	2.972*	2.812	2.909	1.064	0.360	4.919*
	(0.724)	(0.750)	(2.679)	(1.556)	(2.077)	(3.216)	(1.028)	(1.048)	(2.689)
Line strength	-0.016***	-0.018***	-0.012	-0.011**	-0.013***	0.014	-0.012***	-0.014***	-0.011
	(0.002)	(0.002)	(0.008)	(0.005)	(0.005)	(0.011)	(0.002)	(0.002)	(0.009)
Factory-floor FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-3.858***	-3.245**	-11.119***	-5.354***	-5.764**	-11.345**	-2.394*	-2.340	-3.688
	(1.165)	(1.295)	(3.658)	(2.024)	(2.443)	(4.435)	(1.395)	(1.487)	(3.178)
N	1076	888	188	1076	888	188	1076	888	18
Pseudo R-sq	0.160	0.138	0.345	0.311	0.249	0.424	0.075	0.088	0.142

Note: As elucidated above. Details for results in Table 4.

Table A.4: Recommendation and formal vertical ties

	Received recommendation			*Supervisory recommendation*			*Grade recommendation*		
	Overall	Female	Male	Overall	Female	Male	Overall	Female	Male
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Female (β_1)	-0.367***			-0.582***			0.014		
	(0.123)			(0.160)			(0.147)		
Informal vertical ties (β_2)	0.209***	0.258***	-0.071	0.166	0.299***	-0.036	0.128**	0.147**	-0.006
	(0.063)	(0.069)	(0.168)	(0.108)	(0.109)	(0.257)	(0.065)	(0.075)	(0.178)
Formal vertical ties (β_3)	0.121*	0.106	0.262	0.069	-0.054	0.272*	0.102*	0.156**	-0.092
	(0.068)	(0.082)	(0.163)	(0.090)	(0.121)	(0.149)	(0.062)	(0.077)	(0.211)
Used ties for job information	-0.133	-0.174	-0.033	-0.185	-0.266	-0.170	-0.050	-0.092	0.170
	(0.111)	(0.125)	(0.326)	(0.123)	(0.163)	(0.327)	(0.112)	(0.122)	(0.254)
Social ties in garment industry	0.085	0.051	0.843*	-0.088	-0.017	-0.248	0.115	0.048	0.543
	(0.131)	(0.144)	(0.470)	(0.242)	(0.229)	(0.561)	(0.127)	(0.139)	(0.385)
Characteristics controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Line level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Factory-floor FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-4.033***	-3.306**	-12.705***	-5.529***	-5.727**	-12.373***	-2.554*	-2.474*	-3.358
	(1.168)	(1.285)	(3.579)	(2.025)	(2.440)	(4.345)	(1.383)	(1.476)	(3.067)
N	1076	888	188	1076	888	188	1076	888	18
Pseudo R-sq	0.162	0.140	0.352	0.312	0.250	0.431	0.077	0.092	0.143

Note: As elucidated above. "Formal vertical ties" is number of seniors a worker 'i' interacts to discuss workplace/task/professional advice related issues.

Table A.5: Recommendation and weighted informal vertical ties

	Received recommendation			*Supervisory recommendation*			*Grade recommendation*		
	Overall	Female	Male	Overall	Female	Male	Overall	Female	Male
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Female (β_1)	-0.383***			-0.583***			-0.007		
	(0.122)			(0.157)			(0.145)		
Weighted- Informal vertical ties (β_2)	0.126***	0.151***	-0.016	0.113**	0.153***	0.034	0.064*	0.088**	-0.060
	(0.031)	(0.034)	(0.084)	(0.047)	(0.049)	(0.114)	(0.035)	(0.039)	(0.089)
Used ties for job information	-0.120	-0.162	-0.004	-0.179	-0.261	-0.158	-0.038	-0.077	0.178
	(0.113)	(0.127)	(0.323)	(0.126)	(0.165)	(0.338)	(0.111)	(0.122)	(0.251)
Social ties in garment industry	0.084	0.056	0.796*	-0.087	-0.008	-0.336	0.109	0.049	0.559
	(0.130)	(0.142)	(0.482)	(0.240)	(0.231)	(0.581)	(0.126)	(0.138)	(0.380)
Characteristics controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Line level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Factory-floor FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-3.867***	-3.329**	-11.141***	-5.352***	-5.882**	-11.275**	-2.395*	-2.396	-3.816
	(1.167)	(1.304)	(3.701)	(2.031)	(2.451)	(4.380)	(1.396)	(1.490)	(3.153)
N	1076	888	188	1076	888	188	1076	888	18
Pseudo R-sq	0.161	0.140	0.345	0.314	0.251	0.425	0.074	0.089	0.144

Note: As elucidated above. "Weighted- informal vertical ties" is sum of number of seniors a worker 'i' interacts with weighted by the hierarchy rank of the ties.

Table A.6: Observables of men and women recommended for supervisory roles

	Overall	**Male**	**Female**	**Diff**
	(1)	(2)	(3)	(4)
	112	**54**	**58**	**(2)-(3)**
Total experience in garment manufacturing	10.99 (0.492)	11.171 (0.747)	10.820 (0.653)	0.351 (0.989)
Total experience in current factory	7.503 (0.384)	6.977 (0.565)	7.994 (0.518)	-1.017 (0.766)
Mean education level	0.384 (0.046)	0.481 (0.069)	0.2936 (0.060)	**0.188**** (0.091)
Special skills training by the management	0.455 (0.047)	0.315 (0.063)	0.586 (0.065)	**-0.271***** (0.091)
Ever taken initiative to lead line	0.589 (0.047)	0.759 (0.0588)	0.431 (0.431)	**0.589***** (0.328)

Note:Analogous to Figure A.2. Here, we compare observables of men and women recommended for supervisory roles. We control for these and other variables in the regressions. Source: Factory survey data, September-December 2020. Standard errors in parentheses. Significant at *10%, **5% and ***1%.