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Childbirth and women's labour market transitions in India

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Abstract: The impact of childbirth on the labour market participation of women has been discussed extensively in the context of developed countries, constraints on mothers' labour market participation and earnings being characterized as the motherhood penalty. In the developing country context, and specifically for India, similar studies are limited, primarily due to the lack of longitudinal data. In this paper, using a Life History Calendar approach, we collect retrospective information on major events (education, marriage, and childbirth) and the concurrent employment status of men and women over their adult lives. Using an event study method, we estimate the impact of first childbirth on women's labour market participation. Our main finding is that the birth of the first child does not impose a penalty on the mother's labour supply. While, overall, employment does not show any association with childbirth, women's paid work actually registers a significant increase two to three years post childbirth even after controlling for several other factors. The life history analysis also shows that, conditional on participating in the labour market, women are unlikely to have several episodes of entry and exit. We hypothesize that, in a developing country context such as India's, motherhood may not be accompanied by a penalty in terms of labour market participation given the predominance of informal and flexible employment arrangements and the early age of marriage and childbirth for women.

Key words: motherhood penalty, childbirth, event study, life history calendar, India

JEL classification: J01, J12, J13, J16

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1 Introduction

The low levels of female labour force participation in India have generated considerable attention in recent literature (Afridi et al. 2018; Klasen and Pieters 2015; Sarkar et al. 2019; Sorsa et al. 2015). In the Indian context, in addition to the traditional supply and demand considerations, social norms restricting women's autonomy and mobility come into play (Anukriti et al. 2020; Jayachandran 2020). Norms offer a perspective on why even a favourable ecosystem of rising education and decreasing fertility have not had a positive impact on women's labour supply.

Social roles that impinge on women's employment are usually related to major life events, such as marriage and childbirth, which are almost universally experienced by Indian women. In this paper, we focus on women's labour market transitions as related to childbirth—specifically the birth of the first child. Motherhood is a watershed event for most Indian women that is not only anticipated, but also exalted. Gendered norms assign a prescriptive definition of mothers' roles and responsibilities that are generally in conflict with their ability to engage with the labour market. This is referred to as the motherhood penalty and has been well researched in developed countries, where long-term individual-level panel data are available. However, such studies are relatively few in India, mainly due to the fact that there is a lack of longitudinal data.

This paper addresses this gap using unique retrospective data collected in 2020 from two states, Karnataka and Rajasthan, located in southern and northern India, respectively. Using the Life History Calendar (LHC) method we obtain retrospective information on labour market participation and other important life events from our respondents from the age of 15 years. We employ an event study framework (Kleven et al. 2019b) to estimate the impact of childbirth on women's labour force participation. To the best of our knowledge, this is the first study in the Indian context to use long-term retrospective data to explore women's labour market trajectories and how these may be impacted by childbirth.

Our main findings from the event study suggest that the birth of the first child does not impose a penalty on the mother's labour supply. While, overall, employment does not show any association with childbirth, women's paid work actually registers a significant increase two to three years post childbirth. The life history analysis also shows that, conditional on participating in the labour market, women are unlikely to have several episodes of entry and exit. In fact an overwhelming majority of women, once they enter the labour force, do not exit before they are 45 years of age, and only 6.5 per cent exit the labour market at all after entry. But about 40 per cent of women never enter the labour market.

These results have to be interpreted within the broader context of structural changes in the Indian economy and how these impact women's work in rural India. We emphasize patterns in rural India, as more than 80 per cent of our sample is from rural areas. India's economic growth has been powered mainly by the services sector, which, unlike the manufacturing sector, has not provided mass employment opportunities for women (Lahoti and Swaminathan 2015). There has been little diversification in women's employment, with as many as 73 per cent of women workers in rural areas continuing to be engaged in agriculture and allied activities in 2017–18 (Sundari 2020). Jobs in rural areas, whether in the agriculture sector or other sectors, tend to be informal in nature. A recent ILO study estimates that informalization of labour is more than 90 per cent in India (ILO 2018).

Self-employment accounts for more than 50 per cent of informally employed women; but within this category women are more likely to be helpers or contributing family workers in household

enterprises than own-account workers or employers (Sundari 2020). The advantage of the helper category is that it allows women to combine work with their domestic responsibilities.

There is almost no institutionalized childcare through either the state or employers. Schemes for the provision of public childcare to support working mothers have been mooted but not prioritized by the state in terms of funding or have been poorly implemented (Nandi et al. 2020). Thus, childcare is provisioned within the family—usually by other women in the household and sometimes even an older daughter. Women are primarily responsible for childcare, which makes flexible forms of work, whether paid or unpaid, advantageous even if this comes at the cost of compromising on wages and other benefits. Given that women’s employment options are dominated by agriculture or the informal sector, it is not totally surprising that childbirth does not have a negative association with their work. Childcare responsibilities are addressed through participation in the labour market in a specific type of employment arrangement with certain job-related attributes and through gendered social norms. That is, if the jobs are already of such a nature that they support childcare (through flexible hours and convenient location of work (from home) and not through employer-provided benefits) or if childcare is handled within the family, then there need be no penalty per se associated with becoming a mother. It is also possible that the economic conditions of the household prevent women from exiting the labour market. However, women may reduce the intensity of work, which our analysis does not capture as we do not have information on the average number of hours worked.

Our main contribution is to the relatively sparse literature on the impact of childbirth on women’s employment patterns in developing countries and specifically in India. Most studies in this field have focused on developed countries (Angelov et al. 2016; Kleven et al. 2019b; Lundborg et al. 2017) and some on developing countries that have long-term panel data. Our contribution is to study this issue in a setting that lacks panel data by collecting retrospective data while minimizing recall bias. We also show that context matters when investigating the impact of motherhood. In developed countries with formal markets, nuclear families, and higher labour force participation among women prior to marriage and childbirth, the notion of penalty due to childbirth is expected and observed. But in rural India, where women marry early and give birth to their first child at a young age, labour market participation prior to marriage is very low, labour markets are informal and dominated by agriculture, and the need to work is high, a labour force participation penalty due to motherhood is not the norm.

The rest of the paper is organized as follows. Section 2 describes the life history approach to collecting data. Section 3 details the data and presents descriptive results, while Section 4 discusses the event-study estimations. Section 5 concludes.

2 Background literature and life history calendar method

In this section, we first discuss the literature on the motherhood penalty, provide a context of why the penalty experienced in developed and developing countries might be different from the Indian context, and then describe the method we used to collect retrospective data.

Kleven et al. (2019a) provide compelling evidence for the motherhood penalty across a set of developed countries that are diverse with respect to both women’s labour force participation and family policies supporting working mothers. After the birth of the first child, women’s earnings are negatively impacted and do not recover to pre-childbirth levels even after ten years. What is striking is their finding that institutional support such as parental leave and childcare policies do not make a difference in the long term. The authors speculate that sticky gender norms with prescriptive roles

for mothers may be responsible for a motherhood penalty across countries: traditional views regarding mothers' responsibilities are correlated with a larger earnings penalty for women.

The evidence from developing countries corroborates these results but the size of penalty is smaller and the mechanisms are different. Ageuro et al. (2020) use Demographic and Health Survey (DHS) data from 21 developing countries and confirm a motherhood penalty on women's earnings, the effect being larger in middle-income countries than in lower-income countries. The authors suggest that the mechanisms operate largely through differences in the labour market. In lower-income countries, there is a greater concentration of women in agricultural activities or in the informal sector, which may allow them to combine childcare responsibilities with employment. With economic development, as labour markets become formal without accompanying changes in supporting infrastructure such as childcare facilities, such flexible arrangements may not be an option. The importance of a flexible labour market arrangement is also emphasized by Berniell et al. (2019), who estimate the impact of motherhood for Chilean women. Chile has a large informal sector, which provides a cushion for mothers in that it allows them to continue in the labour market while reducing their hours of work. The penalty for women is with respect to reduced earnings, loss of contributory social pensions, and damage to long-term career prospects.

There are very few studies that examine the motherhood penalty in the Indian context.¹ Based on cross-sectional data, Das and Zumbyte (2017) examine how the presence of a young child affects the labour supply of urban married women. As expected, they find that younger children in the household show a negative association with women's labour supply, but this is offset to a certain extent when there are older women in the household. This is presumably due to a sharing of care-giving responsibilities among women. These findings are indirectly reinforced by Khanna and Pandey (2021) using panel data from the India Human Development Survey (IHDS) collected in 2004–05 and 2011–12. Their results show that the death of a co-resident mother-in-law negatively impacts women's labour supply, particularly for women with four or more children, reflecting the distribution of the care burden with an older woman in the household. Using the same IHDS data, Sarkhel and Mukherjee (2020) find a negative association between young children and women's labour market wages and working hours. In addition to a traditional variable that captures the presence of a young child, the authors use the difference between current number of children and desired number of children as a motherhood proxy. The authors argue that 'extra children' is a closer estimate of the motherhood burden as the desired number of children could be endogenous to women's labour market outcomes, i.e. women internalize their ideal family size when making labour supply choices. To the best of our knowledge, ours is the first paper that estimates the impact of the first childbirth on women's labour market participation in the Indian context.² Additionally, the life history calendar (LHC) approach used here provides an alternative to panel data in understanding how life cycle events impact labour market outcomes.

We adopt an LHC technique to collect retrospective data from our respondents (Freedman et al. 1988). LHC is a method where respondents provide autobiographical information across various domains and for a specified period that is determined by the research question (Morselli et al. 2019). Typically, a chronological time frame is presented graphically to the respondent or information is collected around specific personal events such as childbirth, death, and marriage or around major public events (Glasner and Van Der Vaart 2009). A key advantage of LHC is that the

¹ There are many studies that find a negative association between the presence of a young child in the household and the mother's employment (Klasen and Pieters 2015; Sarkar et al. 2019; Sorsa et al. 2015), but few consider the impact of first childbirth on women's labour market outcomes.

² There have been some correspondence studies on discrimination against mothers in the formal sector (e.g. Bedi et al. 2018), but no studies documenting the actual impact of motherhood on labour force participation.

method provides visual and temporal cues that generate more accurate recall of events than conventional surveys aiming to collect retrospective data (Freedman et al. 1988). Inconsistencies in information can also be easily detected and immediately corrected (Glasner and Van Der Vaart 2009).

The LHC approach has been applied extensively in social science research into various phenomena, including community stress (Ensel et al. 1996), intimate partner violence (Yoshihama et al. 2005), vulnerability (Morselli et al. 2016), employment transitions (Manzoni 2012), and occupational mobility (Solga 2001). Many studies have compared LHC with the traditional survey approach and found that data quality is often superior in the former method (see Morselli et al. 2016 for an overview). This is mainly due to features of LHC that aid recall of specific events and the interactive nature of the calendar that makes it easy to spot discrepancies in responses.

Of particular relevance to our analysis is the methodological paper by Manzoni (2012), which compares determinants of labour market transitions in Germany using two different survey designs: retrospective data (German Life History Study) and panel survey data (German Socio-Economic Panel). At a broad level, there are few differences across these survey approaches. The author notes that retrospective data underestimate the level of employment transitions but show similar results to panel data in terms of the determinants of labour market events.

3 Data and descriptive results

The LHC analysis is part of a larger study, the Indian Working Survey (IWS 2020–21), which was conducted in two major states, Karnataka and Rajasthan, with the aim of understanding whether and how social identity interacts with the labour market.³ Using a detailed survey instrument, IWS 2020–21 seeks to examine the multi-faceted ways in which caste, gender, and religious identities impact work participation, employment patterns, and remuneration for paid work. It also addresses the problem of accurately measuring women’s participation in paid work. The survey adopts a number of approaches to capture these influences including a time-use module, random lists to uncover biases, a life history calendar that marks entries and exits from the labour force over an individual’s life, and self-versus-proxy reporting of labour market participation.

During the months of February and March 2020, 3,646 randomly selected households were visited across Karnataka and Rajasthan. We spoke with one randomly selected male and one randomly selected female respondent from each household, where available. We interviewed 5,951 individuals (3,371 women and 2,580 men) across the two states.

The LHC collected long-term, retrospective data on men’s and women’s life histories from the time they were 15 years of age. Thus, the time span of information obtained is determined by the current age of the respondent. It was administered only to respondents who were below 47 years of age, thus giving us information for up to 32 years (from 15 to 46 years) of an individual’s life. The LHC was administered to 3,078 individuals in 2,065 households. Of these, 1,766 were women (1,010 from Karnataka and 756 from Rajasthan) and 1,312 were men (608 in Karnataka and 614

³ The IWS is a collaborative project between researchers at Azim Premji University, the Indian Institute of Management Bangalore (IIMB), and the University of Western Australia. The IWS (and LHC) was supposed to be a state-representative study, but the fieldwork was discontinued in March 2020 due to COVID-19, resulting in approximately half the original sample being surveyed.

in Rajasthan). The sample is predominantly rural, with more than 80 per cent of respondents in both states from rural areas.

Information was collected on several domains including labour force activity and events that might have impacted labour outcomes—such as migration, marriage, childbirth, household structure, spouse’s occupation, and other income and health shocks. The LHC is a yearly calendar, i.e. the year in which the event occurred is noted.

Standard cross-sectional data provide insight into an individual’s status (e.g., marital status, employment) at a point in time or, at best, a cumulative understanding of a particular event or aspect of an individual’s life (e.g., years of education, number of children). In contrast, the LHC is able to provide a life-cycle perspective on various events around an individual’s life including their first occurrence, the relative position of that occurrence vis-a-vis current time, and the duration and re-occurrences (where applicable) of that event. In this section, we present initial findings on the frequency, nature, and relative time vis-a-vis other aspects in the occurrence of a couple of key events that potentially impact women’s labour market outcomes.

We divide our respondents into age cohorts based on their age at the time of the interview (Table 1). The average age of our respondents was 32 years. However, in terms of age distribution, a slightly larger share of men belonged to the older age categories (above 35 years of age) compared with women. Around 59 per cent of female respondents were below the age of 34, compared with 55 per cent of men.

Table 1: Distribution of respondents across age groups

Age group	Male	Female
18–20	10.5	9.1
21–24	13.2	11.7
25–29	15.2	17.7
30–34	16.0	20.8
35–39	21.9	19.4
40–44	17.0	14.5
45–49	6.2	6.9
Total	100	100

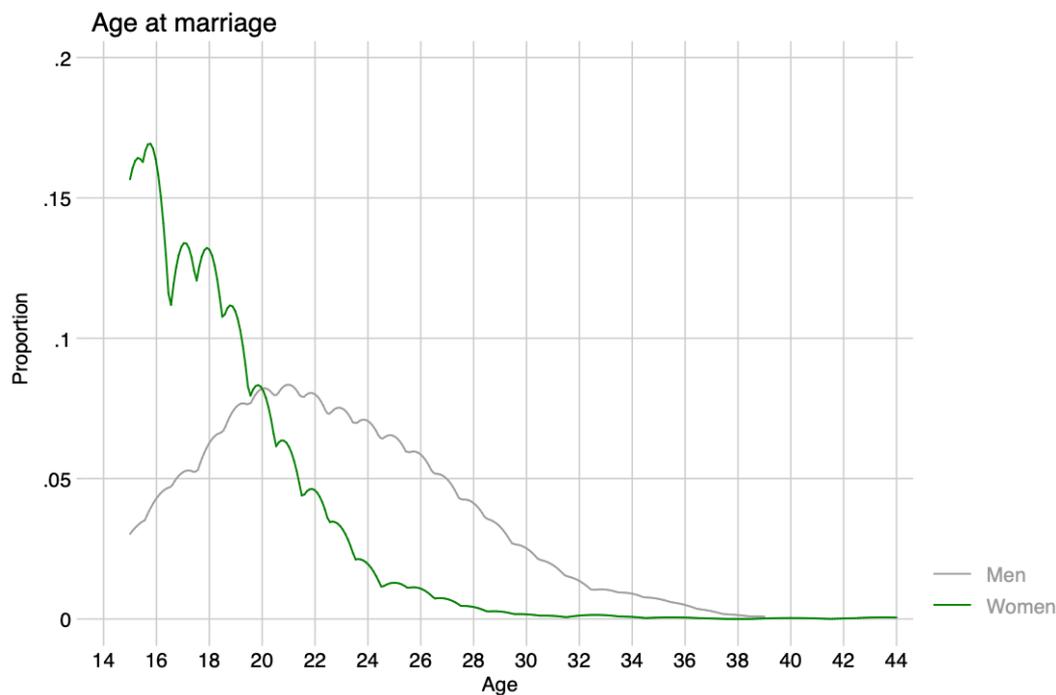
Source: authors’ calculations based on India Working Survey (IWS) data.

About 38 per cent of our female respondents and 15 per cent of male respondents were not literate. About 50 per cent and 60 per cent of women and men, respectively, had up to secondary education. The corresponding figures for above secondary-level education were 12 per cent and 9 per cent, for men and women, respectively.

3.1 Marriage

Marriage was a near universal event, particularly for women in our sample. About 74 per cent of men and 92 per cent of women in our sample were married.⁴ The average age of marriage for men was 23 years compared with 18 years for women. By the age of 19, about 72 per cent of women were married, compared with only 25 per cent of men (Figure 1).

Figure 1: Age at marriage, kernel density estimates



Source: authors' calculations based on IWS data.

It is likely that age at marriage, particularly for women, is in fact lower, as respondents may not reveal the true age of marriage given that the legal age for marriage is 18 years. When we compare across cohort groups where at least 90 per cent are married, we do not find any significant change in the age of marriage for women over the years (Table 2). However, for men in our sample, we note a steady advancement in the year of marriage.

The average age of marriage for men in Karnataka was higher than that of men in Rajasthan. In Karnataka, most men married between the ages of 20 and 24, compared with 15–20 in Rajasthan. Among women, we do not see substantial state-wise differences, 18 years being the average age of marriage reported by women in both Karnataka and Rajasthan. There were no significant differences in the average age of marriage across social groups. However, we find that the average age of marriage increased with education level, illiterate women having an average marriage age of 17 years compared with 20 years for women with an education level of higher secondary or above.

⁴ If we consider only those who are married currently (and exclude those who have been divorced/widowed/separated/abandoned), then the share of men who are married remains unchanged. On the other hand, the share of currently married women falls to 86 per cent.

Table 2: Age at marriage by cohorts

Age group	Share married (%)		Age at marriage (years)	
	Men	Women	Men	Women
18–20	10.9	46.3	17.6	17.5
21–24	32.8	82.2	19.9	18.4
25–29	68.0	96.5	21.0	18.2
30–34	91.0	99.7	22.3	18.0
35–39	97.6	99.4	23.3	18.0
40–44	100.0	99.6	23.7	18.0
45–65	97.4	100.0	24.0	19.3

Source: authors' calculations based on IWS data.

3.2 Shifts in residence

In the LHC, we collected the place of residence of the respondent every year from age 15 up to the time of the interview in 2019. The place of residence was identified vis-a-vis the current location. Further, we collected four kinds of location types with relation to current location: same district but different location, same state but different district, different state, and, finally, outside India.

For men, about 83 per cent stayed in their current location throughout their lifetime. Women, on the other hand, experienced far more locational shifts. If we restrict the sample to unmarried women, then the share of women having at least one locational shift reduces and is close to that of men. This suggests that women's migration is mainly linked to marriage. For the overall sample, 37 per cent of women have shifted residence once, and 9 per cent have had two shifts of residence (Table 3).

Table 3: Number of shifts in place of residence

Number of shifts in residence since age 15	Men	Women
0	83.2	47.6
1	9.8	37.0
2	5.8	9.0
3	0.8	3.3
4	0.3	2.3
5	0.1	0.7
6	0.0	0.1
7	0.1	0.1
Total	100	100

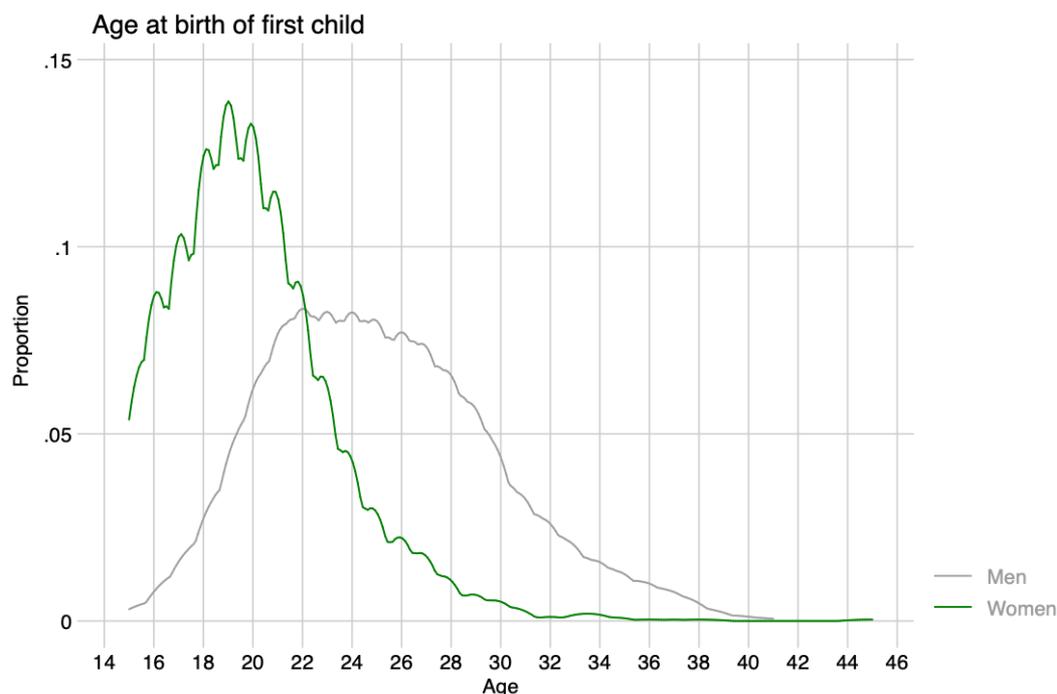
Source: authors' calculations based on IWS data.

For women, the majority of these shifts in residence (72 per cent) are within the same district but to a different location. For men, although there are fewer who move residence, an equal share of men (42 per cent) move either intra-state to a different district, or within the same district. Only 16 per cent of men in our sample move across states.

3.3 Childbirth

The majority of ever-married individuals we spoke with (88 per cent) had at least one child. On average, most men have their first child at the age of 25 years, whereas the average age of first childbirth for women is much earlier, 19 years. By the age of 22 years, 81 per cent of women have had their first child. The figure is only 22 per cent for men at the same age (Figure 2).

Figure 2: Age at birth of first child, kernel density estimates



Source: authors' calculations based on IWS data.

Looking at the age at first childbirth for different age cohorts, we find a systematic decline for both men and women, suggesting that younger couples had children earlier than their older counterparts (Table 4).

Table 4: Average age at time of first birth, by cohort

Age group	Share with at least one child (%)		Average age at childbirth	
	Men	Women	Men	Women
18–20	2.2	21.6	17.2	18.1
21–24	14.9	64.4	20.6	19.5
25–29	54.5	87.9	22.7	19.7
30–34	79.5	92.7	24.1	20.1
35–39	89.6	94.2	25.6	19.9
40–44	94.2	95.0	26.5	20.0
45–65	96.1	94.6	27.2	21.6

Source: authors' calculations based on IWS data.

Women with higher education had, on average, children a year later than women with below higher secondary education. We do not find any significant difference in the age of childbirth for men across educational groups, or for men and women across social groups.

3.4 Employment

In the LHC, we categorized an individual's employment into one of the following six categories: regular salaried, agricultural self-employed (farming/fishing), farm labour, non-agricultural self-employed, non-agricultural casual labour, or unpaid family helper. For any given year, the primary activity of the individual in that year is recorded for every individual from the age of 15 to the age at the time of interview. An individual not in any of the employment categories (student, domestic duties, unemployed) would be categorized into a single category representing those out of the workforce. We use two definitions of workforce—one including all waged and self-employed workers and unpaid family helpers (employment), the other including only waged and self-employed workers (paid employment).

3.5 All employment

About 11 per cent of men and 39 per cent of women had never entered the workforce. Among men who had never worked, a large share (57 per cent) were in education or had just finished education. Only 8 per cent of women who had never worked, in comparison, were in education or had just completed their education. In fact, if we restrict the sample to those above the age of 25 years, the share of men who have never been employed falls to 2 per cent, while the share of women remains at around 32 per cent. Therefore, while the non-entry of men into the workforce can be explained to a large extent by their age and educational activities, the same cannot be said for women. A large share of women remain out of the workforce even after accounting for their age and educational commitments.

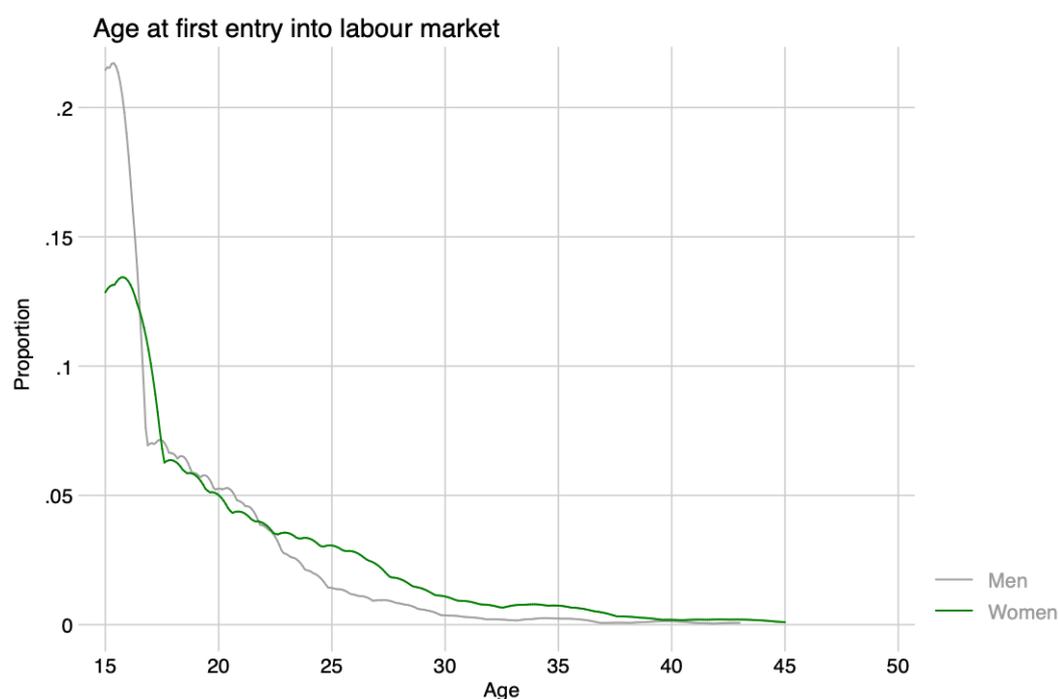
There are state-wise differences in the share of those who have never been part of the workforce. In Karnataka, 6 per cent of men had never been employed, compared with 16 per cent in Rajasthan. We see a similar divergence in women's participation in employment, with 32 per cent of women in Karnataka never having been employed, compared with 49 per cent in Rajasthan.

Typically, and not surprisingly, men entered the labour market earlier than women, the average age of entry for men in Karnataka (Rajasthan) being 17 (19) years compared with 20 years for women in both Karnataka and Rajasthan (Figure 3).

For men, there were no significant differences between social groups in the average age at first entry. Women from General category groups entered a year or two later than those from SC, ST, and OBC.⁵

⁵ Caste is social stratification in Indian society, with certain castes being historically socio-economically marginalized. The Indian government has identified the marginalized castes as Scheduled Castes (SC), Scheduled Tribes (ST), and Other Backward Classes (OBC). Individuals falling outside these caste groups belong to the 'General' or 'Others' category and represent the dominant, privileged communities.

Figure 3: Age at first entry into labour market



Source: authors' calculations based on IWS data.

3.6 Paid employment

If we consider only paid employment, i.e. exclude unpaid family workers, the share who have never entered the workforce increases, especially for women. Now, 15 per cent and 55 per cent of male and female respondents have never participated in paid work. If we restrict the sample to those above the age of 25 (to account for education), the share of men falls substantially, to 5 per cent, while the share of women falls only slightly, to 49 per cent.

There are significant differences between states with respect to paid work as well. In Karnataka, 9 per cent and 45 per cent of men and women, respectively, had never engaged in paid work, while the corresponding numbers in Rajasthan were 21 per cent and 69 per cent. Restricting the sample to those who were above the age of 25 years, the share of men and women who had never engaged in paid work in Karnataka falls to 2 per cent and 38 per cent, respectively. In Rajasthan, the share falls to 6 per cent and 63 per cent for men and women, respectively.

For only paid employment, the average age at entry into the labour market increases to 18 years for men in Karnataka, and 20 years for men in Rajasthan. For women, the average age at the time of first entry was 20 years, compared with 21 years in Rajasthan.

3.7 Transitions in and out of the labour market

The LHC gives a perspective into an individual's entry into and exit from the workforce over up to 32 years of their lifetime. Table 5 looks at the transitions in and out of employment for men and women over this period.

Table 5: Transitions in and out of the workforce

	Male (N=1311)	Female (N=1767)
Never entered	10.9%	38.9%
Entered and never exited	85.2%	49.9%
Entered, exited, and no re-entry	1.6%	6.5%
Entered, exited, and re-entered	2.1%	4.2%
Entered, exited, re-entered, exited, re-entered	0.2%	0.5%
	100.0%	100.0%

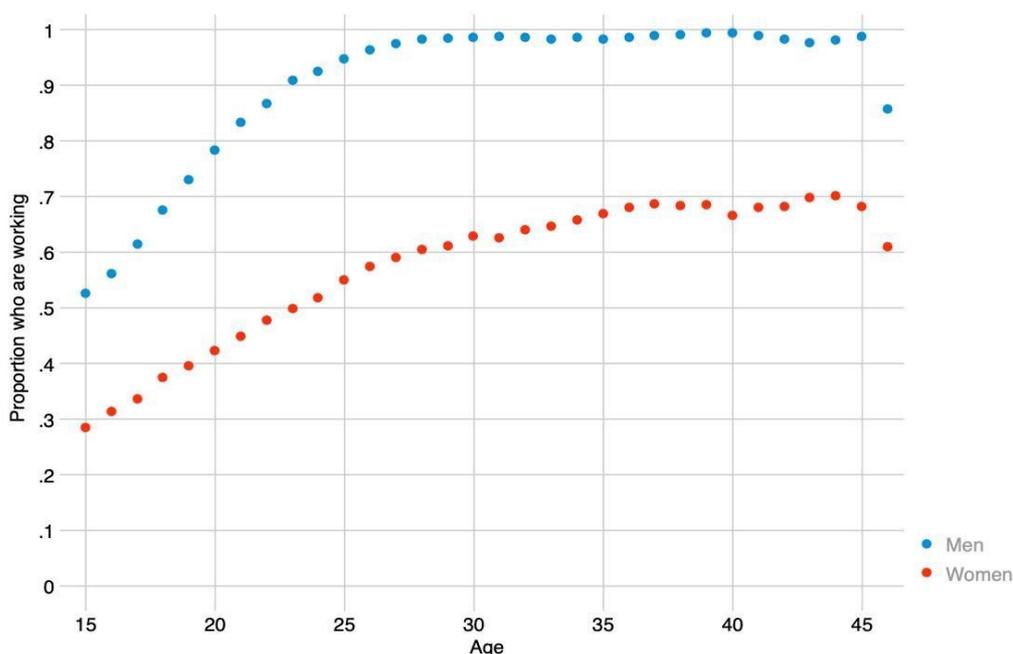
Note: The sample is all respondents.

Source: authors' calculations based on IWS data.

About 85 per cent of men who enter the workforce do not exit. For women, on the other hand, only 50 per cent remain in the workforce having entered it. Thus, for many women, entry into the labour market is not a one-time event and women generally experience more flux than men in their labour market status, although even this 'flux' is limited to at most two more re-entries. For about 6.5 per cent of women, there is a permanent exit from the workforce. A smaller share of women, 4.2 per cent, make a temporary exit from the workforce, re-entering at a later point. The average age at the time of exit for women is 25 years, and they re-enter, on average, at the age of 28 years. In sum, labour market transitions are close to non-existent for men, who, having entered the workforce, continue to remain employed for the rest of the period under consideration, whereas for women, there are more movements in and out of the labour market, though these are limited too.

Figure 4 shows the labour force participation rate (LFPR) of men and women at every age, from 15 years to 46 years.

Figure 4 : Trends in labour force participation rate



Source: authors' calculations based on IWS data.

The sample size at higher ages may be too small to make a reasonable interpretation. Ignoring the higher age groups, therefore, we can conclude from Figure 4 that men’s participation increases steadily and that by the age of 30 almost all men are working. For women, on the other hand, participation levels are lower at all ages compared with men. However, for women too, there is a steady increase until the age of 35, after which the participation rate remains more or less steady at around 70 per cent.

Table 6 summarizes some of the key findings from the descriptive statistics. Broadly, women marry earlier than men. Parenthood occurs earlier for women than for men. Men start working earlier, whether in paid or unpaid employment. We also find (not shown in table) that women experience more flux in terms of their place of residence, as well as more labour market transitions than men.

Table 6: Average age at the time of major events

	Men	Women
Average age at marriage	22.7	18.1
Average age at childbirth	25.1	19.9
Average age at entry into any employment	17.9	19.7
Average age at entry into paid employment	18.9	20.5
Average age at first exit from employment	26	25

Source: authors’ calculations based on IWS data.

4 Event study methodology

We are interested in understanding the impact of the birth of the first child on labour force participation by women. To study the impact of childbirth in an experimental set-up, one would need to assign fertility randomly among women and then measure how it changes labour market behaviour. Thankfully, that is not possible. Therefore, we use an event study approach based on changes around the birth of the first child for mothers, or the time of marriage. Fertility choices (timing of birth of first child) are not exogenous but the birth of the first child generates sharp changes that are not related to unobserved characteristics, which would evolve slowly over time. The event study approach also lets us observe the entire dynamics of change in labour force participation and controls for most individual-level time-invariant factors. We also control for several important time-varying factors, giving the model a high degree of precision in estimating the impact of first childbirth. Before discussing the event study results, we examine some initial descriptive results around the event of interest, childbirth, and its relation to labour market participation.

4.1 Marriage and labour market participation

Table 7 shows the relation between marriage and the employment participation of men and women for the sample of all married men and women. For men, the vast majority start working before marriage and employment continues uninterrupted despite any change in marital status. For women, on the other hand, there is substantial variation in the relation between marriage and entry into the labour market. Aside from the large share (36 per cent) of women who never participate in the labour market, there is a significant share who enter work in the same year as marriage. A slightly smaller, but still substantial, share of women (22 per cent) enter the labour market three

years or more after marriage. For about 9 per cent of women, on the other hand, marriage causes no interruption in their labour market participation.

Table 7: Marriage and labour market participation

	Men (N=952)	Women (N=1535)
Never entered	2.5%	35.8%
Entered before marriage and did not exit	74.5%	9.4%
Entered before marriage and exited before or same year as marriage, no re-entry	0.2%	2.5%
Entered before and exited 1 year after marriage, no re-entry	0.0%	0.5%
Entered before and exited 2+ years after marriage	0.6%	0.7%
Entered/Re-entered same year as marriage	7.7%	24.4%
Entered/Re-entered 1 year after marriage	2.6%	2.3%
Entered/Re-entered 2 years after marriage	1.7%	1.9%
Entered 3+ years after marriage	10.2%	22.5%

Source: authors' calculations based on IWS data.

4.2 Childbirth and labour market participation

For the sample of all married individuals with at least one child, we look at the distribution of men and women across different employment–childbirth interactions. A large share (35 per cent) of married women have never worked, compared with only 2 per cent of men. For men, the majority experience is that of entering work before fatherhood and continuing as a worker for the rest of their working life. Only 32 per cent of women have the same experience, i.e. entry into the workforce before birth and remaining employed through childbirth. About 3.2 per cent of women experience a break in employment in the same year as or prior to childbirth. For 20 per cent of women, entry into the labour market occurs three years or more after the year of birth of their first child (Table 8).

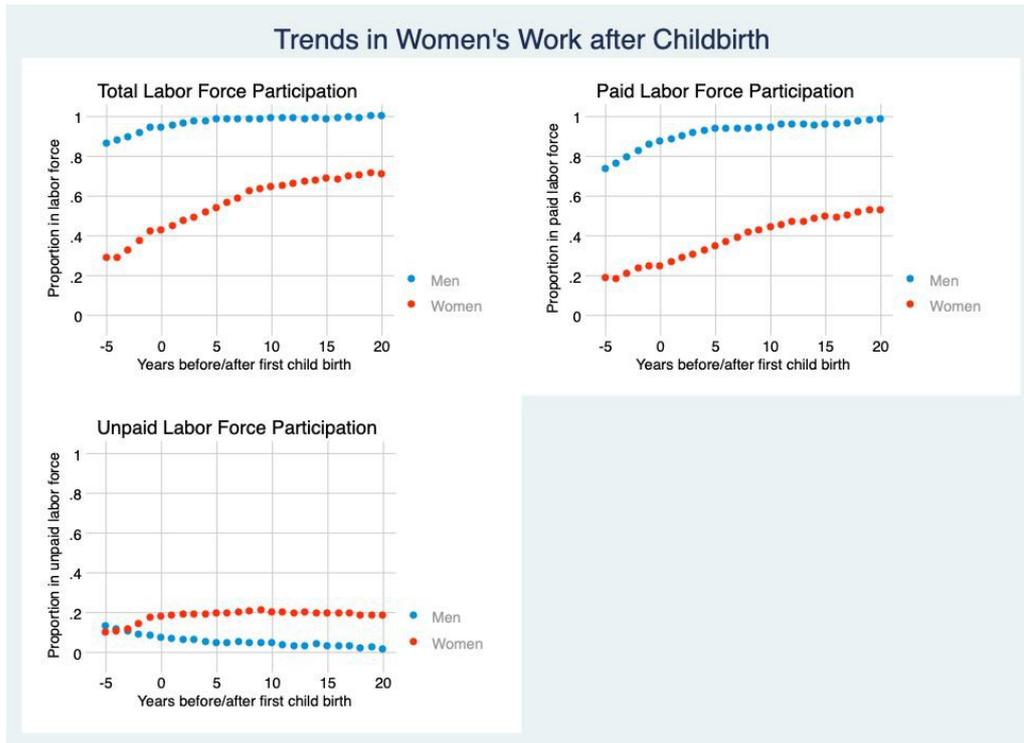
Table 8: Childbirth and labour market participation

	Men (N=952)	Women (N=1535)
Never entered	2.2%	35.0%
Entered/re-entered before childbirth and did not exit	85.0%	32.0%
Entered before childbirth and exited before or same year as childbirth, no re-entry	0.2%	3.2%
Entered before and exited 1+ year after childbirth, no re-entry	1.0%	1.8%
Entered/Re-entered same year as childbirth	1.7%	4.3%
Entered/Re-entered 1 year after childbirth	1.3%	1.8%
Entered/Re-entered 2 years after childbirth	1.2%	1.8%
Entered 3+ years after childbirth	7.3%	20.1%

Source: authors' calculations based on IWS data.

Therefore, broadly, for both men and women, the year of childbirth *per se* does not seem to be affecting labour market attachment. Rather, for women, we find that in the years subsequent to childbirth one can expect a marginal increase in women’s LFPR. For men, there is a steady increase in LFPR even prior to fatherhood. The increase continues after childbirth and, for both rural and urban men, the levels of labour force participation are relatively high. For instance, men after 15 years from childbirth are all employed, as shown by the 100 per cent LFPR at that point. For women, the LFPR is lower, and we do not see the steady and unhindered increase in participation that we see for men (Figure 5).

Figure 5: Trends in labour force participation around childbirth



Source: authors' calculations based on IWS data.

In the rest of this section, we use the event study method to examine the robustness of these results after controlling for various factors.

For the event study analysis, we include data for the period from 5 years before childbirth to 10 years afterwards. We investigate the dynamics of the probability of being employed as a function of event time:

$$Y_{it} = \beta_0 + \beta_1 I_{[j=t]} + \sum_k \beta_k I_{[k=age_i]} + \sum_y \beta_y I_{[y=s]} + Z_i + \epsilon_{ist} \quad (1)$$

where Y_{it} is the outcome of interest for woman i in year s and at event time t . We include a full set of event time dummies, age dummies, and calendar year dummies. We omit the event time dummy at $t=-1$, implying that the event time dummies measure the impact on women’s probability of being employed relative to the year just before the first childbirth. The full set of age dummies control non-parametrically for underlying life cycle trends in women’s employment. The full set of calendar year dummies control non-parametrically for time trends such as droughts and business cycles. We capture the effect of event time when controlling for age and year because there is variation in the age at which women have their first child. We control for multiple child births by controlling for the number of children of the respondent in each year their data are

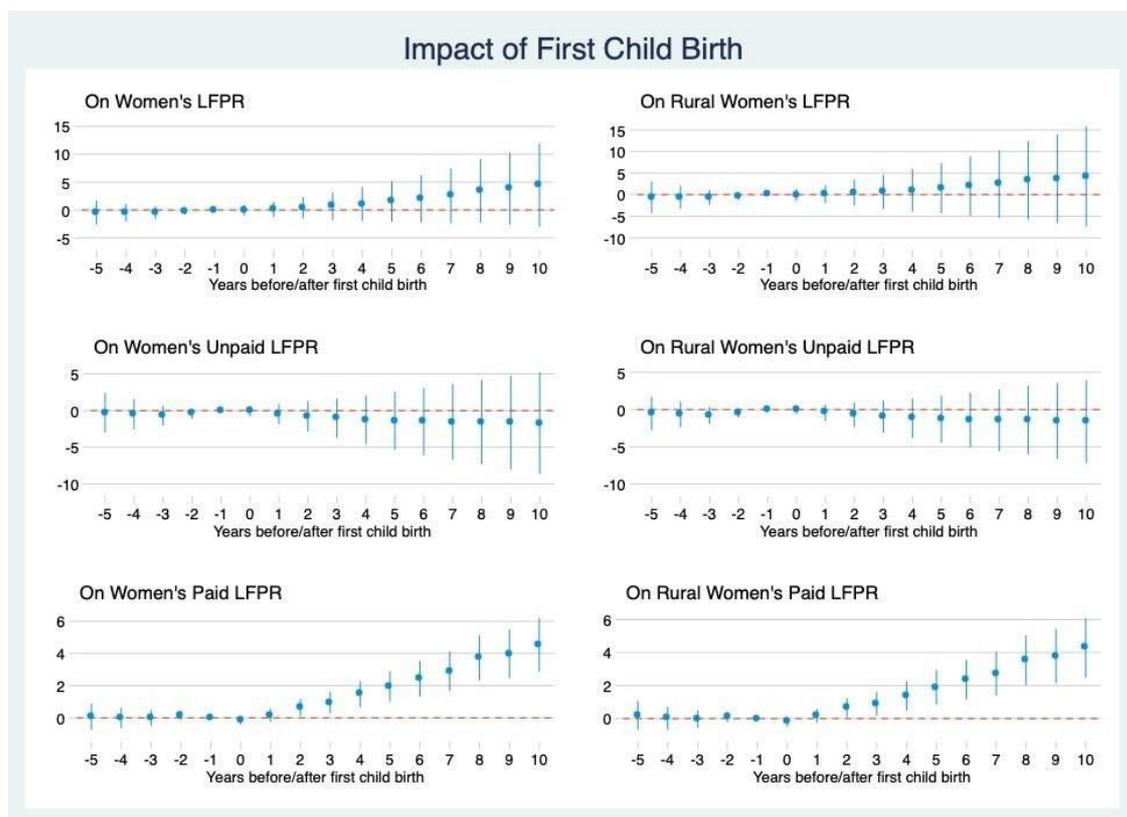
recorded. We also control for year of marriage. In addition, we control for household structure by including dummies in the presence of parents, in-laws, spouse, and other household members co-residing in the household for each year. Finally, we control for a range of time-invariant individual and household characteristics like education level and caste category. We also have region- and state-fixed effects in the model. Similar event study models have been used to investigate childbirth penalties in developed countries (Kleven et al. 2019a) and in Chile (Berniell et al. 2019).

The outcomes we consider are the labour market status of women in any work, paid or unpaid. Since most of our sample is rural (80 per cent), we also present results of our rural sample separately. We cluster the standard errors at the individual level.

Impact of first childbirth

Figure 6 plots the impact of first childbirth on labour market participation for all women as well as rural women separately. The impacts are relative to the year before childbirth ($t=-1$), controlling for age and calendar year and a range of other individual and household characteristics. The figure includes 95 per cent confidence interval bands around the event year coefficients.

Figure 6: Event study estimates of childbirth and employment



Note: dependent variable is a binary variable indicating whether the individual participated in the labour market in that year. Independent variables include dummies for years before/after childbirth, age- and calendar year-fixed effects, and a range of individual- and household-level characteristics. The x axis plots the log odds ratio. Standard errors are clustered at the individual level.

Source: authors' calculations based on IWS data.

Total and paid labour force participation gradually increase after childbirth. The probability of working declines in the year of childbirth as compared with the previous year. The odds of

participating in the labour market one year after first childbirth are 1.09 times greater as compared with one year before childbirth. These odds increase to 4.56 times five years after childbirth. But these increases are not statistically significant at 95 per cent confidence levels. The odds of getting paid employment increase statistically significantly in the second year after childbirth and keep increasing until 10 years after childbirth. The probability of being engaged in unpaid work decreases after first childbirth but is not significantly different from the year before childbirth. These patterns are similar in the overall as well as the rural sample.

Controlling for other factors, the probability for women of having a paid job generally increases with age but is not consistently significant across all age groups. The overall probability for women of having a paid job has declined statistically significantly since 1988. Women with a greater number of children and those living with spouses or in-laws are more likely to have a paid job, while those living with parents or other family members are less likely to have a paid job. However, these results are not statistically significant. Women who have not completed graduation are statistically significantly less likely to have a paid job than women who have studied only until primary school.

5 Discussion and concluding thoughts

Based on unique retrospective data from two states in India, Karnataka and Rajasthan, we explore major events in men's and women's lifetimes for up to 32 years. Specifically, using event study analysis, we explore the impact of first childbirth on labour supply, an experience that is near universal and extremely important for Indian women. The event study results do not show any negative impact of motherhood on labour market participation. We find that women's overall employment is not impacted by motherhood, while their participation in paid work shows a significant increase from the second/third year after the first childbirth.

Our descriptive results support existing evidence of women marrying and having children earlier than men. Women also experience more flux in their locations, a majority having lived elsewhere from their current place of residence. Specifically, the life history analysis of employment suggests that there is limited movement into and out of the labour market for both men and women. While a little more than one-third of our sample of women do not participate at all in the labour market, a majority of those who participate do not exit. Men, not surprisingly, show a high rate of participation in employment.

While our results are counter to the evidence of the negative impact of motherhood on labour market outcomes, we argue that experience from other countries is not directly transportable to the Indian context. Our results are largely driven by rural women, for whom agriculture or some form of informal work is likely to dominate their employment. These types of work may be more conducive to being undertaken along with childcare responsibilities than work in an urban or more formalized setting. In contrast to Berniell et al. (2019), who find that motherhood causes a shift from the formal to the informal sector for women in Chile, we find that employment prospects are relatively bleak for Indian women even before childbirth, but having a child does not necessarily worsen outcomes in terms of moving away from formal sector employment.

Women in our sample marry young, with childbirth following soon after (a gap of about one year). The average age at marriage is 18 years, while the average age of first childbirth is 19 years. By the age of 22 years, 81 per cent of women have had their first child. Thus, it is possible that many women were employed before marriage. They could be completing school or awaiting marriage. In the latter situation, even if there is a lag of a year or so between completion of schooling and

marriage, young women are discouraged from taking up activities that may entail travel and/or contact with strangers.

There are limitations to our current analysis. First, our labour market outcomes do not capture differences in the intensive margin (hours of work, full time vs. part time status, salaried vs. casual work), which may reflect a negative association with childbirth. We did not collect earnings data (due to potential recall errors), which could have provided another measure of labour market outcomes and which would have picked up reduced intensity of employment. Second, there is a possibility that our current estimates suffer from omitted variable bias. We do not control for time-invariant unobservables that are almost certainly correlated with our observed variables, such as social norms constraining women's employment, attitudes towards paid work in natal and marital families, and other community-specific effects. Thus, more analysis and robustness checks are necessary to validate our findings and also to explore how childbirth impacts mothers' employment.

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