Push and Pull Factors in Women's Rural Employment in India since Covid-19

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Abstract: The Covid-19 pandemic had a devastating impact on the world of work in India. It resulted in unprecedented job and income losses, reinforcing the adverse labour market situation of women. There was a significant contraction in demand as the crisis unfolded, and the effects of this contraction was exacerbated by an increase in the demand for unpaid care work as a result of business and school closures, and return migration. Return migration of working-age men pulled women out of employment, particularly in rural areas. Job and income losses and lower household income pushed women towards employment as a survival strategy to supplement family income, a strategy captured in the term "added-worker effect." We postulate that the net result of these competing forces on women's employment is ambiguous and investigate the pattern of rural women's labour supply during the Covid-19 pandemic. The paper uses a mixed methods approach. Factors that played a determining role in changes to the labour force status of women-broadly classified through focus group discussions with women in selected rural areas-were further probed through econometric analysis. The main factors were loss of employment by members of the household, changes in household size during the period as migrants returned home, shifts in the time women spent on unpaid care work, and the number of young children in a household. The impact of these factors on entry into and exit from employment were estimated for both women and men in rural and urban India, using data from the Centre for Monitoring the Indian Economy (CMIE) Consumer Pyramids Household Survey (CPHS). The findings show complex coping strategies at the household level where women's work–paid and unpaid–plays a critical role.

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INTRODUCTION

The Covid-19 pandemic had a devastating impact on the world of work, with unprecedented job and income losses globally, hitting women the hardest (ILO 2020a, 2021a). In India, the negative effects on women workers were particularly harsh as they added to their already adverse labour market situation (Deshpande and Kabeer 2021; Chaudhary and Verick 2014; Kapsos, Silberman, and Bourmpoula 2014). Even before the Covid-19 crisis, women's employment-to-population ratio was markedly low and declining, from 27.6 per cent in 2005 to 19.2 per cent in 2018.[1] This phenomenon has been attributed to the lack of job opportunities for women along with their expected role as primary care givers in general.[2] The extent of the decline in the employment-to-population ratio was more marked in rural India (from 31.1 to 19.9 per cent) while the levels remained lower but relatively stable for urban women (18.1 in 2005 to 17.5 per cent in 2018). The Covid-19-induced labour market crisis in India further compounded these trends. As jobs losses during the lockdown increased sharply, Deshpande (2021) notes that women's employment fell to 61 per cent of pre-lockdown levels in 2020 compared to 71 per cent for men. Abraham, Basole, and Kesar (2022) found that women were seven times more likely than men to lose work during the nation-wide lockdown of 2020. While there is not much research on the impact of the lockdown on rural women per se, Leonardelli *et al.* (2021) in a study of rural women in India, Morocco, and Algeria argue that intersectionality, resilience, and care have defined the disproportionate effect of Covid-19 on rural women.

While job losses, in particular of women who were more likely to be engaged in low paid and unstable work, were a global phenomenon, as was the rise in time spent in unpaid care and domestic work (UCW) by women during school and business closures (ILO 2020a, 2021a), one issue that was peculiar to the Indian context and particularly relevant for rural women was the sudden, large-scale return migration to rural areas. The lockdown in India, announced on March 24, 2020, with four hours' notice, had a severe impact on workers, particularly rural migrants and casual workers, many of whom worked in the informal sector in the cities. The immediate loss of jobs, along with accommodation, forced many short-term inter-state migrants working in the informal economy as construction workers, street vendors, domestic help, and casual labour to return to their rural homes (ILO 2020b). This added to the size of rural households as shown in Appendix Table 1.

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[1] All data from National Sample Survey Office (NSSO) published in the ILOSTAT database.
[2] See Swaminathan, Nagbhushan, and Ramachandran (2020).

Mamgain (2021) notes that between April 2020 and May 2020, when stringent lockdown measures were in place, the rural share of total employment increased from 68.2 per cent to 70.5 per cent. The growth in the average size of rural households largely comprised rural male return migrants, and, at a time of declining job opportunities, this phenomenon likely accentuated existing disparities between women and men in rural labour markets. On the one hand, employment opportunities for women could have declined, as women were likely to be crowded out of the labour market when men return migrants crowded in. Indeed, when jobs are scarce, gender is often a rationing mechanism to allocate limited job opportunities (UNCTAD 2017). On the other hand, as men lost their jobs, survival strategies may have led women's labour supply and employment to have risen as a survival strategy, albeit in low paid unstable jobs, in what is described as the added-worker effect.

The closure of schools and other care services, restrictions to mobility, and, in many cases, caring for those infected by the virus created an unprecedented demand for care within the home. Available evidence shows that, on average, women in India spent more than double the time in carework than men did (around 4.5 hours, compared to the 2 hours for men).[3] As noted by Deshpande (2021) men's participation in unpaid work increased by 28 per cent (rural) and 30 per cent (urban) in April 2020, compared to December 2019, starting from a low base, while that of women increased by 33 per cent from an already high level. However, men's time spent on unpaid work declined after the peak of April 2020, and by December 2020, the gender gap in time spent on unpaid care work (UCW) was larger than in the same period, the previous year.

This paper builds on the work done by Deshpande (2021, 2020a, 2020b) and Abraham, Basole, and Kesar (2021, 2022) and others, in an attempt to understand the labour market dynamics for rural women, particularly their transitions into and out of employment in response to the Covid-19 labour market shock. We seek to explore the impact of Covid-19 on rural women's employment through specific channels, which women in focus group discussions indicated as key changes that they experienced at the household level during the Covid-19 crisis. We postulate that these channels, i.e. loss of employment by other household members, increase in household size, and increase in unpaid care work, affected women's exit and entry into employment. We do not test for other possible effects of Covid-19 such as losses in income due to reduced hours, nor do we identify other channels that could have impacted employment in the short run (for example, sickness of household members).

In more conceptual terms, the paper investigates (a) a version of the added-worker effect, according to which distress caused by loss of employment (and income) in

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[3] Figures calculated from time-use data collected by the Centre for Monitoring the Indian Economy (CMIE) between late 2019 and mid-2022.

the household can lead women to engage in employment i.e. be *pushed in* (b) if increases in unpaid care work negatively affected women's engagement in employment, i.e., be *pulled out* of the work force; and (c) whether the post-Covid-19 situation is quantitatively and qualitatively different from the pre-pandemic situation in respect of women's employment (i.e. whether new patterns are emerging in the short post-Covid-19 period we are able to observe). Our focus therefore is on the entry and exit of women from employment in response to changes in the household due to the Covid-19 crisis. The key findings highlight the complex coping strategies at the household level where women's work–paid and unpaid–plays a critical role.

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Review of Literature

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Across the globe, studies on the effects of Covid-19 on labour markets suggest that women were hit the hardest. The International Labour Organization (ILO) estimates that in 2020, job losses were proportionately greater for women, 4.2 per cent, than for men, three per cent, with sharper relative declines in women's employment-to-population ratios compared to men's, particularly in middle-income countries (ILO 2021a). Studies examining the US (Alon *et al.* 2020), Spain (Farre *et al.* 2020), China, Italy, Japan, South Korea, and the United Kingdom (Dang and Nguyen 2021), Austria, Brazil, Canada, Germany, Poland, and Sweden (Galasso and Foucault 2020) find that women have been disproportionately affected by the global pandemic.

The literature suggests that gendered effects are on account of differences in women's and men's distribution of employment across sectors, with women over-represented in some of the sectors which were most affected, such as retail trade, accommodation and food services, and education (ILO 2020a, 2021a). Another issue relates to the increased demand for care with school closures and restrictions on mobility (limiting the possibility of outsourcing care), associated with the uneven distribution of unpaid care work, which is traditionally higher among women than men (Alon *et al.* 2020 and Farre *et al.* 2020). In addition, in contexts where older household members, such as grandparents, provided childcare before the pandemic, this was discouraged after the pandemic due to higher mortality rates among the older population (Alon *et al.* 2020). Overall, the available evidence suggests that Covid-19 increased gender inequalities in paid and unpaid work, at least in the short-term.

This is also the case with studies focused on India. Several studies found the effects of the lockdown on employment were greater for men than for women in absolute terms but were larger for women in relative terms, given their lower rates of employment and labour force participation. Women were also affected more deeply by income loss, food insecurity, and asset sales during the pandemic.

Abraham, Basole, and Kesar (2021) found that women were seven times more likely than men to lose jobs and eleven times more likely not to return to work after the

lockdown, even after controlling for differences in demographic and employment patterns, such as age, education, caste, marital status, type of employment (self, salaried, or casual), and industry of work. Education and marriage had opposite effects on the trajectories of women and men–educated women (men) were more (less) likely to lose jobs and married women (men) were less (more) likely to return to work. They also suggested that during the crisis, women had fewer fallback options and were thus more likely to exit employment, while men were able to find alternative work, as evident from the increase in self-employment and daily wage work in agriculture, trade and construction among men. Research by the World Bank (2020) suggests that self-employment was indeed a fallback option for wage workers who lost their jobs during the initial months of Covid-19 in India, as reflected in a shift in the composition of employment with the share of self-employment increasing 12 per cent in the first six months of the pandemic.

Deshpande (2020a, 2020b) found that the drop in employment during the first lockdown was greater for men than for women in absolute but not relative terms. Moreover, conditional on being employed pre-lockdown, women's employment loss was 18-20 per cent higher relative to men's (Deshpande 2020b). Her analysis suggests that rural women's employment suffered the largest relative fall in the first (April 2020) lockdown, standing at 57 per cent of the previous year average, in sharp contrast to rural men, for whom the ratio to the previous year average was 73 per cent (Deshpande 2020b). In urban areas, there was not much difference between men and women, with employment at 67-69 per cent of the previous year. By August 2020, while men's employment had nearly recovered to pre-pandemic levels, women's remained lower than in the pre-lockdown period – the likelihood of being employed was 9.5 percentage points lower for women than that for men, compared to the pre-pandemic period (Deshpande 2020a). Moreover, women's employment declined further between September and December 2020, especially in rural areas (Deshpande 2021). An analysis of gender gaps in paid and unpaid work showed that the gap contracted during the first wave of Covid-19, as a result of a fall in probability of men's employment, but had recovered to pre-Covid-19 levels in December 2020 (Deshpande 2021). Examining time-use data on care activities Deshpande (2021, 2020a) found that the gender gap declined in the first month of the lockdown, due to an increase in men's engagement in care activities, but the trend had reversed by August 2020, and by December 2020 had reached levels below those of the pre-pandemic period, while women's unpaid care work had risen.

These findings on job and income loss reported by Deshpande (2021, 2020a, 2020b) and Abraham, Basole, and Kesar (2021, 2022) using stratified national-level panel data (from CMIE) are echoed by findings from several other surveys conducted during and immediately after the 2020 lockdown. Dutta and Kar (2022) found that gender inequalities in the labour market were exacerbated in the rural areas of six States during the lockdown. Desai, Deshmukh, and Pramanik (2021) found that gender disparities in post-lockdown employment in New Delhi metropolitan area related to

differences in sector and type of employment. Analysing data from a National Council of Applied Economic Research (NCAER) survey of 2,227 women and men for the period March 2019 to May 2020, they argue that among the self-employed, women were less affected by the lockdown than men (partly because of women's concentration in agriculture), but the opposite was true for wage workers. A survey by Azim Premji University (APU) on the impact of the lockdown on 4,000 workers across 12 States found that job loss was more prominent in urban relative to rural areas (APU 2020). They showed that 67 per cent of workers had lost their employment in April/May as compared to February 2020; 80 per cent of workers in urban areas and 57 per cent workers in rural areas reported employment loss. Those still employed reported sizeable fall in earnings, ranging from 50 per cent lower weekly earnings for casual workers to 90 per cent for non-agricultural self-employed workers; in addition, salaried workers either saw a reduction in their income or received no income. A survey of over 11,000 informal and largely migrant workers in 21 States similarly found extremely high levels of livelihood loss (78 per cent) and indebtedness (53 per cent) (Action Aid Association 2020). Notably, fewer women reported looking for work during the lockdown than men.

Smaller scale studies help bring into focus the plight of women in agriculture. Kulkarni *et al.* (2022) found that the majority of the 900 single women farmers surveyed in Maharashtra struggled to harvest and market their produce due to logistical difficulties and mobility restrictions created by the lockdown. These disruptions, combined with a sharp drop in price due to limited access to government markets, meant that women farmers found themselves without the ability to repay old loans, exhausting borrowing options and having to lease their lands, shift to food crops, and reduce food intake to sustain themselves. Similar findings are reported by Harris *et al.* (2020) who found, six weeks into the lockdown, that among 448 farmers in four States, farm income dropped for 90 per cent of the sample, and by more than half for 60 per cent; 62 per cent reported disruptions to their diets, with women farmers significantly more likely than men to report a reduction in consumption of vegetables, fruits, and dairy produce. The first round of the Rapid Rural Community Response to Covid-19 (RCRC) survey collected data from about 11,000 low-income farmers in nine states, the majority of whom were women (RCRC 2020). Of the surveyed households, 39 per cent experienced hunger in May 2020, and 75 per cent reported not having enough cash in hand. Many of these households reported pawning assets, such as ornaments and jewellery or mortgaging land for food, medicines, and agricultural activities. Looking at research covering late 2020 and early 2021, we found that this pattern of reduced incomes, increased food insecurity, borrowing, and distress sale of assets, persisted long after the national lockdown was lifted.[4]

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[4] See for instance evidence on persisting income shortages captured in the third round of the Rapid Rural Community Response to Covid-19 survey (RCRC 2021) or continued food insecurity in Bihar (Mishra, Dutta, and Madan 2021).

The discussion above confirms that, the impact of the economic crisis that ensued in the wake of Covid-19 pandemic was complex, and employment and income loss affected many aspects of living standards. Agarwal (2021) makes a further point about understanding impact as a sequential process rather than as a one-time event, with short-term, and long-term consequences which are different for women and men. She argues that job losses and livelihood disruption for extended periods of time without recovery can lead to long-lasting change in intra-household dynamics. She argues that indirect gender effects that arise within families, due to pre-existing and new inequalities tend to remain concealed and often not captured by surveys.

DATA AND METHODOLOGY

This paper relies on mixed methods to explore the impact of Covid-19 on women's employment. It examines quantitative data from the CMIE Consumer Pyramids Household Survey, as well as qualitative data gathered through focus groups discussions (FGDs).

Qualitative data collected through FGDs enable a nuanced understanding of the challenges faced by rural women during the Covid-19 pandemic. Information collected from discussions with rural women in selected rural areas informed the design of the econometric approach.

Focus Groups Discussions

In November and December 2021, focus group discussions were conducted in partnership with the Foundation for Agrarian Studies (FAS) in India to complement and inform the analysis of survey data. Four focus groups were conducted, two in Karnataka, and, two in Tamil Nadu, encompassing a total of 39 women. Sampling was purposeful, building on previous survey data, to reflect the main socio-economic groups present in the villages. Aged 29-66, these were married or widowed rural women who engaged in a wide range of activities before the pandemic, including household work, animal husbandry, sericulture, ASHA work, work at MGNREGA (Mahatma Gandhi National Rural Employment Guarantee Act) sites, and casual labour.

These moderated semi-structured group interviews allow for a deeper understanding of the effects of Covid-19 on households in rural areas and women's perceptions and experiences.[5] Discussion topics comprised:

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[5] At the start of the discussions, participants were given a brief introduction of the goals of the study, were informed that participation was voluntary, and that the information collected would remain confidential and be used strictly for academic purposes.

- The usual labour market status of participants before and after the start of the pandemic, as well as participants' unpaid care work (UCW) before and after the onset of Covid-19;
- The effect of Covid-19 on participants' households, including whether there was job and income loss, return migration, or changes in consumption patterns;
- The main challenges women faced since the start of the pandemic;
- Access to public programmes and support measures (including access to MGNREGA, the public food distribution system, health services, among others);
- Government support participants received, if any, both financial and in-kind, since the start of Covid-19, and additional support expected or needed.

Participants, their husbands, and other household members were often unable to work for pay or profit during the lockdown months. As a result, household income was negatively affected, and many women said that they pawned jewels or mortgaged gold, took on household debt or sold animals to pay for daily expenses. One woman said,

> There were no jobs. We were jobless at home. We pawned the things at home when we didn't have money. When we got money, we redeemed it. During Covid-19 period, that is how we survived.

In regard to unpaid care work, the presence of young children was identified as a major factor that prevented women's engagement in employment. In addition, women reported an increase in care and domestic work when relatives returned from other regions due to job loss.

Several return migrants resorted to working as agricultural labourers. One of them said, "My sons were working in Bangalore, both of them did not get their salaries. They came back, did agricultural work."

At the same time, it was stated that return migrants were not called for work due to the fear of Covid-19, illustrating the unclear role of return migrants in rural labour markets.

Women's accounts suggest that there was some movement in and out of employment during the crisis. Although many of the women were economically active prior to the pandemic, they were often unable to find work during it. As one woman said,

> In the village, sericulture work also stopped because they (cultivators) did not get a good price (for cocoons) as markets closed during the lockdown. There was no work during lockdown. Everyone stopped working.

During the lockdown, some managed to engage in agricultural labour, while other work (e.g. teaching) was interrupted. For yet other women, during Covid-19, both paid and unpaid work continued, "I do household work. I go for agricultural wage work. If we get construction work, I go for that too. If we get MGNREGA work, we

go for that too." And for another, "During the lockdown time, after finishing all housework, and taking care of children, I was going to the field for agricultural work."

Some households relied solely on women's labour income. As noted by one woman,

> Because of lockdown, everyone came back home as all companies and businesses were closed. Both my daughters used to work in Bangalore but came back home due to the lockdown. They did not get any salary during that time. We faced a lot of problems during that time. I was the only person in the household who went for labouring jobs. Managing household expenses with one person's earnings was very difficult.

The focus group discussions also highlight the overall difficulties in getting work for women in the face of various changes that are taking place in the labour market. These long-term trends were summed up by one a woman as follows, "Our livelihoods were being lost. Machinery had come for sowing, for harvesting, for threshing."

Several common features emerged from the discussions, motivating our empirical strategy. Covid-19 was repeatedly associated with household distress due to loss of jobs, more mouths to feed due to return migration, and continuing or increased care work at home. It was also clear that very few of those in the FGDs received any support from the Government during the period.

Consumer Pyramids Household Survey

The Consumer Pyramids Household Survey (CPHS) is a panel survey conducted by the Centre for Monitoring Indian Economy (CMIE) that includes three waves or rounds each year, with households surveyed every four months, leading to a total of three observations for each household per calendar year, assuming no attrition. The survey has information on households and individuals including demographic characteristics, activity and employment, and time use, among other variables. As we investigate transitions in and out of employment, we restrict the sample to persons aged 15 and above and who had made at least one transition (entry or exit) between early 2016 (when CPHS began collecting information on employment) and May-August 2022. Data are presented in four-month periods (quadrimesters) which are called QM1 (January-April), QM2 (May-August), and QM3 (September-December) for ease of reference.

An individual is classified as employed if 15 years of age or older and engaged in any economic activity on the day of the survey or the preceding day, or who is generally regularly engaged in an economic activity (CMIE n.d.). According to the survey documentation, employment includes salaried workers, as well as casual workers, employers, own-account workers, and contributing family workers. However, some categories of workers, especially the self-employed and contributing family workers may be underestimated as a result of the question construct. A CMIE note on the

CPHS employment indicators states that the self-employed often need to be further prompted to self-identify as employed (Kumar 2021). In addition, the indicator description notes potential issues with self-identification among unpaid family workers (CMIE n.d.).

As a result of differences in questionnaire design and definitions, many important labour market data from CPHS are not strictly comparable to NSSO data, including employment. The employment (and labour force) levels calculated using CPHS data, and presented in this paper, are substantially lower than those presented by the NSSO, particularly for women. For 2018 the employment-to-population ratio for men based on CPHS data (68.3 per cent) was similar to that calculated using NSSO data (68.2 per cent). However, the CPHS ratio is much lower for women, 9.3 per cent as compared to the NSSO estimate, 19.2 per cent. Underlying this underrepresentation are all kinds of economic activities of women, which are equally likely to not be captured by the CMIE dataset (Abraham and Shrivastava 2022).[6]

The CPHS sample encompasses a larger share of urban compared to rural respondents. However, the CPHS data are balanced to produce rural/urban estimations similar to those made by the NSSO. For 2018, NSSO data indicated that women's (men's) rural employment was 71.8 (69.4) per cent of total women's (men's) employment, while estimations based on CPHS data indicate that women's (men's) rural employment was 70.5 (68.4) per cent of women's (men's) total employment.

Econometric Approach

In a setting in which rural women's labour force participation has been declining (ILO 2020b) and/or volatile, and irregular and short-term (Deshpande and Singh 2021), the significant decrease in economic activity and contraction in demand for workers caused by the Covid-19 pandemic and the measures taken to curb the spread of the disease may have further inhibited women's engagement in employment. To understand how rural women's labour market engagement responded to the sanitary and economic crisis triggered by the Covid-19 pandemic, our analysis focuses on the movement of persons of working age into (entry) and out of (exit) employment. Rural women's employment transitions are analysed in comparison to that of urban women as well as to rural and urban men. It is worth noting that given that employment data is gathered every four months, our estimates likely underestimate transitions during the crisis.

Our main dependent variables are $Entry_{it}$ and $Exit_{it}$. We define $Entry_{it}$ as taking a value of one for individual i in period t, if the person entered employment in period t when she

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[6] To the extent that the CPHS data under-represents women's paid work, it is also likely to not capture the full extent of entry and exit into employment that was experienced by women as estimated in this analysis. This, as well as the fact that survey data are collected every four months for each respondent, means our estimations are conservative.

was either unemployed or out of the labour force in period *t-1*; the variable takes the value of zero if there is no change in employment status. Similarly, we define $Exit_{it}$ which takes the value of one if the individual *i* was employed in period *t-1* and exited employment (i.e. was either unemployed or out of the labour force) in period *t*, it takes the value of zero if the individual remained in employment. It should be noted that we opt to analyse movements in and out of employment, rather than to examine unemployment and inactivity separately for two key reasons. Historically, unemployment rates in India, particularly for women, have been low, as women tend to move from employment to inactivity rather than to unemployment (see Figure 1). In addition, as noted in ILO (2021b), during the Covid-19 crisis, inactivity increased much more than unemployment globally, driven by women's inactivity rates.

We begin by outlining trends in key labour market indicators. Then, we measure and report, entry and exit probabilities through time, from early 2016 to May-August 2022. Next, we use the econometric approach of a Difference-in-Difference (DiD) estimator to examine the impact of a shock (Covid-19) on women's entry and exit. An important innovation of this paper is that the shock (or Treatment variable) is not a binary variable but continuous. We create a continuous variable on the Covid-19 shock using the Stringency Index defined by Oxford Coronavirus Government Response Tracker to analyse the impact of Covid-19 as a shock on women's entry and exit using a difference-in-difference estimator. Finally, we examine the role of different factors identified from the focus group discussion in determining entry and exit. The full methodology is reported in Appendix A1.

Two-Way Fixed Effects (TWFE) Model

A methodological problem in estimating the relation between women's employment and household distress and increased unpaid care work (UCW) lies in the fact that women who engage in employment are likely to differ from those who do not. There might be some (ex-ante) observed characteristics, such as household income, but also unobserved characteristics, that simultaneously explain the time dedicated to unpaid care work and their engagement in employment, the outcome of interest. To address these concerns, the longitudinal structure of the data is exploited and individual fixed-effects estimators are utilised, assuming that selection into employment is explained by unobserved heterogeneity captured by time-invariant individual-specific characteristics (Appendix A2). We suggest that the use of a fixed-effects model minimises potential concerns over endogeneity by accounting for fixed individual factors which could simultaneously affect women's paid employment and care responsibilities.

DETERMINANTS OF ENTRY INTO AND EXIT FROM EMPLOYMENT

We hypothesise that the long-term decline in women's employment-to-population ratios and economic activity was reinforced in the context of Covid-19 due to an
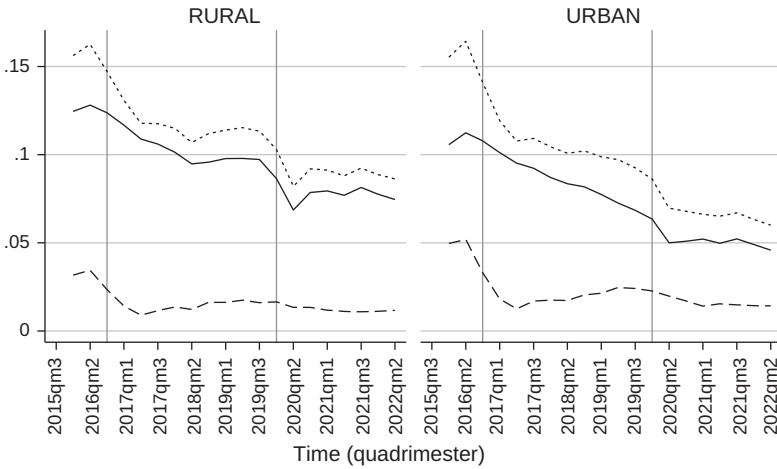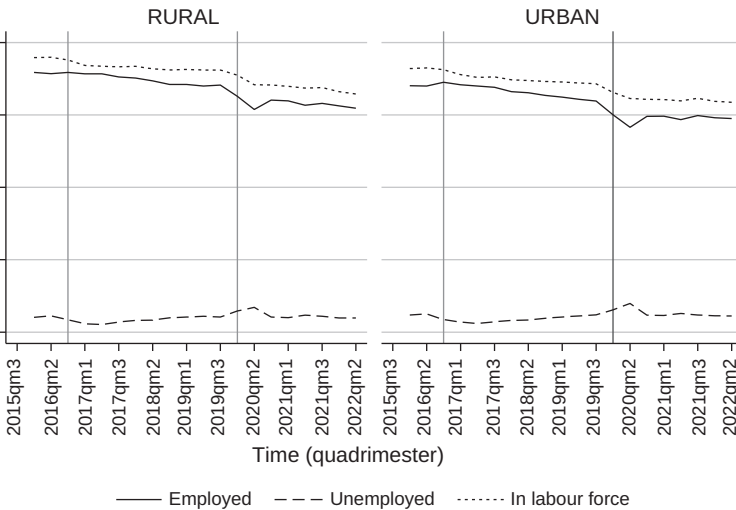
Figure 1 *Trends in employment status for working-age persons (ages 15 years and older)*, by sex and region, 2015 QM3 to 2022 QM2

increase in unpaid care work resulting from school closures, tending for those who fell ill, and return migration. However, at the same time, lower employment and hence lower incomes at the household level may have pushed women towards employment as a survival strategy, to supplement family income, in what is termed the added-worker effect. Indeed, women's engagement in the labour market can be seen as a household insurance mechanism in developing countries (Dasgupta and Verick 2016). In the absence of unemployment insurance and in the context of weak

social security systems, the added-worker hypothesis implies that unemployment in the household positively affects women's economic activity so as to compensate for the loss of family income. Women's labour supply and employment becomes counter-cyclical, rising in response to economic crisis and household shocks. Hence, an increase in women's labour market participation is often observed during economic downturns, mainly in response to a fall in household income and unemployment in the household (Dasgupta and Verick 2016). Given women's burden of unpaid care work, their reservation wages are likely to be higher than men's, who would be more reluctant to take over some of women's unpaid care responsibilities (Khitarishvili 2013).

We postulate that the net result of these competing forces on women's employment is ambiguous and set out to investigate two hypotheses:

1. a shock at the household level (proxied by loss of employment in the household) is positively linked to women's engagement in employment (the added-worker effect); and
2. a rise in unpaid care and domestic work is negatively related to women's engagement in employment.

To examine the presence of the added-worker effect, we construct a variable representing a household shock, which captures a change in the number of working-age household members who are not in employment between period *t-1* and period *t*, i.e., the loss of employment in the household. Given the traditional extended household structure of rural households in India, we believe this variable captures shocks at the household level better than a variable examining the spouse's employment status alone.[7] If there is no loss of employment, the variable takes the value of zero. Appendix Table 1 shows that the household employment shock for all women, rural and urban in QM2 and QM3 2020 was larger than any previous values, even larger than those corresponding to the demonetisation shock in early 2016. The household employment shock was higher for rural women, than for urban women in both QM2 and QM3. Further, the value of the employment search remained high throughout 2021 for rural women while for urban women, the year 2021 was similar to the pre-Covid-19 years.

We expect that a rise in the number of working-age household members not in employment is likely to increase the probability of women engaging in employment and lower the probability of women exiting employment.

To analyse the relationship between women's unpaid care work (UCW) and employment, we focus on two explanatory variables. The first is a dummy variable with a value of one if there is an increase in time spent in UCW between the two

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[7] On average, 80 per cent of the sample lived in households with more than two working-age members.

time periods, and zero otherwise. The CPHS started collecting data on "time spent on work done for household and its members" from September-December 2019, which means that the "increase" can only be calculated for the period 2020 QM1, which therefore constitutes our first observed period. Appendix Table 1 shows that the increase in care time is evident in the first observed QM period, as compared to the last QM 2019 period: 33.5 per cent of women reported an increase in care time. After this first shock, proportionally fewer women reported increases in 2020. However, in 2021 and early 2022, over a quarter of rural women and close to a third of urban women in 2021 QM2 and 2022 QM1 reported increases in care time. The higher number in urban areas may be on account of smaller households and lack of care services.

We also examine the number of children aged five and younger in the household. Appendix Table 1 shows that for both rural and urban women, the number of young children in the household systematically increased, going from 0.678 in early 2016 to 1.243 in mid-2022 for urban women, and, from 0.848 to 1.545 in the same period for rural women. These figures also show that rural households have, on average, more young children than urban households.

We expect that an increase in UCW will hinder women's engagement in paid work, lowering the likelihood of women entering employment and increasing the likelihood of women exiting employment.

Finally, we examine the impact of return migration on employment by taking the change in the number of household members of working age as a proxy for return migration. We use a dummy variable which takes the value of one if there was an increase in the number of working-age household members between periods *t-1* and *t* and zero otherwise. Appendix Table 1 shows that in urban households, average number of members contracted slightly during but especially after the lockdown months: in 2020 QM1 and QM3, and during 2021. Rural households mirror these figures in the opposite direction: higher average values for 2020 QM1 and QM3, and over 2021 and early 2022.

The expected effect of this variable is two-fold, with unclear net results for women's employment: the greater the number of household members, the greater the income needs which may push women towards employment; but a larger household can also be associated with greater UCW needs, which tend to fall disproportionately on women, thus curbing the time available to engage in economic activities.

We use a two-way fixed effects model to estimate the causal relationship between women's employment and their response to variables such as household distress and increased unpaid care work, as outlined in Appendix A.

We begin with an overview of changes in employment, unemployment, and labour force participation as emerging from the CPHS data for 11 quadrimesters, from 2015 QM3 (September-December 2015) to 2022 QM2 (May-August 2022) (see Figure 1). Women's labour force participation and employment rates have been declining in rural and urban areas, in parallel trends. Since 2016, there have been much sharper declines for women than for men immediately after shocks, including demonetisation and Covid-19. In contrast, unemployment rates have been much more stable, remaining relatively low. These trends suggest that, in India, in the absence of employment opportunities, women tend to withdraw from the labour force rather than become unemployed – a feature of the Covid-19 crisis also identifiable at a global scale (ILO 2021a). In contrast, the dip in men's employment after the Covid-19 lockdown was accompanied by an equivalent rise in unemployment.

Differences are also marked between women in rural and urban settings. Women's unemployment rate is higher and more variable in urban areas *before* Covid-19. But after the peak of Covid-19, it contracted, and stabilised at a low level, as did employment and labour force participation. The employment-to-population ratio of urban women in May-August 2022 was eight per cent (0.4 percentage point) lower than in the same period of 2020, and the share of urban women not in employment reached 95.4 per cent. In comparison, women's rural employment clearly rebounded after the lockdown months, to stabilise at a level that is, however, lower than the pre-pandemic one. Rural women's employment-to-population ratio contracted more than 20 per cent (2.3 percentage points) between May-August 2019 and May-August 2022 to reach 7.5 per cent. In both rural and urban cases, data for 2022 shows a decline in employment and labour force participation. For urban women, this level is even lower than the immediate post-lockdown period.

Given the focus on unpaid care work, trends for women and men in households with young children were also examined. These trends were similar to those for all women and men and are not presented for brevity.

Transition Tables

We next estimated the probability of entry into and exit from employment in each wave by gender and geographical area (total/rural/urban), from the second quadrimester of 2016 (May-August) to the second quadrimester of 2022 (See Appendix Table 2). Entry is computed as the proportion of the population that transitions from a state of unemployment in *t-1* to employment in *t*, and exit is the proportion of the total population that transitions from a state of employment in *t-1* to unemployment in *t*. The previous analysis reinforced our focus on employment as opposed to labour force participation, given the strong implications on both

labour demand and supply of Covid-19 restrictions, which contracted both employment and the possibility to search for jobs (unemployment).

These entry and exit tables follow a fire colour code, from lower transition probabilities in green to higher probabilities in orange and red (highest alert) (the scales are created separately for men and women). A quick review of Appendix Table 2 shows the magnitude of the Covid-19 shock: the probability of entry almost doubled amongst women, and almost tripled amongst men in the period May-December 2020 (QM2-QM3). Restrictions in movement and economic activities were strictest during QM2. Exit probabilities increased even more, reaching 11 per cent for men and 3.8 per cent for women between QM2 and QM3. Further research is needed to understand the underlying causes of this higher churning. In a context of limited economic support, we believe this is the result of many workers losing their jobs who could not afford to remain without labour income, and thus engaged in precarious and unstable jobs for survival.

Women's and men's entry probabilities differ. After the demonetisation shock in 2016, prior to which men's entry rates had peaked and women's entry rates were particularly low, the panel data show that both men's and women's entry rates fell, but that of women remained systematically below that of men though fluctuating parsimoniously for most of the QM-periods. After the Covid-19 shock, women's probability of entry went to a new low, at one per cent or less for most of the pre-Covid-19 periods. Men's probabilities of entry also fell and reached a historic low of less than one per cent in the most recent period (up to August 2022). Exit probabilities steadily declined for men and women from early 2018 up to the Covid-19 shock, and again in recent periods. The Covid-19 peaks in exit and entry rates, for men and women, rural and urban, are therefore a remarkable disturbance in the trend, but one that did not last. After QM1 and QM2, the first Covid-19 shock, exit and entry probabilities continued to decline, and are now lower than in the pre-pandemic period.

In net terms (Appendix Table 2.c), the employment contraction had already started during 2020 QM1, which includes the first lockdown month. The net probability of losing employment was higher for urban men (-3.2) than for rural men (-2.4), whilst the reverse was true for women at a much lower level (-0.36 for urban women as compared to -0.4 for rural women). Negative net employment effects were the highest in 2020 QM2, in rural areas (-3.09 for men and -0.72 for women) and urban areas (-2.78 for men and -0.90 for women respectively). By 2020 QM3, entry probabilities far exceeded exit probabilities in all cases. The low probabilities of entry and exit for both women and men during 2021 and 2022 suggest that the situation has stabilised post-Covid-19, as compared to the crisis, though as mentioned, at lower than pre-pandemic levels. It is noticeable however, that, rural women lost employment in net terms during 2021 and in QM1 2022.

To gather insights on transitions in and out of employment in the context of increased unpaid care work, we also examined transitions of women and men in households with young children (under the age of six) (Appendix Table 3). As expected, women's probability of entry and exit in these households was generally lower than men's. Interesting trends emerge when we examine men and women separately.

Before Covid-19, men in households with young children transitioned less in and out of employment than the general male working-age population. However, in the months of the lockdown and after, i.e. from May-August 2020 onwards, the probabilities of entry and exit were higher amongst men who had young children in the household as compared to all men, a trend that has persisted since. This is not the case amongst women. Between the second half of 2018 and early 2020, the probability of entry for women with young children at home was higher than for all women. It became lower in 2020 QM2 and QM3 at the peak of the Covid-19 crisis, and turned higher again afterwards. Having a young child in the house is also associated with women in the household being more likely to exit employment after the peak Covid-19 months than the female working-age population overall.

On the one hand, children represent a *push in* factor, as household members whose needs must be met by higher household income; on the other hand, in the context of lockdown, with school closures and limited ability to outsource unpaid care work, women were *pulled out* from the labour market, with no other choice than to remain at home to undertake care duties. These two effects underline differences between women in rural and urban settings. The probability of exit for women in households with children is higher in rural than in urban areas, a trend that remained unaffected by Covid-19. Entry is, however, also more frequent which could be associated with the nature of work available in rural versus urban areas. The lower entry probabilities for urban women with children could be related to the lack of care services.

For all women and men, the net employment contraction had already started during 2020 QM1 (Appendix Table 3.c). The net probability of losing employment was bigger for urban men in these households than for all men (-3.53 compared to -3.20 in 2020 QM1). Again, negative net employment effects were the highest in 2020 QM2 in rural areas (-3.46 for men and -0.95 for women). And by 2020 QM3, entries far exceeded exits in all cases, and there were therefore strong positive net employment effects. These were however short-lived, and in 2021 QM2 net employment effects turned negative. A year after, negative employment effects were still evident for all women and men living in households with children under six except for urban men, the situation in these households worse than for the overall population, 15 years and older.

We use our difference-in-difference specification to directly observe the effects of the Covid-19 shock on women's entry into and exit from employment. Figure 2 summarises the results of the difference-in-difference estimation.

First, there was a noticeable increase in the rate of exit in 2020 QM2 (May–August). This captures the period of most stringent lockdown (May–June 2020), when many workers were unable to remain in employment. The effect is stronger for women in urban areas, who could be tied to stricter (*de facto* and *de jure*) confinement regulations compared to women in rural areas, where agriculture and allied activities were permitted to continue during the lockdown while industry and services came to a halt. There was also a sharp increase in the rate of entry during 2020 QM2, in both rural and urban areas, something observable also in the transition matrixes. The effects are stronger on exit than entry in this period, resulting in a likely aggregate contraction of employment.

These increases in the rate of entry are followed by a sharp decrease in 2020 QM3, the subsequent quadrimester. This could possibly be the result of tightness in the labour market, exacerbated by lingering lockdown measures. The effect is again, stronger for urban areas.

The new lockdowns in 2021 QM2 are associated with a decrease in exit rates, but the effect is weaker compared to the lockdowns of 2020; while no significant effects could be identified for the rate of entry in that period. Rates of entry decreased in 2021 QM3
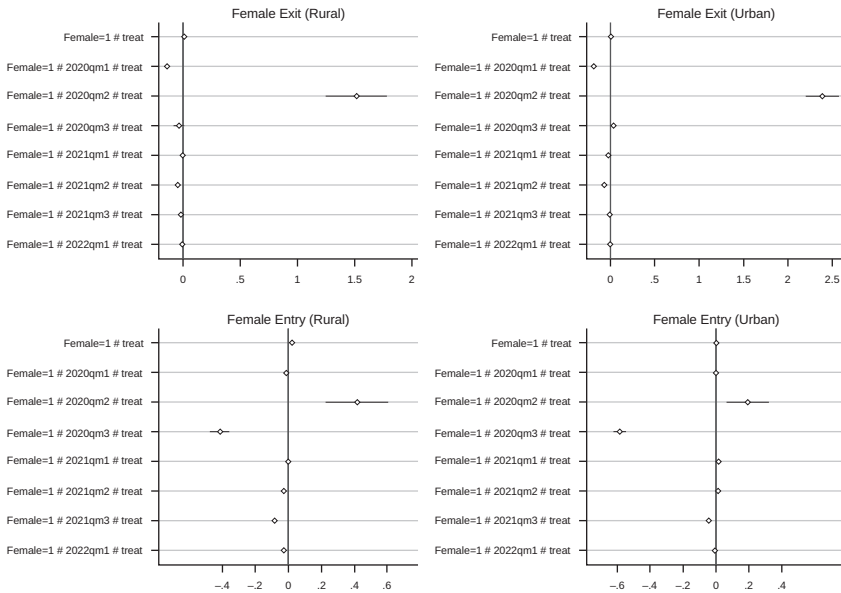
Figure 2 *Difference-in-difference estimation results*

for both rural and urban women, but this effect has largely disappeared, as early as 2022 QM1. Overall, the direct effects of Covid-19 observed in our DiD specification are significant on the rates of entry and exit, but short lived, as they are barely observed after a quadrimester. Further decomposition of both time intervals (from four-month periods to months) and the Stringency Index (from States to districts) would be useful to advance our understanding of the impact of Covid-19 on employment entry and exit dynamics.

Determinants of Entry and Exit in Employment and Effects of Covid-19

We use fixed effects regressions to investigate women's and men's entry into and exit from employment. The results in Tables 1 and 2 show the estimated effect of the four major explanatory variables, number of children, increase in unpaid care work, household distress, and increase in working-age household members on the dependent variables (entry and exit). Results for rural and urban women are reported in Table 1, and for rural and urban men in Table 2. An additional regression for entry and exit of women in households with young children is reported in Appendix Table 4. In all cases, we control for industry, type of occupation, wage, and household income.

Table 1 *Results for entry and exit of women in rural and urban areas, all households*

Variables	(1) Entry Rural Female	(2) Entry Urban Female	(3) Exit Rural Female	(4) Exit Urban Female
Number of children in household	-0.00529***	-0.00314***	0.0124***	0.00866***
	(0.000470)	(0.000262)	(0.000573)	(0.000384)
Increase in care time	-0.00745***	-0.00525***	0.0155***	0.0123***
	(0.000379)	(0.000192)	(0.000532)	(0.000298)
Household employment shock	0.0816***	0.0435***	-0.0991***	-0.0709***
	(0.00178)	(0.000966)	(0.00182)	(0.00119)
Household member increase	0.0113***	0.00715***	0.00379***	0.00394***
	(0.000871)	(0.000514)	(0.00105)	(0.000682)
Constant	0.307***	0.248***	-0.123***	-0.0331
	(0.0211)	(0.0488)	(0.0148)	(0.0387)
Observations	398,481	882,643	398,481	882,643
R-squared	0.274	0.305	0.141	0.092
Number of iid	94,982	179,890	94,982	179,890
Industry controls	Yes	Yes	Yes	Yes
Nature of occupation controls	Yes	Yes	Yes	Yes
Wage level controls	Yes	Yes	Yes	Yes
Household income level Controls	Yes	Yes	Yes	Yes

Notes: Robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. All regressions include individual and time fixed effects.

Table 2 *Results for entry and exit of men in rural and urban areas, all households*

Variable	(1) Entry Rural Male	(2) Entry Urban Male	(3) Exit Rural Male	(4) Exit Urban Male
Number of children in household	0.000728	0.00351***	0.00101*	0.00143***
	(0.000652)	(0.000494)	(0.000583)	(0.000432)
Increase in care time	-0.0102***	-0.0125***	0.0234***	0.0237***
	(0.000555)	(0.000364)	(0.000669)	(0.000440)
Household employment shock	0.194***	0.152***	-0.161***	-0.163***
	(0.00670)	(0.00535)	(0.00499)	(0.00430)
Household member increase	0.0161***	0.0181***	0.00685***	0.00955***
	(0.00123)	(0.000907)	(0.00113)	(0.000841)
Constant	0.140***	0.148***	-0.0287***	0.0302
	(0.00744)	(0.0287)	(0.00664)	(0.0294)
Observations	462,646	1,011,556	462,646	1,011,556
R-squared	0.160	0.150	0.164	0.144
Number of iid	107,293	200,622	107,293	200,622
Industry controls	Yes	Yes	Yes	Yes
Nature of occupation controls	Yes	Yes	Yes	Yes
Wage level controls	Yes	Yes	Yes	Yes
Household income level controls	Yes	Yes	Yes	Yes

Notes: Robust standard errors in parentheses. ***$p<0.01$, ** $p<0.05$, * $p<0.1$. All regressions include individual and time fixed effects.

For women, all four independent variables were statistically significant in the equations for entry and exit into and out of employment with the expected signs (Table 1). The number of young children in the household was negatively associated with women's entry into employment and positively linked to women's exit from employment. The same was true for increase in the time spent on care work, which was negatively associated with women's entry into employment and positively associated with exit. For both variables, the coefficients were larger (in absolute terms) for women in rural areas than urban areas, indicating a stronger impact of changes in time spent on childcare and other care work on women's employment in rural areas relative to urban areas. These findings corroborate insights from the focus groups discussions, that, household responsibilities increased during Covid-19, a fact that could have put pressure on the time available to engage in paid work.

A priori, the effects of an increase in the number of working-age household members on women's employment is ambiguous. On the one hand, a larger household, with greater income needs, can lead to higher entry and lower exit for women. On the other hand, a larger household, can increase unpaid care work, and deter women from entering employment (lower entry and higher exit). Regression results show that an increase in the number of household members is positively correlated with both women's entry and exit from employment. However, the coefficient for entry

is three times that of exit for rural women and nearly two times that of exit for urban women, suggesting greater income needs can outweigh the pressure from increased care work.

The fourth variable, household distress, confirms the presence of an added-worker effect. A shock at the household level (proxied by loss of employment by members of the household) is positively correlated with women's entry and negatively correlated with their exit. Notably, the coefficient for entry is twice as large for rural women compared to urban women. Although the coefficient for exit is also large for women in rural areas, the difference is much smaller.

The regression results for men (Table 2) are starkly different from that of women. In rural areas, the number of children in the household was not a determinant of rural men's entry into employment and weakly significant to exit. The picture changes when we only examine households with young children. The number of children is now positively, and significantly linked to men's entry and exit in urban areas, with the entry coefficient almost three times that for exit. Men's 'breadwinner' role is accentuated with the number of children in the household.

As for women, increase in the time spent in unpaid care work was negatively associated with entry and positively with exit among men. The coefficients for men were much larger than for women, suggesting men's entry and exit to and from employment are more sensitive to shifts in unpaid care work than women's. Our hypothesis is that differences in the sensitivity of women's and men's entry and exit to changes in UCW result from their very different starting points, as women's average hours of UCW are approximately double those of men. Increases of UCW over and above these levels seem to be more acceptable for women, who are expected to carry out the brunt of UCW irrespective of their employment status. This result is also in line with the findings pointed out in the literature that reservation wages are higher for women due to their greater UCW responsibilities– in other words, that labour market conditions should change much more than for men's in order for them to engage in employment.

Household distress influences men's entry and exit to a much higher degree than women's, especially in urban areas, the coefficients for men were between 1.6 to 3.5 times those for women. This is suggestive of cultural norms which designate men as primary breadwinners and women as secondary workers. An increase in the number of working-age household members has a positive and significant relationship on entry and exit of men, similar to women, in both rural and urban areas, but the coefficients were higher for entry than for exit, especially for rural men.

To better examine the relationship between unpaid care work and employment, we focus on women in households with children five years old and younger (Appendix Table 4). As expected, the number of young children in the household was

negatively related to women's entry and positively linked to exit. The coefficient for rural women was nearly three times that for urban women, a larger difference than that found in the regression for all households (Table 1). Moreover, while the effect of the number of children on entry is greater for rural women in households with children relative to all rural women, the opposite is found among urban women. Exit coefficients are similar for women with young children and all women. An increase in time spent on care work was also negatively linked to entry and positively linked to exit, with coefficients similar to those for all women. This suggests that the variable time spent in UCW largely captures the demands of young children in a household. The regression coefficients for women with young children in a household did not have substantially different coefficients for other variables too. As was the case for all women, a household employment shock positively (negatively) affects the entry (exit) probability of rural and urban women with children in the household.

The effect of an increase in the number of working-age household members on women's entry into and exit from employment differs in intensity for women with young children in the household as compared to all women. This relationship is positive and significant across the board, but the coefficients for exit for rural and urban women with young children in the household were twice those for women overall. Further, the coefficients for entry were lower for women with young children, relative to the estimates for all women. Therefore, in the presence of young children in the household, an additional working-age household member is much more likely to lead a woman to exit employment, and less likely to lead her to entry, than in the absence of young children.

As noted earlier, to address endogeneity problems, we also estimated a dynamic panel generalised method of moments (Arellano-Bond Generalized Method of Moments (AB GMM) one-step) estimator (Appendix Tables 5-7). The dynamic panel regressions act as a robustness check to our results from the two-way fixed effects (TWFE) specifications (Appendix A2). They confirm the significance of our main variables of interest, i.e. number of children, loss of employment in the household, number of household members, and increase in time spent on unpaid care work.

Household distress remained positively and significantly associated with women's entry into employment. Similarly, the negative effect of household distress on exit was confirmed. Increases in time spent on unpaid care work had a negative effect on women's entry in to employment, and a positive effect on women's exit from employment.

In addition, the GMM estimates suggest that the presence of young children in a household is mainly linked to the probability of women's exit from employment, the effect on entry was not significant.

Finally, the GMM estimates for men also confirmed the two-way fixed-effects results. There are two noteworthy differences between the specifications though: first, the number of young children in the household was not a determinant of the likelihood of entry for rural men in the fixed-effects regression, but it was significant in the dynamic panel regression. Secondly, an increase in the number of working-age household members was not significant for men's exit in rural areas, unlike in the fixed effects regression.

<center>CONCLUSION</center>

Covid-19 has exacerbated long-term trends in women's employment in India. Employment-to-population ratios have been declining since the mid-2000s. The decline was more rapid in rural than urban areas and the rates have converged in recent years. Rates have declined further since the onset of the pandemic. A comparison of the latest observation available, May-August 2022, to the same period in 2018 suggests that women's rate of employment contracted more than 20 per cent in rural India and nearly halved in urban India.[8]

The paper used a mixed method to probe rural women's employment transitions in response to the Covid-19 shock. The paper focuses on four channels identified in focus group discussions through which the Covid-19 crisis affected women's rural employment, loss of employment by a household member, addition to household size because of return migration, increase in unpaid care work, and the presence of children in the household. Combining findings from the focus groups with a review of literature, we hypothesised that (i) the loss of employment of a household member was positively linked to women's employment, therefore positively associated with entry and negatively associated with exit, and (ii) increases in unpaid care work time were negatively linked to women's employment, therefore negatively associated with entry and positively associated to exit.

Regression estimates for the entry into and exit from employment of rural and urban women using multiple rounds of the Consumer Pyramids Household Survey (CPHS) data (from August 2016 to August 2022) showed a positive relationship between loss of employment in the household and women's entry into employment, supporting the added-worker hypothesis; the relationship was significant for all women as well as for women with young children in the household. Results also confirmed a negative relationship between exit and loss of employment in the household. The coefficients for both entry and exit were bigger for rural than urban women, suggesting that these effects were stronger among the former. In respect of care

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[8] In mid 2022 92.5 per cent of rural women and 95.4 per cent of urban women of working age were out of employment as per the CPHS. These high rates need to be viewed with caution as the CPHS does not include "contributing family work" in employment. Nevertheless these results are consistent with the findings from other surveys on low LFPR, for women in India which are also declining, and Covid-19 has likely contributed further towards this trend.

work, increases in time spent in unpaid care work and in the number of young children in a household had a negative (positive) effect on women's entry (exit), as expected. In both cases, the coefficients were larger (in absolute terms) for women in rural areas, indicating a stronger impact of changes in care time on women's employment in rural areas.

Finally, we attempted to capture the effects of return migration to rural areas on employment with a variable representing increase in number of working-age household members. Results showed that an increase in household members was positively linked to both entry into and exit from employment, with higher coefficients for entry suggesting that the effect of increased income needs, the added-worker effect once more outweighed the increase in demand for UCW on account of new members (15 years and older) in the household. As with other explanatory variables, the coefficients for rural women were larger in magnitude than those for urban women suggesting that engagement in employment was more volatile and counter cyclical among rural women.

The findings for men are suggestive of cultural norms that designate men as primary breadwinners and women as secondary workers. Employment loss in the household and an increase in the number of working-age household members influenced men's entry into and exit from employment to a much higher degree than they influenced women's entry into and exit from employment. In rural areas, the number of children in the household was not significantly related to men's entry into employment and was only weakly significant to their exit. The employment variable for men appears to be more sensitive than the corresponding variable for women to changes in time spent in unpaid care work despite dedicating much less time to these activities. This is likely linked to social expectations where women are held responsible for care work irrespective of their employment status. This social expectation regarding women's unpaid care work is summed up by one participant at the focus group discussion who said,

> We have to cook, wash vessels and utensils, feed the children, and after feeding them, go for agricultural work. We return at night, wash vessels, take a bath, cook, and feed the children. It is midnight before we go to bed. We wake up at 5 am and we go for work. This is our routine.

Lastly, our Difference-in-Difference analysis suggests that the direct effect of the Covid-19 measures were short-term and barely felt beyond a quadrimester. The transitory nature of these effects require further study and observation, as we do not yet have enough observations *after* Covid-19 to draw firm conclusions.

Our findings support the hypothesis that the Covid-19 shock both pushed women into the labour market, the so-called added-worker effect, and pulled them out, and these effects were stronger for rural women than for other categories of workers (urban women, and rural and urban men). The channels through which the Covid-19 crisis

impacted these transitions into and out of employment for rural women (losses in household employment; increases in unpaid care work and an increase in household size as migrants returned from urban centres), however, are factors that influence rural women's employment status on a long standing basis and continue to impact women's employment beyond the Covid-19 crisis. To address these issues in a systematic and comprehensive manner, targeted gender-responsive employment policies, along with investments in care, are required. Further research is needed to identify the probability of women with differing income levels exiting from employment and entering employment and to better understand the extent to which Covid-19 related short-term transitions have a longer-term impact on rural women's employment in India.

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APPENDIX A

Methodology

Appendix A1 *Difference-in-Difference Estimator*
We directly estimate the impact of Covid-19 on women's entry into and exit from employment utilising a DiD estimator. We utilise this technique since we have a continuous treatment variable over many time periods in our sample. As we are primarily interested in the effects of differential treatment due to (more or less) stringent lockdowns, we utilise the time period itself (before and after Covid-19) as another control in our specification.

$$
\begin{aligned}
Entry_{it} = \beta_0 &+ \beta_1 \cdot Female_{it} \cdot Time_t \cdot Treat_{kt} + \beta_2 \cdot Female_{it} \cdot Time_t + \beta_3 \cdot Female_{it} \\
&\times Treat_{kt} + \beta_4 \cdot Time_{it} \cdot Treat_{kt} + \beta_5 \cdot Treat_{kt} + \beta_6 \cdot Time_{it} + \beta_7 \cdot Female_{it} \\
&+ \gamma_i + \varepsilon_{it}
\end{aligned}
$$

$$Exit_{it} = \beta_0 + \beta_1 \cdot Female_{it} \cdot Time_t \cdot Treat_{kt} + \beta_2 \cdot Female_{it} \cdot Time_t + \beta_3 \cdot Female_{it}$$
$$\times \ Treat_{kt} + \beta_4 \cdot Time_{it} \cdot Treat_{kt} + \beta_5 \cdot Treat_{kt} + \beta_6 \cdot Time_{it} + \beta_7 \cdot Female_{it}$$
$$+ \ \gamma_i + \varepsilon_{it}$$

Here, $Treat_{kt}$ represents a variable exposure to Covid-19-related lockdowns in state k at time t. We utilise the Stringency Index from the Oxford Coronavirus Government Response Tracker (OxCGRT) to construct this variable.[9] We transform the Stringency Index into a continuous variable with values ranging from zero to one, with one representing the highest level of stringency. The index is provided at the national level for 2020 but at the district level for 2021 and 2022. We presume a zero value for the time period prior to 2020 since we are primarily interested in evaluating the effect of Covid-19 through government policies designed in response to it. $Time_{it}$ is an indicator for the time periods, γ_i represents individual fixed effects and e_{it} is the error term. The novelty of this approach is that we have a continuous treatment variable, not a binary variable representing "lockdown" or "no lockdown," to be able to test the long-term effects of Covid-19 on women's and men's employment transitions.

Appendix A2 *Two-Way Fixed Effects (TWFE) Model*
To investigate the presence of the added-worker effect and the relationship between UCW and women's engagement in employment, we run the following two-way fixed effects (TWFE) specification:

$$Entry_{it} = \alpha + X_{jt}\beta + Z_{it}b + \gamma_i + \tau_t + \varrho_{it}$$
$$Exit_{it} = \alpha + X_{jt}\beta + Z_{it}b + \gamma_i + \tau_t + \varrho_{it}$$

X_{jt} are our main household variables of interest. These include the number of children in the household, a change in time spent on unpaid care work, a household employment shock variable and an increase in the number of working-age members of the household variable, as described above. γ_i represents individual fixed effects and τ_t represents time fixed effects. The subscript i represents individuals, j represents households and t represents time periods, and Z_{it} represents individual level controls. We utilize the industry, nature of occupation, wage income level and household income level as controls. In the case of wage and household income, we deflate them utilizing the GDP deflator and then divide them into quintiles.[10]

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[9] See Mathieu *et al.* (2020).
[10] The GDP deflator is taken from the World Bank's World Development Indicator's database. See World Bank (n.d.).

There is a potential concern that $Entry_{it}$ and $Exit_{it}$ are dynamic variables which are dependent on their previous values and our household level variables might be correlated with previous values, which would make causal interpretation from the TWFE specification harder. We, therefore, utilise the Arellano-Bond Generalized Method of Moments (AB GMM) estimator to account for endogeneity issues and incorporate dynamic effects between our main variables of interest. The results from the AB GMM estimator serve as a robustness check to our TWFE analysis.

The AB GMM equations are specified as follows:

$$Entry_{i,t} = \alpha Entry_{i,t-1} + X_{i,t}\beta + X_{i,t-1}\beta + X_{i,t-2}\beta + X_{i,t-3}\beta + X_{i,t-4}\beta + T_t + \varepsilon_{i,t}$$
$$Exit_{i,t} = \alpha Exit_{i,t-1} + X_{i,t}\beta + X_{i,t-1}\beta + X_{i,t-2}\beta + X_{i,t-3}\beta + X_{i,t-4}\beta + T_t + \varepsilon_{i,t}$$

We regress entry and exit to their lagged value and include four lags to our dependent variables and time dummies.

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APPENDIX B

Statistical Tables

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Appendix Table 1 *Summary statistics for all women, women living in rural areas and women living in urban areas,* 2016–2022

Time period	Number of children in household (less than six years old)	Household members (15 years and older)	Household member increase	Increase in care time	Household employment shock	Entry	Exit
All							
2016QM1	0.798	3.562	0.079				
2016QM2	0.932	3.603	0.103		0.490	0.041	0.039
2016QM3	0.962	3.555	0.094		0.488	0.039	0.046
2017QM1	0.983	3.582	0.120		0.484	0.025	0.033
2017QM2	1.014	3.561	0.100		0.461	0.026	0.034
2017QM3	0.957	3.626	0.148		0.497	0.018	0.025
2018QM1	1.013	3.612	0.137		0.494	0.025	0.033
2018QM2	1.039	3.596	0.116		0.459	0.023	0.030
2018QM3	1.071	3.600	0.115		0.438	0.023	0.024
2019QM1	1.066	3.657	0.137		0.448	0.022	0.022
2019QM2	1.118	3.600	0.102		0.444	0.017	0.020
2019QM3	1.173	3.591	0.112		0.439	0.017	0.020

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Appendix Table 1 *(continued) Summary statistics for all women, women living in rural areas and women living in urban areas,* 2016−2022

Time period	Number of children in household (less than six years old)	Household members (15 years and older)	Household member increase	Increase in care time	Household employment shock	Entry	Exit
2020QM1	1.232	3.592	0.116	0.335	0.426	0.018	0.024
2020QM2	1.279	3.604	0.135	0.239	0.541	0.032	0.037
2020QM3	1.294	3.600	0.130	0.185	0.654	0.030	0.028
2021QM1	1.284	3.610	0.117	0.262	0.471	0.016	0.015
2021QM2	1.328	3.599	0.107	0.289	0.450	0.010	0.013
2021QM3	1.376	3.606	0.108	0.276	0.486	0.012	0.012
2022QM1	1.363	3.627	0.097	0.289	0.416	0.008	0.009
2022QM2	1.434	3.611	0.093	0.268	0.413	0.008	0.014
Rural							
2016QM1	0.848	3.544	0.079				
2016QM2	0.979	3.593	0.106		0.497	0.041	0.041
2016QM3	1.023	3.551	0.099		0.494	0.041	0.049
2017QM1	1.053	3.588	0.126		0.495	0.026	0.034
2017QM2	1.089	3.570	0.107		0.472	0.027	0.036
2017QM3	1.010	3.651	0.172		0.521	0.020	0.030
2018QM1	1.073	3.628	0.152		0.512	0.026	0.034
2018QM2	1.102	3.608	0.122		0.473	0.022	0.030
2018QM3	1.131	3.615	0.122		0.452	0.024	0.024
2019QM1	1.122	3.685	0.146		0.468	0.023	0.022
2019QM2	1.170	3.633	0.106		0.459	0.018	0.020
2019QM3	1.235	3.618	0.116		0.456	0.018	0.020
2020QM1	1.288	3.630	0.125	0.335	0.446	0.019	0.025
2020QM2	1.360	3.624	0.140	0.236	0.548	0.033	0.038
2020QM3	1.393	3.637	0.142	0.185	0.661	0.033	0.028
2021QM1	1.368	3.649	0.126	0.259	0.492	0.018	0.015
2021QM2	1.410	3.653	0.118	0.274	0.475	0.011	0.013
2021QM3	1.476	3.665	0.122	0.275	0.500	0.013	0.014
2022QM1	1.471	3.706	0.109	0.276	0.434	0.009	0.010
2022QM2	1.545	3.673	0.103	0.263	0.436	0.009	0.017

Appendix Table 1 *(continued)* *Summary statistics for all women, women living in rural areas and women living in urban areas,* 2016–2022

Time period	Number of children in household (less than six years old)	Household members (15 years and older)	Household member increase	Increase in care time	Household employment shock	Entry	Exit
Urban							
2016QM1	0.678	3.607	0.077				
2016QM2	0.822	3.627	0.096		0.473	0.039	0.036
2016QM3	0.823	3.562	0.085		0.474	0.035	0.041
2017QM1	0.823	3.567	0.106		0.459	0.023	0.030
2017QM2	0.842	3.540	0.083		0.436	0.024	0.029
2017QM3	0.847	3.575	0.099		0.448	0.014	0.017
2018QM1	0.885	3.578	0.106		0.453	0.024	0.031
2018QM2	0.897	3.571	0.103		0.428	0.024	0.030
2018QM3	0.944	3.569	0.101		0.410	0.022	0.023
2019QM1	0.946	3.595	0.116		0.403	0.019	0.023
2019QM2	1.006	3.531	0.094		0.412	0.015	0.020
2019QM3	1.042	3.535	0.104		0.402	0.015	0.018
2020QM1	1.112	3.510	0.096	0.335	0.384	0.016	0.022
2020QM2	1.108	3.562	0.124	0.245	0.526	0.029	0.037
2020QM3	1.106	3.529	0.109	0.185	0.640	0.025	0.027
2021QM1	1.122	3.536	0.100	0.266	0.431	0.012	0.014
2021QM2	1.173	3.496	0.086	0.317	0.403	0.010	0.012
2021QM3	1.191	3.498	0.082	0.277	0.459	0.010	0.010
2022QM1	1.173	3.486	0.075	0.312	0.384	0.006	0.008
2022QM2	1.243	3.503	0.076	0.275	0.372	0.006	0.010

Appendix Table 2 *Transition tables for working-age persons (ages 15 years and older)*, by sex and region, 2016-2022

a. Entry into employment

	Total		Rural		Urban	
	M	W	M	W	M	W
2016QM2	7.86	1.59	8.57	1.10	7.66	1.72
2016QM3	5.54	3.99	5.06	5.02	5.77	3.51
2017QM1	3.93	2.60	3.97	3.23	3.91	2.32
2017QM2	3.95	2.60	4.23	3.60	3.82	2.16
2017QM3	2.17	1.58	2.10	2.00	2.21	1.39
2018QM1	3.66	2.46	3.95	2.97	3.53	2.21
2018QM2	3.73	2.27	3.65	2.53	3.77	2.14
2018QM3	3.11	2.37	3.17	2.87	3.08	2.10
2019QM1	3.25	2.01	3.28	2.46	3.23	1.78
2019QM2	2.83	1.55	2.83	2.00	2.83	1.32
2019QM3	3.16	1.63	3.30	1.90	3.08	1.49
2020QM1	3.07	1.74	3.32	2.27	2.94	1.48
2020QM2	8.12	2.99	7.80	3.76	8.27	2.64
2020QM3	9.77	3.01	9.30	4.01	9.97	2.59
2021QM1	2.55	1.26	2.77	1.85	2.46	1.02
2021QM2	2.02	0.87	2.00	1.14	2.03	0.77
2021QM3	3.07	1.10	3.13	1.39	3.04	0.98
2022QM1	1.54	0.65	1.79	1.00	1.43	0.50
2022QM2	1.75	0.71	1.78	1.07	1.74	0.58

Appendix Table 2 *(continued)* *Transition tables for working-age persons (ages 15 years and older)*, by sex and region, 2016-2022

b. Exit from employment

	Total		Rural		Urban	
	M	W	M	W	M	W
2016QM2	3.76	3.27	5.19	2.56	3.38	3.47
2016QM3	4.79	4.37	4.47	5.27	4.95	3.95
2017QM1	3.75	3.31	3.61	4.13	3.81	2.95
2017QM2	3.81	3.35	3.75	4.35	3.84	2.91
2017QM3	1.87	1.39	1.78	1.54	1.91	1.33
2018QM1	3.84	3.06	3.79	3.9	3.86	2.67
2018QM2	3.48	2.88	3.53	3.6	3.45	2.51
2018QM3	3.26	2.21	3.35	2.66	3.21	1.97
2019QM1	2.72	2.06	2.5	2.28	2.84	1.95
2019QM2	2.64	1.96	2.5	2.2	2.71	1.84
2019QM3	2.73	1.66	2.68	2.05	2.75	1.46
2020QM1	6.01	2.11	5.74	2.68	6.14	1.84
2020QM2	11	3.83	10.89	4.48	11.05	3.54
2020QM3	5.56	2.74	5.68	3.15	5.51	2.56
2021QM1	2.24	1.11	2.13	1.34	2.29	1.02
2021QM2	2.66	1.06	2.49	1.49	2.73	0.88
2021QM3	1.76	0.99	1.87	1.43	1.72	0.8
2022QM1	1.41	0.76	1.56	1.04	1.35	0.65
2022QM2	1.76	1.07	2.11	1.8	1.62	0.8

Appendix Table 2 *(continued) Transition tables for working-age persons (ages 15 years and older), by sex and region, 2016-2022*

c. Net transitions (Entry-Exit)

	Total		Rural		Urban	
	M	W	M	W	M	W
2016QM2	4.10	-1.68	3.38	-1.46	4.28	-1.75
2016QM3	0.75	-0.38	0.59	-0.25	0.82	-0.44
2017QM1	0.18	-0.71	0.36	-0.90	0.10	-0.63
2017QM2	0.14	-0.75	0.48	-0.75	-0.02	-0.75
2017QM3	0.30	0.19	0.32	0.46	0.30	0.06
2018QM1	-0.18	-0.60	0.16	-0.93	-0.33	-0.46
2018QM2	0.25	-0.61	0.12	-1.07	0.32	-0.37
2018QM3	-0.15	0.16	-0.18	0.21	-0.13	0.13
2019QM1	0.53	-0.05	0.78	0.18	0.39	-0.17
2019QM2	0.19	-0.41	0.33	-0.20	0.12	-0.52
2019QM3	0.43	-0.03	0.62	-0.15	0.33	0.03
2020QM1	-2.94	-0.37	-2.42	-0.41	-3.20	-0.36
2020QM2	-2.88	-0.84	-3.09	-0.72	-2.78	-0.90
2020QM3	4.21	0.27	3.62	0.86	4.46	0.03
2021QM1	0.31	0.15	0.64	0.51	0.17	0.00
2021QM2	-0.64	-0.19	-0.49	-0.35	-0.70	-0.11
2021QM3	1.31	0.11	1.26	-0.04	1.32	0.18
2022QM1	0.13	-0.11	0.23	-0.04	0.08	-0.15
2022QM2	-0.01	-0.36	-0.33	-0.73	0.12	-0.22

Notes: The fire colour coding used here is green (lowest), orange, and red (highest alert). The data are from CPHS waves from quadrimester 2 or QM2 (May-August) 2016 to 2022. There are three four monthly waves in the survey: quadrimester 1 or QM1 (January-April), QM2 (May-August), and QM3 (September-December).
Source: CPHS

Appendix Table 3 *Transition tables for working-age persons (ages 15 years and older) in households with children under six years old*, by sex and region, 2016-2022

a. Entry into employment

	Total		Rural		Urban	
	M	W	M	W	M	W
2016QM2	6.56	0.9	7.84	0.71	6.22	0.95
2016QM3	4.86	3.97	4.43	4.99	5.09	3.44
2017QM1	3.43	2.55	3.5	2.96	3.39	2.34
2017QM2	3.45	2.55	3.77	3.42	3.29	2.13
2017QM3	1.85	1.56	1.83	1.9	1.86	1.4
2018QM1	3.27	2.45	3.54	2.87	3.13	2.24
2018QM2	3.32	2.27	3.28	2.47	3.34	2.16
2018QM3	2.79	2.43	2.76	2.92	2.81	2.15
2019QM1	2.97	2.03	2.91	2.44	3.01	1.79
2019QM2	2.66	1.6	2.61	2.09	2.69	1.33
2019QM3	2.99	1.64	2.99	1.94	2.99	1.47
2020QM1	2.97	1.75	3.26	2.28	2.81	1.47
2020QM2	8.31	2.89	7.61	3.6	8.67	2.53
2020QM3	10.34	2.95	9.76	3.98	10.63	2.46
2021QM1	2.63	1.31	2.79	1.79	2.56	1.09
2021QM2	2.16	0.84	2.03	1.11	2.22	0.72
2021QM3	3.27	1.13	3.21	1.4	3.3	1.01
2022QM1	1.57	0.7	1.83	1.08	1.45	0.53
2022QM2	1.88	0.77	1.84	1.16	1.9	0.6

Appendix Table 3 *(continued) Transition tables for working-age persons (ages 15 years and older) in households with children under six years old, by sex and region, 2016-2022*

b. Exit from employment

	Total		Rural		Urban	
	M	W	M	W	M	W
2016QM2	2.49	3.04	3.92	1.67	2.14	3.41
2016QM3	4.25	4.37	4	5.18	4.39	3.95
2017QM1	3.38	3.21	3.34	3.96	3.39	2.84
2017QM2	3.45	3.32	3.4	4.09	3.47	2.95
2017QM3	1.76	1.37	1.72	1.49	1.78	1.32
2018QM1	3.45	3.02	3.49	3.75	3.43	2.65
2018QM2	3.18	2.91	3.18	3.62	3.18	2.5
2018QM3	3.14	2.2	3.24	2.57	3.08	1.98
2019QM1	2.58	2.07	2.27	2.23	2.75	1.98
2019QM2	2.53	1.97	2.33	2.09	2.64	1.9
2019QM3	2.61	1.63	2.54	1.98	2.65	1.44
2020QM1	6.08	2.1	5.62	2.67	6.34	1.8
2020QM2	11.27	3.71	11.07	4.55	11.38	3.28
2020QM3	5.43	2.69	5.41	3.1	5.44	2.5
2021QM1	2.43	1.14	2.29	1.38	2.49	1.03
2021QM2	2.94	1.07	2.67	1.41	3.07	0.91
2021QM3	1.95	1.02	1.98	1.43	1.93	0.83
2022QM1	1.6	0.82	1.67	1.02	1.56	0.72
2022QM2	1.98	1.16	2.32	1.93	1.84	0.84

Appendix Table 3 *(continued) Transition tables for working-age persons (ages 15 years and older) in households with children under six years old, by sex and region, 2016-2022*

c. Net transitions (Entry-Exit)

	Total		Rural		Urban	
	M	W	M	W	M	W
2016QM2	4.07	-2.14	3.92	-0.96	4.08	-2.46
2016QM3	0.61	-0.40	0.43	-0.19	0.70	-0.51
2017QM1	0.05	-0.66	0.16	-1.00	0.00	-0.50
2017QM2	0.00	-0.77	0.37	-0.67	-0.18	-0.82
2017QM3	0.09	0.19	0.11	0.41	0.08	0.08
2018QM1	-0.18	-0.57	0.05	-0.88	-0.30	-0.41
2018QM2	0.14	-0.64	0.10	-1.15	0.16	-0.34
2018QM3	-0.35	0.23	-0.48	0.35	-0.27	0.17
2019QM1	0.39	-0.04	0.64	0.21	0.26	-0.19
2019QM2	0.13	-0.37	0.28	0.00	0.05	-0.57
2019QM3	0.38	0.01	0.45	-0.04	0.34	0.03
2020QM1	-3.11	-0.35	-2.36	-0.39	-3.53	-0.33
2020QM2	-2.96	-0.82	-3.46	-0.95	-2.71	-0.75
2020QM3	4.91	0.26	4.35	0.88	5.19	-0.04
2021QM1	0.20	0.17	0.50	0.41	0.07	0.06
2021QM2	-0.78	-0.23	-0.64	-0.30	-0.85	-0.19
2021QM3	1.32	0.11	1.23	-0.03	1.37	0.18
2022QM1	-0.03	-0.12	0.16	0.06	-0.11	-0.19
2022QM2	-0.10	-0.39	-0.48	-0.77	0.06	-0.24

Notes: The fire colour coding used here is green (lowest), orange, and red (highest alert). The data are from CPHS waves from quadrimester 2 or QM2 (May-August) 2016 to 2022. There are three four monthly waves in the survey: quadrimester 1 or QM1 (January-April), QM2 (May-August), and QM3 (September-December).
Source: CPHS

Appendix Table 4 *Regression results for women in rural and urban areas, all households with children five years old or younger*

Variables	(1) Entry Rural Female	(2) Entry Urban Female	(3) Exit Rural Female	(4) Exit Urban Female
Number of children in household	-0.00665***	-0.00276***	0.0114***	0.00796***
	(0.000639)	(0.000377)	(0.000784)	(0.000553)
Increase in care time	-0.00735***	-0.00504***	0.0158***	0.0121***
	(0.000536)	(0.000278)	(0.000740)	(0.000435)
Household employment shock	0.0900***	0.0413***	-0.105***	-0.0739***
	(0.00257)	(0.00133)	(0.00259)	(0.00174)
Household member increase	0.00971***	0.00618***	0.00796***	0.00706***
	(0.00132)	(0.000834)	(0.00169)	(0.00117)
Constant	0.333***	0.285***	-0.133***	-0.00395
	(0.0308)	(0.0719)	(0.0235)	(0.0722)
Observations	205,836	423,417	205,836	423,417
R-squared	0.299	0.325	0.149	0.097
Number of iid	56,750	101,865	56,750	101,865
Industry Controls	Yes	Yes	Yes	Yes
Nature of Occupation Controls	Yes	Yes	Yes	Yes
Wage Level Controls	Yes	Yes	Yes	Yes
Household Income Level Controls	Yes	Yes	Yes	Yes

Notes: Robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. All regressions include individual and time fixed effects.

Appendix Table 5 *Results of Generalized Method of Moments (GMM) regressions for entry and exit of women*

Variables	(1) Entry Rural Female	(2) Entry Urban Female	(3) Exit Rural Female	(4) Exit Urban Female
L. entry	-0.0501***	-0.0364***		
	(0.00558)	(0.00353)		
Number of children in household	-0.00138	0.000311	0.0118***	0.00873***
	(0.00196)	(0.00122)	(0.00197)	(0.00103)
L. Number of children in household	-0.00317*	-0.00538***	-0.00188	0.00171*
	(0.00188)	(0.00105)	(0.00160)	(0.000982)
L2. Number of children in household	-0.00402***	-0.000652	0.00260**	0.00113
	(0.00141)	(0.000816)	(0.00132)	(0.000865)
L3. Number of children in household	0.00114	-0.00180***	-0.000127	0.000766
	(0.00127)	(0.000696)	(0.00119)	(0.000747)
L4. Number of children in household	0.000588	0.000264	0.00138	0.000464
	(0.00104)	(0.000567)	(0.00107)	(0.000619)
Increase in care time	-0.0100***	-0.00857***	0.0115***	0.00770***
	(0.00112)	(0.000567)	(0.00129)	(0.000654)
L. Increase in care time	-0.00268*	-0.00288***	-0.00359**	-0.00326***
	(0.00140)	(0.000711)	(0.00153)	(0.000767)
L2. Increase in care time	-0.000721	-0.00193***	-0.00704***	-0.00248***
	(0.00143)	(0.000739)	(0.00157)	(0.000755)
L3. Increase in care time	-0.00146	-0.00306***	-0.00615***	-0.000551
	(0.00134)	(0.000713)	(0.00146)	(0.000720)
L4. Increase in care time	0.000275	-0.00186***	-0.00280**	0.000532
	(0.00122)	(0.000659)	(0.00136)	(0.000673)
Household employment shock	0.0946***	0.0553***	-0.105***	-0.0695***
	(0.00716)	(0.00389)	(0.00669)	(0.00373)
L. Household employment shock	0.00717	0.0139***	-0.0116**	-0.00684***
	(0.00446)	(0.00253)	(0.00478)	(0.00250)
L2. Household employment shock	0.00613**	0.00207	-0.00957***	-0.00155
	(0.00296)	(0.00153)	(0.00325)	(0.00153)
L3. Household employment shock	0.000812	0.000899	-0.00260	-0.00268**
	(0.00255)	(0.00136)	(0.00275)	(0.00136)
L4. Household employment shock	0.00162	0.000907	-0.00765***	-0.00265***
	(0.00133)	(0.000698)	(0.00148)	(0.000737)
Household member increase	0.0143***	0.0137***	-0.00316	-0.00215
	(0.00272)	(0.00174)	(0.00293)	(0.00158)
L. Household member increase	0.00795***	0.00553***	-0.00853***	-0.00223
	(0.00284)	(0.00159)	(0.00287)	(0.00165)
L2. Household member increase	0.000944	0.00452***	-0.00224	-0.00226
	(0.00265)	(0.00142)	(0.00279)	(0.00150)
L3. Household member increase	-0.00171	0.000509	-3.73e-05	-1.45e-05
	(0.00222)	(0.00124)	(0.00253)	(0.00133)

(continued on next page)

Appendix Table 5 *(continued) Results of Generalized Method of Moments (GMM) regressions for entry and exit of women*

Variables	(1) Entry Rural Female	(2) Entry Urban Female	(3) Exit Rural Female	(4) Exit Urban Female
L4. Household member	-0.00244	-0.000427	-0.00169	0.000991
increase	(0.00154)	(0.000963)	(0.00176)	(0.000989)
2021QM2	-0.00768***		-0.00207	
	(0.00157)		(0.00155)	
2021QM3	-0.00656***	0.00209***	-0.00582***	-0.000807
	(0.00161)	(0.000701)	(0.00148)	(0.000705)
2022QM1	-0.00970***	-0.00144**	-0.0107***	-0.00276***
	(0.00163)	(0.000641)	(0.00158)	(0.000682)
2022QM2	-0.00916***	-0.000349	-0.00837***	-0.00227***
	(0.00178)	(0.000729)	(0.00175)	(0.000761)
2021QM1		0.00200***		0.00432***
		(0.000774)		(0.000799)
L. exit			-0.0377***	-0.0332***
			(0.00511)	(0.00340)
Constant	0.0163***	0.0116***	0.0224***	0.00204
	(0.00556)	(0.00264)	(0.00571)	(0.00263)
Observations	59,389	159,869	59,389	159,869
Number of iid	26,748	68,448	26,748	68,448

Notes: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Appendix Table 6 *Results of Generalized Method of Moments (GMM) regressions for entry and exit of men*

Variables	(1) Entry Rural Male	(2) Entry Urban Male	(3) Exit Rural Male	(4) Exit Urban Male
L. entry	-0.0396***	-0.0479***		
	(0.00304)	(0.00213)		
Number of children in household	0.00798***	0.0137***	0.00374	0.00864***
	(0.00274)	(0.00194)	(0.00258)	(0.00172)
L. Number of children in household	-0.0108***	-0.00953***	-0.00184	-0.00383**
	(0.00247)	(0.00179)	(0.00221)	(0.00155)
L2. Number of children in household	-0.00187	-0.00125	-0.000897	-0.000800
	(0.00185)	(0.00131)	(0.00173)	(0.00124)
L3. Number of children in household	-0.00154	-0.000518	0.00404**	-9.45e-05
	(0.00171)	(0.00119)	(0.00177)	(0.00117)
L4. Number of children in household	0.000900	-0.000442	0.00245	0.00180*
	(0.00180)	(0.00102)	(0.00170)	(0.00107)
Increase in care time	-0.0110***	-0.0101***	0.0166***	0.0202***
	(0.00148)	(0.000914)	(0.00170)	(0.00100)
L. Increase in care time	0.00580***	0.0122***	0.00162	0.000250
	(0.00194)	(0.00118)	(0.00192)	(0.00109)
L2. Increase in care time	0.00466**	0.00793***	0.00136	-0.00108
	(0.00204)	(0.00119)	(0.00194)	(0.00108)
L3.Increase in care time	0.00221	0.00425***	0.00200	0.000497
	(0.00195)	(0.00115)	(0.00184)	(0.00107)
L4. Increase in care time	-0.000179	0.00583***	0.00317*	-0.00270***
	(0.00183)	(0.00114)	(0.00176)	(0.00101)
Household employment shock	0.254***	0.167***	-0.200***	-0.226***
	(0.0280)	(0.0224)	(0.0209)	(0.0166)
L. Household employment shock	0.0154	0.0507***	-0.0365***	-0.0473***
	(0.0176)	(0.0159)	(0.0128)	(0.0110)
L2. Household employment shock	0.00273	0.000677	-0.00988**	-0.0130***
	(0.00581)	(0.00382)	(0.00429)	(0.00307)
L3. Household employment shock	-0.00372	-0.00923***	-0.00985**	-0.00306
	(0.00559)	(0.00343)	(0.00488)	(0.00300)
L4. Household employment shock	0.00164	-0.00219**	0.00163	-0.00160
	(0.00184)	(0.00110)	(0.00175)	(0.00101)
Household member increase	0.0228***	0.0281***	0.00213	0.0114***
	(0.00425)	(0.00293)	(0.00354)	(0.00249)
L. Household member increase	-0.000603	0.0109***	-0.00146	0.00256
	(0.00383)	(0.00269)	(0.00364)	(0.00240)
L2. Household member increase	0.000838	0.00350	-0.00423	0.00213
	(0.00370)	(0.00239)	(0.00349)	(0.00225)
L3. Household member increase	-0.000972	0.00371*	0.00419	-0.00354*
	(0.00322)	(0.00218)	(0.00322)	(0.00197)

Appendix Table 6 *(continued) Results of Generalized Method of Moments (GMM) regressions for entry and exit of men*

Variables	(1) Entry Rural Male	(2) Entry Urban Male	(3) Exit Rural Male	(4) Exit Urban Male
L4. Household member increase	0.00175 (0.00239)	0.000273 (0.00151)	0.00349 (0.00226)	-0.00302** (0.00140)
2021QM2	0.00873*** (0.00186)	0.00779*** (0.00114)	-0.00207 (0.00185)	-0.00955*** (0.00123)
2021QM3	0.0124*** (0.00181)	0.0132*** (0.00117)	-0.00622*** (0.00173)	-0.0134*** (0.00110)
2022QM1	0.00172 (0.00171)	-0.00182* (0.000997)	-0.00662*** (0.00178)	-0.0163*** (0.00110)
2022QM2	0.00137 (0.00198)	-0.000423 (0.00117)	-0.00208 (0.00212)	-0.0145*** (0.00124)
L. exit			-0.0443*** (0.00411)	-0.0419*** (0.00231)
Constant	0.0203*** (0.00722)	0.00475 (0.00417)	0.00555 (0.00719)	0.0194*** (0.00386)
Observations	71,282	189,194	71,282	189,194
Number of iid	32,019	80,487	32,019	80,487

Notes: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Appendix Table 7 *All households with children five years old or younger, women in rural and urban areas,* Arellano Bond GMM

Variables	(1) Entry Rural Female	(2) Entry Urban Female	(3) Exit Rural Female	(4) Exit Urban Female
L. entry	-0.0569***	-0.0346***		
	(0.00861)	(0.00508)		
Number of children in household	-0.000663	0.00163	0.0117***	0.00895***
	(0.00222)	(0.00134)	(0.00235)	(0.00119)
L. Number of children in household	-0.00188	-0.00560***	-0.00247	0.000729
	(0.00218)	(0.00123)	(0.00190)	(0.00115)
L2. Number of children in household	-0.00349**	-0.000424	0.00316**	0.00203*
	(0.00162)	(0.000972)	(0.00155)	(0.00104)
L3. Number of children in household	0.00151	-0.00188**	-0.000224	-0.000176
	(0.00149)	(0.000841)	(0.00138)	(0.000901)
L4. Number of children in household	0.000594	0.000520	0.00104	0.00100
	(0.00131)	(0.000745)	(0.00126)	(0.000784)
Increase in care time	-0.0105***	-0.00817***	0.0125***	0.00821***
	(0.00153)	(0.000808)	(0.00174)	(0.000941)
L. Increase in care time	-0.00347*	-0.00191*	-0.00235	-0.00325***
	(0.00198)	(0.00104)	(0.00209)	(0.00113)
L2. Increase in care time	-0.00376*	-0.000874	-0.00356*	-0.00296***
	(0.00207)	(0.00109)	(0.00212)	(0.00113)
L3. Increase in care time	-0.00305	-0.00202*	-0.00419**	-0.00185*
	(0.00189)	(0.00106)	(0.00199)	(0.00108)
L4. Increase in care time	-0.00111	-0.000463	-0.00254	-0.000480
	(0.00161)	(0.000957)	(0.00183)	(0.00100)
Household employment shock	0.0944***	0.0458***	-0.102***	-0.0634***
	(0.00870)	(0.00444)	(0.00807)	(0.00444)
L. Household employment shock	0.00452	0.0123***	-0.00481	-0.00589*
	(0.00576)	(0.00327)	(0.00593)	(0.00322)
L2. Household employment shock	0.00522	0.00162	-0.0122***	-0.00115
	(0.00396)	(0.00211)	(0.00425)	(0.00200)
L3. Household employment shock	0.00147	0.000981	-0.00151	-0.00243
	(0.00354)	(0.00189)	(0.00376)	(0.00199)
L4. Household employment shock	0.00115	0.00174*	-0.00589***	-0.00215**
	(0.00185)	(0.000979)	(0.00197)	(0.00107)
Household member increase	0.0140***	0.0126***	-0.00457	0.00119
	(0.00349)	(0.00251)	(0.00367)	(0.00242)
L. Household member increase	0.00615*	0.00530**	-0.00845**	0.00105
	(0.00371)	(0.00243)	(0.00377)	(0.00247)
L2. Household member increase	0.00259	0.00505**	0.000728	0.00147
	(0.00374)	(0.00214)	(0.00384)	(0.00224)
L3. Household member increase	-0.00205	0.000815	0.00309	0.00105
	(0.00331)	(0.00194)	(0.00369)	(0.00206)

Appendix Table 7 *(continued)* *All households with children five years old or younger, women in rural and urban areas,* Arellano Bond GMM

Variables	(1) Entry Rural Female	(2) Entry Urban Female	(3) Exit Rural Female	(4) Exit Urban Female
L4. Household member	-0.00264	-0.00140	-0.00366	0.00406***
increase	(0.00237)	(0.00148)	(0.00253)	(0.00155)
2021QM2	0.00654***	0.00235**	0.00436**	0.00321***
	(0.00212)	(0.00113)	(0.00207)	(0.00115)
2021QM3	0.000245	0.00289***	-0.000217	-0.000862
	(0.00180)	(0.00103)	(0.00181)	(0.00104)
2022QM1	-0.00190	-0.00133	-0.00633***	-0.00236**
	(0.00183)	(0.000936)	(0.00181)	(0.00102)
2022QM2	-0.00296	-0.000170	-0.00165	-0.00163
	(0.00205)	(0.00107)	(0.00215)	(0.00112)
L. exit			-0.0349***	-0.0297***
			(0.00719)	(0.00465)
Constant	0.0110	0.0149***	0.000821	-0.0121**
	(0.0103)	(0.00535)	(0.0104)	(0.00521)
Observations	32,521	79,541	32,521	79,541
Number of iid	15,141	35,690	15,141	35,690

Notes: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1