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Pandemic Pendulum: Investigating the Post-COVID
Resurgence in India's Female Labour Force Participation
Using Probit Analysis

By

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***Abstract:** India's Female Labour Force Participation started declining from 2004-05 and fell from 42.74% in 2004-05 to 19.23% in 2021-22. However, in 2022-23, after the COVID-19 Pandemic, the Female Labour Force Participation rate was recorded at 28.26%. Against these circumstances, this thesis aims to characterize the nature of women's employment after the COVID-19 Pandemic. Furthermore, this thesis uses Probit and IV Probit Models to determine whether this increase is a result of change is a result of changes in labour-supply side factors. The results indicate that while there is some variation in how supply-side factors; it does not fully explain the surge in female employment.*

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1. Introduction

In recent years, India has emerged as the fifth-largest economy, and as of April 2023, India is the most populated country in the world (UN DESA, 2023). Though India continues to be a lower middle-income country with a GDP per capita of \$2410, it has sustained a high average growth rate of 6.4% since liberalisation in 1992 (World Bank, 2024) and has borne witness to moderate structural change (Deshpande & Singh, 2021; Erumban et al., 2019; Krishna et al., 2017). However, in recent years, India has seen declining rates of Female labour force participation (Abraham et al., 2022; Deshpande & Kabeer, 2019; Deshpande & Singh, 2021; Sarkar et al., 2019)

Achieving a high rate of female labour force participation (FLFPR) is imperative for a country like India, where women's participation would allow for a larger workforce, allowing for the country to tap into its demographic advantage, similar to China (MEHROTRA et al., 2014). According to the Organisation for Economic Cooperation and Development (OECD), raising FLFPR in paid labour could lead to a 2-percentage point increase in the economy's growth. Furthermore, the growth of FLPR is necessary for increasing women's agency and better women's empowerment. Deshpande and Kabeer (2019) posit that the presence of working women in the family (such as mothers/mothers-in-law) leads to the creation of *virtuous cycles*. This indicates that the presence of older working women in a family led to an increase in the probability of other women in the family by between 18 and 21 percentage points (Basole et al., 2023).

India's low FLFPR is quite unprecedented, both in comparison to its neighbours (See Appendix Figure 2) and in comparison, to G20 countries (See Appendix Figure 1). G20 symbolises a premier forum of international economic cooperation comprised of the world's foremost and systematically essential countries. G20 countries account for 85% of the Global GDP, 75% of the international trade and represent 2/3rd of the world's population (OECD, 2024). In this group, when it comes to indicators of Women's Economic Participation, India is the worst performer, with the lowest FLFPR of 19.23% and the highest wage gap percentage, with men earning 77% more than women as of 2022 (Swabhimaan, 2023). As per the Gender Gap Report 2023, India ranks 127th of 146 countries when it comes to closing the gender gap,

and the country ranks 142nd in the same list regarding economic participation and opportunities for women.

Despite such a severe fall in FLFPR from 2018 onwards (See Figure 1), FLFPR in India has considerably jumped between 2022 and 2023, jumping from 19.23% to 28.26% (Global Gender Gap Report, 2023). This rapid increase in FLFPR happened after the contraction of employment as a result of the COVID-19 pandemic. The sudden increase in employment can be categorised as an improvement if most women have entered the workforce, either in manufacturing or services. Women, in the past, have exited the agricultural sector when growth has been high. The shift in women's employment from agriculture to other sectors has been slower than that of men. This increase in employment can also be a positive sign if it has seen a rise in regular or salaried work. If the increases were seen in such jobs, it would indicate that women were gaining employment in better-paying industries with more stability.

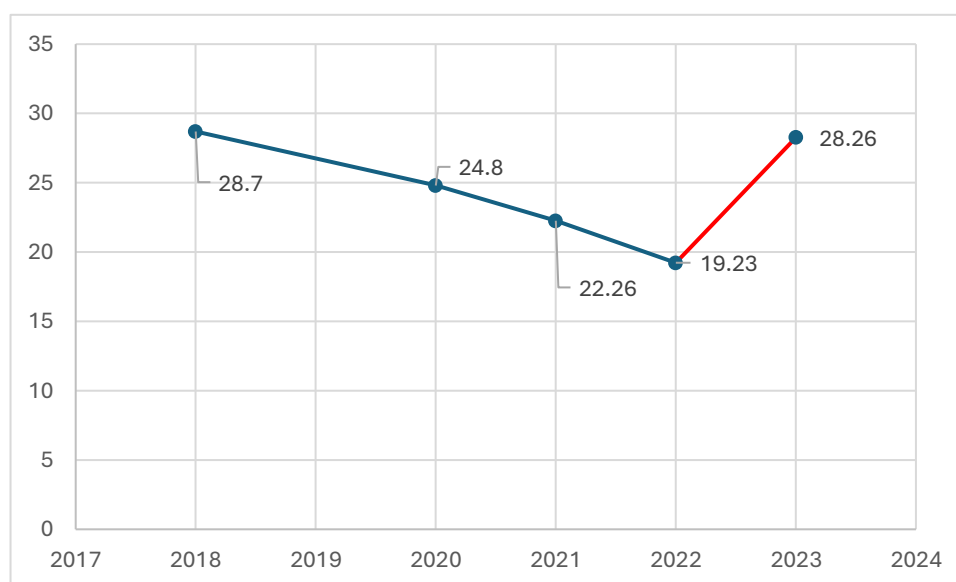


Figure 1 India's Female Labour Force Participation Rate 2018-2023(Global Gender Gap Report, 2023)

1.1. Research Question

This Thesis aims to estimate the differences in the probability of women participating in the labour force before and after the COVID-19 pandemic relative to men. To analyse the differences in probability, this thesis will look at the impact of supply-side indicators, namely individual and household characteristics, that factor into whether a person chooses to work. Also, the thesis aims to characterise the nature of employment that women have come into

after the COVID-19 pandemic and its significance in analysing female labour force participation in the country.

This thesis uses data made available in October 2023; to the author's knowledge, no other academic literature uses the same methodology for this time period.

Section 2 of this paper is a section on Context- which briefly covers India's recent Economic History vis-à-vis growth, informality and structural transformation within the Economy.

Section 3 of the paper is the Literature Review, which is divided into three sub-sections- Feminisation U Hypothesis and Structural Transformation, Factors Unique to the Indian Case and Indian Workforce in the COVID-19 Pandemic. This first sub-section covers the theoretical framework of literature on how female labour force participation changes in an economy, and the second sub-section briefly explains factors unique to India that affect FLFPR in the economy. The last sub-section delves into how the COVID-19 pandemic played out in the country and its impact on the workforce.

Section 4 delves into the intricacies of the Periodic Labour Force Survey and the way the Thesis utilises the survey. It also includes a sub-section that provides descriptive statistics that record the division of women's labour force across a variety of areas, sectors, employment types and education levels. Section 5 covers the methodology utilised in the Thesis and delves into the implications of the results achieved. Section 6 provides a conclusion for the Thesis.

2. Context

In 1992, after an economic crisis induced by the balance of payments deficit, the Indian economy liberalised through a set of market-oriented reforms. After these reforms, India experienced a stable growth rate of around 6.4% between 1992 and 2019. In this same time period, India's FLFPR, which was around 30% in 1992, started experiencing a steady decline in 2004 and reached a new low of 18.63% in 2020 (World Bank 2024). In the G20 Cohort, as of 2022, India had the lowest FLFPR at 19.23%, and the Global Gender Gap Report by the World Economic Forum ranked India at 143 of 146 countries with inequality of economic opportunity across gender (Swabhimaan, 2023; World Economic Forum, 2022). This low participation of women in the Indian Economy should not be taken to mean that women somehow do not contribute towards economic growth. Women, especially in developing

countries, expend their labour in care work, which is necessary for developing and maintaining human capabilities (Folbre, 2006, 2021). While this unequal distribution holds true for all countries in the world, the difference is worse in India. On average, women perform 76.2% of the unpaid care work worldwide, while Indian women perform 90.5% of the unpaid care work (ILO 2018). (See Figure 2)

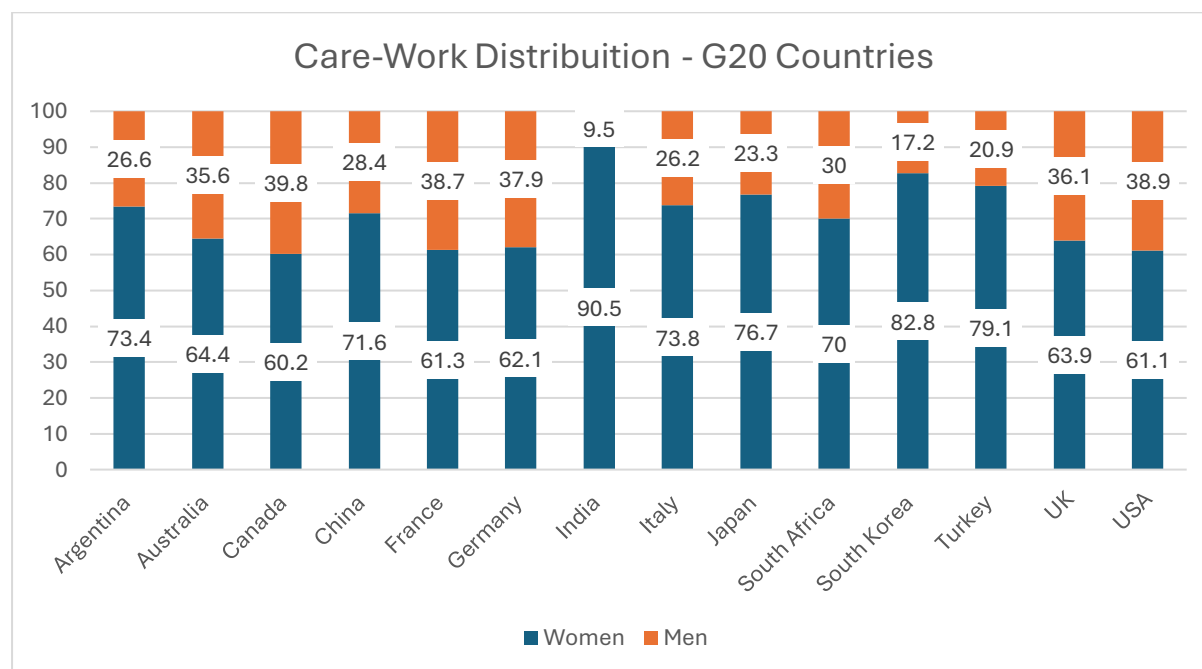


Figure 2 Care Work Distribution for G20 Countries (Based on ILO 2018)¹

Scholars (Chatterjee et al., 2015; Goldin, 1994; Kingdon & Unni, 2001) suggest that this fall in FLFPR is in line with the Feminisation U-Hypothesis. However, India's FLFPR was not showing the same signs of recovery, but this changed in 2023, when India's FLFPR was recorded at 28.26%; much higher than the 19.23% recorded in 2022 (Global Gender Gap Report, 2023; World Economic Forum, 2022).

The initial assessment of the Feminisation U hypothesis holds true for India, where researchers (Dubey et al., 2017; Kannan & Raveendran, 2019; Kapsos et al., 2014) argue that the fall in FLFPR was a result of a fall in rural women's participation rates and urban women's participation rates have stayed stable. Women in rural India were primarily involved

¹ This includes all countries that are part of the G20 cohort and the care-work distribution calculated in ILO (2018).

in the agricultural sector and receded from the workforce when they no longer needed to work to survive (See Table 1). This phenomenon was the result of improvements in agricultural technologies, which led to a decrease in the requirement for labour-intensive practices in the sector. (Afridi et al., 2020) found that increased mechanisation between 1999-2011 led to a 22% reduction in women's labour use in agriculture.

Female Labour Force Participation Rate for Women as per UPSS					
	1994	2000	2005	2010	2012
Rural	49	45.4	49.4	37.8	35.8
Urban	23.8	20.8	24.4	19.4	20.5
All Areas	42.7	38.9	42.7	32.6	31.2

Table 1 Female Labour Force Participation Rates in India (Adapted from Kapsos et al. (2014))

As these women retreated from the workforce, the expectation was that women in the coming generations would opt for higher education and then re-enter the workforce for better opportunities. However, scholars (C Rangarajan et al., 2011; Chattopadhyay & Chowdhury, 2022; Chowdhury, 2011; Kannan & Raveendran, 2019) report that the fall in FLFPR does not fully correspond to the number of female students; suggesting that other factors are playing into rural women not being able to access economic opportunities.

Subsequently, India's growth in the recent decades has been classified as a 'Jobless Growth'. This implies that India owes its recent growth to expansions in the country's service sector, which primarily generates low-labour-intensive but high-skilled jobs. This has meant that despite high economic growth in the last thirty years, most of the country's population is still deriving its livelihood in the informal sector. Employment in this sector is characterised by low wages, uncertain working conditions, lack of social security nets, and usually a severe dependence on daily earnings. 90% of all workers in the country find employment in the informal economy (Ghose, 2020).

In India, employment is usually sorted into four basic categories- regular-formal salaried/ wage employment, regular-informal salaried/ wage employment, casual wage employment and finally self-employment. The most vulnerable of this group to economic shocks is casual-wage employment. These workers rely on daily employment and daily wages, and they face immediate job loss and uncertainty in the case of the cessation of wages. This group of workers was the most vulnerable during the lockdown, considering their reliance on daily work (Ghose, 2020). These workers were forced to travel towards their rural homes from urban centres, where they had migrated to in search of work. Moreover, even after the lockdown was eased around August 2020, they struggled to find employment and earn wages similar to the ones before the lockdown was initiated. Despite the government's promises to provide support, workers reported that no such relief came to pass (Mohan et al., 2021).

Regular-informal wage/ salaried employment, albeit less than casual employment, can also be quite unreliable, with a lack of security in terms of tenure and an absence of social protection. Regular-formal wage/salaried employment is considered to be the most secure in the group with some sense of security of tenure and some social protection and were naturally considered to be the most secure against the shutdown of activities. The last in the group is self-employed. This group is a diverse one- a small portion (4%) of these workers can be classified into 'employers', where they mainly use hired labour and are considered to be relatively secure against economic shocks. The rest include own-account workers and unpaid family workers, and these workers can be quite vulnerable to economic shocks (Ghose, 2020).

Kesar et al. (2021) report that 52% of the workers were self-employed, 25% were casual labourers, and only 23% were salaried employees; out of which 71% did not have a formal job contract (Ghose, 2020; Kesar et al., 2021; NSSO, 2018, 2019)

3. Literature Review

3.1 Feminisation U Hypothesis and Structural Transformation

The Feminization U hypothesis (Goldin, 1994) posits that there is a curvilinear relationship between FLFPR and economic development. What this implies is that when there is an increase in growth in a developing country's economy, there will initially be a decline in FLFPR. This happened because women who were working in low-wage jobs moved out of the workforce, as their work would no longer be necessary for subsistence. Following this, the next generation of women will be exposed to education and skill training, allowing them to enter the workforce at an advantage, as compared to their predecessors. In other words, women's FLFPR is high when an economy is low-income; it declines with increases in per capita incomes to a certain point, and then ascends again, accompanied by a rise in per-capita income.

Gaddis and Klasen (2014) find that there is feeble support for the Feminisation U hypothesis when a different source for GDP is used, and instead argue that women's participation in the workforce may be better explained as a consequence of particular patterns of structural change. Klasen (Gaddis & Klasen, 2014; Klasen, 2019) and Heintz (2021) characterize the Feminisation U hypothesis within the rationale of Structural Transformation. They point out that in developing countries, where the economy is mainly agricultural, women tend to have higher FLFPR. This is so because their work in agricultural fields is made possible while managing to keep up with their unpaid care work, given extended family structures.

However, when economies move out of agriculture and towards industrialisation, women are forced to withdraw from the workforce and tend to specialise in unpaid work, especially considering industrial jobs are harder to manage with their burden of care work. After that, when economies move into later stages of industrialisation and with the expansion of the services sector are able to provide opportunities for women to re-enter the workforce. This happens alongside rises in educational attainment and falls in fertility rates.

Factors that affect differences in presentations of Feminisation U-hypothesis

Klasen (2019) argues that under certain circumstances, women's FLFPR does not evolve with changes in income per capita, as the feminisation U hypothesis suggests. The variations can

be a result of differences in the relationship between household income and labour force participation since increases in household incomes reduce the need for women to continue working. In such cases, the increases in men's earnings, coupled with gender norms that are built to support men, force women to retreat from the workforce and expend their labour on care work.

Additionally, considering that labour markets are segregated and that these segregations are stable over time (Borrowman and Klasen, 2020), depending upon economic structures, women have poorer access to better jobs and economic opportunities, as compared to men; further limiting women's access to paid employment. These economic structures and their results are a consequence of social norms. Gunatilaka and Vithanagama (2021) show that in the case of the protracted conflict in Sri Lanka, the expectation of an increase in female-led households, leading to women entering jobs traditionally dominated by men was unfounded because of prevailing norms. Lakshman et al. (2021) showed that widowed or separated women's ability to enter the workforce was limited by the absence of a male family member and Kandanearachchi and Ratnayake (2017) found an increased incidence of Gender-Based violence in the aftermath of the conflict, in households, but also the workplace.

Similarly, social norms also have a positive effect on the FLFPR in different cultures. Klasen (2019) finds that socialist regimes had a 7% significantly higher record in FLFPR. He argues this is a direct consequence of socialist ideology's promotion of a relatively more gender-equal ideology and following through with the same in legislation while also propagating policies that promote the compatibility of child-rearing with employment. Hence, he posits that the kind of social norms that shape labour market segregations, consequently affecting women's access to economic opportunities, result in variation in regions for the follow-through of the feminisation hypothesis. Thus, Klasen argues that differences in growth processes interact with structural barriers in a way that produces different outcomes for FLFPR.

3.2 Factors Unique to the Indian Case

What is interesting about India's case is that it has maintained a stable growth rate of around 6.4% (World Bank, 2023) and has seen a significant increase in education parity. India has also seen a rise in girls' enrolment in primary education and has seen female enrolment, for women aged 15-24 (At secondary and tertiary levels), in any educational institution go from 16.1% to 36% (Kapsos et al., 2014). India's ranking in parity across 'Education Attainment' was 29th in the world (Global Gender Gap Report, 2023). Furthermore, the fertility rate in India has gone down from 5.92 in 1960 to 2.05 births per woman in 2020 (India - World Bank Gender Data Portal, 2024). Despite all these positive changes that tend (Goldin, 1994; Haseeb et al., 2015; Husain, 2022) to increase women's entrance into the labour force, it has not come to pass in India.

When it comes to reasons why there are so few women in the labour force in India, there are two sides to the debate- the supply side and the demand side. The Supply-side argument refers to the idea that women choose to not enter the workforce due to a variety of factors.

Supply Side

One of the most prevalent arguments is that women choose not to enter the workforce because they take on the burden of 'Care work', which includes childcare, elder care, and domestic chores ((Bedi et al., 2021; Das & Ieva Žumbytė, 2017; Folbre, 2006, 2021; ILO, 2018, 2022) While this argument is prevalent in most societies, its influence in India is much more significant. India has one of the highest gaps when it comes to the distribution of care work. According to the ILO, Indian women perform 92.1% of the care work, implying that where women contribute 297 minutes to care work in a day, Indian men contribute 31 minutes (ILO, 2018).

In addition, Sudarshan & Bhattacharya (2009) in their survey on women in Delhi, found that women's decision to work is often a household one (specifically the marital household), wherein a large portion of the women did not work prior to marriage and those that did, stopped working after their marriage or the birth of a child. This phenomenon has been termed the "marriage penalty" (Deshpande & Kabeer, 2019). Furthermore, this study found that it was not the individual attributes of the women, but rather the external environment and

perceptions within the marital households(Sudarshan & Bhattacharya, 2009); with another study that found that the likelihood of women being employed increased when mothers-in-law in the family enjoyed employment (Basole et al., 2023).

Moreover, in India, social identities play a significant role in determining labour market outcomes. For instance, scheduled tribes, scheduled castes and other backward castes make up for the most impoverished section of Indian societies and are subject to economic and social exclusion. These groups often coincide with extreme levels of poverty, lack of social support and low education levels. Women belonging to these marginalised groups often have no choice but to work to support their families, and as such, women from these groups have the highest FLFPR. On the other hand, the norms of the Muslim community are often stricter when it comes to restricting women's mobility and hence, Muslim women seem to suffer from lower FLFPR(Deshpande & Kabeer, 2019, 2024a; Neff et al., 2012; Srivastava & Srivastava, 2010).

Another argument posed forward to explain the lack of women in the workforce is that of the 'Sanskritization' effect. This argument suggests that low-income households choose for women not to work when it is no longer required. Women in lower-caste households have a higher FLFPR than upper-caste women (Kakati, 2018; Kingdon & Unni, 2001). So, these low-income households, which often belong to lower-caste or class, do so to emulate upper-caste archetypes where women are not 'required' to venture out of the households to keep their families afloat, and their 'honour' remains intact.

Demand Side

However, some scholars believe that the supply-side argument of this debate only explains part of the low rates of labour(Ashwini Deshpande, 2019; Deshpande & Kabeer, 2019, 2024a, 2024b; Deshpande & Singh, 2021). Some scholars argue that the low rates of FLFPR are a result of a lack of demand for female labour. They suggest that women are willing and able to work. So, while the poorest of women have no option but to work, women belonging to households with a relatively higher income threshold may be willing to work and look for jobs that are not a hurdle to 'their' domestic responsibilities. Ashwini Deshpande's work looks at 12 waves of the CPHS data and found that women enter and exit the workforce over short periods (Deshpande & Singh, 2021). They found that where 70% of

men had no transitions in and out of the workforce, and only 20% made more than two transitions; only 5% of the women were present throughout. 34% made one transition, 36% made two, and 25% made more than three transitions. This rapid change in employment supports the argument that low FLFPR in the country is explained as well with the supply side of the argument, considering norms and customs do not mutate that fast. Rather, it denotes an absence of economic opportunities for women to access avenues of employment that are regular and steady.

3.3 Indian Workforce in the COVID 19 Pandemic

While the containment measures associated with the COVID-19 pandemic led to a massive toll on most of the world's economies, their impact on India was more pronounced. The government-imposed COVID-19 lockdown lasted from March 24th, 2020, to May 31st 2020, and it is considered one of the largest and most stringent lockdowns during the COVID19 Pandemic (Kesar et al. 2021). This lockdown warranted a pause on most economic activities within the country, which had severe consequences for the Indian Economy, with GDP shrinking by 23% in the first quarter of 2020-21. Like it was for most Economies, the COVID-19 Pandemic had a damaging impact; its catastrophic nature can be traced to the pre-existing inadequacies in the structure of the Indian Economy, particularly the high rate of informality and continual underinvestment in public goods, leading to a lack of social security nets (Abraham et al., 2022; Kesar et al., 2021). This impact was felt most strongly within economically disadvantaged groups around race, caste, social and demographic status, religious and gender lines (Ghose, 2020; Ghosh, 2022).

Ghosh (2022) notes that the precarity of India's informal Economy, combined with low median wages, is such that the lockdown initiated by the government led to the poorest of the country being extremely vulnerable. This group is vulnerable to the extent that losing a week's wages leads them 'to the brink of starvation', and the shutdown of all economic activities had an immediate and devastating effect on them. This, coupled with the refusal of India's government to increase government funding, initiated a humanitarian crisis in the country that unduly affected marginalised groups and women, alongside millions of migrant workers being forced to leave urban centres for their homes in dreadful conditions (Ghosh, 2022; Mohan et al., 2021).

During the COVID-19 Pandemic, the Consumer Pyramid Household Survey by the Centre for Monitoring the Indian Economy documented how households were affected by the Pandemic. The CPHS is a periodic survey, implying that the same families are visited thrice in one year. Between December 2019 and April 2020, a study found that while the contraction of men's jobs in the sample was larger in absolute terms, Women lost more jobs in proportionate terms (Abraham et al., 2022). As per Abraham et al. (2022) work on CPHS, between December 2019 and April 2020, 43% of women lost their jobs during the pandemic while only 30% of men. Furthermore, as per data recorded during the year of the Pandemic, women's jobs showed fewer signs of recovery. This indicates that women's jobs were more turbulent during the pandemic and saw drastically less recovery than men. (See Appendix Figure 3).

4. Data

The PLFS is a set of unemployment and employment surveys undertaken by the NSSO, which serve as the primary source of statistics on the Indian labour force, encompassing activity participation of the population and accounting for the structure of employment within the country. The PLFS was launched by NSSO in April 2017 "to estimate the key employment and unemployment indicators (viz. Worker Population Ratio, Labour Force Participation Rate, Unemployment Rate) in the short time interval of three months for the urban areas only in the 'Current Weekly Status'" and "to estimate employment and unemployment indicators in both 'Usual Status' and 'Subsidiary Status' or with Current Weekly Status in both rural and urban areas annually". The survey is built in a way that it provides data on employment across ages, gender, education, industry, occupation, time disposition, mobility, and wages. It also includes questions around household characteristics, which include the kind of employment the house is involved in, the size of the household, and the social and religious group the house belongs to.

This survey was introduced in place of the previous Employment Unemployment Survey (EUS), which also fell under the purview of NSSO. The EUS, unlike the PLFS which is conducted annually, was conducted every five years. The PLFS, to date, has had six annual reports; the first being based on data collected during July 2017-June 2018 and the latest report was based on data collected from July 2022-June 2023(NSSO, 2023).

PLFS uses a rotational panel sampling design for urban areas, wherein each selected household is visited four times a year. However, there are no revisits in the rural area. For rural areas, the samples are drawn randomly and in each quarter 25% of the first-stage sampling units are visited.

As per the NSSO, the purpose of conducting the PLFS is to provide insights into the behaviour of the labour market and how it changes as a result of changes in the overall economy. They argue that the domestic labour market reflects the changes caused by the volatility in the economy, transformations in inter-intra-sectoral linkages and changes in patterns of economic integration vis-à-vis the rest of the world. The PLFS is meant to capture the short-term impact of such fluctuations. In the context of this paper, the PLFS will help chart how the labour force, especially with regard to women, has changed since the COVID-19 Pandemic.

Additionally, since LFPR encompasses both employed and unemployed people, the surveys around the labour force may often understate the number of women involved in the workforce. This is so because, at times, women may report themselves out of the workforce when they are unemployed yet may be willing to work, but they will be counted out of the workforce (Deshpande & Singh, 2021). Another reason women may not be counted, even when contributing to economic activities, is if their work needs to be paid. This is not a reference to Care work that significantly supports economic activities but is hard to measure (Folbre, 2006; ILO, 2018). Instead, here, the reference is to the fact that women actively contributing to family businesses, or the main livelihood of the household are challenging to account for. These women may or may not earn a wage and often do not consider themselves or are considered by their families to be 'workers' (Ashwini Deshpande, 2019). The PLFS survey has been designed with this in mind. Under questions around Current Weekly Status, it questions participants if they were involved in household enterprises, even if it was without remuneration.

This study will be utilising two of the PFLS databases. The first will be the database for 2018-2019. This year, 101,579 households (55,812 in rural areas and 45,767 in urban areas) and 420,757 persons (239,817 in rural areas and 180,940 in urban areas) were surveyed. This year is before the effects of the COVID-19 Pandemic and will serve as a basis for comparison (NSSO, 2019).

The second will be the database for the PLFS 2022-2023. This is two years after the height of the COVID pandemic, and it is this year that the sudden increase in the Female labour force is documented. This year, 101,655 households (55,844 in rural areas and 45,811 in urban areas) and a total of 419,512 persons (243,971 in rural areas and 175,541 in urban areas) were surveyed (NSSO, 2023).

For the purpose of this study, the data on all households and all persons will be used. After accounting for the presence of children in a household, the PLFS data was restricted to those between the ages of 15 and 59 (Working age). Only men and women were considered, and people assigned under the third gender were not utilised for the analysis. To capture the nature of involvement in the labour force, Current Weekly status (CWS) rather than 'usual' + 'subsidiary' status, because CWS was better suited for capturing individuals who were involved in the labour force more sporadically, which is often the manner in which women are involved in the labour force (NSSO, 2023).

As per the CWS, "A person is considered working (or employed)) if he/ she worked for at least one hour on at least one day during the seven days preceding the date of the survey or if he/she had worked for at least 1 hour on at least one day during the 7 days preceding the date of the survey but did not do the work. A person is considered 'seeking or available for work (or unemployed)' if during the reference week, no economic activity was pursued by the person but he/ she made efforts to get work or had been available for work for at least one hour on any day during the reference week. A person who had neither worked nor was available for work any time during the reference week is considered to be engaged in non-economic activities (or not in the labour force)." (NSSO, 2023)

The PLFS is an essential representative measure of the employment and unemployment characteristics in both rural and urban India. When looking at the state of employment in the country, the PLFS provides a better reference point than even the Census of India, which is conducted once every decade, since it covers much more detailed information in its household surveys. Additionally, unlike the EUS, the PLFS even records the wages of self-employed persons and salaried and wage workers.

4.1 Descriptive Statistics

At first glance, the difference in women's LFPR in 2018-19 and 2022-23 presents a beacon of hope. According to the PLFS, the FLFPR rose from 21.83% for urban and 24.15% for rural areas in 2018-19 to 26.72% for urban areas and 36.95% in rural areas. As stated, the decline in India's labour force from 2004-05 onwards resulted in the fall of labour force participation rates in rural areas, while the FLFPR in urban areas remained consistent. Similarly, the rise observed between 2018-19 and 2022-23 is primarily a result of a rise in participation for rural women, which increased by more than 12 percentage points. In contrast, the urban rate increased by around 5 percentage points.

Furthermore, it is essential to note that this expansion of the female labour force in the country is not linked to an increase in work availability in rural areas, considering the men's labour force has yet to see similar increases in participation rates. Additionally, it is important to characterise the kind of employment that is seeing increases and understand the sectors that are observing an influx of female workers.

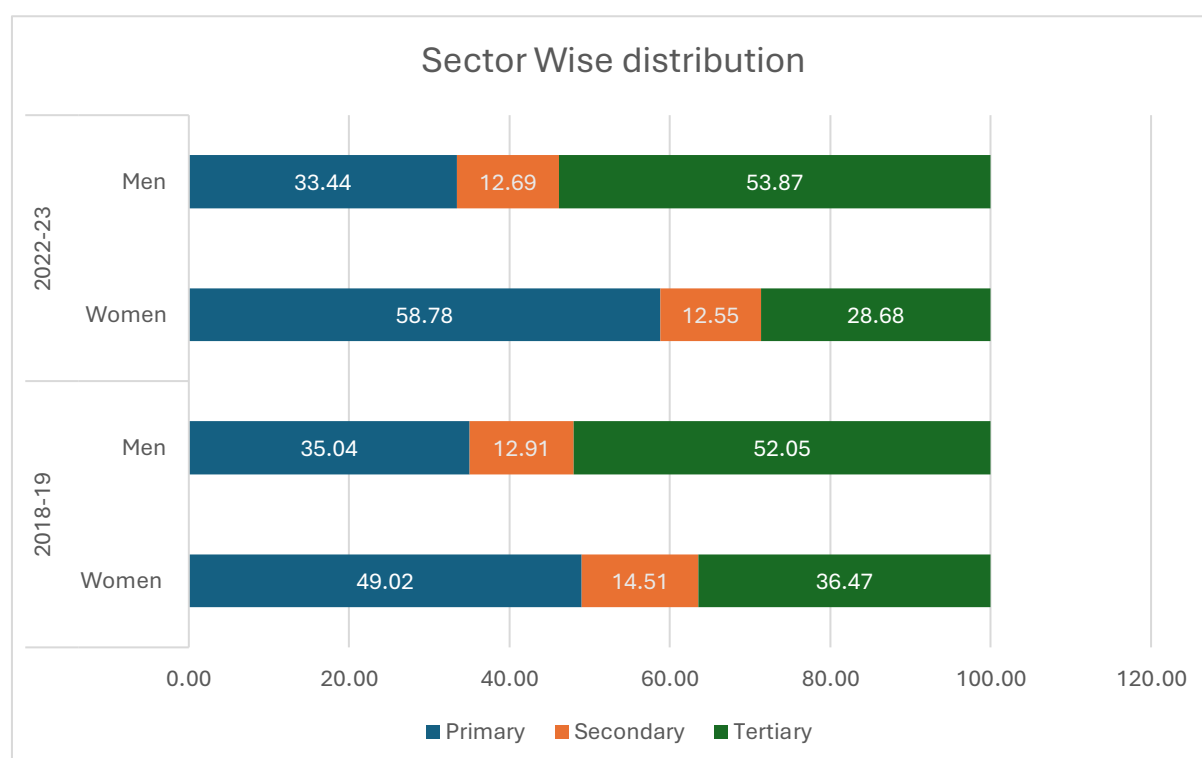


Figure 3 Sector Wise Distribution of the Labour Force

Figure 4 depicts the sector-wise distribution of men and women workers in the country in 2018-19 and 2022-23. Between the two years, the distribution of men's employment across sectors has remained consistent, but the same was not valid for women. The share of women's participation in the primary sector increased by almost 10 percentage points, and this happened mainly at the expense of their share of participation in the tertiary sector, which reduced by more than 8 percentage points. This indicates that women who entered the workforce in the primary sector between 2018-19 and 2022-23 did so.

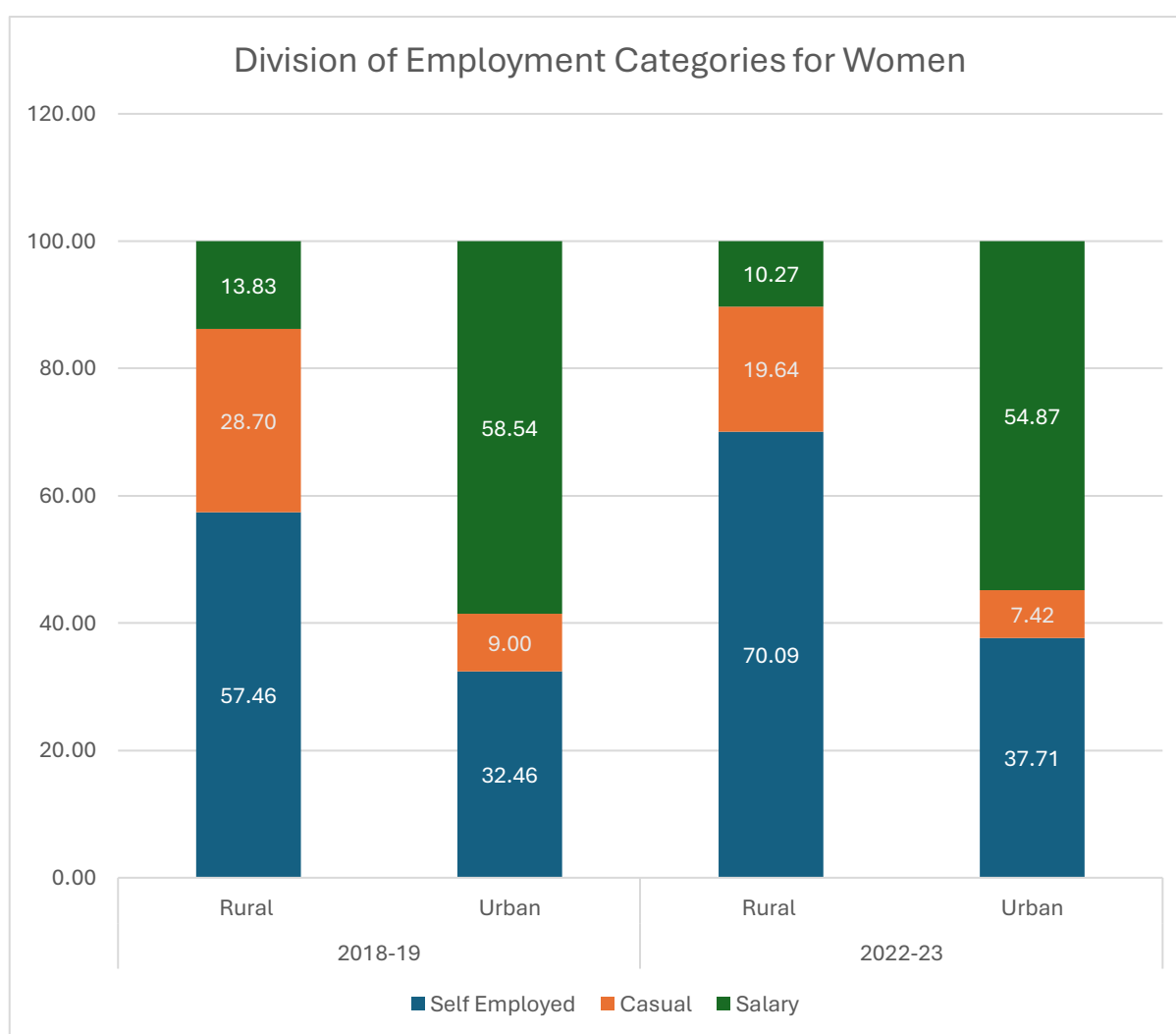


Figure 4 Division of Employment Categories for Women

Furthermore, as shown in Figure 5, between 2018-19 and 2022-23, the constitution of employment for women in urban areas has remained somewhat similar, with some expansion in self-employment in urban areas, at the expense of salaried employment; the same cannot

be said for rural areas. In the case of the constitution of employment in rural areas between 2018-19 and 2022-23, the proportion of women involved in self-employment increased by almost 13 percentage points after the COVID-19 pandemic. This increase in the proportion of self-employed workers comes mainly at the expense of the proportion of casual workers, which was reduced by almost 10 percentage points. In comparison, salaried employment in rural areas continued to hover around the same proportion and saw a reduction of just 3 percentage points.

The concern about the rise in self-employed workers is that only about 4% of these self-employed workers are 'employers' who hire labour and are regarded as having security in their livelihood. The rest, on the other hand, mostly consist of own-account workers or unpaid family workers, especially women. This group can be highly vulnerable to economic shocks.

Subsequently, as shown in Figure 6 and 7, the distribution for type of employment for urban women has remained the same. There were increases in self-employed workers across all three sectors. In the case of rural women, however, the share of self-employed women in the primary sector increased by almost 12 percentage points, and this happened at the expense of women employed as casual workers. No increases in regular-salaried wage employment were seen. The concern with the rise in self-employment in the primary sector, which is majorly agriculture, for rural areas is that there might need to be more evidence of improving job quality. Instead, this may signify a rise of disguised or underemployment within the region, implying that more people engage in work than necessary. This would suggest that these women engaged in agriculture need to be more engaged to their total productive capacity (Deshpande, 2023).

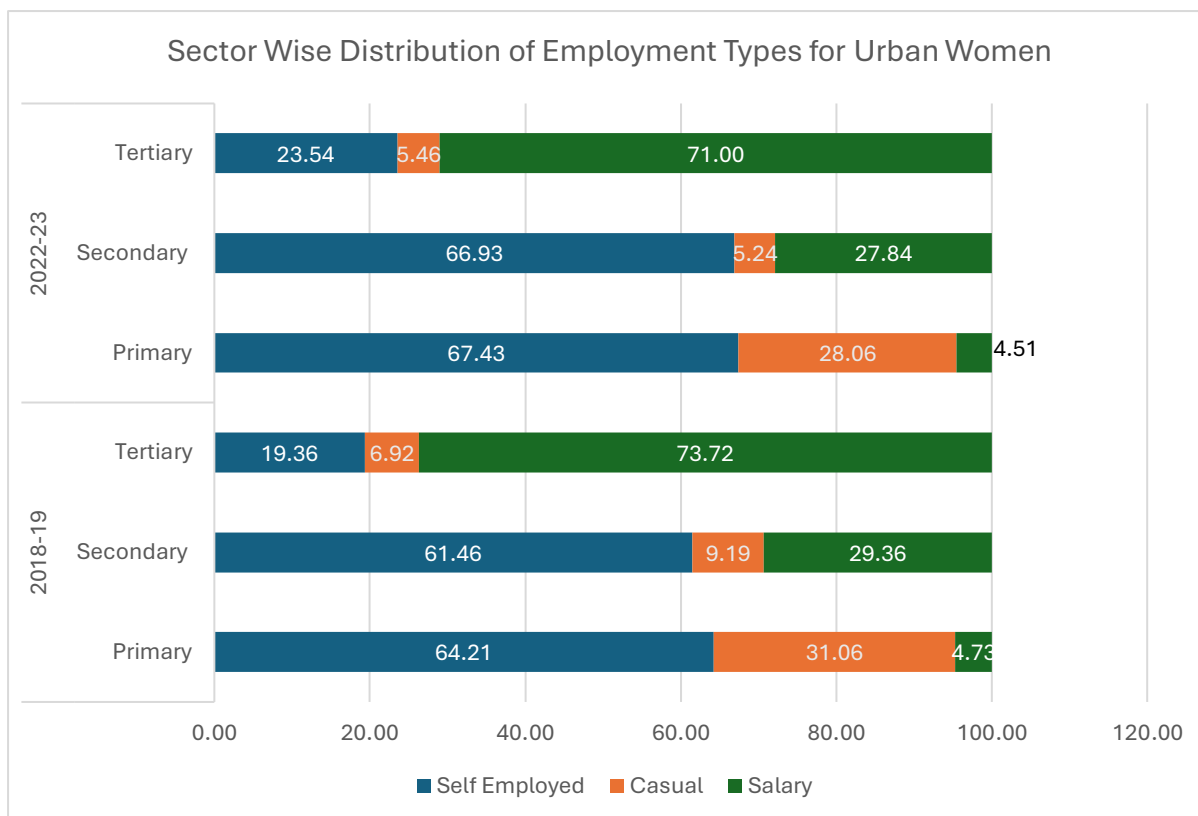


Figure 5 Sector Wise Distribution of Employment Types for Urban Women

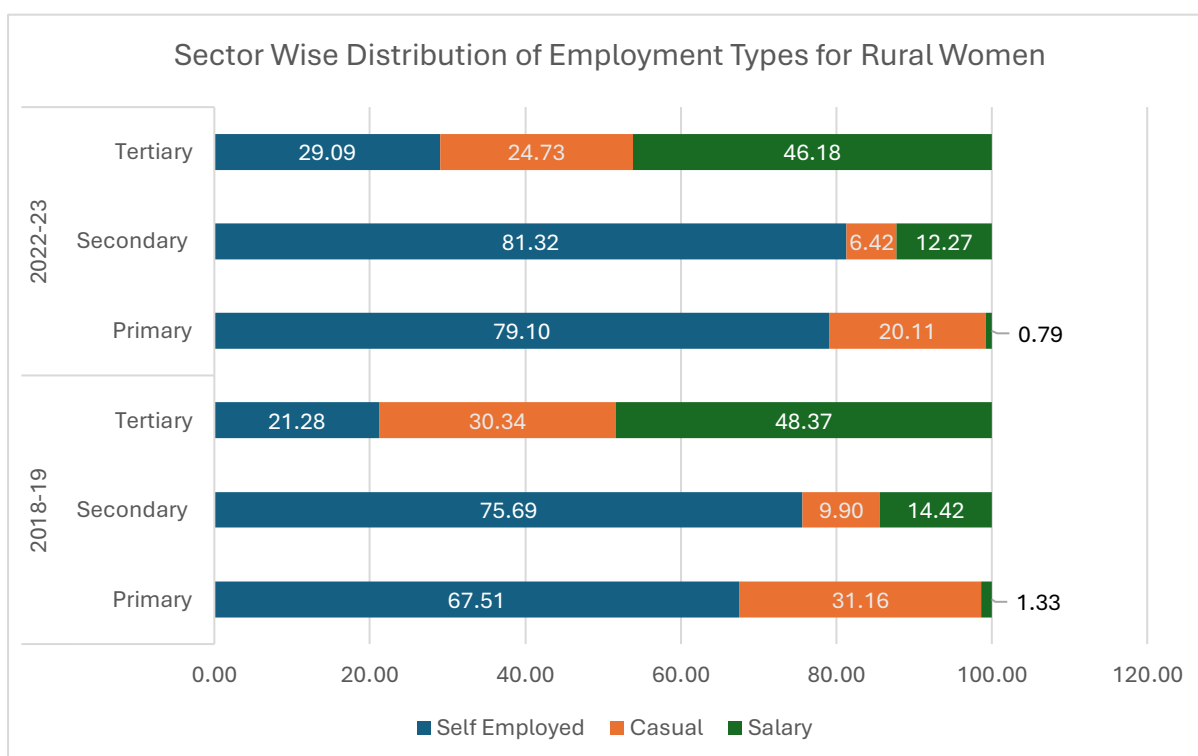


Figure 6 Sector Wise Distribution of Employment Types for Rural Women

Figure 8² shows the LFPR rates for women across education levels. The results found through calculations using the PLFS suggest that education levels and female labour force participation show a u-shaped curve, implying that the labour force participation rate is very high for illiterate women and then starts decreasing with increases in education and then begins to rise again for women with graduate degrees and above. Essentially, women with no education and those with tertiary education have the highest participation rates. The reason for this is that illiterate women have a more dire need for work because they usually also are women from the poorest of households and, hence, are more open to engaging in poorly paid and unskilled wage labour. With women with relatively higher education, the same kind of work might be unappealing, and they choose to refrain from engaging in the workforce. Additionally, women with tertiary education can access better-paying, stable white-collar jobs, making employment more attractive (Chatterjee et al., 2015; Deshpande & Kabeer, 2019; Kingdon & Unni, 2001) .

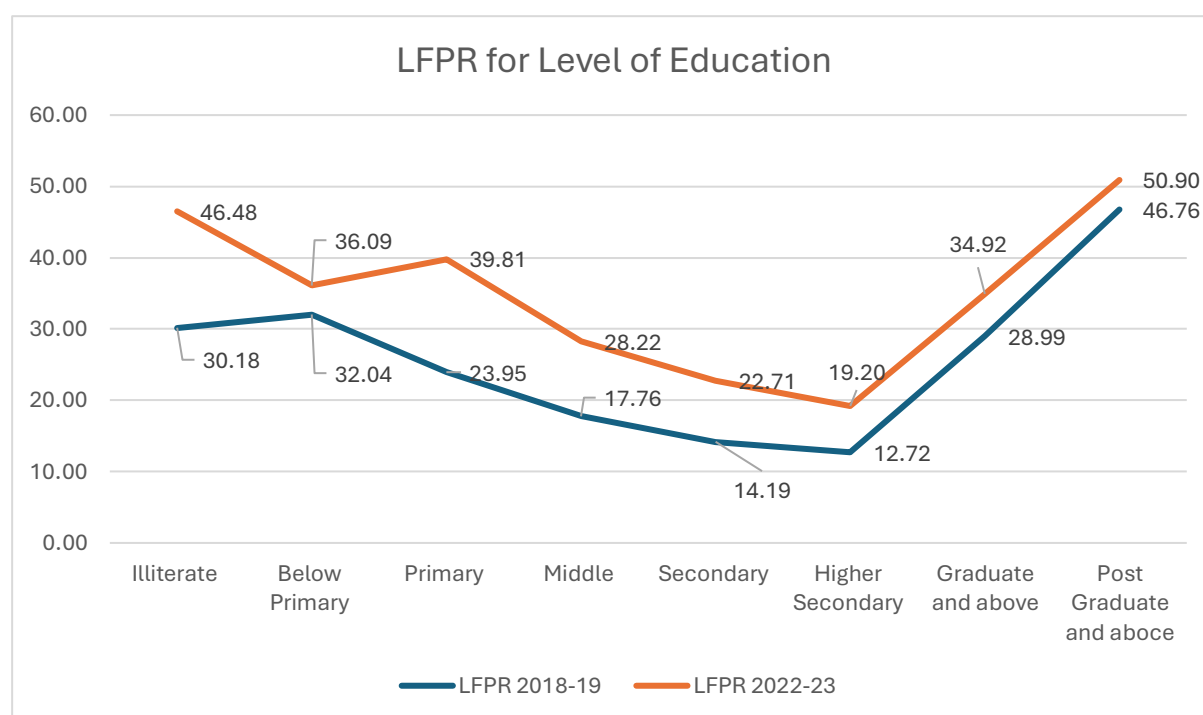


Figure 7 LFPR for Level of Education

² To preserve the progression of education, some indicators have not been included in this figure. These figures include literate without formal education and diploma/certificate course.

In this case, the rise of women for women's LFPR between 2018-19 and 2022-23 can be seen across education levels. Nevertheless, what is important to note is that the rise is the highest for Illiterate women, with an increase in LFPR being 16 percentage points. Furthermore, the increases in LFPR are relatively higher for women with Primary education (13 percentage points) and Middle school education (11 percentage points). Additionally, the labour force participation rates are lowest for women with high-secondary education and then secondary education for both years, signifying that women with relatively higher education (and no tertiary education) have a lower chance to participate in the workforce(Chatterjee et al., 2015; Kingdon & Unni, 2001).

5. Methodology and Analysis

5.1 Probit Model

5.1.1 Probit Model Methodology

In their analysis on NSS Employment-Unemployment Survey (EUS) 1987-2012 , (Agénor et al.(2015) evaluated the efficacy of both the Ordinary Least Squares (OLS) and an extended Probit model of the NSSO survey from the year 2012. They found that the probit model, compared to the OLS mode, was stronger since it was better suited to capture the individual factors that affected women's participation in the workforce. They posit that the OLS model measures the average correlation between the dependent variable and each explanatory variable while holding the rest constant. On the other hand, the probit model can capture the average changes in the probability of women participating in the workforce, given unit changes in the explanatory variable or changes in dummy variables relating to the different characteristics corresponding to each individual in the dataset.

Variable	Variable Description
<i>Dependent Variables</i>	
Labour force participation of persons	is 1 if the female participates in the labour force in the Current Weekly Status (CWS), 0 otherwise (Tabulated separately for men and women)
<i>Independent Variable</i>	
Marital status	Single, Married, Widowed, Divorced/Seperated
Social Group	Scheduled Tribe, Scheduled Caste, Other Backward Castes and Other Castes
Religion	Hinduism, Muslim
Education	Not Literate, Primary and Middle, Secondary and Higher Secondary, Diploma/certificate, Graduate and above, Post-Graduate and above
Age	Respondent's age in years
Age square	Square of Respondent's age
MPCE quintiles of the household	Usual monthly per capita consumer expenditure (Rs.) in 5 quintiles (1st is lowest, 5th is highest), separately calculated for rural and urban areas
Log(MPCE)	Log of Monthly per capita expenditure of the household
Household type (Rural)	Self Employed in Agriculture, Self Employed in Non Agriculture, Regular Salaried or Wage Work, Casual Labour in Agriculture, Casual Labour in Non-Agriculture Others
Household type (Urban)	Self Employed, Regular Salaried or Wage Work, Casual Labour, Others
Presence of Chilren under 14	is 1 if there are children up to the age of 14 years in HH, 0 otherwise
Household size	Total no. of persons in the household
Household head's education	Years of education of the household head
State	State codes for 35 states, introduced as dummies (Fixed Effects)
Sector	is 1 for rural areas; 2 for urban areas

Table 2 Variables used in Probit Model with Description

Since this paper evaluates the changes in factors determining women's participation in the labour force, and the decision to participate in the labour force is a binary one, a Probit model is chosen. By choosing the probit model, it is possible to capture changes in the probability of women participating in the workforce, given their unique characteristics (marriage, religion, social group, income group, etcetera). This paper follows the estimation strategy adopted by Klasen and Pieters (2015), Agénor et al. (2015) and Gupta (2023) the estimation equation is as follows:-

$$P_{it} = F(\alpha_{st} + \beta_{xt}X_{it} + \beta_{zt}Z_{it})$$

Here, P_{it} refers to the probability of women i participating the labour force in the year t . F signifies the standard normal cumulative distribution, α_{st} refers to the state fixed effects, X_{it} represents the socio-demographic and household characteristics and finally Z_{it} refers to the local labour demand and supply variables. The variations in local labour demand and supply are recorded through instating State controls and accounting for the type of employment the head of the household is involved in. The labour force function is calculated separately for the two years- 2018-19 and 2022-23 for men and women, as well as urban and rural. The function is calculated separately for men and women to capture the difference in how the same characteristics determine probability of participation in the workforce contrarily. In the case of rural and urban, the function is calculated separately to account for differences in consumption expenditure as well as the type of employment the head of the household was employed in. Table 2 lists the variables used in the Probit estimation model.

The independent variables chosen for the estimation model for deciding to participate in the labour force can be classified under individual and household characteristics. The individual characteristics include Age, marital status, and education, and the household characteristics include the social and religious identity of the household, whether children are present in the household, income level, household size, education level of head of household, and employment type of the household-head. The education and type of employment of the head of the household allow for the characterization of the education exposure seen by the household characteristics, which raises the household's occupation structure based on the primary income. Additionally, State fixed effects are used to capture spatial heterogeneity (Klasen & Pieters, 2015).

5.1.2 Results of the Probit Model

Individual Characteristics

Table 3 and 4 display the probit regression estimates for men and women in rural and urban areas for 2018-19 and 2022-23. In the Probit table for rural areas and urban areas, the Model for men's LFPR has a higher Pseudo R^2 , which is more than 50% in all cases. The Women's LFPR is harder to predict, given these household and individual characteristics and hovers around 20% for rural areas and around 17% for urban areas.

As shown in Table 3 and 4, for women in both rural and urban areas, the probability of women participating in the Labour force is significantly lowered if they are married, as compared to women who have never been married, more so in the case of urban women. Widowed women have a significantly higher probability of participation in rural areas for both years vis-à-vis women who have never been married, while widowed women had a non-significant positive coefficient for 2018-19 and have a significantly negative coefficient for probability of participation after the COVID-19 pandemic, in 2022-23. Widowed Men, on the other hand, have a significantly, in some cases, negative probability of participating in the labour force as compared to men who have never been married.

Finally, divorced or separated women have the highest probability of participating in the labour force in rural and urban areas for both years. This coefficient, while positive, is only not significant for divorced/separated women in urban areas for the year 2022-23. These results indicate the 'marriage effect' within the female labour force. 'Marriage effect' should not be confused with the 'motherhood penalty', wherein women retreat from the workforce in favour of child-rearing responsibilities; instead, in Indian households, the added responsibilities of the husband's households result in women retreating from the workforce (Deshpande & Kabeer, 2019). The significance of this effect is documented by the probit estimates that show that married women are less likely to be involved in the labour force, as compared to single, widowed and divorced/separated women.

Regarding social groups, women of Scheduled Tribes experience a significant and the highest likelihood of participating in the labour force in rural and urban areas for both years.

Furthermore, even women from Scheduled Castes and Other Backward Castes also witness a significantly positive probability of participating in the labour force in rural and urban areas, with the probability increasing since the COVID-19 pandemic. For all the cases mentioned

above, the reference group is other castes. It is essential to distinguish the groups of Scheduled Tribes, Scheduled Castes and Other Backward Castes from the reference group of "other castes", aforementioned groups have a continued history of social and educational marginalisation in the country. Despite these circumstances, women from these groups have higher probability of participation in the workforce as compared to women from 'other castes'. Compared to women from these groups, the probability of participation for men is relative lower (but higher than "other castes"), insignificant in some cases and even negative for men of Scheduled Tribes in 2018-19. One of the reasons the probability of LFP is higher for women from Scheduled Tribes, Scheduled Castes and Other Backward Castes, is that these groups are often also the poorest groups in the country, implying that women here have a higher opportunity cost in earning livelihood (Deshpande & Kabeer, 2024a; Duflo, 2012; Klasen & Pieters, 2015).

In the case of religion, as compared to Hindu women, Muslim women have a significantly lower probability of participating in the labour force in urban and rural areas for both years. Muslim men, on the other hand, have a significantly positive probability of participating in the labour force in rural and urban areas in both years. The reduced probability for Muslim women's propensity to participate in the labour force, as compared to the majority religion of Hinduism, is associated with more stringent control over women's mobility in Islam (Deshpande & Kabeer, 2019; Duflo, 2012; Neff et al., 2012; Srivastava & Srivastava, 2010). The coefficients for other religions have not been included in the table and can be made available on request.

VARIABLES	Rural			
	2018-2019		2022-2023	
	Female LFPR	Male LFPR	Female LFPR	Male LFPR
	(1)	(2)	(3)	(4)
Marital status (Ref=never married)				
Married	-0.337*** (0.0269)	0.679*** (0.0293)	-0.222*** (0.0247)	0.655*** (0.0336)
Widowed	0.270*** (0.0369)	-0.129** (0.0647)	0.146*** (0.0354)	-0.0501 (0.0722)
Divorced/Seperated	0.540*** (0.0893)	-0.180 (0.144)	0.490*** (0.0864)	-0.0466 (0.160)
Social Group (Ref:All other Castes)				
Scheduled Tribe	0.143*** (0.0228)	0.0142 (0.0302)	0.344*** (0.0221)	0.179*** (0.0333)
Scheduled Caste	0.112*** (0.0206)	0.0216 (0.0264)	0.176*** (0.0200)	0.0246 (0.0293)
Other Backward Caste	0.147*** (0.0178)	0.00879 (0.0226)	0.177*** (0.0171)	0.0695*** (0.0251)
Religion (Ref:Hinduism)				
Muslim	-0.170*** (0.0230)	0.145*** (0.0277)	-0.229*** (0.0207)	0.104*** (0.0297)
Education (Ref:Not Literate)				
Primary and Middle	-0.0537*** (0.0170)	0.705*** (0.0334)	-0.0928*** (0.0167)	0.758*** (0.0377)
Secondary and Higher Secondary	-0.0229 (0.0219)	0.123*** (0.0340)	-0.176*** (0.0209)	0.220*** (0.0391)
Diploma/certificate	0.754*** (0.0745)	0.856*** (0.0740)	0.492*** (0.0779)	1.089*** (0.0811)
Graduate and above	0.523*** (0.0344)	0.471*** (0.0445)	0.196*** (0.0322)	0.653*** (0.0503)
Post-Graduate and above	0.878*** (0.0644)	0.715*** (0.0948)	0.518*** (0.0616)	0.919*** (0.116)
Age				
	0.226*** (0.00476)	0.439*** (0.00516)	0.241*** (0.00433)	0.453*** (0.00560)
Age square				
	-0.00274*** (6.29e-05)	-0.00549*** (6.70e-05)	-0.00288*** (5.71e-05)	-0.00566*** (7.24e-05)
MPCE per capita (Ref: 3rd Income Group- Separate for Urban-Rural)				
1st Income group (Lowest)	0.0105 (0.0201)	0.00743 (0.0259)	-0.109*** (0.0193)	-0.0649** (0.0289)

2nd Income group	0.0190 (0.0189)	0.0457* (0.0246)	-0.0477*** (0.0180)	-0.0403 (0.0269)
4th Income group	-0.0453** (0.0191)	-0.00796 (0.0251)	0.0195 (0.0180)	0.0145 (0.0268)
5th Income group	-0.0879*** (0.0201)	-0.00912 (0.0263)	0.0615*** (0.0196)	0.0642** (0.0292)
House-hold size	-0.0213*** (0.00419)	-0.00873 (0.00536)	-0.0144*** (0.00395)	0.00161 (0.00602)
Head Education Level				
Primary and Middle	-0.0657*** (0.0160)	-0.350*** (0.0207)	-0.0751*** (0.0154)	-0.373*** (0.0226)
Secondary and Higher Secondary	-0.199*** (0.0198)	-0.285*** (0.0264)	-0.139*** (0.0190)	-0.353*** (0.0295)
Diploma/certificate	-0.284*** (0.0863)	-0.652*** (0.149)	-0.351*** (0.0713)	-0.458*** (0.133)
Graduate and above	-0.406*** (0.0352)	-0.618*** (0.0484)	-0.346*** (0.0317)	-0.665*** (0.0518)
Post-Graduate and above	-0.373*** (0.0649)	-0.793*** (0.103)	-0.403*** (0.0592)	-0.851*** (0.111)
House Type (Ref Self Employed in Non-Agriculture/)				
Self Employed in Agriculture	0.174*** (0.0181)	-0.0697*** (0.0235)	0.389*** (0.0162)	0.0112 (0.0244)
Salaried or Wage	0.0835*** (0.0205)	-0.0331 (0.0271)	-0.0299 (0.0186)	-0.0153 (0.0282)
Casual labour in Agriculture	0.326*** (0.0252)	-0.0647* (0.0341)	0.342*** (0.0261)	-0.140*** (0.0379)
Casual labour in non Agriculture	-0.00177 (0.0229)	-0.0664** (0.0299)	0.00608 (0.0206)	0.0104 (0.0296)
Others	-0.908*** (0.0447)	-1.465*** (0.0481)	-1.835*** (0.0804)	-2.072*** (0.0767)
Children Dummy	0.0369** (0.0149)	-0.0613*** (0.0193)	0.0521*** (0.0143)	-0.0766*** (0.0209)
States Fixed Effects	Yes	Yes	Yes	Yes
Pseudo R2	0.1944	0.5472	0.2104	0.5587
Constant	-4.065*** (0.0881)	-6.906*** (0.103)	-4.145*** (0.0811)	-7.205*** (0.113)
Observations	62,805	67,049	61,427	64,194

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 3 Probit Estimates for Rural Areas

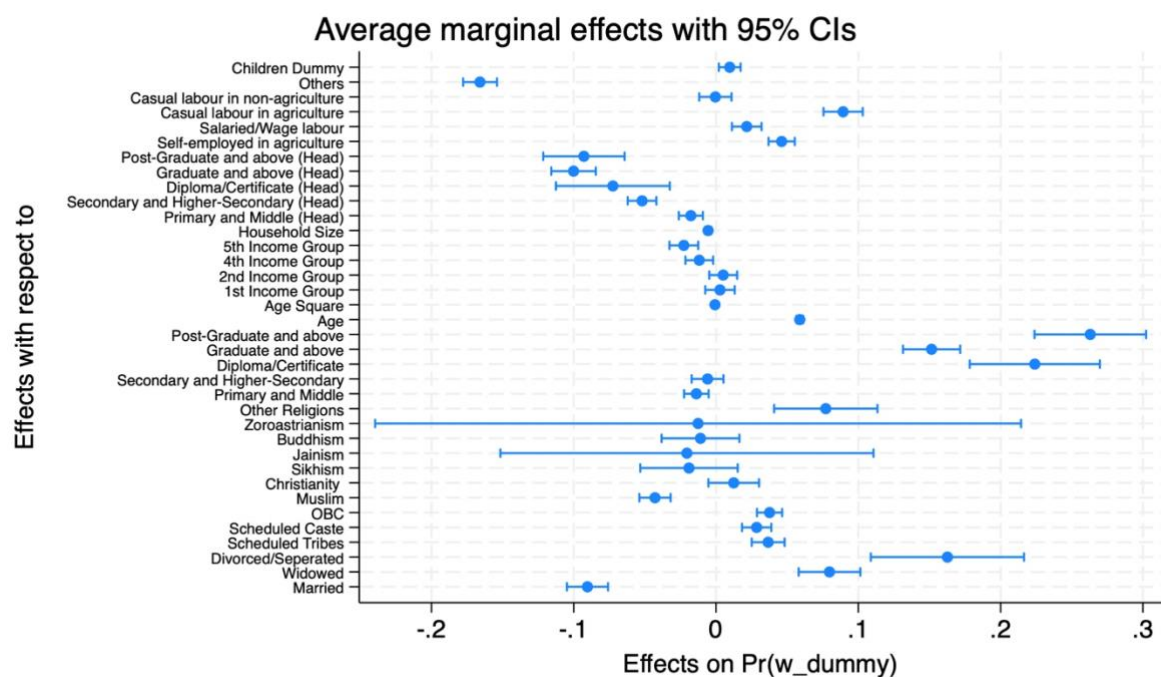


Figure 9 Marginsplot for Probit Model-Rural Women (2018-19)

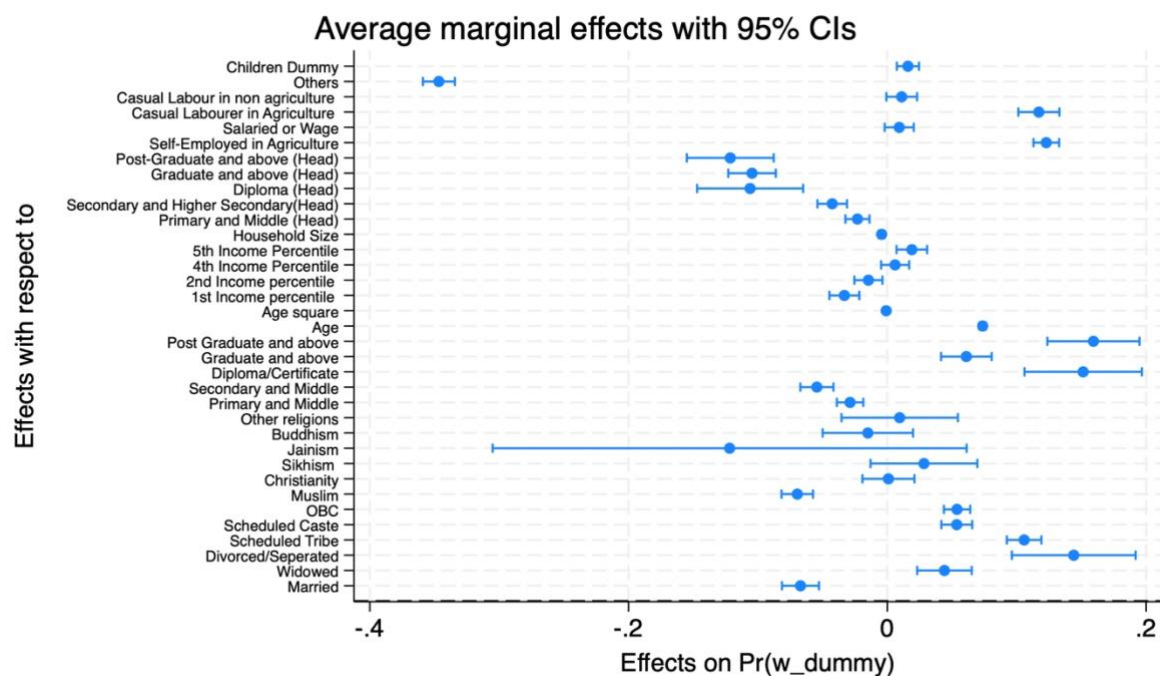


Figure 8 Marginsplot for Probit Model- Rural Women (2022-23)

VARIABLES	Urban			
	2018-2019		2022-2023	
	Female LFPR	Male LFPR	Female LFPR	Male LFPR
	(1)	(2)	(3)	(4)
Marital status (Ref=never married)				
Married	-0.807*** (0.0290)	0.629*** (0.0342)	-0.820*** (0.0294)	0.612*** (0.0386)
Widowed	0.0150 (0.0405)	-0.519*** (0.0727)	-0.155*** (0.0408)	-0.330*** (0.0771)
Divorced/Seperated	0.365*** (0.0796)	-0.113 (0.152)	0.123 (0.0771)	-0.239* (0.137)
Social Group (Ref:All other Castes)				
Scheduled Tribe	0.233*** -0.0378	-0.0475 (0.0473)	0.282*** (0.0359)	0.00697 (0.0501)
Scheduled Caste	0.169*** (0.0236)	0.0462 (0.0290)	0.198*** (0.0228)	0.124*** (0.0311)
Other Backward Caste	0.123*** (0.0185)	0.0583*** (0.0223)	0.140*** (0.0183)	0.0731*** (0.0242)
Religion (Ref:Hinduism)				
Muslim	-0.179*** (0.0226)	0.185*** (0.0260)	-0.293*** (0.0223)	0.198*** (0.0280)
Education (Ref:Not Literate)				
Primary and Middle	-0.00935 (0.0242)	0.660*** (0.0452)	-0.0544** (0.0246)	0.903*** (0.0495)
Secondary and Higher Secondary	-0.0180 (0.0275)	0.173*** (0.0454)	-0.141*** (0.0277)	0.462*** (0.0498)
Diploma/certificate	0.876*** (0.0633)	0.918*** (0.0712)	0.794*** (0.0670)	1.325*** (0.0839)
Graduate and above	0.649*** (0.0316)	0.705*** (0.0509)	0.481*** (0.0313)	1.083*** (0.0556)
Post-Graduate and above	1.134*** (0.0399)	1.186*** (0.0793)	0.900*** (0.0404)	1.710*** (0.0924)
Age	0.232*** (0.00557)	0.430*** (0.00563)	0.253*** (0.00551)	0.455*** (0.00608)
	- 0.00290*** (7.36e-05)	- 0.00541*** (7.23e-05)	- 0.00310*** (7.18e-05)	- 0.00572*** (7.77e-05)
Age square				

MPCE per capita (Ref: 3rd Income Group- Separate for Urban-Rural)

1st Income group (Lowest)	0.0877*** (0.0256)	-0.0709** (0.0311)	0.0253 (0.0243)	-0.0267 (0.0325)
2nd Income group	0.0623*** (0.0221)	-0.0837*** (0.0276)	0.0245 (0.0220)	-0.0127 (0.0297)
4th Income group	0.0109 (0.0231)	-0.0358 (0.0288)	0.0198 (0.0216)	0.0366 (0.0299)
5th Income group	0.0114 (0.0234)	0.0445 (0.0290)	0.0544** (0.0235)	0.118*** (0.0321)
House-hold size	-0.0603*** (0.00493)	-0.0492*** (0.00552)	-0.0589*** (0.00523)	-0.0648*** (0.00642)
Head Education Level				
Primary and Middle	-0.196*** (0.0240)	-0.400*** (0.0306)	-0.154*** (0.0245)	-0.448*** (0.0341)
Secondary and Higher Secondary	-0.394*** (0.0271)	-0.445*** (0.0336)	-0.353*** (0.0274)	-0.510*** (0.0375)
Diploma/certificate	-0.630*** (0.0563)	-0.754*** (0.0828)	-0.528*** (0.0560)	-0.822*** (0.0902)
Graduate and above	-0.581*** (0.0331)	-0.768*** (0.0423)	-0.599*** (0.0324)	-0.889*** (0.0457)
Post-Graduate and above	-0.638*** (0.0434)	-1.048*** (0.0657)	-0.623*** (0.0428)	-1.278*** (0.0746)
House Type (Ref: Self Employed)				
Salary or Regular wage	0.136*** (0.0160)	0.00508 (0.0199)	0.0655*** (0.0154)	-0.0153 (0.0212)
Casual Labour	0.0635*** (0.0246)	0.0521* (0.0309)	0.0485** (0.0247)	0.0767** (0.0337)
Others	-0.893*** (0.0422)	-1.453*** (0.0389)	-1.326*** (0.0531)	-1.789*** (0.0495)
Children Dummy	0.00143 (0.0171)	0.0531** (0.0218)	0.00479 (0.0168)	0.0786*** (0.0240)
States Fixed Effects	Yes	Yes	Yes	Yes
Pseudo R2	0.1705	0.526	0.1684	0.5624
Constant	-4.028*** (0.106)	-6.478*** (0.117)	-4.145*** (0.105)	-7.047*** (0.127)
Observations	47,969	51,974	45,548	49,414

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4 Probit Estimates for Urban Areas

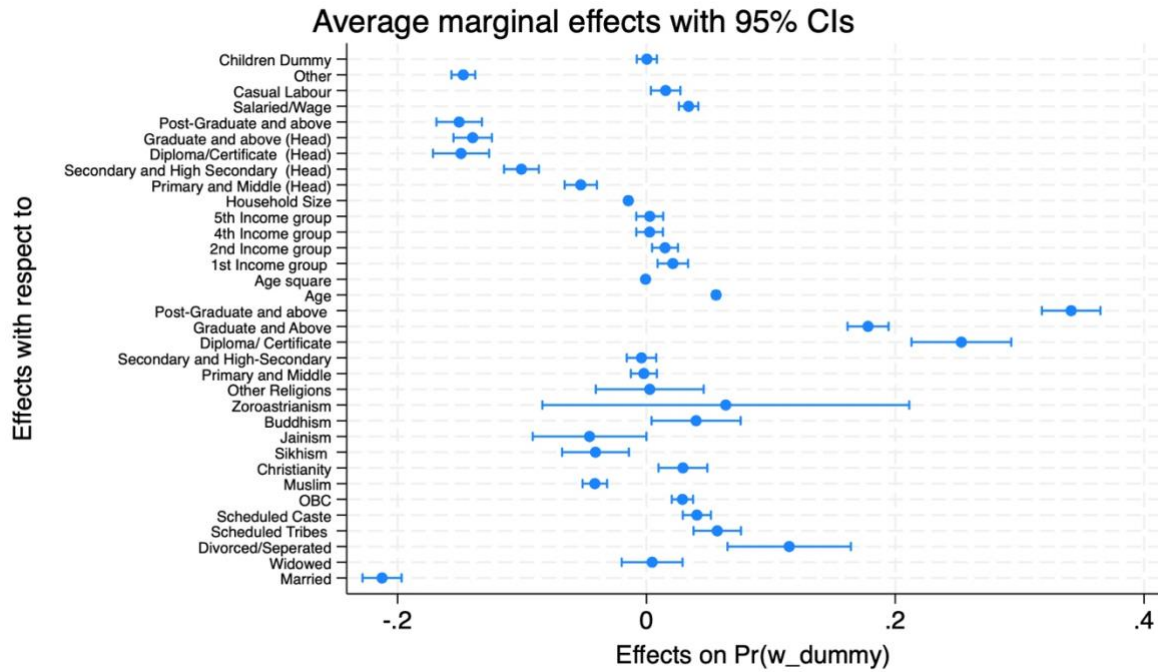


Figure 10 Marginsplot for Probit Model- Urban Women (2018-19)

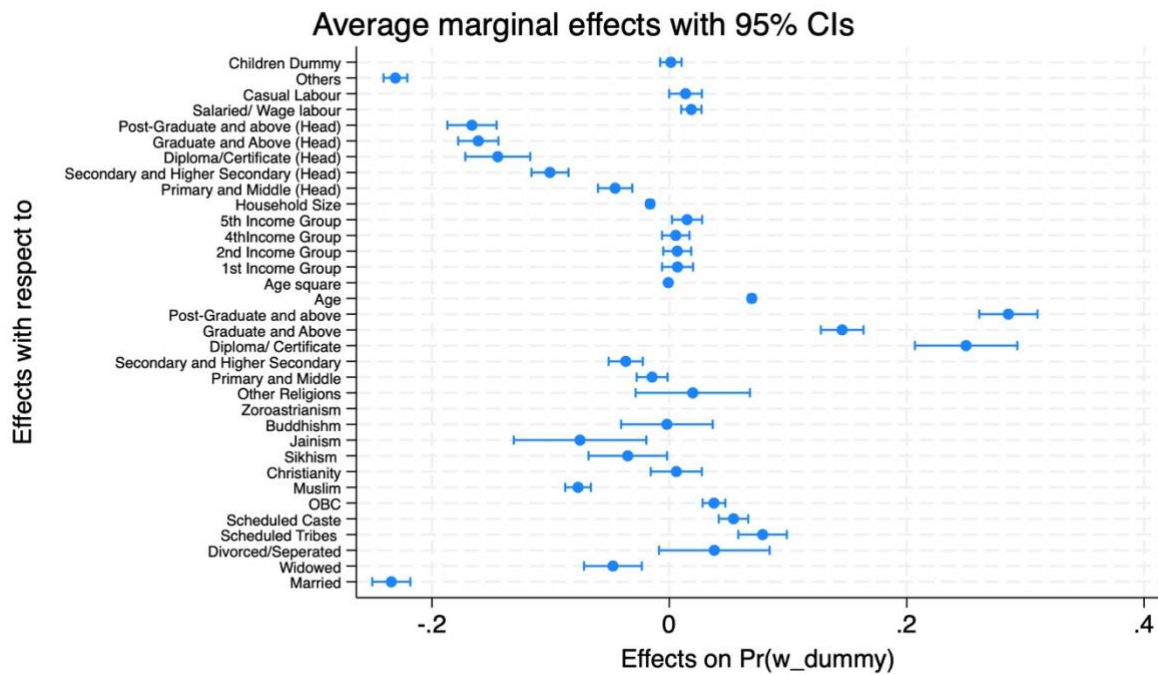


Figure 11 Marginsplot for Probit Model- Urban Women (2022-23)

Education of the Individual has a non-linear relationship with the probability of participation in women's cases. Women who are educated at Primary and middle, secondary and higher secondary levels have a negative, significant for some, effect on the probability of participation in the labour force in rural and urban areas, as compared to illiterate women. The probability of participation is significant for women with Diploma Certificates, Graduate Degrees, and Post-Graduate degrees and above, held in urban and rural areas for both years. In the case of men, the probability of participation in the labour force has a direct relationship with education in both sectors. Furthermore, Age, which acts as a proxy for experience, significantly impacts female LFP. The age square variable has a negatively significant coefficient for female LFP, indicating that the positive impact of Age increases in a decreasing manner.

Education is one of the most significant factors in determining the employability of workers (Chatterjee et al., 2015; Deshpande & Kabeer, 2019; Kingdon & Unni, 2001): and in the case of women and the labour force, there exists a u-shaped curve. As shown in the probit estimates in Table 3 and 4, the probability of participation of women is highest for illiterate and highly educated women. Kingdon and Unni (2001) argue that this relationship exists because women with no education are often unskilled and take up poorly paid jobs; women with little to no schooling cannot find appealing jobs, given their additional skills. Then, participation is higher among women with either diploma certification or women with college degrees (and higher) because they can access better and more stable white-collar jobs.

Household Characteristics

In the rural sector, households in the 1st and 2nd quintile were non-significantly but positively correlated with women's LFP in 2018-19 but were significantly and negatively correlated to women's LFP in 2022-23. The households in the 4th and 5th quintile in rural areas had significant and negative effect on women's LFP in 2018-19, and in 2022-23, they have a positive effect on women's LFP. For urban households, 1st and 2nd quintile households had a significant and positive effect on women's LFP and by 2022-23, they still have a positive, but not significant effect on women's LFP and the houses in the 4th and 5th quintile have a positive effect for both years. Klasen and Pieters (2015) argue that education Level of the head of the household is an indicator of household's wealth and this variable has

a significantly negative effect on women's LFP in all the cases. Next, household size has a significantly negative effect on Women's LFP for both years, in rural and urban areas. The presence of children in a household has a slightly positive effect on women's LFP in rural and urban areas for both years in the probit model.

Lastly, the type of household refers to the type based on the means of livelihood of a household and is decided based on the source of income for a household. It is characterised differently for rural and urban areas, with rural areas having a source of income for self-employment and casual labour being distinguished between agriculture and non-agriculture. In both cases, the category "Others" refers to households that accrue income from sources that are not economic activities (NSS0 2023). In rural areas, as compared to self-employed in non-agricultural activities, self-employed in agricultural activities has a significantly positive effect on women's LFP, and casual labour in agriculture continues to have a significant positive impact. Salaried or regular wage labour was significantly positive in 2018-19 but was non-significantly negative in 2022-23. For urban women, where the reference category is self-employed, salary or regular labour continues to have a significantly positive effect, albeit with less effect in 2022-23. Casual labour also maintains a significantly positive impact on women's LFP, albeit less in 2022-23, compared to 2018-19.

5.2 IV Probit Model

5.2.1 Methodology of the IV Probit Model

These Probit estimation results, however, run the risk of endogeneity of the Marginal Per capita expenditure (MPCE). MPCE of a household is indicative of its income level; hence, it affects the decision of the household members regarding working in the Labour Force.

Boruah & Das (2022) and Gupta (2023), both utilised the IV Probit model for the determinants of FLFP and found endogeneity in their estimates. In this case, the IV Probit model is used, where the level of education for the head of the household is used as an instrument for the log of MPCE. The choice for the household's head's level of education as the instrument is argued for by Klasen & Pieters, 2015 who find that the education of the head is indicative of a household's wealth.

Additionally, in this model, unlike the simple Probit model where the MPCE was sorted into quintiles and used as a discrete variable, MPCE is a continuous variable. Furthermore, the log

of MPCE is being used to reduce the impact of extremes in the data distribution. The estimation equation is as follows:-

$$P(Y = 1|X, C, Z) = \phi(\beta_0 + \beta_1 X + \beta_2 C + \beta_3 Z + u_i)$$

Herein, $Y=1$, represents the probability of a person participating in the workforce. C represents the endogenous variable, which is the log of MPCE in this case, X represents the exogenous independent variables and Z represents the instrumental variable, which is the education level of the head of the household.

5.2.2 Results of the IV Probit Model

For the IV Probit estimates, the Wald test of endogeneity is significant at 99%, indicating that there is, in fact, endogeneity in the model. Thus, the IV probit model is more efficient than the probit model. The coefficient for the household head's level of education was positively significant for men and women in both sectors for both years, which signifies that the instrument used is robust.

Other estimates for the IV Probit are comparable to those generated in the Probit model. First, increases in the Log of MPCE have a significantly negative effect on women's labour force participation rates, signalling that increased expenditure decreases the probability of women's participation in the workforce. Married women have the lowest probability of participating in the labour force for both years. In contrast, divorced/ separated women have the highest probability, and widowed women have a higher probability than single women. Hence, the 'marriage effect' is also present in the IV Probit model. In the case of men, married men have the highest probability of participating in the workforce in rural and urban areas.

Regarding estimates for social groups, the results are more miscellaneous. This is to be expected, considering the model uses an instrument for consumption expenditure, which is also a continuous variable in this model. This allows the model to better account for the endogeneity of marginalised low-income households marginalised groups. The most relevant of these results was that women from scheduled tribes and castes in rural areas had a significantly negative coefficient in 2018-19; but the same was significantly positive in 2022-23- indicating that the probability of participation for women in marginalised groups

increased. Being Muslim continues to have a negative effect on the probability of women's participation in the workforce.

Age continues to have a significantly positive effect. In contrast, age-square has a significantly negative effect on women's probability of participating in the workforce, indicating that the positive effects of age diminish marginally. Furthermore, the size of the household has a significantly negative effect on everyone's labour force participation rate, not just women. However, in the IV Probit, the presence of children below the Age of 14 in the family has a significantly negative impact on women's (and men's) labour force participation rate- which is indicative of the 'childhood penalty'. Finally, while education at even the earlier stages (Primary/Middle and Secondary/Higher Secondary) positively impacted the labour force in 2018-19 for both rural and urban areas, this relationship was non-significantly negative in 2022-23. Tertiary education significantly positively affects women's LFP for both years in both rural and urban areas.

Finally, regarding the type of employment the head of the household is engaged in, the IV Probit results indicate that in urban areas, the results are consistent for both years. Suppose the head of the household is engaged in salaried employment. In that case, the chances of women participating in the labour force are significantly higher than if the head of the household were self-employed. The probability is significantly negative if the household head is engaged in casual labour or 'other' activities. On the other hand, in the case of rural areas, the probability of women being engaged in self-employment in agriculture, while positive in 2018-19, became significantly positive after the COVID 19 pandemic, as compared to those households where the head was involved in self-employment in non-agricultural activities. The exact positive change was seen in cases where the head of the household was involved in casual labour in agriculture. Being involved in casual labour in non-agricultural activities continued to have a negative effect on probability, and having the head involved in salaried or wage employment continued to have a positive effect.

VARIABLES	Rural			
	2018-2019		2022-2023	
	Female		Female	
	LFPR	Male LFPR	LFPR	Male LFPR
	(1)	(2)	(3)	(4)
Log MPCE	-1.545*** (0.0776)	-1.990*** (0.0666)	-1.308*** (0.0877)	-2.043*** (0.0598)
Religion (Ref:Hinduism)				
Muslim	-0.178*** (0.0206)	0.0434* (0.0222)	-0.242*** (0.0193)	0.00539 (0.0216)
Social Group (Ref:All other Castes)				
Scheduled Tribe	-0.0495** (0.0243)	-0.223*** (0.0251)	0.0925*** (0.0289)	-0.192*** (0.0280)
Scheduled Caste	-0.0454** (0.0214)	-0.173*** (0.0218)	0.0388* (0.0217)	-0.164*** (0.0217)
Other Backward Caste	0.0712*** (0.0173)	-0.0749*** (0.0175)	0.106*** (0.0175)	-0.0423** (0.0183)
Age	0.181*** (0.00630)	0.286*** (0.0132)	0.201*** (0.00641)	0.265*** (0.0145)
	-	-	-	-
Age Square	0.00210*** (8.38e-05)	0.00350*** (0.000169)	0.00234*** (8.33e-05)	0.00326*** (0.000184)
Marital status (Ref=never married)				
Married	-0.246*** (0.0262)	0.421*** (0.0294)	-0.123*** (0.0249)	0.370*** (0.0304)
Widowed	0.173*** (0.0345)	-0.159*** (0.0514)	0.164*** (0.0330)	-0.0303 (0.0532)
Divorced/Seperated	0.370*** (0.0836)	-0.0375 (0.113)	0.403*** (0.0815)	0.0564 (0.112)
Education (Ref:Not Literate)				

Primary and Middle	0.0543*** (0.0175)	0.439*** (0.0241)	-0.00905 (0.0176)	0.455*** (0.0257)
Secondary and Higher				
Secondary	0.167*** (0.0244)	0.172*** (0.0259)	-0.0113 (0.0251)	0.197*** (0.0258)
Diploma/certificate	1.041*** (0.0699)	0.786*** (0.0551)	0.644*** (0.0733)	0.854*** (0.0554)
Graduate and above	0.787*** (0.0346)	0.544*** (0.0331)	0.408*** (0.0347)	0.587*** (0.0322)
Post-Graduate and above	1.229*** (0.0612)	0.841*** (0.0650)	0.865*** (0.0621)	0.914*** (0.0693)
House Type (Ref Self Employed in Non-Agriculture/)				
Self Employed in Agriculture	0.0207 (0.0197)	-0.232*** (0.0186)	0.164*** (0.0250)	-0.258*** (0.0196)
Salaried or Wage	0.183*** (0.0196)	0.152*** (0.0218)	0.0709*** (0.0177)	0.104*** (0.0200)
Casual labour in Agriculture	-0.00515 (0.0323)	-0.435*** (0.0294)	0.0797** (0.0336)	-0.438*** (0.0279)
Casual labour in non- Agriculture	-0.205*** (0.0240)	-0.320*** (0.0242)	-0.160*** (0.0228)	-0.261*** (0.0227)
Others	-0.726*** (0.0433)	-0.901*** (0.0570)	-1.536*** (0.0811)	-1.125*** (0.0869)
Children Dummy	-0.139*** (0.0158)	-0.251*** (0.0152)	-0.116*** (0.0161)	-0.256*** (0.0147)
Household Size	-0.123*** (0.00668)	-0.155*** (0.00655)	-0.129*** (0.00797)	-0.181*** (0.00669)
State Fixed Effects	Yes	Yes	Yes	Yes
Observations	62,805	67,049	61,426	64,192

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 5 IV Probit Estimates for Rural Areas

Urban

VARIABLES	2018-2019		2022-2023	
	Female	Male LFPR	Female	Male LFPR
	LFPR		LFPR	
	(1)	(2)	(3)	(4)
Log MPCE	-1.141*** (0.0449)	-1.235*** (0.0482)	-1.309*** (0.0455)	-1.517*** (0.0450)
Religion (Ref:Hinduism)				
Muslim	-0.234*** (0.0208)	0.0637*** (0.0236)	-0.323*** (0.0198)	0.0241 (0.0235)
Social Group (Ref:All other Castes)				
Scheduled Tribe	0.146*** (0.0355)	-0.131*** (0.0410)	0.0517 (0.0344)	-0.212*** (0.0403)
Scheduled Caste	-0.00198 (0.0239)	-0.169*** (0.0271)	-0.0143 (0.0230)	-0.145*** (0.0266)
Other Backward Caste	0.00708 (0.0182)	-0.0926*** (0.0205)	-0.0427** (0.0183)	-0.131*** (0.0204)
Age	0.189*** (0.00590)	0.346*** (0.00857)	0.194*** (0.00632)	0.324*** (0.0103)
	-	-	-	-
Age Square	0.00224*** (8.00e-05)	0.00428*** (0.000112)	0.00228*** (8.33e-05)	0.00401*** (0.000132)
Marital status (Ref=never married)				
Married	-0.690*** (0.0289)	0.433*** (0.0316)	-0.638*** (0.0298)	0.363*** (0.0326)
Widowed	-0.0669* (0.0380)	-0.545*** (0.0650)	-0.168*** (0.0370)	-0.355*** (0.0635)
Divorced/Seperated	0.197*** (0.0756)	-0.0608 (0.131)	0.0373 (0.0706)	-0.253** (0.109)
Education (Ref:Not Literate)				
Primary and Middle	0.0454** (0.0222)	0.449*** (0.0346)	0.00258 (0.0220)	0.523*** (0.0353)
Secondary and Higher Secondary	0.128*** (0.0280)	0.157*** (0.0365)	-0.00156 (0.0271)	0.295*** (0.0344)
Diploma/certificate	1.007*** (0.0594)	0.837*** (0.0565)	0.822*** (0.0606)	0.946*** (0.0593)
Graduate and above	0.866*** (0.0320)	0.717*** (0.0415)	0.682*** (0.0299)	0.886*** (0.0378)
Post-Graduate and above	1.418*** (0.0390)	1.145*** (0.0607)	1.163*** (0.0371)	1.313*** (0.0577)
House Type (Ref: Self Employed)				

Salary or Regular wage	0.199*** (0.0151)	0.109*** (0.0178)	0.111*** (0.0141)	0.0672*** (0.0170)
Casual Labour	-0.142*** (0.0251)	-0.195*** (0.0288)	-0.205*** (0.0248)	-0.237*** (0.0287)
Others	-0.711*** (0.0403)	-1.125*** (0.0426)	-0.982*** (0.0509)	-1.167*** (0.0562)
Children Dummy	-0.141*** (0.0163)	-0.128*** (0.0195)	-0.130*** (0.0153)	-0.0864*** (0.0191)
Household Size	-0.138*** (0.00557)	-0.155*** (0.00612)	-0.180*** (0.00617)	-0.221*** (0.00635)
State Fixed Effects	Yes	Yes	Yes	Yes
Observations	47,969	51,974	45546	49412

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 6 IV Probit Estimates for Urban Area

6. Conclusion

India has experienced significant strides in development in the last three decades. Yet, the country continues to struggle with provisions for equal opportunities for women- with economic opportunities just being one of the major concerns. As stated before, the growth experienced by the country's Economy has been jobless. It has led to entrenchment in the country's inequality, with a small portion of the population being able to have access to secure and stable white-collar jobs; In contrast, the rest of the country (90%) finds employment in the informal sector, which is plagued by instability, low wages, lack of social security nets and is highly vulnerable to economic shocks. This was recently made apparent by the COVID-19 crisis, where while the poor and middle class struggled to make ends meet and were confronted with poverty, hunger, and material insecurity- the country's richest saw expansions in their wealth during a recession (Ghosh, 2022). The COVID-19 crisis exacerbated the economic crisis alongside India's pre-existing economic vulnerabilities, which, in the case of women, meant that their jobs were more vulnerable and saw lower rates of recovery after the lockdown (Abraham et al., 2022).

Women's employment in the country started falling in 2004-05, and this fall was a result of declines in rural women's FLFPR while urban women's FLFPR remained constant. This fall was mainly the result of women's retreating from agriculture, considering improvements in the industry with advancements in technology and increased productivity. Since then, women's education levels have improved, and fertility rates have declined, but women's LFPR has shown little to no signs of recovery. This number further declined during the COVID-19 Pandemic, but in 2022-23, women's FLFPR saw drastic improvements.

This paper has analysed how and where the rise in women's labour force participation rate has manifested in the Economy. It utilised supply-side indicators of women's labour to determine their role in whether women were choosing to work. The increase in women's labour force rate was driven majorly by the rural sector, which saw more than a 12-percentage point increase, while the urban sector witnessed a 5-percentage increase. Moreover, this rise in employment was mainly due to an increase in the number of women in the primary sector. Even in 2018-19, half (49.02%) of all female workers in the country were

involved in the primary sector, and this number increased to 58.78% after the COVID-19 pandemic in 2022-23³.

Klasen (2019) argues that the feminisation U hypothesis about women's labour force changes with structural transformation, rather than GDP. He argues, that considering social structures that permeate economic interactions, women tend to have poorer access to economic opportunities and better jobs. Women's share a higher burden of care work; and when they pursue agricultural work, they are able to balance this burden alongside their economic pursuits. They retreat from the labour force once their presence in the fields is no longer a requirement and start specialising in unpaid care work. It is only when economies enter later stages of industrialisation, that women are able to balance their burden of care work, alongside pursuing economic opportunities.

However, considering India's jobless growth and lack of expansion of the manufacturing sector- truly expansive structural transformation has not come to pass in the country. The Economy continues to remain largely agrarian, especially in terms of employment. Furthermore, regarding the share of workers by gender, a significantly more significant portion of women are involved in this sector. Additionally, the increases witnessed in the rising FLFPR between 2018-19 and 2022-23 were the result of women re-entering agriculture and present a situation that is rescinding alongside the feminisation U-hypothesis that is based on structural transformation, as proposed by Gaddis and Klassen(2019).

Besides, the increases in agriculture for women that have come to pass have not been an increase in regular salaried or wage employment, but rather, they have been significant increases in self-employed workers at the expense of casual workers. Though the decline of casual workers is good, the situation remains precarious because of the rise in proportion among self-employed workers. If the rise had been in regular salaried work, it would have indicated improved job quality. Instead, this increase signals the possibility of rising disguised or underemployment regarding women's jobs in rural areas.

³ On the other hand, only around 35% of male workers were involved in the primary sector in 2018-19 and 33% in 2022-23.

The Probit results for urban and rural areas in 2018-19 and 2022-23 reveal that when it comes to supply-side determinants, how they impact the probability of women being in the labour force remains relatively similar. The IV Probit results confirmed the presence of endogeneity in the Probit model and produced similar results. The dearth of changes in how the supply-side indicators impact the probability of women's in the labour force, yet the presence of a significant increase of women's participation in the labour force, suggest that it is not changes in the characteristics of women's individual lives, but rather an increase in demand for female labour that led to the rise in FLFPR.

Nevertheless, it is necessary to consider if this demand for FLFPR will be sustainable in the coming years or if the stress of the COVID-19 Pandemic merely induces this. Considering that the rise of FLFPR is seen mostly in the agricultural sector and that too with rises in self-employment rather than regular salaried work, it seems most likely that this increased demand for women's FLFPR will not be sustainable in the coming years and women's LFPR will decline again in the coming years.

To avoid such a situation, measures must be taken to increase availability and demand for women's labour. Creating such demand should also happen for jobs that are paid for and more stable (regular salaried/wage). Furthermore, it is essential to address the inequality in the burden of care that falls on Indian women through public messaging. However, this change will be slow because this phenomenon depends on cultural norms. Moreover, successful movement in the Economy's structural transformation towards the manufacturing and services sector and away from the agrarian sector may also create a demand for women's labour.

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8. Appendix

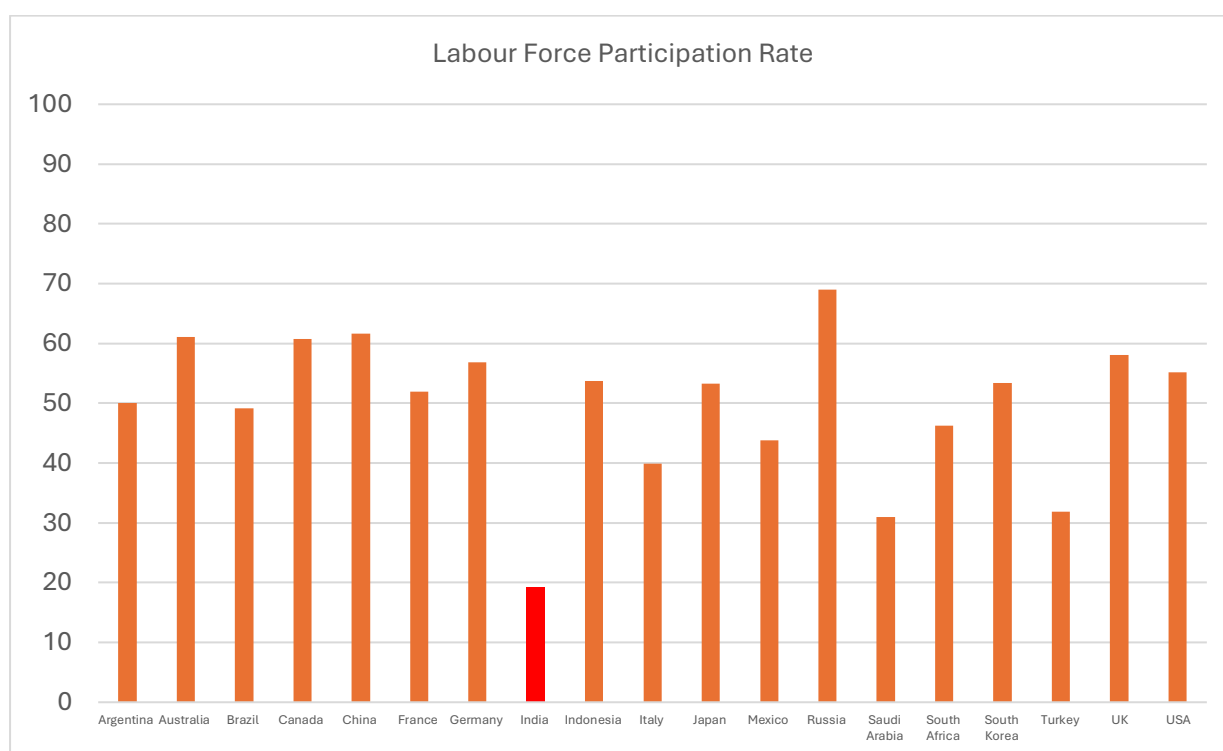
Note on Data Processing

The data processing began with downloading files for all available years from the [National Data Archive](#). The data layout, provided on the National Data Archive, was then used to

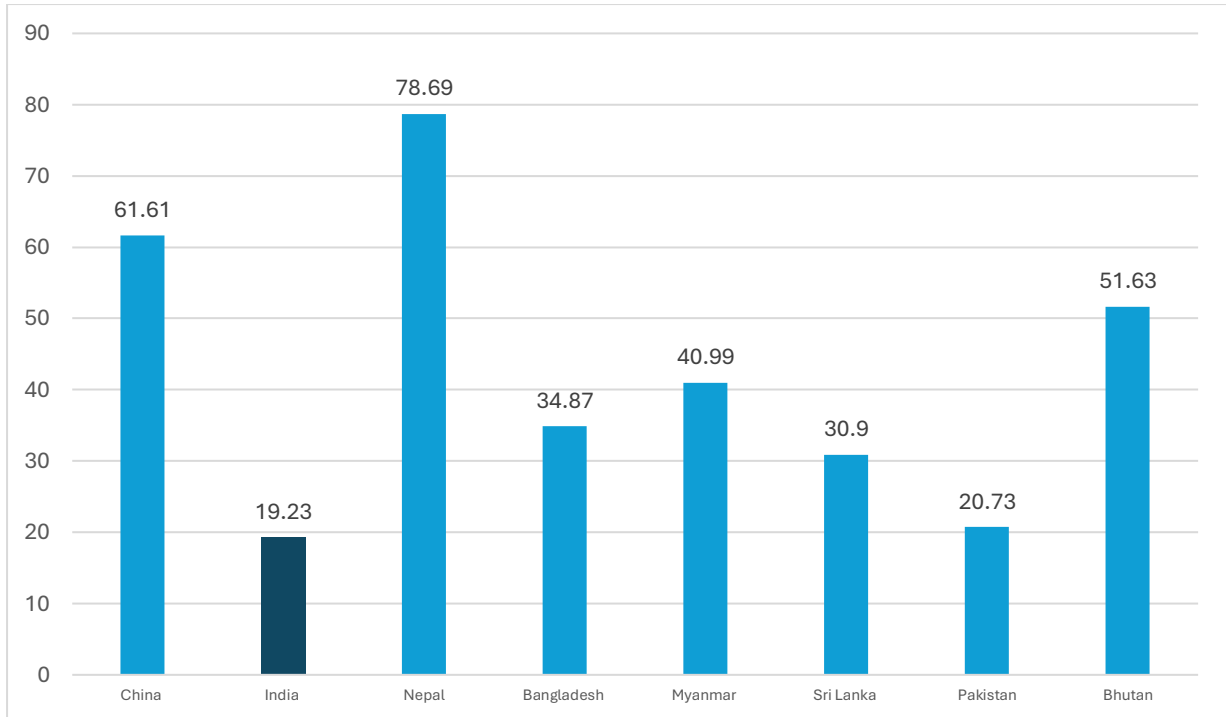
create dictionary files, and subsequently, data was generated for each state. The data for 2018-19 was corrupted on the government site, but a [scholar's site](#) provided an alternative source, and preliminary results were verified with [CEDA](#).

Household data for all individuals was merged with personal data regarding social characteristics using a many-to-one merge (m:1). Non-working ages were excluded, keeping only the 15-59 age range. Furthermore, weights had to be applied to the dataset, as instructed on the National Data archive. I was unfamiliar with this process, so I consulted with the Directors of CEDA and I am thankful for their guidance. For employment analysis, the Current Weekly Status (CWS) was used as the basis, where individuals above the age of 82 were considered part of the labour force. The corresponding industry codes in the CWS were used to generate tiers.

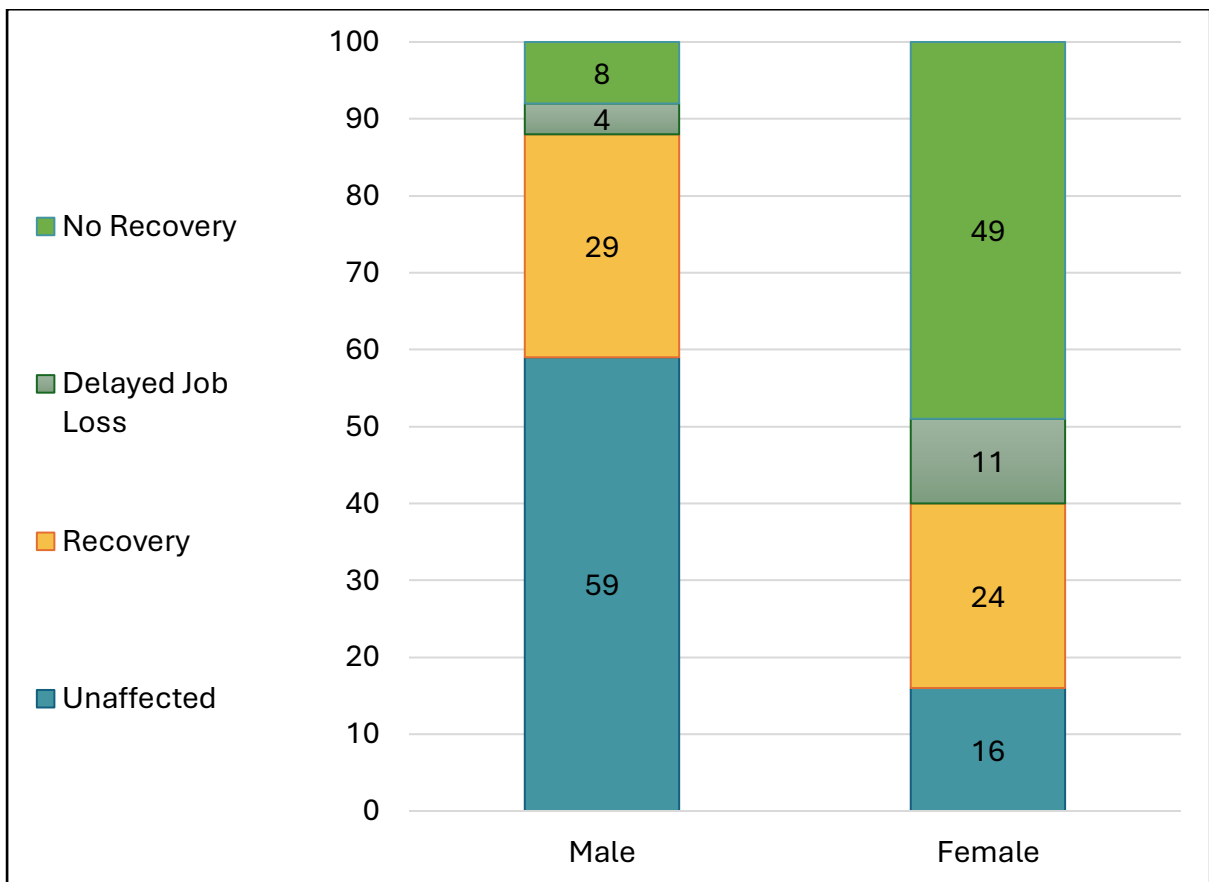
Tables and Figures



Appendix Figure 1 Labour Force Participation Rate for G20 Countries



Appendix Figure 2 Labour Force Participation Rate for India and its Neighbouring Countries



Appendix Figure 3 Changes in Employment Status between April 2019 and August 2020 (Adapted from Abraham et al. 2022)