worker wellbeing is good business

Studying the latent demand for female labor in rural India

Achyuta Adharvyu, Anant Nyshadham, Priyanka Sarda

Jan 2025

Project Overview

- The primary objective of this research study is to address the question of whether leaving one's home is a significant barrier for women to participate in the labor force in a developing country context and whether a more flexible opportunity of working from home can increase women's formal entry into the workforce
  Access to credit and financial stress
- We will examine two potential mechanisms driving the differences in labor supply: complementarity of in-home activities with economic production, and negative social perceptions around women's work

Research Questions

- Can we increase the labor force participation of women if we offer work that can be done from the home?

- If so, how does time use adjust for these women to make room for this work?

- Are there notable productivity differences between participants working at home compared to participants working at the workshop? And if so, why?

Subject Population

- The study is underway in Neemrana district in Rajasthan, India with a target population of 500 women. **Currently, we have completed two batches consisting of 133 women** and the third batch is ongoing (expected to end Jan‘ 24).
- Our implementation partner is Kalaa Trust, a public charitable trust with extensive experience leading skilling projects to create home-based work opportunities for women in the handicraft industry.
- Eligibility criteria for women are:

  a) aged between 18-60 years

  b) willing to take up training and work for the next 10 weeks

  c) not currently employed in any income generating activities outside home, and

  d) presently not enrolled in any educational institution

  e) possess the necessary motor skills required for crochet production.

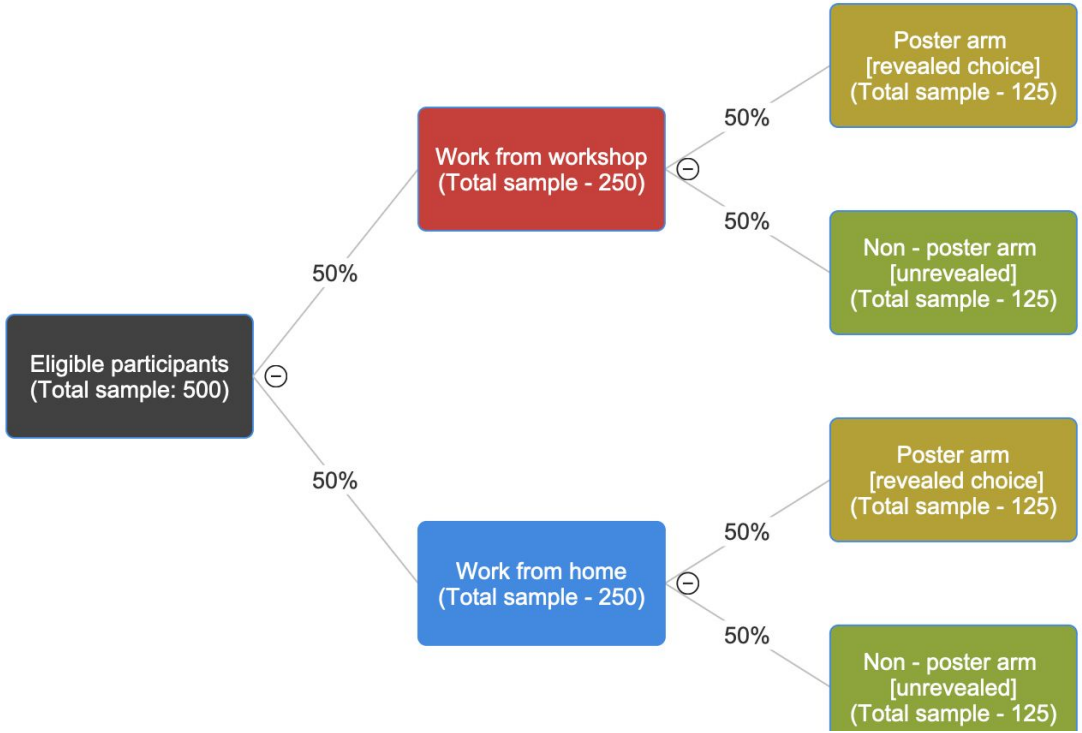
Results Summary

- Women working from home increases their participation in the labor force.
  - Women assigned to work from home are **17% more** likely to **take up** the job offer.
  - WFH **47% more** likely to work at least one hour or produce at least one output **on any given day**

- WFH achieve more production **(ITT)**: WFH women produce nearly **81-83% more output** than WFW women (even with quality adjustment)
  - **64% more hours** (⅔ from reduced personal well being time, less than ¼ from insig reduction in chores)
  - **10%** of additional hours from **multi-tasking with child care** (WFH 63% more multitasking)
  - **9-12%** more productive in both lab testing and realized output per day (gap closes over time, consistent with faster learning at home)

- Poster revelation test of norms against women working has no impact at all

Experimental Design



Randomization strategy

- Randomization will be stratified by training batch and conducted at the individual level
- In cases where there are multiple trainees from the same household, we ensure that they are allocated to the same group to prevent information spillover within the household.
- To achieve balance in two sets of variables (at the woman level and household level), we utilize the quantile-targeting rerandomization method. This involves drawing a large set of independent, exchangeable assignments and randomly selecting one assignment from the top five percent of most balanced assignments, as suggested by Banerjee et al. (2020).
- This approach improves the subjective performance of the RCT while maintaining result robustness.

We examine 5 household characteristics and 16 women characteristics and find no issues of balance at 5% significance level. Even when conducting joint significance tests for both household and women characteristics, we find no significant deviations.

Balance Table

Variable	WFW group	WFH group	Mean difference	p-values
Household level variables				
Backward cate (1= yes, 0 = no)	0.823	0.698	-0.124	0.118
Household size	4.779	4.677	-0.102	0.763
Another adult female member in HH (1= yes, 0 = no)	0.471	0.354	-0.117	0.192
Number of children at home	1.662	1.785	0.123	0.613
Primary HH income from non-farm sector (1= yes, 0 = no)	0.721	0.815	0.095	0.212
Migrated out of state (1= yes, 0 = no)	0.603	0.615	0.012	0.889
Woman level variables				
Age	31.544	30.938	-0.606	0.693
Ever married (yes/no)	0.882	0.908	0.025	0.648
Do you have children? (Yes/no)	0.794	0.846	0.052	0.474
Do you have young children (below 8 years of age)? (yes/no)	0.426	0.508	0.081	0.359
Education beyond high school done (yes/no)	0.559	0.692	0.133	0.114
Previously worked in income generating activity (yes/no)	0.221	0.231	0.010	0.891
Preference for WFH (yes/no)	0.824	0.844	0.020	0.757
Do you know crochet work (yes/no)	0.574	0.477	-0.097	0.286
Gender index (Progressive = 1, Regressive = 0)	0.270	0.287	0.018	0.920
Financial index (higher value is better outcome)	-0.022	0.075	0.097	0.591
Mobility index (higher value is better outcome)	0.046	-0.194	-0.240	0.207
Distance to workshop	0.265	0.272	0.007	0.649
Family attitude index	0.118	-0.072	-0.190	0.286
Community norms index (higher value is better outcome)	0.024	-0.089	-0.113	0.516
Total time taken to make one product (in minutes)	95.142	97.889	2.746	0.713
Total time spent on sleep and leisure (in minutes)	14.871	14.604	-0.268	0.724
Total time spent on domestic activities (in minutes)	7.315	6.990	-0.324	0.550
Observations	68	65		

Empirical Strategy

We use a balanced panel fixed effects model.

$$y_{ibkt} = \beta WFH_i + \gamma X_i + \lambda_{bk} + \mu_t + \varepsilon_{ikt}$$

y_{ibkt} is the outcome for women *i* from batch *b* in the *k*-th week of intervention, and *t* denotes calendar month.

WFH_i is an indicator variable that equals 1 if the woman is assigned to work from home, and 0 otherwise

λ_{bk} are relative period fixed effects λ_{bk} to flexibly control for trends in outcome as intervention length increases, allowing these trends to vary by batch (strata).

μ_t are calendar month fixed effects

X_i is a vector of baseline controls

Coefficient of interest is β. Standard errors are clustered at the household level (unit of randomization).

Women assigned to work from home are more likely to take up the job offer.

- Around 82% of the women assigned to work from the workshop took up the work opportunity and made at least one unit of crochet product during the intervention period.
- However, the take up of the work opportunity rises by around 17 percent when women are offered work from home.
- Difference is statistically significant at the 1% level.

	Take up of work opportunity (Whether woman makes at least one unit of quality adjusted output during the intervention period)
WFH assignment	0.1416*** (0.0494)
Control mean	0.824
Observations	133

Note: Unit of observation is the woman. We control for batch fixed effects and set of baseline covariates. Standard errors are clustered at the household level and are in parentheses.

Women assigned to work from home participate in work more regularly.

- For each day of the intervention, we collect data on how many (raw) products the woman completed, and hours worked on crochet. We use them to construct attendance measures.
- Only 1 in 3 women assigned to work from the workshop showed up to work on any given day, compared to 1 in 2 women working from home.
- In other words, women are 47% more likely to work on crochet on any given day if assigned to work from home vis-a-vis work from a workshop.

	(1) Whether woman works greater than zero hours in a day	(2) Whether woman makes greater than zero products in a day
WFH assignment	0.1610*** (0.0090	0.1605*** (0.0089)
Control mean	0.346	0.338
Observations	7310	7310

Note: We have a balanced panel at woman-day level. Analysis includes relative period FEs that vary by batch; calendar month FEs; day of week FEs, and a set of controls. Standard errors are clustered at the household level and are in parentheses

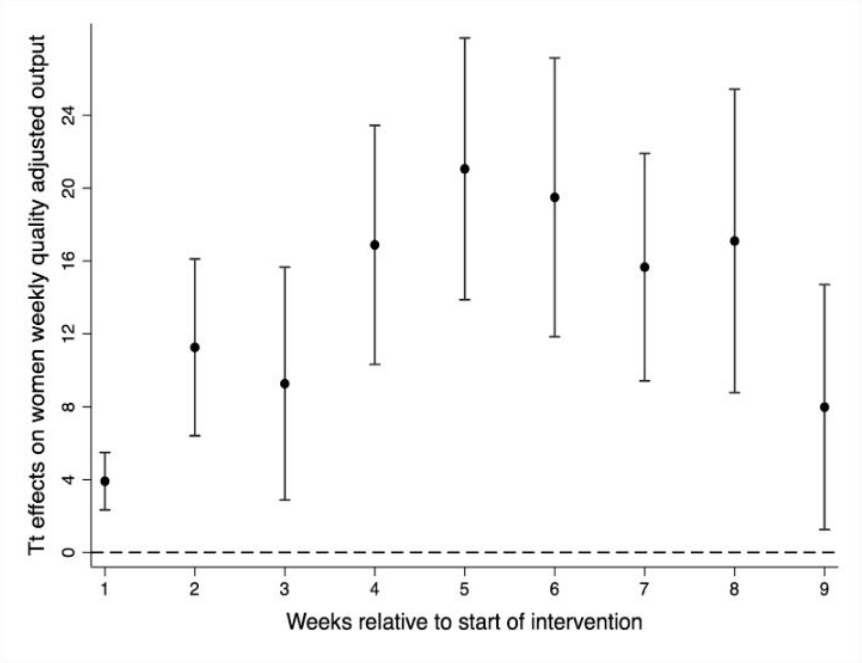
Relaxing mobility constraints by allowing women to work from home increases their participation in the labor force

- Women working from home produce 13.6 more units of quality adjusted output per week, which translates to nearly 80% more output than women assigned to work-from-workshop.
- The results are similar when we look at raw output produced per day as well.
- Women working from home also work 1.09 more hours per day, which translates to 64% more hours relative to women working from a workshop.

	(1) Quality adjusted output produced per week	(2) Raw output produced per day	(3) Hours worked per day
WFH assignment	13.626*** (1.286)	1.9749*** (0.5098)	1.0944*** (0.3063)
Control mean	16.827	2.393	1.710
Observations	1197	7310	7310

Note: Dataset for column 1 is balanced panel at woman-week level. Regression includes relative period FEs that vary by batch; calendar month FEs and set of controls. Dataset for Col 2 and 3 is a balanced panel at woman-day level. In Col 2 and 3, we also control for day of week FEs. Standard errors are clustered at the household level and are in parentheses.

Heterogeneity in LFP across weeks of the intervention



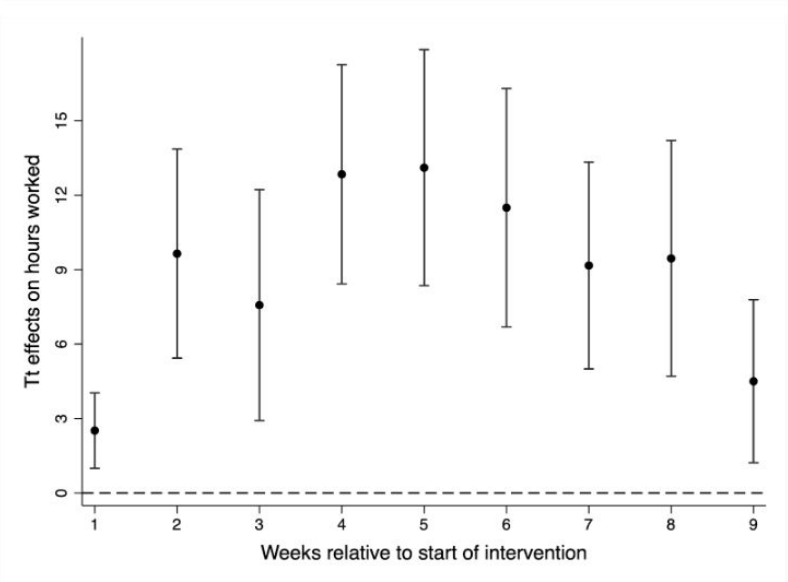


Figure 1 : Coefficient plot of Quality Adjusted output produced and Hours Worked across weeks of intervention.

Women exhibit different productivity depending on their work location (not yet significant)

We have three measures productivity/efficiency of the woman in crochet making-

1) Time taken to produce a single unit of product measured in a lab experiment kind of setup.

2) Raw output produced per hour by woman

3) Quality adjusted output per hour by woman

The coefficient is in the direction that supports the hypothesis that work from home women are working more efficiently, but the effects are not statistically significant.

	Time taken to produce a single unit of product at endline (in minutes)	Raw output per hour	Quality adjusted output per hour
WFH assignment	-3.6438 (2.928)	0.1346 (0.0900)	0.1409* (0.0735)
Control mean	41.160	1.365	1.142
Observations	100	3147	882

Note: In col 1, unit of observation is a woman. The equation 1 is an ANCOVA specification where we control for the time taken by the woman to produce a single unit of product at baseline, aside from batch FEs. Dataset for Col 2 is a panel at woman-day level, and for Col 3 is a woman-week level. Standard errors are clustered at the household level and are in parentheses. In all equations we control for the time taken by the woman to make a single unit of product at baseline.

Heterogeneity in productivity across different weeks of intervention

We also test productivity using quality adjusted output produced per hour.

As Figure 2 shows, location assignment does not have clear a direction of impact on the quality adjusted output produced per hour by the women across different weeks of the intervention.

We find mostly positive coefficients on the work from the home indicator variable, but in 5 out of the 8 weeks, the coefficients are not distinguishable from zero.

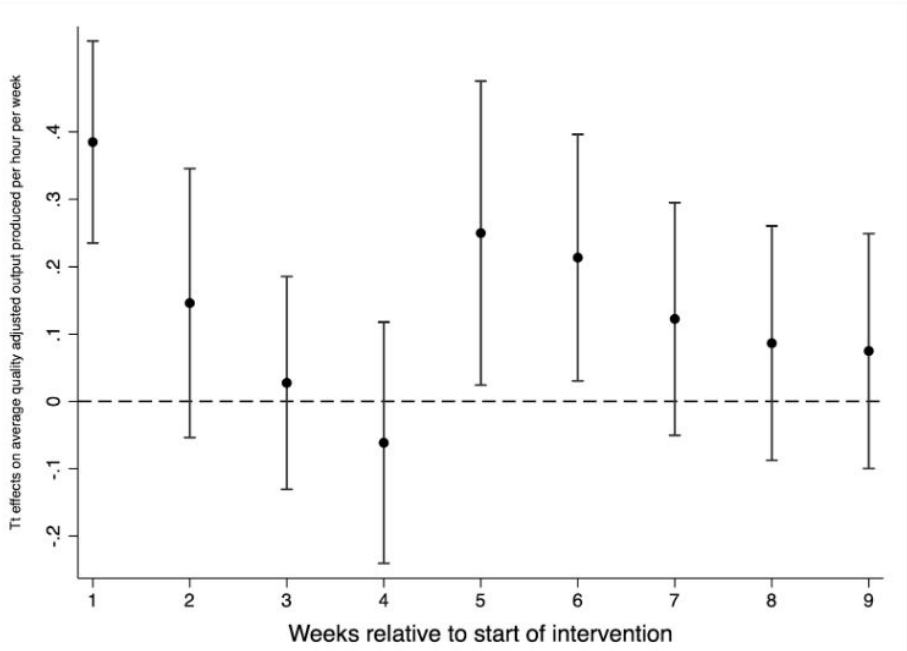


Figure 2 : Coefficient plot of Impact of Work location on Quality Adjusted output produced across weeks of intervention.

Time Use Data

- Time use data collection using a **traditional enumerator-assisted time diary** approach is carried out during the first 8 weeks intervention period.
- For each week of the intervention, we picked a random day wherein the enumerators visited the respondents' homes (or workshop), and guided respondents through the process of recording their daily activities in a structured manner, over the previous day.
- The survey asks questions such as: "What activity were you doing?", "At what time did you start and finish?", "Who were you with?", and "Where were you while doing the activity?" We also asked "whether multiple activities were performed simultaneously" and if yes, "what were the simultaneous activities being performed and for what duration"
- We also collect data on time use using **observational time use method** twice- once at baseline and secondly during last week of intervention. Enumerators visit the respondent's home every two hours within a 10-hour window (8 AM-6 PM) and during each visit, the respondent are asked about what they had done since the enumerator's last visit. On the day's final visit, enumerators will obtain the respondent's planned rest-of-day activities and associated timings.
    - Results from observational time use method are in similar direction as time diaries. However, given the small sample size of 133 women, we are presenting results from time diaries which utilize panel dataset instead.

Women decrease their time on personal well being activities to accommodate for time spent working.

- We find that the average woman in the WFW arm spent around 2.03 hours on crochet work, and the WFH assignment raised this by around 80%.
- We find that the average woman in the workshop arm spent around 12.85 hours on personal well-being activities (sleep, leisure and personal care), while those in the work-from-home assignment spent approximately 1.12 hours less on these activities, i,e., a fall of 8.7%
- Comparing columns (1) and (2), we find that this reduction in personal well being time accounts for over 68% of the time spent on crochet work.

	(1) Avg. number of hours per day spent on crochet work	(2) Avg. number of hours per day spent on personal well being
WFH assignment	1.6301*** (0.3407)	-1.1173*** (0.3844)
Control mean	2.030	12.846
Observations	762	762

Note: Panel at woman-week level. Analysis includes relative period FEs that vary by batch; calendar month FEs and set of controls. Standard errors are clustered at the household level and are in parentheses. In calculating our outcome measure of hours spent, we only consider hours spent on the category as a primary activity.

Work location does not affect the time women devote to domestic chores and care activities.

- Although the coefficients on the WFH indicator are negative, they are small and statistically indistinguishable from zero. The time women spend on domestic chores and care activities remains similar across both arms.
- Suggestive evidence that labor for household chores is not easily substitutable in this context. The reasons for this low substitutability can be manifold, and we will investigate further in future work.

	(1) Avg. number of hours per day spent on domestic responsibilities (includes both domestic chores and care work)	(2) Avg. number of hours per day spent on domestic chores (e.g., cleaning, cooking)	(3) Avg. number of hours per day spent on care work (e.g., childcare, elderly care)
WFH assignment	-0.373 (0.3527)	-0.319 (0.301)	-0.061 (0.195)
Control mean	6.706	5.411	1.295
Observations	762	762	762

Note: Panel at woman-week level. Analysis includes relative period FEs that vary by batch; calendar month FEs and set of controls. Standard errors are clustered at the household level and are in parentheses.

Multi-tasking

	Time spent as primary activity (in hours)				Time spent as secondary activity (in hours)		
	Full sample	WFH	WFW		Full sample	WFH	WFW
Personal well being	12.25	11.60	12.85		0.00	0.00	0.00
Child care	**1.32**	**1.38**	**1.30**		**0.69**	**0.77**	**0.62**
Home chores	5.31	5.21	5.41		0.03	0.03	0.03
Crochet work	**2.84**	**3.68**	**2.03**		**0.01**	**0.02**	**0.00**
Other economic activity	0.59	0.64	0.54		0.02	0.03	0.00
Home production	0.13	0.08	0.18		0.00	0.00	0.00
Travel	0.30	0.21	0.40		0.00	0.00	0.00

Likelihood of multitasking with crochet work is higher for women working from home vis-a-vis work from women working from the workshop

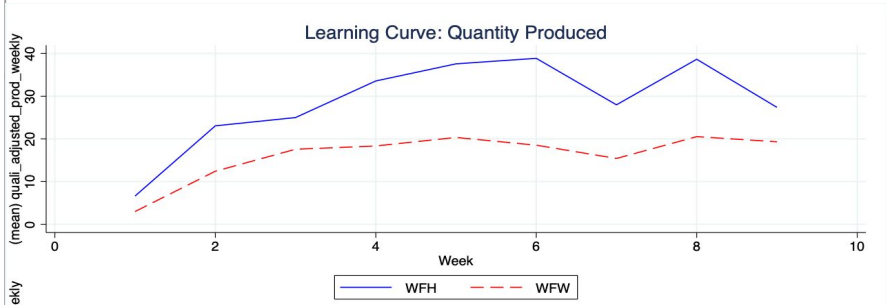
- 20.12% for women working from workshop simultaneously work on a secondary activity while working on crochet.
  (Note: women are allowed to bring children to the workshop, and this is the simultaneous activity being referred to here)
- This likelihood of multi-tasking while doing crochet rises by 62% for women working from home.

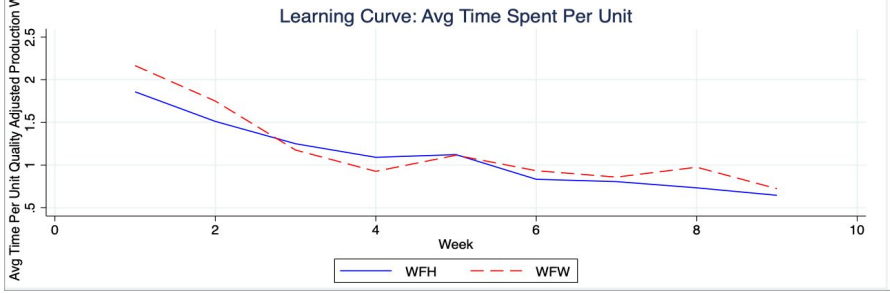
	Whether the woman was multitasking while doing crochet work (conditional on working on crochet during that time window)
WFH assignment	.125**
	(.0414)
Control mean	.201
Observations	466

Note: Panel at woman-week level. Analysis includes relative period FEs that vary by batch; calendar month FEs and set of controls. Standard errors are clustered at the household level and are in parentheses.

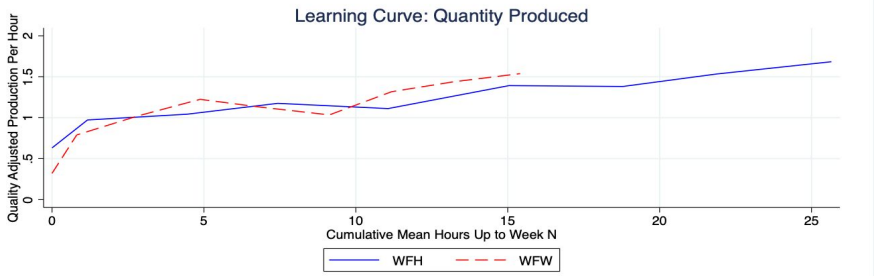
Learning Curve Analysis

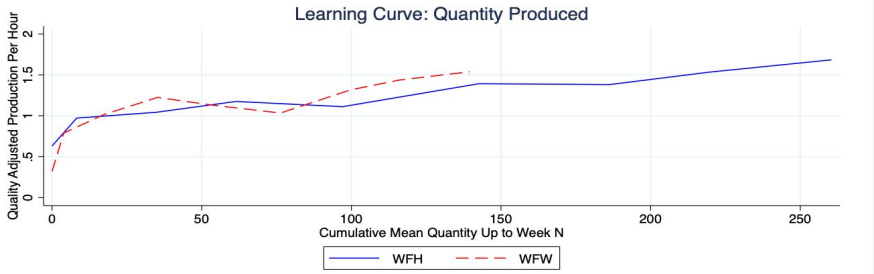
Definition 1 : Learning And Weeks Spent





Definition 2 : Learning And Hours Spent v Qt Produced





Analysis in progress

- Examine likelihood and nature of multitasking when working from home and its impact on labor supply

Hypothesis- Assignment to work from the home treatment arm increases the likelihood of multitasking between economic production and home activities compared to assignment to work in the workshop arm.

- Evaluate the impact of social observability on labor supply

Hypothesis- Assignment to the social-revelation treatment group lowers women's labor supply and productivity compared to assignment to the control (no revelation) group.

- Heterogeneity in treatment impact by gender attitudes, availability of substitute labor

Hypothesis- The work from home treatment will have a larger positive impact on labor supply and productivity for women whose households and personal perception are more opposed to women's work than for women whose households and personal perceptions is more receptive to women working

- Learnings curves of women across the two arms

Hypothesis- How does the work environments influence the pace of learning for this production activity. Is learning faster in office environment due to peer effects or a lesser-distraction work environment

- Attachment to labor force and take up of work in the future

Thank you !

Cross randomization design results

	(1) Quality adjusted output produced per week	(2) Hours worked per week	(3) Time taken to produce a single unit of product (in minutes)	(4) Take up of work opportunity	(5) Whether woman works greater than zero hours in a da	(6) Raw output produced per day
WFH assignment	12.6642*** (4.0232)	8.9868*** (2.9030)	-4.3985 (4.1160)	0.1264* (0.0725)	0.1370** (0.0604)	1.6717** (0.7609)
Poster	0.4084 (4.2695)	0.1902 (2.8751)	0.8366 (5.1005)	-0.0119 (0.0801)	-0.0146 (0.0677)	-0.3404 (0.6650)
WFH assignment* Poster	2.0171 (6.2127)	-0.1164 (4.0842)	13467 (6.6442)	0.0306 (0.0973)	0.0475 (0.0838)	0.3555 (1.0941)
Control mean	18.343	13.997	40.074	0.853	0.364	2.705
Observations	1197	1197	1197	1197	1197	1197