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THEME 10: Gender Dynamics

36. Gender Disparities and Factors Underlying Low Female Labour Force Participation

Title:

Reproductive to Productive Labor: Exploring Gender Gaps in Female Workforce Participation Across Fertility Transitions in India

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Abstract

This paper examines the relationship between fertility transitions and female workforce participation in India, focusing on the shift from reproductive to productive labor. We use the Indian Human Development Survey (IHDS) longitudinal data from 2004-2005 and 2011-2012. We examine how labor market outcomes are impacted by reproductive burdens among women. The study uses the same women throughout the study by making a panel. Descriptive statistics, fixed-effects regression, chi-square test, and Heckman sample selection models are used to estimate the impact of fertility on female labor participation and working hours. The result shows that an increase in number of children significantly decreases the likelihood of women participating in paid employment and total annual work hours. Women with more than two children [coef.: -0.02; CI: -0.04, -0.01] are more likely to exit from labor market, and caste, education, and regional background influence these outcomes. While women with fewer children (3%) are more likely to enter or remain in the workforce. The findings highlight that reproductive labor contributes to gender disparities in workforce participation. This underscores the importance of policies that reduce reproductive barriers to increase female participation in the productive labor market, which is crucial for economic growth and development in India.

Keywords: Reproductive Labor, Fertility Transitions, Female Workforce Participation, Gender Disparities, India

1.0 Introduction

The longstanding issue concern is the relationship between women's reproductive roles and labor market participation. It is a crucial factor contributing to gender disparities in the labor market, particularly in developing countries like India. Demographers and economists hypothesized the negative relationship between childbearing and female workforce participation (Adair et al., 2002; Bloom et al., 2009; Heath, 2017). Childbearing, caregiving, and elderly care responsibilities often limit women's ability to engage in paid employment, leading to significant gender disparities in labor force participation (Ashenfelter & Heckman, 2012; Becker et al., 1960; Mincer, 1962). Although education and economic advancement have led to improvements in various sectors, there is still paradox persists as the decline in female labor force participation (FLFP) in India remains in recent decades (Desai & Joshi, 2019; Tiwari et al., 2022a; Verick, 2018). This phenomenon underscores the complex interplay between reproductive labor and economic activity. It necessitates understanding how fertility transitions shape women's labor force participation.

The global reduction of fertility rates-shifts in the number and timing of births between 1970 and 2020 - play a key role in shaping women's employment outcomes. Recently, India has also experienced a decline in fertility. Low fertility, usually characterized by a Total Fertility Rate (TFR) below the replacement level of children, has become an increasingly notable aspect of India's demographic dynamics (IIPS & ICF, 2021; Ministry of Home Affairs, 2022). This transformation sharply diverges from India's longstanding image of having high fertility rates, which are associated with high reproductive burdens, limiting time and energy available for paid work, especially for women in rural or lower socioeconomic strata (Bhattacharyya & Haldar, 2020; Tiwari et al., 2022b). Studies reveal that while the number of children increases, women's likelihood to participate in the labor market declines, and those who work tend to engage in informal or low-paid sectors (Becker et al., 1960; Mammen & Paxson, 2000). This relationship between fertility and labor force participation reflects different socio-cultural norms, where women's reproductive roles are prioritized over economic contributions (Desai et al., 2010).

In India, gender disparities in employment can be linked to both reproductive responsibilities and structural barriers in the labor market. Socio-cultural norms and expectations from the family often limit women to unpaid care work. In developing countries, joint family households persist where the burden of childbearing, elderly care, and household chores is shared, but the

responsibility falls disproportionately on women (Eswaran et al., 2013). Furthermore, the opportunity cost of motherhood is exceptionally high in low-income households, where childcare and supportive policies are minimal, and it further restricts their ability to enter or remain in the workforce (Afridi et al., 2018).

Fertility transitions have also led to changing patterns of female labor force participation. With the declining rate of fertility, especially in urban areas, some women are able to shift from merely reproductive roles to active participants in the workforce. However, various factors like education, caste, and regional disparities have an impact on the transition from reproductive to productive labor (Klasen & Pieters, 2015). Women with fewer children are more likely to participate in formal employment in regions with access to education and employment opportunities. However, in rural or marginalized communities where women face limited options for formal employment due to traditional gender roles, lack of infrastructure and constrained mobility (Bloom et al., 2009).

This study aims to explore the relationship between fertility and female workforce participation in India, focusing on how reproductive burdens influence women's ability to engage in productive labor. By examining the impact of fertility on labor market outcomes, the paper contributes to the growing body of literature on gender disparities in employment. It highlights the necessity for measures and policies that support women in balancing their reproductive and productive roles. Addressing the constraints that reproductive responsibilities have on women's workforce participation is crucial for establishing gender equality and inclusive economic growth in India.

1.1 Measuring Women's Reproductive Labour Market Transition: A Conceptual Framework

The transition from reproductive labor to productive labor involves a multifaceted complex, where women's participation in economic activities evolves alongside their life cycles through socioeconomic status and availability of resources. Reproductive labor refers to unpaid care work, which includes childbearing, adult and child caregiving, sick care, and household chores (cleaning, cooking, shopping, and household maintenance) (Duffy, 2007). Unpaid reproductive responsibility remains critically undervalued and overlooked in economic analyses. Despite it is essential for maintaining households and indirectly maintaining the formal workforce (Folbre, 2006). Women disproportionately bear the brunt of unpaid reproductive responsibilities, which constrains their participation in the formal workforce. This burden

reduces employment opportunities and leads to severe gender disparities in employment (Mussida & Patimo, 2021). The constraints are more pronounced in developing countries like India, where complex socioeconomic factors and cultural norms significantly influence FLFP (Benería et al., 2015). In many patriarchal societies, like India, women's roles as primary caregivers are often prioritized over their economic participation. Even in households where women express willingness or ability to enter the workforce, sociocultural expectations often restrict their participation (Eswaran et al., 2013).

Fertility transition demarketing, by low fertility rates and small family sizes, has a significant impact on women's labor market participation. As fertility rates decline, the reduced reproductive burden allows women to spend more time on paid work. However, the extent women engage in paid work depends on various socioeconomic and institutional factors (Bongaarts, 2008). For instance, the paradox exists in India, where the fertility decline does not led to corresponding increase in FLFP (Klasen & Pieters, 2021). This can be attributed by several factors such as social norms, gender roles, and economic opportunities, that translate into reproductive to productive labor.

Economic prospects and different types of work available also play a critical role in determining whether women can successfully transition from reproductive to productive labor. To effectively increase FLFP policies, one must address the underlying causes of reproductive burdens, including the need for affordable childcare, maternity leave, and flexible working arrangements. In many developing countries, formal sector jobs are frequently inaccessible for women due to factors such as low education, employment discrimination, or social barriers (Kabeer, 2012). Consequently, women have frequently confined themselves to informal or part-time jobs, which do not provide job security and economic benefits that would incentivize greater participation. For example, women in rural India are more likely to engage in agricultural work, which is seasonal and poorly paid, offering less opportunity for long-term economic advancement (Chaudhary & Verick, 2014).

The transition is a continuum process where women's roles evolve throughout life cycles. During early adulthood, women often experience high fertility and intense reproductive responsibilities, while in the later stages, children grow older, and caregiving demands decrease, which may provide more opportunities for labor market participation (McDonald, 2000). However, this transition is not uniform for all women. Women from higher socioeconomic backgrounds typically have better access to resources such as quality childcare

and education, which enable them to move easily into productive labor. In contrast, women from marginalized backgrounds often face compounded barriers, including limited access to education, fewer economic prospects, and persistent social norms that restrict their economic autonomy (Crenshaw, 2018; United Nations, 2009).

Fig. 1 shows the Women's Reproductive Labour Market Transition conceptual framework.
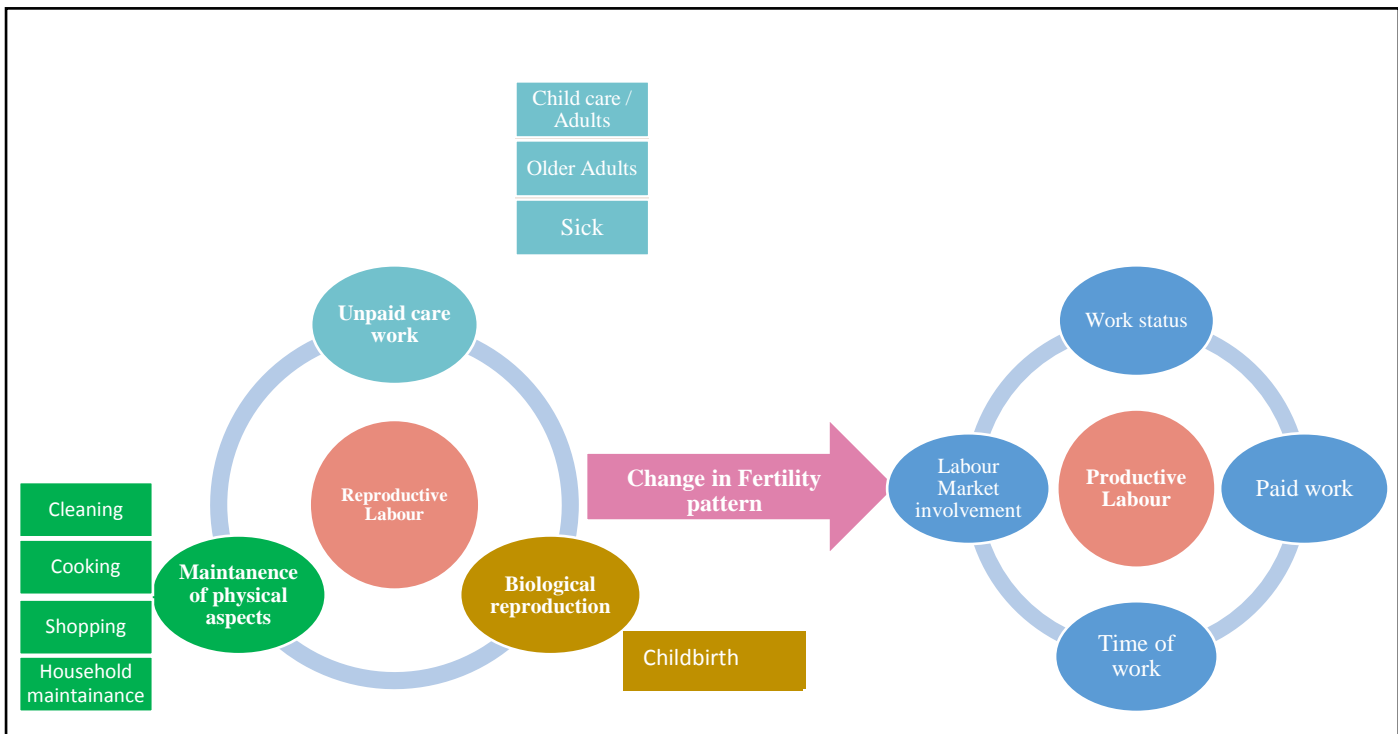
Source: Adapted from (Duffy, 2007)

2. Data and methods

2.1 Data and Sample Size

We used two waves of the nationally representative longitudinal Indian Human Development Survey (IHDS) conducted in 2004-2005 (IHDS-1) and 2011-2012 (IHDS-2) dataset for this study. The survey is conducted by the University of Maryland, the USA, and the National Council of Applied Economic Research (NCAER), India. The IHDS report was developed to offer assessments of essential indicators at the national level. It covers over 42000 households and provides detailed data on socioeconomic factors, fertility, household income, and employment. The IHDS survey uses a multi-stage cluster sampling design for data collection.

We used the eligible women's module to explore the transition from reproductive to productive labor. This module included questions about women's involvement in the paid and unpaid

workforce, hourly work, and wages. IHDS tracks the same individuals across both rounds, making it ideal for analyzing fertility transitions and female labor force participation. It also includes data on unpaid care work, offering insights into how reproductive labor affects women's engagement in the labor market across different socioeconomic groups.

The sample for our analysis includes 28821ever-married women aged 15–49 years in 2004-2005. Of the original sample (33,482 women aged 15–49 years in 2005), there are 6652 women for whom there is no follow-up information in 2012 due to household attrition, death, or moving to other places.

2.2 Variables and their Measurement

Dependent Variables

We consider two dependent variables to investigate the impact of fertility change on the female labor supply. These include (i) working = 1 if the female respondent reported that she was currently in wage employment, 0 otherwise. For those women who have participated in the labor market, two separate analyses were conducted at both the extensive and intensive margins using (ii) the total annual hours worked.

Explanatory Variables

Our explanatory variables reflect the respondent's socioeconomic, demographic, and household decision-making autonomy. The fertility behavior of respondents is a key explanatory variable in this study. In our analyses, we will include three variables relating to the respondent's fertility behavior: the total number of children she has given birth to, age, female health, education levels, women's empowerment, caste, religion, economic status, region, and residence.

2.3 Analytical Methodology

This study is designed to explore the relationship between fertility transitions and female labor force participation using longitudinal data from the two waves of IHDS. The study employs descriptive and econometric techniques to examine the shift from reproductive to productive labor among Indian women. In the beginning, we illustrated the percentage distribution of each variable, such as fertility rates, work with wages, and socioeconomic characteristics like education, caste, and region. Furthermore, we use fixed-effect regression models to control for time-invariant individual characteristics and isolate the effect of changes in fertility on labor

outcomes. This approach allows for examining within-individual variations across the two time periods, making it suitable for longitudinal data analysis. The dependent variables include labor market outcomes like work status, hours of work, and earnings, while the key independent variables are children ever born, capturing fertility transitions. We used Stata version 17.0 to analyze data (Stata Corporation, College Station, TX).

In the next phase, we utilized a fixed effect regression model to account for women-level unobservable factors that may have an impact on both fertility and female labor market outcomes., particularly for women's work hours and earnings, where non-participation in the labor market may result in zero values. Further, we estimate a Heckman sample selection model by including variables such as the household's primary source of income and economic stability to capture the broader socioeconomic context. By integrating these factors, the study aims to provide a nuanced understanding of the gender disparities in workforce participation amidst fertility transitions.

This analysis was divided into two main parts. Firstly, we investigated whether having a lower number of children ever born (CEB) was associated with women's labor market transition. Secondly, we explored the relationship between women's paid work and the number of children ever born (CEB) while also considering background characteristics.

3. Results

3.1 Variation in the salaried position of eligible women for each indicator in India (2004–11).

Table 1 reveals the distribution of salaried employment among eligible women in India utilizing data from IHDS-1 (2004-05) and IHDS-2 (2011-12). The analysis delineates the variation in women's participation in salaried work across different socioeconomic and demographic characteristics, with significant statistical differences evident in both rounds. The age distribution indicates that younger women (15-24 years) have the lowest participation rates in salaried work. Conversely, women aged 35 and above show higher involvement, reflecting the impact of age and potential reductions in caregiving responsibilities in the formal workforce. Education emerges as a critical factor in salaried employment. Women with higher educational attainment (graduation and above) exhibit over 50% participation, whereas those with no education or only primary schooling have notably lower participation rates. These findings underscore the significant role of education in accessing formal employment.

Caste-based disparities are evident in employment sectors, with women from the general caste backgrounds exhibiting higher participation rates (28.6%) compared to their counterparts from Other Backward Classes (OBC) and Scheduled Caste (SC) / Scheduled Tribe (ST) communities (20.2%). Additionally, religion also plays a role, as women from Sikh and Christian communities show higher participation (27-28%) compared to the Muslim community who have lower participation rates (21%). Health status is a significant factor, as women reporting better health are more likely to be in the formal paid sector. Further, women's empowerment, measured by the empowerment scale, is strongly associated with employment. Women in the lowest empowerment categories exhibit lower participation rates (18.6%), whereas those in the highest have considerably higher rates (38.1%).

Wealth disparities are stark, as women from wealthier households participate significantly in formal employment at much higher rates (45.9%) than those from poorer households (7.2%). Regional variations also exist; women in North and Northeast India report higher levels of employment than those in Central and Southern regions. This disparity indicates uneven economic development and disparities in labor market access across India. Lastly, the rural-urban divide is pronounced, with urban women showing significantly higher participation in paid employment (41.8%) compared to rural women. The urban advantage underscores the concentration of formal paid opportunities in urban areas, while rural women face barriers related to geographical and infrastructural constraints.

Table 1 Percentages of salary position of eligible women for each indicator in India (2004–12).

Background characteristics	IHDS-1 (%)			IHDS-2 (%)		
	No	**Yes**	**p Value**	**No**	**Yes**	**p Value**
Age						
15-24	81.46	18.54	0.000	81.05	18.95	0.027
25-34	76.55	23.45		78.64	21.36	
≥35	74.77	25.23		77.05	22.95	
Educational level						
No education	85.42	14.58	0.000	87.7	12.3	0.000
Below primary	80.93	19.07		83.93	16.07	
Primary to Higher sec	69.01	30.99		70.06	29.94	
Graduation and above	47.76	52.24		48.55	51.45	
Caste						
General	71.44	28.56	0.000	72.43	27.57	0.000
OBC	79	21		80.97	19.03	
SC/ST	79.81	20.19		79.86	20.14	
Religion						

Hindu	76.55	23.45	0.000	77.57	22.43	0.000
Muslim	78.77	21.23		80.7	19.3	
Sikh/Christian	72.75	27.25		71.93	28.07	
Female health						
Good	75.95	24.05	0.013	77.02	22.98	0.003
OK	77.69	22.31		79.67	20.33	
Poor	77.55	22.45		78.79	21.21	
Women's empowerment						
Poorest	81.36	18.64	0.000	81.62	18.38	0.000
Poorer	78.67	21.33		79.19	20.81	
Moderate	74.53	25.47		75.66	24.34	
Good	71.66	28.34		70.47	29.53	
Better	61.87	38.13		66.74	33.26	
Wealth quintiles						
Poorest	92.79	7.21	0.000	94.36	5.64	0.000
Poorer	90.18	9.82		90.19	9.81	
Middle	82.82	17.18		83.08	16.92	
Richer	69.09	30.91		70.42	29.58	
Richest	54.03	45.97		55.21	44.79	
Region						
North & NE	68.82	31.18	0.000	69.69	30.31	0.000
Central	81.95	18.05		82.23	17.77	
East	73.14	26.86		76.22	23.78	
West	72.35	27.65		72.39	27.61	
South	79.78	20.22		81.28	18.72	
Residence						
Rural	84.82	15.18	0.000	85.47	14.53	0.000
Urban	58.29	41.71		60.14	39.86	

Source Authors' calculations using IHDS (2004-05 to 2010-2011).

3.2 Mean number of women empowerment in background characteristics wise

Table 3 presents a comparative analysis of mean annual work hours for women in India across two periods. The data reveals a significant decrease in average work hours for younger women (aged 15-24) from 2017.35 hours in 2004-2005 to 1974.81 hours in 2011-2012. Educational attainment significantly influences work hours. Higher educated women showed increased work hours (2434.8 to 2539.9 hours), while those with no education reported a decline (1968.5 to 1876.8 hours). These findings suggest that higher education attainment is associated with greater labor force participation.

Caste-based disparities in work hours persist, with women from general caste maintaining higher average work hours, though they are experiencing a slight decrease. OBC and SC/ST

women experience reductions in work hours, which may reflect barriers related to both caste and reproductive labor responsibilities. Religious differences are also evident. Muslim women exhibit a slight increase in work hours, while Hindu and Sikh/Christian women show a decline.

Health status has an impact on annual work hours. Women in good health maintain relatively stable hours, whereas those in poor health experience significant reductions (from 2059 to 1994 hours). Women who are more empowered and come from a wealthier background are strongly correlated with labor force participation. On the other hand, the poorest show women show significant declines in work hours, highlighting economic disparities that influence FLFP.

Regional disparities also exist in India. Women in the North and Northeast experience the most significant decline in work hours, from 2389.9 to 2222.2 hours. In contrast, the rural-urban divide remains pronounced. Urban women consistently report higher participation. They see an increase in their mean work hours, from 2431.1 to 2499.7 hours, while rural women see a decline in work hours from 1938.5 to 1865.5 hours. This trend highlights the ongoing challenges faced by rural women in accessing labor market opportunities and are constrained by higher fertility and limited support for reproductive labor. These findings suggest the complexity of the interplay of fertility, socioeconomic status, and labor market participation.

Table 2 shows women's mean transition in average annual work hours in response to fertility change in India (2004–12).

Background characteristics	2004-2005		2011-2012	
	Mean	SD	Mean	SD
Age				
15-24	2017.351	14.39	1974.81	63.61
25-34	2136.246	8.877	2089.22	11.866
≥35	2075.857	8.716	2042.77	8.49
Educational level				
No education	1968.51	8.09	1876.85	10.12
Below primary	2038.6	20.39	1988.73	23.05
Primary to Higher sec	2201.79	9.038	2190.71	10.39
Graduation and above	2434.82	26.16	2539.89	29.07
Caste				
General	2217.75	9.87	2180.39	12
OBC	2028.75	9.95	1989.44	12.06
SC/ST	2010.66	9.57	1990.23	11.37
Religion				
Hindu	2071.96	6.27	2037.14	7.57
Muslim	2158.08	17.29	2168.63	20.2

Sikh/Christian	2198.43	23.21	2110.62	27.98
Female health				
Good	2082.13	6.99	2068.96	7.86
OK	2114.92	10.77	2029.66	17.22
Poor	2059.02	25.5	1994.98	24.78
Women's empowerment				
Poorest	2043.12	12.29	2004.73	19.06
Poorer	2057.86	12.08	2069.89	14.92
Moderate	2083.79	17.66	2102.16	19.11
Good	2118.68	19.76	2204.72	21.67
Better	2277.64	17.51	2260.72	20.88
Wealth quintiles				
Poorest	1813.32	12.57	1701.61	14.9
Poorer	1839.69	12.64	1825.59	15.55
Middle	2022.16	11.9	1981.49	13.44
Richer	2235.9	12.11	2234.69	14.81
Richest	2449.22	12.07	2450.87	14.96
Region				
North & NE	2389.99	14.49	2222.28	17.63
Central	1941.43	10.14	1936.04	13.12
East	2002.14	14.48	2031.39	16.95
West	2236.8	14.11	2196.87	15.79
South	2046.5	11.57	2030.16	13.78
Residence				
Rural	1938.45	6.906	1865.52	8.145
Urban	2431.06	8.94	2499.69	10.57

Source Authors' calculations using IHDS (2004-05 to 2010-2011).

Figure 2 depicts that those with at least four or more children had a notable decline in participation in the labor market (18%-15%). The opposite trend is observed in those who have fewer children, particularly those with below-replacement fertility levels. The data suggests a negative relationship between the number of children (CEB) and labor market involvement, particularly among large families. This trend underscores that lower fertility is associated with higher rates of salaried employment among women across both waves.
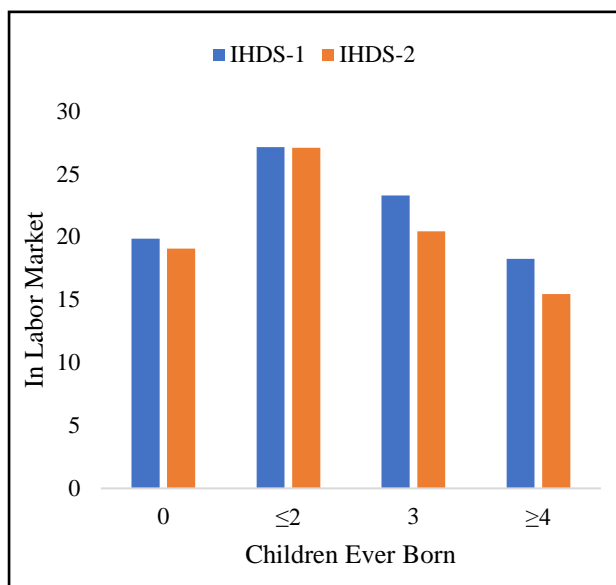
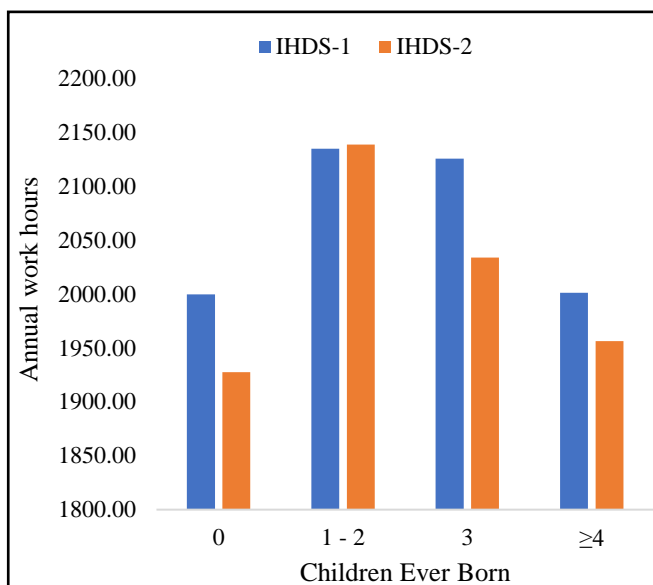**Fig. 2** shows the transition in salaried women in response to fertility change.

Fig. 3 Transition in average annual work hours of women in response to fertility change

Figure 2 illustrates the transition in women's annual work hours based on the number of children ever born. Women below the replacement level consistently worked the most hours (2134 hrs.-2139 hrs.), while those with no children or four or more children worked fewer hours. Similarly, women with four or more children worked fewer hours than those with lower fertility annual work hours (2001 hrs-1956 hrs.). This pattern suggests that lower fertility is associated with higher rates of salaried employment among women with more annual hours across both rounds.

3.3 The association between women's labor market transition and background characteristics

Table 4 presents the factors associated with women's labor market transition in India. Model 1 shows that the number of children ever born is statistically significant and negatively associated with employment. It shows less likelihood of employment for women with four or more children (-0.00*, CI: -0.01, -0.00; $p < 0.05$). Age also plays a significant role; older women are more likely to be employed than those in the 15-24 age group. Education is a critical determinant, with graduates having a 13% higher likelihood of employment (0.03, CI: 0.01,0.05; $p < 0.05$). Caste and health status further influence entry into the labor market. Women from the general caste are more likely to be employed, whereas Muslim women (-0.02; CI: -0.03,0.00) are less likely to engage in paid work, and those with moderate health status (-0.02; CI: -0.03, -0.00) are less likely to work. Wealth and urban women strongly predictors of

employment. The richest women are 28% more likely to be employed (0.28; CI: 0.26,0.30), and urban women have a 14% higher likelihood of employment (0.14; CI: 0.13,0.15). Regional disparities are evident where central India is less likely to work than counterparts of the country. These findings suggest that education and household wealth index play a significant role in influencing fertility and women's entry into the labor market.

The Model 2 reveals that age and education also impact annual working hours. Women aged 25-35 work 55.83 more hours annually, and graduates work 85.53 more. Wealth strongly predicts working hours, while the richest women work 367.4 more hours annually than their counterparts. Urban working women 390 more hours than rural women, while women in Central, East, and South India work significantly fewer hours. These results suggest the influence of education, wealth, and regional disparities on women's labor market engagement.

Table 3 Results from Fixed effect regression model showing factors associated with women labour market transition in India (2004–2005 to 2011-2012).

	Currently working	**Annual working hours**
	Model 1	**Model 2**
CEB		
≥4	-0.00*[-0.01, -0.00]	6.79[-1.78,15.35]
Age		
15-24®		
25-34	0.02*[0.00,0.04]	55.83**[15.68,95.98]
≥35	0.03***[0.01,0.05]	-26.44[-68.02,15.14]
Education		
No education®		
Below primary	0.01[-0.01,0.03]	39.70*[1.19,78.20]
Primary to Higher	0.05***[0.04,0.06]	43.57***[18.75,68.40]
Graduation and above	0.13***[0.10,0.15]	85.53**[31.34,139.71]
Caste		
General®		
OBC	-0.01[-0.03,0.00]	-20.06[-47.53,7.41]
SC/ST	0.04***[0.03,0.06]	27.2[-1.55,55.95]
Religion		
Hindu®		
Muslim	-0.02[-0.03,0.00]	50.44**[13.32,87.57]
Sikh/Christian	-0.03**[-0.05, -0.01]	6.99[-34.29,48.27]
Female health		
Good®	0[0.00,0.00]	
OK	-0.02**[-0.03, -0.00]	47.47***[23.04,71.90]

Poor	0.01[-0.01,0.03]	21.47[-19.59,62.52]
Women empowerment		
Poorest®		
Poorer	0[-0.01,0.01]	-23.6[-49.80,2.60]
Moderate	0.01[-0.00,0.03]	-40.77*[-72.07, -9.47]
Good	0.04***[0.02,0.06]	3.58[-30.93,38.10]
Better	0.05***[0.03,0.07]	11.65[-22.43,45.72]
Wealth quintiles		
Poorest®		
Poorer	0.03***[0.01,0.05]	36.42*[2.94,69.90]
Middle	0.08***[0.07,0.10]	138.24***[104.78,171.70]
Richer	0.18***[0.16,0.20]	269.81***[232.57,307.04]
Richest	0.28***[0.26,0.30]	367.38***[324.89,409.87]
Region		
North & NE®		
Central	-0.03***[-0.05, -0.02]	-219.09***[-251.90, -186.27]
East	0[-0.01,0.02]	-178.88***[-216.00, -141.75]
West	-0.03**[-0.04, -0.01]	-75.25***[-110.48, -40.01]
South	-0.10***[-0.12, -0.09]	-213.87***[-247.44, -180.31]
Residence		
Rural ®		
Urban	0.14***[0.13,0.15]	390.24***[366.04,414.44]
Pseudo R-square	0.1594	0.1276
Observation	28821	27353

Note: ®: Reference category; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

3.4 Determinants of currently working women in India from the two waves of the IHDS

The analysis shows that higher fertility (CEB) reduces the likelihood of women being employed, while age, education, caste, empowerment, wealth, and urban residence significantly increase the chances of labor market participation. Notably, wealth and urban residence positively influence both the probability of being employed and the number of work hours, highlighting the economic and regional disparities affecting women's employment. Although health and religion do not significantly impact participation or work hours, education and empowerment are critical in improving employment prospects. Additionally, the analysis reveals that regional differences persist, with women facing barriers to employment and work hours in certain areas. The transition between IHDS-1 and IHDS-2 shows a decline in employment likelihood but a substantial increase in annual work hours, suggesting a shift in women's work over time.

Table 4 Determinants of currently working women in India from the two waves of the IHDS (2004–2005 to 2011-2012) as per Heckman sample selection model estimates

	Outcome Equation for currently working (coef.)	Selection Equation for annual working hours (coef.)
CEB	-0.02**[-0.04, -0.01]	10.83[-3.60,25.26]
Age	0.06***[0.03,0.09]	18.41[-10.23,47.05]
Education	0.13***[0.11,0.15]	-7.21[-29.16,14.74]
Caste	0.08***[0.05,0.10]	2.86[-18.26,23.97]
Religion	-0.01[-0.04,0.02]	-10.61[-38.17,16.95]
Female Health	0[-0.03,0.03]	22.85[-5.84,51.53]
Women empowerment	0.32***[0.20,0.44]	98.37[-13.02,209.76]
Wealth quintiles	0.28***[0.26,0.30]	61.68***[31.54,91.83]
Region	-0.08***[-0.09, -0.07]	-36.50***[-49.79, -23.20]
Residence	0.47***[0.43,0.51]	58.73*[6.38,111.08]
IHDS1 (2005) o~2012)	-0.08***[-0.12, -0.04]	2257.09***[1977.11,2537.06]
Constant	-1.89***[-2.01, -1.78]	2257.09***[1977.11,2537.06]

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

4.1 Discussion

The study highlights the intricate relationship between fertility levels, socioeconomic factors, and FLFP in India. The research explored various dimensions, including labor market participation, particularly how changes in fertility influence labor force participation across India. The inverse relation between fertility and lower fertility suggests that lower fertility enables higher workforce participation. Women with fewer children tend to have the highest levels of salaried employment and longer work hours compared to those with larger families who experience a decline in participation. This finding aligns with the broader demographic theories that suggest lower fertility facilitates higher economic participation, as women with fewer caregiving responsibilities can allocate more time for formal employment (Bloom et al., 2009; Mammen & Paxson, 2000; McDonald, 2000). Furthermore, the increased burden of reproductive responsibilities significantly contributes to the observed pattern of entry and exit in the labor market (Tiwari et al., 2022a). Other barriers, such as the prevalence of the informal nature of work (Thomas, 2012), household dynamics (Das et al., 2015), and societal norms, played crucial roles in influencing decision-making processes related to entry into the labor market.

Education remains a crucial determinant of labor market outcomes. Women with higher educational attainment are not only more likely to participate in salaried employment but also report higher annual work hours. These findings align with previous studies, which indicate that education enhances women's labor force participation by improving their employability and access to better-paying jobs (Kingdon & Unni, 2001). It emphasizes the significant role of educational attainment in facilitating women's entry into the formal economy.

Furthermore, our study observed that women from marginalized communities, particularly SC/ST and OBC groups, exhibit a lower rate of participation in both salaried employment and annual working hours than their counterparts' general caste backgrounds. These findings are similar to the prior studies that highlight the compounded disadvantages faced by women from lower caste and tribal communities (S. Desai & Dubey, 2012). Similarly, the wealth quintiles expose that women from wealthier households have a distinct advantage in accessing formal employment, pointing to structural inequalities in labor market access.

Regional variations exist in this study. Women from North and Northeast India report higher salaries than those in the Central regions. This geographical divide aligns with broader patterns of uneven economic development across Indian states (Klasen & Pieters, 2015; Lahoti & Swaminathan, 2016). This study also shows that women in urban areas still participate in formal employment at the national level. It is important to note that prior research, as exemplified by studies such as those conducted by Sorsa et al. (2015) and Klasen & Pieters (2015), has concentrated on urban women. These studies have identified an increasingly unfavorable association between the presence of young FLFP.

The fixed-effects regression results highlight that higher education and richer wealth significantly enhance employment likelihood and working hours, while large family sizes and poorer health negatively impact employment. Regional disparities and urban-rural differences also play a crucial role. Urban women and the wealthier category are working more hours. It underscores the importance of targeted policies addressing education, economic resources, and regional inequalities to improve women's labor market outcomes.

This hackman model highlights the significant impact of fertility, education, wealth, and urban residence on women's labor force participation and work hours in India. Higher fertility reduces employment likelihood, while education, wealth, and urban location improve employment chances and work hours. The observed regional disparities suggest barriers in certain areas, with urban women benefiting more from formal employment opportunities. Despite lower

employment participation, the increase in work hours between IHDS-1 and IHDS-2 indicates a shift toward longer work hours, potentially in informal sectors. These findings emphasize the need for targeted policies addressing fertility-related barriers and promoting women's access to education and formal labor markets.

4.2 The significance of the context

This research addresses the critical intersection of fertility transitions and FLFP in India, a country undergoing rapid demographic and socioeconomic changes. Despite declining fertility rates, women's work participation rate remains low, highlighting the need to understand the role fertility plays in shaping gender disparities in employment. The study's context is relevant as India seeks to harness its demographic dividend, emphasizing the importance of gender equality in labor markets for sustained economic growth. By utilizing IHDS data, this research explores how fertility transitions intersect with socioeconomic inequalities, offering valuable insights for policy interventions to increase women's economic participation and reduce gender gaps.

4.3 Strengths and limitations

This study uses longitudinal IHDS data, which helps track the same women's fertility history throughout the period. This study helps to examine the trends across different socioeconomic and demographic groups, offering valuable insights into regional and wealth disparities.

However, the study faces certain limitations. Firstly, self-reported data may introduce recall bias, particularly concerning employment history and fertility details. Secondly, our study is following quite old waves due to the unavailability of new data sets. We will update the study after getting new waves of IHDS. Thirdly, our research solely focuses on the sample population of currently married women within the 15-49 age group. This focus necessitated the exclusion of unmarried individuals and older segments from the overall sample.

5. Conclusions

This study highlights the complex interplay between fertility transition and FLFP in India, demonstrating that lower fertility is associated with increased salaried employment and longer work hours for women. Socioeconomic factors such as education, wealth, and regional disparities play crucial roles in shaping these outcomes. The findings of our study underline the need for policy interventions to promote smaller family sizes and address socioeconomic inequalities, mainly through expanding access to education and employment opportunities for

women in rural and marginalized communities. Investment in childcare, health infrastructure, and support for women's reproductive labor can further enhance labor market participation, fostering more significant gender equity in the landscape in India.

6. Abbreviations

FLFP: Female Labour Force Participation, RL: Reproductive Labor

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