Structural Transformation and Women's Time Use: High-Frequency Evidence from Malawi*

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Abstract

Sub-Saharan Africa's structural transformation mirrors early twentieth-century patterns in the United States, yet Malawi remains markedly behind: Women continue to work predominantly in agriculture, with limited movement into services and almost no expansion into industry. In a randomized control trial with 1,872 rural mothers with young children, we study how a combined entrepreneurship and parenting support program shifts women's labor supply, time use, and childcare decisions. The intervention bundled business training, cash transfers, grants, soft-skills support, and an early-childhood development course, while both treatment and control villages received support for childcare facilities. Using high-frequency survey data from 40,000 household visits, we show that women adopt small businesses primarily as flexible, part-time activities and the program accelerates the sectoral shift into services. Treated women increase business hours by about 7.5 hours per week, but this additional work is not offset by reductions in home production or childcare, reinforcing the heavy time burden women face in low-income rural settings. The program does, however, raise childcare enrollment, suggesting that households adjust margins that are most compatible with women's constraints. By contrast, fathers' involvement in childcare shows little change, and shifts in empowerment and broader household dynamics remain limited. Strikingly, the treatment increased fertility, which may soon claw back some of the labor supply gains for mothers.

KEYWORDS: Structural transformation, time use, gender, fertility, randomized control trial

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1 Introduction

Women's time allocation in many Sub-Saharan African countries mirrors the structural transformation observed in the United States in the 1920s and 1960s (Dinkelman and Ngai, 2022). In these contexts, the key constraints shaping women's labor supply are limited infrastructure and social norms, which jointly determine how women divide their time between market work, home production, and childcare. We study how these patterns change under a randomized controlled trial offering business training, cash transfer, early childhood development training in some villages in rural Malawi, while all received support to local childcare centers. Leveraging high-frequency data on women's daily activities, we assess whether the intervention affects sectoral choices, reallocates women's time towards more productive activities, and ultimately enhances women's economic empowerment.

Preliminary results show that the program shifts women out of casual agricultural (*ganyu*) labor and into the service sector, predominantly retail. The observed business activities resemble part-time work that offers flexibility in time allocation and are compatible with women's traditional responsibilities: treated women continue to devote similarly large amounts of time to childcare and home production as the control group. The time invested in doing business is drawn away from a number of other activities, including leisure and idleness, and the reduction in home production is statistically significant but small. This suggests that the intervention enables women to add a flexible income-generating activity on the margin rather than substituting away from domestic tasks. Near the extensive margin with a low number of hours worked, social norms do not appear to be a hindrance to women's labor force participation. We do observe both a meaningful increase in childcare center enrollment and heightened practice of leaving the child in such centers while treated women pursue their livelihood.

Alongside changes in sectoral choices and time allocations, household bargaining power sees modest and nuanced shifts. While women are somewhat more likely to have a say on savings, schooling, and meal allocation decisions, their say in fertility decisions (noisily) decreases and there is a sizable uptick in pregnancies in the treatment group. Fathers' involvement in childcare is unchanged. Overall, the evidence points to shifts in how mothers allocate time rather than broad changes in household decision-making power.

Our paper contributes to three main strands of literature. First, we contribute to the literature on women's labor allocation during structural transformation. Prior work documents how shifts out of agriculture and the rise of services reshape women's work and *marketization* patterns (Reid, 1934; Ngai and Pissarides, 2008; Rogerson, 2008; Buera and Kaboski, 2012; Ngai and Petrongolo, 2017). Related work highlights how frictions including credit constraints, limited childcare markets, and social norms, in shaping women's ability to reallocate labor across sectors (Field et al., 2010; Jayachandran, 2020). Our setting provides experimental evidence on these adjustments in a low-income, highly agricultural-dependent context where own-account work remains the dominant form of female employment.

Second, we contribute to the literature on women's time use, particularly the time allocation

between market work and home production. The large burden of household production and care responsibilities is well documented (Ilahi, 2000; Kes and Swaminathan, 2006), and literature links marketization of household services, sectoral change, and technological adoption to shifts in women's time allocation (Greenwood et al., 2005; Aguiar et al., 2013). our high-frequency RCT data allows us to document how program support affects women's market hours, home production, and use of childcare in a context where marketization of household services is limited.

Lastly, we relate to the female empowerment literature, which studies how improvements in women's economic opportunities shape labor supply, autonomy, and household decision-making (Bandiera et al., 2017, 2020). By comparing treated and untreated women, we provide experimental evidence on how an integrated program affects women's occupational choices and economic roles.

2 Background and Data

2.1 Comparing Malawi to SSA Countries

Compared to other Sub-Saharan African countries, Malawi has a slightly higher female labor force participation rate, though they appear to be slowly converging over the last thirty years (Figure 1).[1] Looking by sectors, Malawi follows the general regional pattern of structural transformation with some lag: the share of women in agriculture decreases while the share in services increases and the share in industry is markedly lagging (Figure 3). This pattern aligns with the sectoral labor push-pull mechanism described in Alvarez-Cuadrado and Poschke (2011), who show that productivity growth in non-agricultural sectors induces reallocation out of subsistence agriculture. Malawi's trajectory suggests that manufacturing productivity has not risen sufficiently to generate a strong industrial pull, resulting in a transformation path where moving out of agricultural labor is absorbed primarily into informal services.

Comparing female worker composition over time, Malawi consistently exhibits a higher share of own-account workers (Figure 2). As in other Sub-Saharan African countries, the fraction of contributing family workers has declined, reflecting the gradual shift away from subsistence agriculture and toward market labor.[2]

These national patterns appear clearly in our study sample. Women in the RCT are predominantly engaged in agriculture and own-account activities, with very limited participation in industry or wage employment. The share in manufacturing is negligible, and movements out of agriculture occur mainly into service-sector self-employment rather than wage work. Thus, the occupational structure observed in the experiment closely mirrors the country-level distribution. Within this

[1] We follow the World Bank categorization and compare Malawi with Sub-Saharan African countries, excluding those classified as high-income.

[2] We compare 2013 and 2023 because the ILO undertook a major revision to the definition of employment, conceptually aligned with the 2008 SNA production boundary and formally implemented through the 2013 19th ICLS resolution. Under the revised framework, much subsistence and family farm work previously counted as "employment" was reclassified as "own-use production of goods," and therefore placed outside the labor force. Relative to 1991, Malawi shows a markedly higher share of own-account and contributing family workers, categories that are subsequently reclassified as "not in the labor force" under the updated ILO definitions.

setting, both treated and untreated women begin from the same baseline composition, allowing us to examine whether the intervention leads treated women to shift differently across sectors relative to untreated women.

2.2 Child-focused Ultra-Poor Graduation Program

This study builds on on a cluster-randomized control trial that takes place in Mangochi, a rural district in southern Malawi and one of the poorest in the country (Poll, 2025b). Following a 30,000-household census to determine program eligibility, 1,872 households were assigned to treatment or control group at the cluster level. Clusters were assigned to either a high-saturation treatment status (all households treated), a low-saturation treatment status (half of the households treated, the other half a spillover control group), or pure control group status (Poll, 2025a). Triplets of clusters are assigned at random to three consecutive program cohorts of 312 treated households each alongside a control group of 312 households per cohort. The three cohorts received the intervention during the planting, harvest, and lean season respectively (Poll, 2025c). All study participants are mothers of a child under the age of five at enrollment who live under the extreme poverty line of $2.15 PPP-2017. Treated households received a unique poverty graduation program, which combines the promotion of business creation with a far-reaching, stream-lined focus on child development (ECD). Alongside monthly cash transfers, business soft skills training, one-on-one coaching, and large start-up grants, mothers receive an ECD course focusing on preventive healthcare, nutrition, parenting, educational play, and early learning.

We collect two years of fortnightly high-frequency data for each cohort, for a total of 40,000 household visits. This includes detailed sector changes and time use on various activities.[3] A comprehensive household survey is conducted at baseline (pre-intervention), first follow-up (one year after the start of the intervention), and second follow-up (two years after), enabling us to track changes in outcomes as well as household and maternal behaviors over time.

3 Results

Our preliminary results point to several important findings on sectoral changes, time use, and female empowerment. Figure 4 illustrates the sectoral choices of women in the treatment and control groups over time. For both groups, there is no observable change in manufacturing participation and agricultural work rises and declines with the seasons.[4] After the cash grant, treated women exhibit a clear increase in participation in service-sector activities, mainly in retail, consistent with the program's emphasis on initiating or expanding business practices. One key factor is the large reduction in casual labor among treated women, reflecting a shift from *ganyu* work toward self-employment in services. This indicates a move from intensive manual labor towards less physically

[3] The full list of time use questions are described in Appendix C.

[4] Remaining fluctuations in the sectoral choices of the control group are driven by seasonality that the existing two cohorts have not yet been able to smooth out and that should be reduced once the data for cohort 3 have been included.

demanding and more flexible business activities. The change is consistent with *labor pull* (Alvarez-Cuadrado and Poschke, 2011): the program effectively raises the returns to small-scale service activities, generating a localized pull away from agriculture towards services.

Regarding time use, Figure 5 and Tables 1 and 2 show that women spend the largest share of their weekly time to childcare and household chores, averaging 48 hours per week (about 24 hours each). Market work, combining business activities, *ganyu*, and farming, amounts to roughly 18-20 hours per week, suggesting women are working more as part-time. This pattern is similar with the broader context in Sub-Saharan African countries, where female labor force participation is high but average market hours remain low (Dinkelman and Ngai, 2022). At baseline, 84% of the female program participants contribute to household income, and this share remains stable and unaffected by treatment.[5]

When the program launches, women crowd in the necessary time for both program participation and experimental small businesses from various other activities. When the trainings end, the freed up time is also shifted to the newly started businesses. Compared to control group women, treated women devote about 6.5 hours per week to program involvement, compared to 1.7 hours in the control group (accounting mostly for surveys). When the main training ends, this falls to 2.5 hours in the treatment group and the difference is driven by ongoing coaching visits. Compared to the control group's 7 hours of business activities and 9 hours of *ganyu* labor, the treatment group spends 11 hours on business and only 6 hours per week on *ganyu*. The program hours are drawn from a collection of other activities, while the shift from *ganyu* to businesses is more or less one-for-one. This reallocation is consistent with the shift away from casual agricultural labor documented above.

Despite these adjustments, treated women show only limited reductions in household chores and childcare, implying that responsibilities in home production and child-rearing activities remain largely unchanged. There is also a small decline in leisure and idle time, as well as roughly 2 hours less allocated to sleep and meals. Remarkably, after the trainings end, the hours freed up by training shift almost entirely to new businesses (and somewhat to farming activities, mostly year-round vegetable gardening that was taught during the training). At this point, time spent in income-generation activities has in fact increased significantly for the control group. These patterns all together align with the evidence on women's time poverty in low-income settings, where increases in market work often occur without corresponding reductions in domestic responsibilities (Kes and Swaminathan, 2006). Consequently, the expansion in business activities is not offset by decreases in household production or childcare.

Next we explore whether the shifts in time use go hand-in-hand with any shifts in intra-household bargaining power. The composite female empowerment score is positively and slightly higher, but it masks some heterogeneity across life domains. Although many indicators are null, women report significantly greater say in household savings decisions, suggesting shifts in intra-household

[5]Travel time could be allocated to business, home production, or leisure and we cannot distinguish whether these trips involve going to the market to buy business inputs, food for the household, or attending social events (e.g. wedding or funeral).

bargaining power. These effects are not mediated by whether the household accumulates savings, nor by changes in food expenditures that primarily serve household consumption. We also find evidence that women's decision-making authority over children's schooling improved.

On the other hand, while statistically insignificant at the current sample size, agency over fertility consistently shows negative coefficients. In fact, while the on-year follow-up time window is too short to lead to any shifts in the demographic composition of the households, we observe a marked and statistically significant uptick in pregnancies among treated women from 6 to 9%. The picture that emerges is a mild increase in financial autonomy and decision-making power at the expense of increased future child-rearing burden. It should be noted that an additional child would be within households' desired number of children: The average household has just under 3.5 children and according to the mother, the parents agree on an ideal number of children of on average 4.5. We therefore interpret the increased fertility result not as a compromise with husbands in exchange for higher bargaining power elsewhere, but rather see in the graduation program a trigger event that provides enough economic stability to household to have the additional child they were planning to have at some point.

Our results also speak to the theme in Dinkelman and Ngai (2022) that lacking infrastructure prevents turning home production into marketed goods, in particular for childcare. Community-based childcare centers (CBCC) are volunteer-run village initiatives that operate for a few hours each day by largely untrained caregivers and rarely provide meals. This limits the number of hours that they could feasibly support women's labor force participation. The program we evaluate supports childcare centers in both treatment and control areas with trainings for caregivers and cash grants, though it does not change their fundamental modus operandi or opening hours. But their use is only encouraged in the treatment clusters. At baseline, the CBCC enrollment for children aged two and above was 38% and after the intervention, it rose from 46% in the control group to 74%. The financial and training support to childcare centers in treatment and control group villages likely accounts for most of the increase in the control group (though other trends may have been at play here). The treatment group mentions the CBCC as the most common place to leave their children while working in 38% of high-frequency surveys, compared to 14% in the control group (Table 4).

Most of the program-induced adjustments stem from women's reallocation of time and responsibilities. Fathers play almost no increased role in home production as a result of the program, neither in childcare nor to early learning, and if anything only very modestly in household chores (Table 5). Consequently, the program generates few changes at the household level and the behavioral responses are concentrated almost entirely on the women's margins rather than reflecting broader shifts within the couple.

4 Conclusion and Next Steps

The key finding of our paper is that female time use is marginally but not fundamentally malleable without larger shifts in infrastructure and norms. Women who are given the means to start a business are able to mobilize an additional 7.5 hours per week to do so – turning them from a side hustle to something resembling part-time work – but not at the expense of their traditional home production responsibilities. We will be following these women to the two-year mark at high frequency and have recently been awarded funding for a three-year follow-up survey that will give us insights into whether the businesses persist and how additional births will affect the labor supply.

A Macroeconomic Data

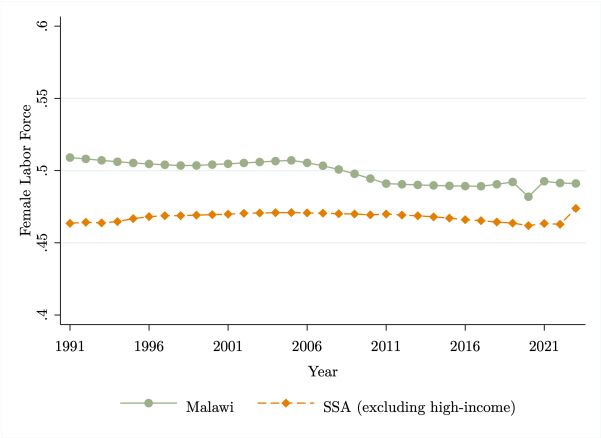


Figure 1: Female Labor Force Participation Rate Over Time

Notes: World Bank Indicators. Female labor force share represents the proportion of women engaged in economic activity. The labor force includes individuals aged 15 and above who contribute labor to the production of goods and services within a given period.

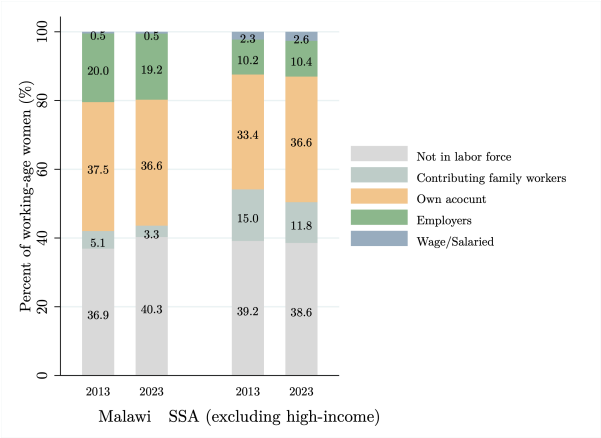
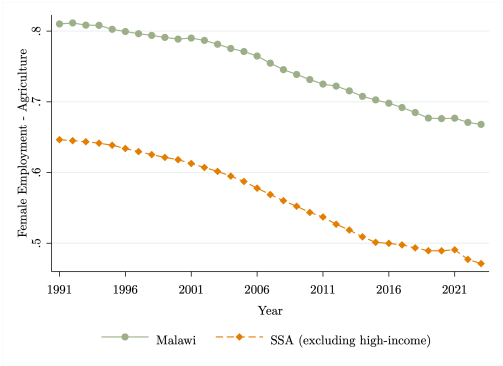


Figure 2: Composition of Female Work Over Time

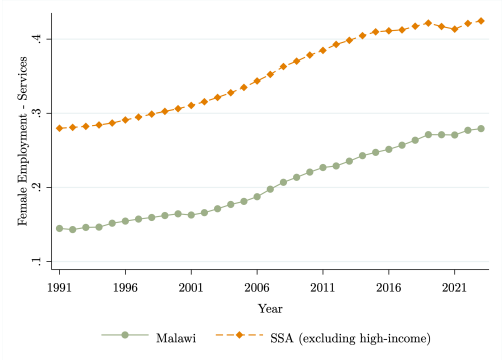
Data: World Bank Indicators. Following the World Bank's classification, own-account workers are defined as self-employed individuals excluding employers and contributing family workers. The employment-to-population ratio is used to scale each job-type category, and the residual provides the estimated share of women outside the labor force. Years are separated for 2013 and 2023 to compare the changes over time.

Figure 3: Sectoral Changes Over Time

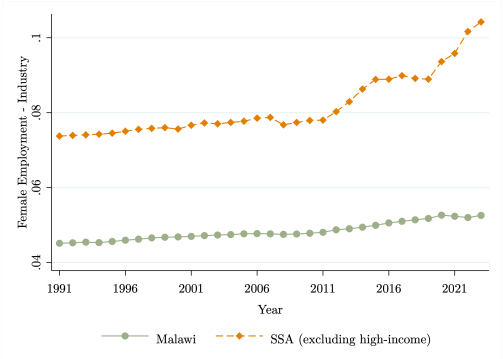
(a) Agriculture



(b) Services



(c) Industry



Data: World Bank Indicators. Values represent the share of female labor force participation in each major sector.

B Sector Choice

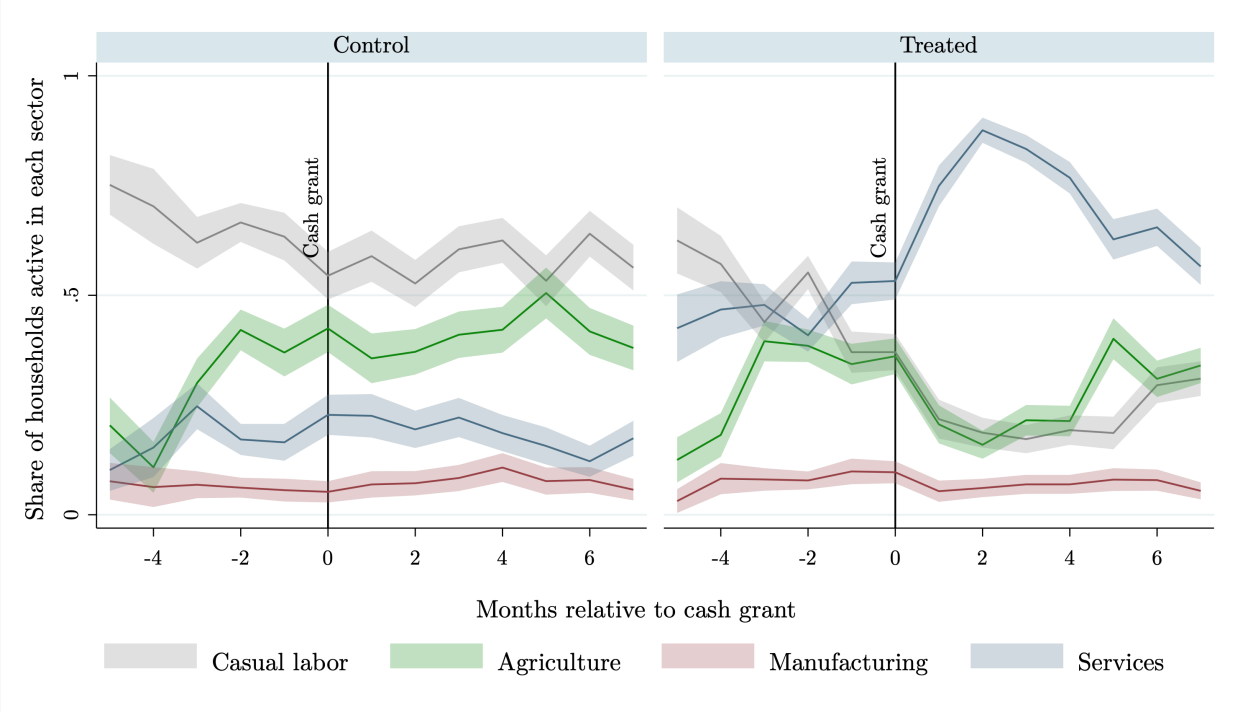


Figure 4: Sector Choice Comparison Over Time

C Time Use

Time Use Questions

- In the past seven days, how many hours have you spent on Yamba Malawi (implementing partner) program activities?
- In the past seven days, how many hours have you spent on household chores (including cleaning, washing, meal preparation, shopping, etc. but not childcare)?
- In the past seven days, how many hours have you spent on traveling or transport (include all forms of transport including walking)?
- In the past seven days, how many hours have you spent on childcare?
- In the past seven days, how many hours have you spent on leisure or resting by yourself (but not sleeping)?
- In the past seven days, how many hours have you spent on social, community, or religious activities?
- In the past seven days, how many hours have you spent idle (not resting or sleeping)?
- Over the past seven days, how many hours did you (Program participant) spend on this income source?

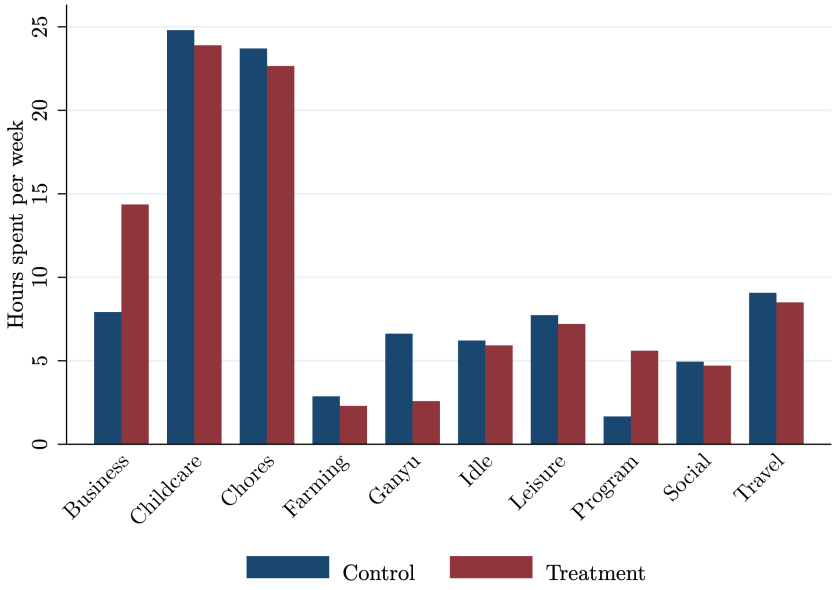


Figure 5: Time Use Comparison

Table 1: Women's Time Allocation (before cash grant)

	(1) Control mean (SD)	(2) Treatment Effect (SE)	(3) N (BL)
Program involvement	1.699	4.869***	1540
	(2.57)	(.3824)	×
Household chores	23.01	-.4011**	1540
	(7.411)	(.1898)	×
Travel	10.38	-.8117***	1540
	(5.04)	(.1587)	×
Childcare	21.78	-.7061***	1540
	(8.579)	(.1674)	×
Leisure	8.74	-.8631***	1540
	(4.384)	(.173)	×
Social	6.078	-.1262	1540
	(3.959)	(.1033)	×
Idle	6.115	-.5488***	1540
	(4.327)	(.1707)	×
Business	6.999	3.873***	1540
	(8.992)	(.6418)	×
Farming	1.145	-.0025	1540
	(3.104)	(.1994)	×
Sleep & Meals	100.5	-1.685***	1540
	(7.184)	(.2916)	×
Ganyu	9.418	-3.696***	1540
	(9.058)	(.539)	×

Notes: The last column indicates the number of observations. All regressions are implemented as an ANCOVA specification, controling for strata fixed effects. A ✓ indicates that the outcome variable is available for all observations at baseline. If it was not collected at baseline, a × is shown, and if it is partially available, missing observations are set to zero and dummied out (✓). Where available, regressions control for baseline levels of the outcome. Standard errors are clustered at the household cluster level. Significance is denoted by * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 2: Women's Time Allocation (after cash grant)

	(1) Control mean (SD)	(2) Treatment Effect (SE)	(3) N (BL)
Program involvement	1.504	1.153**	1005
	(2.544)	(.4466)	×
Household chores	23.94	-.9936***	1005
	(7.314)	(.2753)	×
Travel	9.247	-.3495***	1005
	(3.946)	(.0964)	×
Childcare	24.61	-.8751**	1005
	(9.692)	(.3368)	×
Leisure	7.629	-.5665***	1005
	(3.798)	(.1024)	×
Social	4.916	-.1003	1005
	(2.34)	(.09124)	×
Idle	6.506	-.5005***	1005
	(4.012)	(.1023)	×
Business	7.959	7.445***	1005
	(7.768)	(.6434)	×
Farming	2.643	1.487**	1005
	(4.944)	(.6434)	×
Sleep & Meals	100.4	-2.138***	1005
	(4.974)	(.2553)	×
Ganyu	6.324	-4.518***	1005
	(6.095)	(.3999)	×

Notes: The last column indicates the number of observations. All regressions are implemented as an ANCOVA specification, controling for strata fixed effects. A ✓ indicates that the outcome variable is available for all observations at baseline. If it was not collected at baseline, a × is shown, and if it is partially available, missing observations are set to zero and dummied out (✓). Where available, regressions control for baseline levels of the outcome. Standard errors are clustered at the household cluster level. Significance is denoted by * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

D Female Empowerment and Related Outcomes

Table 3: Impacts on Female Empowerment

	(1) Control mean (SD)	(2) Treatment Effect (SE)	(3) N (BL)
Female empowerment (-16 to 16)	.5459	.6187*	902
	(7.343)	(.3083)	(✓)
How much of the household's income to save?	-.5772	.2686***	902
	(1.671)	(.07684)	(✓)
Meal portions when food reserves are low?	-.1141	.2168**	902
	(1.776)	(.08697)	(✓)
What to do if a child falls sick?	.2841	.1651	902
	(1.718)	(.1079)	(✓)
Any decisions about children's schooling?	-.0626	.2274**	902
	(1.681)	(.08816)	(✓)
How should children be disciplined?	.1991	.002493	902
	(1.622)	(.09307)	(✓)
Whether or not to use a method to avoid having children?	.8568	-.1306	902
	(1.475)	(.09468)	(✓)
Whether to have another child?	-.0403	-.1155	902
	(1.68)	(.1053)	(✓)
Domestic violence justifiable	.6846	-.003749	1211
	(.4651)	(.01729)	×

Notes: The last column indicates the number of observations. All regressions are implemented as an ANCOVA specification. A ✓ indicates that the outcome variable is available for all observations at baseline. If it was not collected at baseline, a × is shown, and if it is partially available, missing observations are set to zero and dummied out (✓). Where available, regressions control for baseline levels of the outcome. Standard errors are clustered at the household cluster level. Significance is denoted by * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 4: Childcare Arrangements During Business Activities

	(1) Control mean (SD)	(2) Treatment Effect (SE)	(3) N (BL)
Left the baby home alone	.0062	-.002972***	12632
	(.0788)	(.0008989)	×
Left the baby with another child younger than 10 years old	.031	-.02043***	12632
	(.1734)	(.003981)	×
Left the baby with another child that is 10 years or older	.1081	-.05103***	12632
	(.3106)	(.01144)	×
Left the baby with the father	.0407	-.01467	12632
	(.1976)	(.01732)	×
Left the baby with another adult or family member	.3393	-.05516**	12632
	(.4735)	(.02228)	×
Left the baby with an adult neighbor	.0461	-.01453***	12632
	(.2098)	(.005472)	×
Took the baby with you	.2894	-.08562***	12632
	(.4535)	(.02553)	×
Brought baby to the CBCC or another childcare facility	.1391	.2444***	12632
	(.3461)	(.03988)	×

Notes: The last column indicates the number of observations. All regressions are implemented as an ANCOVA specification, controling for strata fixed effects. A ✓ indicates that the outcome variable is available for all observations at baseline. If it was not collected at baseline, a × is shown, and if it is partially available, missing observations are set to zero and dummied out (✓). Where available, regressions control for baseline levels of the outcome. Standard errors are clustered at the household cluster level. Significance is denoted by * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 5: Impacts on Husband's Involvement

	(1) Control mean (SD)	(2) Treatment Effect (SE)	(3) N (BL)
Father involved in childcare	.7045	-.01413	1177
	(.4567)	(.02148)	(✓)
Father contributes money	.7062	.04256*	1177
	(.4559)	(.02345)	(✓)
Father plays	.646	.02557	1177
	(.4786)	(.02744)	(✓)
Father feeds	.3625	.002069	1177
	(.4811)	(.02913)	(✓)
Father holds	.4656	.0001609	1177
	(.4992)	(.02796)	(✓)
Father teaches	.5275	.04216	1177
	(.4997)	(.0305)	(✓)
Spouse helped with chores	2.028	.4005**	934
	(2.69)	(.1907)	(✓)

Notes: The last column indicates the number of observations. All regressions are implemented as an ANCOVA specification. A ✓ indicates that the outcome variable is available for all observations at baseline. If it was not collected at baseline, a × is shown, and if it is partially available, missing observations are set to zero and dummied out (✓). Where available, regressions control for baseline levels of the outcome. Standard errors are clustered at the household cluster level. Significance is denoted by * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 6: Impacts on Fertility

	(1) Control mean (SD)	(2) Treatment Effect (SE)	(3) N (BL)
Total number of children	3.314	-.00002275	1211
	(1.513)	(.04568)	✓
Total number of children under five	1.562	.006825	1211
	(.667)	(.03086)	✓
Births	.1376	-.003721	1211
	(.5542)	(.03038)	✓
Pregnancies per household	.0604	.03373**	1211
	(.2384)	(.01376)	✓
Effective contraception	.6745	.01364	1207
	(.4689)	(.02253)	(✓)
Ideal number of children (mother)	4.507	-.07442	1211
	(2.431)	(.09518)	(✓)
Ideal number of children (father)	4.675	.0373	423
	(1.881)	(.2139)	×

Notes: The last column indicates the number of observations. All regressions are implemented as an ANCOVA specification. A ✓ indicates that the outcome variable is available for all observations at baseline. If it was not collected at baseline, a × is shown, and if it is partially available, missing observations are set to zero and dummied out (✓). Where available, regressions control for baseline levels of the outcome. Standard errors are clustered at the household cluster level. Significance is denoted by * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

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