

Job Search Technology, Social Networks and Gender: Experimental Evidence from Urban India

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Motivation

High job search costs

- Work located physically closer to home are often preferred by women due to
 - Social norms that restrict mobility (MacDonald 1999; NFHS)
 - Safety concerns (Dean & Jayachandran 2019; Chakraborty et al. 2018; Eswaran et al. 2013).
 - Home production burden (Afridi et al. 2022; OECD Data)
- Lack of awareness and information of labor market opportunities due to restricted mobility and few weak-ties (Calvo-Armengol & Jackson 2004; Mortensen & Vishwanath 1994)

Motivation

High job search costs

- Digital labor market platforms for employer-employee matching can reduce job search costs and matching frictions, as well as provide more flexible job opportunities:
 - potentially more beneficial for women

Research Questions

- Can digital technology enhance labor market participation and improve employment outcomes?
 - Can women's social networks enable technology adoption and improve labor market outcomes?
 - How do social norms interact with social networks in determining the labor market effects of new technology?

Literature

- Marriage penalty on women in terms of labor force participation (Bernhardt et al. 2018)
- Joint household decision-making may lower the labor market participation of women further (Lowe & McKelway 2019)
- Harnessing women's social networks may have a positive effect on women's economic participation
 - Rural women's take up of entrepreneurship (Field et al. 2016) is higher when they are treated along with their peers.

Literature

- But women's social networks are often narrow and restrictive, potentially reducing their flow of information on job openings unlike men's who may therefore have better access to labor market information (Stoloff et al. 1999; Lindenlaub & Prummer 2016)
 - Focus has been on white-collar jobs in developed countries
- Lack of research on urban women's social network structures and labor market outcomes in developing countries:
 - Migration after marriage
 - Safety concerns

This paper

- Leverage women's social networks to improve technology adoption and labor market outcomes.
- Cluster RCT in India's National Capital Territory (NCT), Delhi, with almost 1600 married couples and over 4000 of women's peers in her social network over two years (2019-21):
 - Without Network:* Offer new job search technology to matched husband and wife pairs
 - With Network:* Offer to matched pairs, and to the wife's peers
 - Control:* No offer of job search technology to either couple or their peers

Preview of findings

- One year after the intervention, the probability husband working increased by 4.4 pp, workdays (per week) by 55.2% and the hours worked per day by 58.5% in the network treatment. Consequently, husbands' monthly earnings more than doubled in the same treatment.
- Contrary to expectations, women's overall work status and earnings did NOT improve; instead the proportion of women who report being self-employed increased by 4.5 pp in network treatment after a year.
- No positive effects on either gender in without network treatment.

Data

- Randomly sampled 11 Assembly Constituencies across 5 districts of Delhi
- Random sample of about 10 polling stations for each of the sampled ACs was drawn and 15 households from each polling station.
- Household eligible for the study if it had at least one married couple in the age group of 18-45 year:
 - More likely to be engaged in the labor force and have home production responsibilities, including child care.
 - Low skilled, low educated
 - Low-income

Data



Timeline

Date	Round	Unit	Full Sample	Matched Sample
May-July 2019	Baseline	Household	1613	1514
		Individual	3127	3028
		Peers in Network	3468	3468
Nov-Jan 2020	Intervention	Household	1549	1383
		Individual	2972	2878
		Peers in Network	893 (treated)	881
Apr-Aug 2020	Nation-wide Lockdown Due to Covid-19 Pandemic			
Aug-Nov 2020	First Endline	Household,	1588	1449
		Individual	3069	2976
		Peers in Network	3583 (baseline+treated)	3575
Apr-June 2021	Second Endline	Household,	1555	1422
		Individual	2981	2891
		Peers in Network	3522 (baseline+treated)	3511

Baseline Data

Attitudes towards women working

	Wife (1)	Husband (2)	Wife - Husband (3)
Panel A: Regressive attitudes			
Woman should work within home	0.8 (0.4)	0.88 (0.33)	-0.078***
Woman should support husband's career	0.86 (0.34)	0.73 (0.44)	0.13***
If mother works children suffer	0.88 (0.33)	0.88 (0.33)	0
If mother works poor relationship with children	0.36 (0.48)	0.3 (0.46)	0.06***

Note: Matched husband-wife sample of 1514

Baseline Data

FLFP and job preferences

	Wife	Husband	Wife-Husband
Panel A: Labor Force Participation			
Working	0.24 (0.42)	0.96 (0.20)	-0.72***
Wage labor	0.07 (0.26)	0.25 (0.44)	-0.18***
Self employed	0.11 (0.32)	0.30 (0.46)	-0.19***
Salaried	0.04 (0.21)	0.40 (0.49)	-0.35***
Unemployed	0.02 (0.13)	0.04 (0.19)	-0.02***
Not working	0.75 (0.13)	0.01 (0.19)	0.74***
Monthly earnings	908.48 (75.29)	11146.82 (436.13)	-10238***

Note: Matched husband-wife sample of 1514

	Wife (1)	Husband (2)	Wife - Husband (3)
Panel C: Job preferences for women			
Salaried	0.67 (0.47)	0.78 (0.42)	-0.10***
Casual	0.08 (0.27)	0.03 (0.18)	0.05***
Domestic help	0.02 (0.15)	0.01 (0.09)	0.01***
Home-based	0.81 (0.39)	0.78 (0.41)	0.03**
Not work	0.02 (0.13)	0.03 (0.17)	-0.1**

Note: Matched husband-wife sample of 1514

*75% of women neither working nor looking for work, but prefer 'good' (salaried) jobs
 Women most likely to be self employed in own business, if working*

Baseline Data

Women's job preferences and gender norms

- *Greater job flexibility*: 81% women and 78% men prefer women to engage in home-based, part-time work
- *Limited mobility*: Women stated preference to work within 3 km of their residence (less than half of the 6.6 km reported by men)
- *Norm of men as breadwinners*: Only 33% husbands (60% wives) approve married woman working if latter has a husband capable of earning

Baseline Data

Social networks by gender

	Wife	Husband	Wife-Husband
Panel B: Social Networks (by relationship)			
Non co-resident relative	0.75 (0.30)	0.39 (0.37)	0.35***
Friend	0.04 (0.12)	0.37 (0.37)	-0.33***
Neighbour	0.21 (0.29)	0.17 (0.27)	0.04***
Work	0.00 (0.04)	0.07 (0.18)	-0.06***
N	1514	1514	

Social Networks (by gender-relationship)

	Wife	Husband
Female non co-resident relative	0.53 (0.31)	0.07 (0.17)
Female friends	0.04 (0.12)	0.02 (0.09)
Female neighbours	0.15 (0.23)	0.03 (0.10)
Female co-workers	0.00 (0.03)	0.01 (0.05)
Male non co-resident relative	0.21 (0.24)	0.32 (0.34)
Male friends	0.00 (0.03)	0.35 (0.36)
Male neighbours	0.06 (0.15)	0.14 (0.25)
Male co-workers	0.00 (0.02)	0.06 (0.18)
N	1,511	1,511

Elicit list of social connections through name-generating method using multiple contexts

Women's network overwhelmingly female with low LFP

Women's network more home-bound or family based relative to men's

=> Significant overlap of husband and wife's social connections due to home-bound network structure

Intervention

Job matching platform technology

- *Hyperlocal*, app-based job aggregation platform
- Connects the employers directly with multiple blue-collar workers who are located physically close to them for permanent or temporary hiring:
 - Worker registers on platform at no cost
 - Potential employer uses app to see matched worker profiles
 - Potential employer calls preferred worker with job offer
 - Employer pays fee to platform if matched with a worker
- Workers can potentially connect with many potential nearby employers:
 - No agents, agencies or contractors – low job search costs
 - Choose job as per their preferred work, location and salary



A smart way to find & hire Helpers near you.

Easy & Quick
Reliable & Affordable

Find multiple professionally verified (& Covid-19 safe) Blue-Collar Workers near you, connect with them directly & hire anyone you like, without the middlemen in between

Find & Hire

									
Domestic Workers	Office Workers	Expats Workers	Permanent Drivers	Workers	Workers	Restaurant Workers	Salon Workers	School Workers	Factory Workers

Find & Hire now →

Intervention

Job matching platform info and offer

108 polling stations randomly assigned to 3 groups with 36 clusters in each:

- *Without network* (T1): **Matched husband-wife pairs** are informed about and offered the job portal service to study the interplay of intra-household factors in one treatment arm and avoid male back-lash to improve chances of women registering on platform
- *With network* (T2): **Matched husband-wife pairs plus the wife suggests two peers from her baseline network** to be informed about and offered the job portal service in a second treatment arm to further improve take-up by women through peer effects
- **Control: No such service** is offered to couples or their networks in the control group

Estimation Method

$$Y_{iv} = \alpha + \beta^1 T_v^1 + \beta^2 T_v^2 + \phi Y_{iv}^0 + X_{iv} + \mu_{iv}$$

- Y_{iv} measures labor market outcomes of individual i in matched-pair in cluster v 14 months after intervention:
 - Work status is a dummy variable that takes value 1 if an individual reports engagement in some occupation over the past 3 months and 0 otherwise.
 - Reference period is last 3 months for all intensive margin outcomes and earnings
- T_v dummy indicating whether cluster v is assigned to either treatment (T1 or T2),
- Y_{iv}^0 is the corresponding baseline labor market outcome of individual i in cluster v
- X_{iv} baseline characteristics of individual i in cluster v include household characteristics (household asset index, dummy for joint family, number of under-5 children, dummy for SC/ST, dummy for Hindu, dummy for migrant status, years living in current location) and individual characteristics (education, mobile usage)
- Standard errors clustered at polling station level.

Results

Men are more likely to be employed in network treatment, but not women

Table 5: Impact of treatment on work status (1 year after intervention)

	Wife (1)	Husband (2)	Wife (3)	Husband (4)
Treatment	-0.013 (0.025)	0.012 (0.018)		
T1 (without network)			-0.044 (0.027)	-0.018 (0.020)
T2 (with network)			0.019 (0.029)	0.044** (0.020)
Baseline Y	0.938*** (0.035)	0.193 (0.173)	0.919*** (0.041)	0.191 (0.178)
p-value [T1=T2]			[0.02]	[0]
Observations	1,377	1,377	1,377	1,377
R-squared	0.177	0.046	0.181	0.053
Mean Y	0.23	0.94	0.23	0.94

Results

Men work more intensively in network treatment

Table 6: Impact of treatment on work status on the intensive margin (1 year after intervention)

	Wife (1)	Husband (2)	Wife (3)	Husband (4)
Panel A: Number of days worked in a week				
Treatment	-0.106 (0.151)	0.431** (0.202)		
T1 (without network)			-0.315* (0.160)	0.317 (0.213)
T2 (with network)			0.111 (0.176)	0.552** (0.212)
ln(Baseline Y)	0.190** (0.078)	0.080* (0.048)	0.195** (0.079)	0.082* (0.048)
p-value [T1=T2]			[0.01]	[0.08]
Observations	1,377	1,377	1,377	1,377
R-squared	0.172	0.046	0.177	0.047
Mean Y	1.25	5.69	1.25	5.69

Results

Men's monthly earnings more than double in network treatment

Table 7: Impact of treatment on monthly earnings (1 year after intervention)

	Wife (1)	Husband (2)	Wife (3)	Husband (4)
Treatment	-0.211 (0.299)	0.924** (0.442)		
T1 (without network)			-0.605* (0.320)	0.668 (0.463)
T2 (with network)			0.196 (0.349)	1.195** (0.467)
ln(Baseline level)	0.232*** (0.082)	0.082* (0.045)	0.238*** (0.082)	0.083* (0.045)
p-value [T1=T2]			[0.01]	[0.08]
Observations	1,377	1,377	1,377	1,377
R-squared	0.178	0.045	0.183	0.047
Mean Y	889.07	11515.43	889.07	11515.43

Results

Women instead take-up self-employment when treated with own network

Employment Type	Self-employed				Salaried				Casual labor			
	Wife	Husband										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Treatment	0.015 (0.016)	0.036 (0.025)			-0.001 (0.009)	0.027 (0.026)			-0.030* (0.017)	-0.042 (0.032)		
T1 (without network)			-0.013 (0.014)	0.042 (0.026)			0.001 (0.011)	0.016 (0.029)			-0.034* (0.020)	-0.067* (0.036)
T2 (with network)			0.045** (0.022)	0.030 (0.031)			-0.002 (0.011)	0.039 (0.031)			-0.025 (0.017)	-0.016 (0.039)
Baseline Y	0.158*** (0.041)	0.417*** (0.032)	0.157*** (0.041)	0.416*** (0.032)	0.340*** (0.071)	0.290*** (0.035)	0.340*** (0.071)	0.291*** (0.035)	0.332*** (0.056)	0.228*** (0.064)	0.332*** (0.057)	0.226*** (0.064)
p-value [T1=T2]			[0]	[0.68]			[0.81]	[0.46]			[0.6]	[0.18]
Observations	1,377	1,377	1,377	1,377	1,377	1,377	1,377	1,377	1,377	1,377	1,377	1,377
R-squared	0.073	0.225	0.082	0.226	0.182	0.148	0.182	0.149	0.128	0.116	0.128	0.118
Mean Y	0.12	0.32	0.12	0.32	0.05	0.39	0.05	0.39	0.06	0.23	0.06	0.23

Summary: Men benefit!

All impacts are mediated by the wife's network!

- Offering the job search service to both couples and the wife's network *increased the probability that husband was employed during the previous 3 months by 4.4 percentage points and work intensity by more than 50%, one year after intervention in network treatment*
- Women, on the other hand, conform to gender norms by *increasing self-employment by 4.5 percentage points with no overall employment effects, one year after intervention in network treatment*
- Effects are insignificant or marginally negative for wife when the treatment is offered only to the couples.
 - Women may be waiting it out for better work opportunities (Kelley et al. 2022)

What explains impacts?

- Role of **social networks**
 - Volume of job openings information is double, by design in network treatment
 - Take-up higher for both men and women in network treatment:
 - 67% of those who were offered registration, took it and 72% of peers were interested
- But **gendered structure of network** benefits men/husbands
 - Women's network overlaps with men's social connections influencing flow of information on job openings (e.g. job referrals)
- Role of **social norms** via network
 - Women interested and register on portal; no heterogeneity by mobile usage/ownership
 - But conform to gender norms

Mechanisms

Network improves take-up

Table 9: Impact of network on interest in and registration on job matching platform

	Interested		Registered (Unconditional)		Registered (Conditional on interest)	
	Wife	Husband	Wife	Husband	Wife	Husband
	(1)	(2)	(3)	(4)	(5)	(6)
T2	-0.021 (0.049)	-0.090** (0.040)	0.034 (0.033)	0.033 (0.026)	0.079* (0.046)	0.126*** (0.038)
Difference (Wife-Husband)		0.069** (0.034)		0.001 (0.035)		-0.048 (0.052)
Observations	921	922	921	922	562	621
R-squared	0.048	0.042	0.064	0.041	0.084	0.079
Mean T2	0.66	0.66	0.25	0.25	0.42	0.42
Mean T1	0.66	0.66	0.22	0.22	0.35	0.35

No gender differential in platform registration

Mechanisms

But network structure benefits men

Table 10: Impact of treatment on job-offers from matching platform (self-reported)

	Job offer (Unconditional)		Job offer		Job offers (Count)	
	Wife	Husband	Wife	Husband	Wife	Husband
	(1)	(2)	(3)	(4)	(5)	(6)
T2	0.001 (0.020)	0.052** (0.021)	0.022 (0.041)	0.150*** (0.045)	0.080 (0.056)	0.202*** (0.069)
Difference (Wife-Husband)		-0.051* (0.027)		-0.128** (0.059)		-0.122 (0.085)
Observations	886	887	362	348	362	348
R-squared	0.012	0.018	0.041	0.071	0.038	0.065
Mean T2	0.09	0.11	0.23	0.3	0.3	0.37
Mean T1	0.09	0.07	0.21	0.17	0.23	0.19

Gender differential in receiving job offers

Mechanisms

Network structure benefits men

Table 11: Impact of treatment on women's network (Endline 2, after 1 year of intervention)

	Extensive Margin	Intensive Margin (in ln)		
	Working	Days (per week)	Hours (per day)	Income (Monthly)
	(1)	(2)	(3)	(4)
Panel A: Male peers				
Treatment	0.083* (0.046)	0.706** (0.304)	0.707** (0.321)	1.638** (0.703)
Observations	411	411	411	411
R-squared	0.156	0.141	0.139	0.128
Panel B: Female peers				
Treatment	-0.030 (0.028)	-0.206 (0.171)	-0.235 (0.174)	-0.398 (0.354)
Observations	1,512	1,512	1,512	1,512
R-squared	0.128	0.137	0.139	0.136

Male peers' employment outcomes improves but not female peers'!

Mechanisms

While women conform to gender norm

Employment Type	Own business manufacturing				Retail				Other Services			
	Wife	Husband	Wife	Husband	Wife	Husband	Wife	Husband	Wife	Husband	Wife	Husband
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Treatment	0.019 (0.013)	-0.001 (0.017)			-0.004 (0.007)	-0.002 (0.020)			0.002 (0.006)	0.032* (0.016)		
T1 (without network)			-0.006 (0.011)	-0.005 (0.017)			-0.009 (0.007)	0.006 (0.023)			0.000 (0.006)	0.031 (0.019)
T2 (with network)			0.045** (0.019)	0.002 (0.021)			0.001 (0.009)	-0.010 (0.022)			0.004 (0.007)	0.033* (0.020)
Baseline Y	0.069 (0.059)	0.110*** (0.037)	0.068 (0.059)	0.110*** (0.037)	0.190** (0.089)	0.366*** (0.047)	0.189** (0.088)	0.365*** (0.047)	0.074 (0.047)	0.258*** (0.043)	0.074 (0.048)	0.258*** (0.043)
p-value [T1=T2]			[0]	[0.71]			[0.28]	[0.44]			[0.6]	[0.91]
Observations	1,377	1,377	1,377	1,377	1,377	1,377	1,377	1,377	1,377	1,377	1,377	1,377
R-squared	0.057	0.057	0.070	0.058	0.070	0.211	0.071	0.211	0.030	0.089	0.031	0.089
Mean Y	0.07	0.1	0.07	0.1	0.02	0.11	0.02	0.11	0.03	0.11	0.03	0.11

Women take-up home-based work possibly explained by income effects from increased earnings of husbands in network treatment

Other explanations?

- Changes in social norms due to peer effects?
 - regressive attitudes towards working women fall due to information on employment options/availability in *both* treatment arms
- Differential access to technology/mobile phones to receive offers?
 - analysis conditional on mobile phone usage
 - no heterogeneity in results by mobile usage/ownership
- Demand factors: nature of job and salary offers align less with women's expectations?
 - lower offers and acceptance rate
 - preference for 'high status' jobs not matched by nature of demand for their labor
 - family income effect on capital investment in home-based venture

But higher reservation wage cannot be disentangled from gender norms!

Other explanations?

Information on jobs improves attitudes towards working women

	Regressive attitudes Index				Progressive attitudes Index			
	Wife	Husband	Wife	Husband	Wife	Husband	Wife	Husband
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment	-0.188*** (0.069)	-0.196*** (0.052)			0.081* (0.046)	-0.047 (0.042)		
T1 (without network)			-0.227*** (0.083)	-0.224*** (0.056)			0.109** (0.050)	-0.045 (0.048)
T2 (with network)			-0.148* (0.085)	-0.166** (0.078)			0.053 (0.052)	-0.048 (0.051)
Baseline Y	0.053 (0.039)	0.045 (0.037)	0.050 (0.039)	0.044 (0.037)	0.087** (0.035)	0.155*** (0.032)	0.088** (0.035)	0.155*** (0.032)
p-value [T1=T2]			[0.41]	[0.5]			[0.19]	[0.95]
Observations	1,375	1,372	1,375	1,372	1,375	1,370	1,375	1,370
R-squared	0.043	0.033	0.045	0.034	0.050	0.059	0.051	0.059
Mean Y	0.04	-0.03	0.04	-0.03	0.07	-0.08	0.07	-0.08

Other explanations?

Labor demand responds to gendered preferences

Data from registrations on job matching platform:

- Women
 - Register for fewer types of jobs, aligned with gender norms
 - Want work within a 3 km distance from their homes (closer)
 - Salary expectation of over INR 10 K per month.
 - Existing salary approx. INR 4500
 - *Bigger mismatch between current earnings and desired earnings*
- In contrast, men
 - Register for larger number of job profiles
 - Willing to travel double the distance (6.6 kms) by women
 - Salary expectation 9% higher than current salary (currently approx. INR 13500)

Conclusions

While digital technology can potentially provide jobs more aligned to women's work preferences at lower search costs, social norms may prevent women from taking full advantage

- Increasing access to job information by including social network can improve women's work opportunities theoretically.
- However, men are more likely to take advantage of information flows to improve earnings due to *gendered structure of network*, while women conform to gender norm of working close to home.
- Social networks may not act as enablers of labor force participation, particularly for women (e.g. Beaman and Magruder 2018)