

A Study of Changing Female Labour Force Participation in India with a Special Focus on Assam

A thesis submitted to the Indian Institute of Technology Guwahati in partial fulfilment of the requirements for the degree of Doctor of Philosophy



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Declaration

I hereby declare that the thesis titled “A Study of changing Female Labour Force Participation in India with a special Focus on Assam”, is the result of investigation carried out by me in the Department of Humanities and Social Sciences, Indian Institute of Technology Guwahati, under the supervision of Dr. Debarshi Das, Professor (Economics), Department of Humanities and Social Sciences, IIT Guwahati.

In keeping with general practice of reporting observations, due acknowledgements have been made, whenever the work described is based on the findings of other investigators.

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Certificate

This is to certify that the thesis entitled “A Study of Changing Female Labour Force Participation in India with aSpecial Focus on Assam”, submitted by Ms. Chayanika Boruah for the Doctor of Philosophy in Economics in the Department of Humanities and Social Sciences, Indian Institute of Technology Guwahati, embodies research work carried out under my supervision and guidance. The present thesis or any part of it, has not been submitted to any other University or Institute for award of any degree or diploma. She has fulfilled all the requirements according to the rules of the Institute for submission of thesis.

(Debarshi Das)

Thesis Supervisor

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Abbreviations

LFPR	Labour Force Participation Rate
FLFPR	Female Labour Force Participation Rate
UPS	Usual Principal Status
UPSS	Usual Principal and Subsidiary Status
PLFS	Periodic Labour Force Survey
NSS	National Sample Survey
SNA	System of National Accounts
MPCE	Monthly Per Capita Consumption Expenditure
MENA	Middle East and North African
WFPR	Work Force Participation Rate
RBI	Reserve Bank of India
NSDP	Net State Domestic Product
CPI	Consumer Price Index



Abstract

In India, since the 1970s, there has been a declining trend in the female labour force participation. Given the fast economic growth, declining fertility rate and rising women's educational enrolment in the last few decades, this decline is puzzling. Assam is not an exception to this trend of declining female LFPR (labour force participation rate). This study is an attempt to analyse the patterns and determinants of female LFPR in India as well as in Assam. The thesis reviews various existing theoretical frameworks on female LFPR. Based on the empirical findings from available literatures probable determinants of female LFPR have been identified.

Data analysis on 15 Indian states covering the time period from 1987—2012 has been conducted. Secondary data from various large sample rounds of Employment Unemployment Survey of the NSSO have been used along with some other data from different sources. Our Random Effect regression model shows that more the “literate” females, lower will be the FLFPR in a state. High fertility is associated with low FLFPR both in rural and urban areas of a state. It has been found that in a state higher rural male unemployment is associated with women withdrawing themselves from labour markets. It may be the case that, as explained by discouraged worker effect, with lower jobs in the market, females are discouraged to continue their job search. The unemployed women could be withdrawing from the labour market.

For the analysis of Assam specific data, the time period of 2004-2011 has been covered. These analyses are based on NSSO unit level data of three rounds of Employment and Unemployment Surveys. This part of the thesis probes female LFPR across age cohorts, education, economic groups, social groups, status etc. Further, probit regression models have been used on the latest available data. Our probit regression analysis, which used NSSO Employment and Unemployment Survey Assam specific unit level data concludes that rural women of Assam from

households with more land have a greater chance to join the labour force. Mildly educated women have a less probability to join the labour force than illiterates and barely literates – while higher educated women are more likely to join the labour force. This describes a U-shaped curve, often mentioned in the literature of women’s work participation. I devised an indicator capturing the compound effect of class and caste, named as “status”, and examined if status affects women’s labour force participation. This is the significant contribution of the thesis to the growing literature of female labour force participation in India. Although caste alone does not affect female LFPR, caste combined with class (proxied by land owned by the family) does affect women’s labour force participation – in a negative manner. This hints at status concerns of landed upper caste families, which impedes women’s work participation. In urban Assam the results are similar, with some exceptions. My thesis finally offers a theoretical model which contains two propositions, The propositions were inferred from the results of the previous empirical chapters. The mathematical proofs of these two propositions are presented in my thesis. The thesis concludes with a few policy implications.

Chapter 1: Introduction

1.1. Background: Why does the female labour force participation rate matter in an economy?

Economic development is a multi-dimensional process. It involves not only rise in income, but also reduction in poverty and inequality, women empowerment, removal of various kinds of discriminations and regional disparity, and so on. Sen(1999) defines development as the process of enhancing human freedom. In the process of development, women play an integral role. This is because development process and women's empowerment are dependent on each other. Hence empowering women is one of the main causes as well as effects of the development process. Once the economy develops, the disparity between men and women goes down. On the other hand, women empowerment itself accelerates the process of development (Duflo, 2012). To achieve development and growth targets, policymakers have been giving more importance to inclusive growth strategies in recent times. This is reflected in Sustainable Development Goal 8. This goal targets to “promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all”¹. Women empowerment has multiple dimensions like economic, social, cultural and political. Women's economic empowerment is considered a precondition to achieve inclusive economic growth (Kelkar, 2013). To achieve women's economic empowerment, their participation in the labour market works as one of the powerful platforms. Females' involvement in the labour market helps in reducing gender inequality, which in turn empowers women by giving them decision making power (Chaudhary and Verick, 2014).

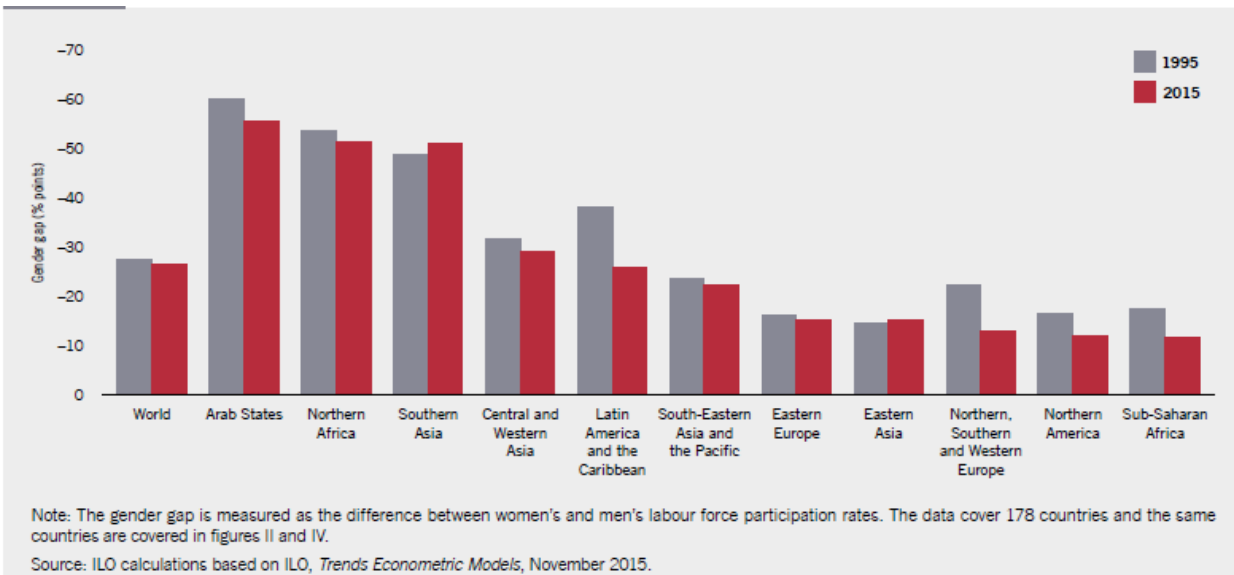
In an economy, participation in the labour force enables people to raise their standard of living. Hence, the involvement of people in the labour force is an essential parameter for the economy.

Therefore, the idea of the labour force participation rate has received a lot of attention. The labour force consists of people in the “workforce” and the people who don’t find employment but are looking for jobs, termed as the “unemployed”. The workforce includes those people who have found employment. Combining the “workforce” and the “unemployed” section, NSSO (Govt. of India, 2014) termed these people all together as “labour force”. People who don’t seek jobs are out of the “labour force”. They withdraw themselves from the “labour force” due to sickness, domestic work, disability, need to carry out education and so on (Rangarajan et al., 2011). The Labour Force Participation Rate measures the proportion of the working age population in the “labour force”. It measures the relative size of the supply of labour available, either actively working or looking for jobs. Labour force participation rate is calculated separately for men and women. The Labour Force Participation Rate (LFPR) of women can be considered as a sign of access to economic opportunities, women’s empowerment, autonomy and overall improved situation of women. ILO (2016) argues that lower participation in the labour force results in poor earning capacity and lack of economic security of women. Female labour force participation can be considered a driver and an outcome of development (Verick, 2014).

1.2. Global trends of FLFPR

Women’s participation is really poor in the labour markets worldwide, and ILO (2016) report confirms that. According to the report, the global female labour force participation rate (LFPR) declined from 52.4 percent to 49.6 percent during 1995-2015. ILO (2016) report shows that across the world, women’s chance to take part in the labour market is 27 percentage points lower than that of men. Across almost all the major regions of the world, the gender gaps in labour force participation are visible. This gap has been declining only marginally over the years. Figure 1.1 shows these facts.

Figure 1.1: Gender gaps in labour force participation rates by region, 1995 and 2015

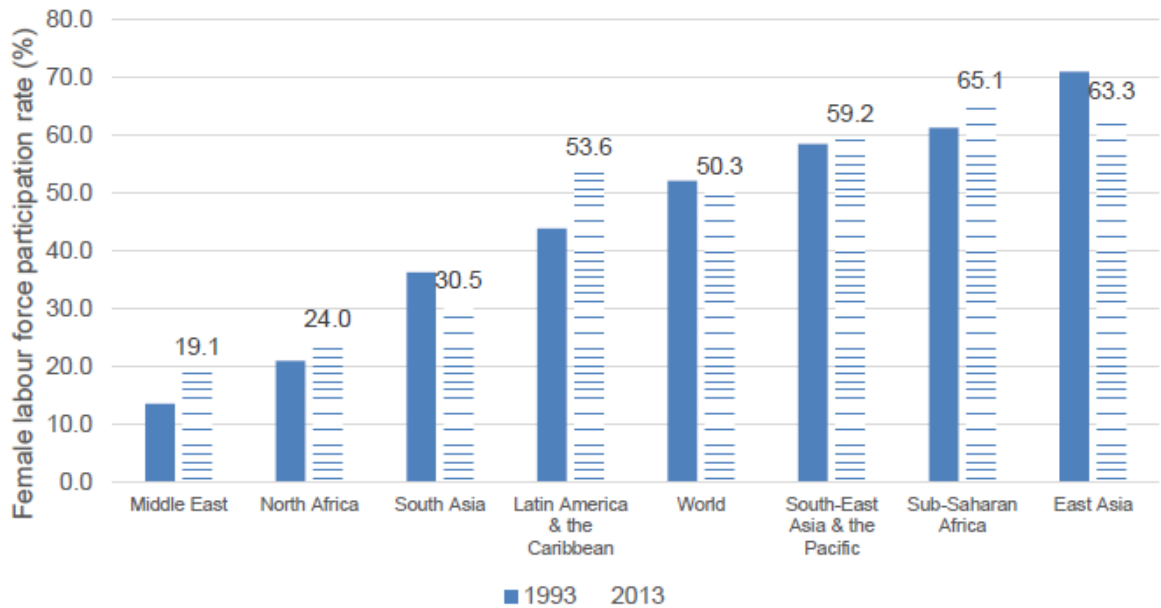


Source: ILO (2016) report: Women at Work Trends 2016

In Northern, Southern and Western Europe the narrowing down in the gap was because of the “added-worker effect”² during the financial crisis (ILO, 2016). In South-Eastern Asia and the Pacific, the male labour force participation rate declined slightly. On the other hand there was an increase in female LFPR.

Chaudhary and Verick(2014) explain the global trend of female LFPR. Figure 1.2 shows that in 2013 the highest participation was in the Sub-Saharan Africa region, and the participation rate was 65.5%. The lowest was in the Middle East, and the rate was 19.1%. In the case of South Asia, the participation rate declined during 1993-2013, and the decline in India drove it. The FLFPR in the East Asia region dropped, although the rate was relatively higher, to begin with. (Chaudhary and Verick, 2014).

Figure 1.2: The labour force participation rate of women (%), selected regions, 1993 and 2013



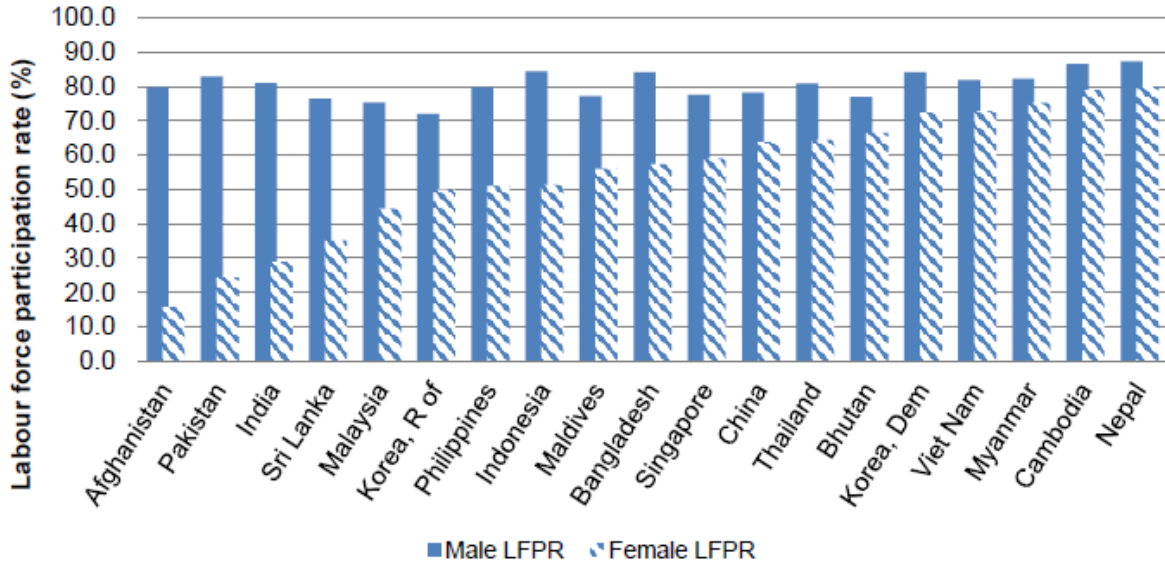
Note: ILO regional estimates from the TRENDS Model.

Source: ILO, 2014.

Source: Chaudhary and Verick(2014)

The gender gap in labour force participation in selected Asia and Pacific countries has been studied by Chaudhary and Verick (2014). Figure 1.3 depicts the results. The gap was the highest in Afghanistan, followed by Pakistan and India. The paper observes that although Nepal, Cambodia and Myanmar have minimal gender gaps in their labour force participation rates, the quality of employment and job opportunities are unequally distributed among men and women (figure 1.3).

Figure 1.3: Gender disparities in labour force participation rates in selected Asia and Pacific countries, 2012



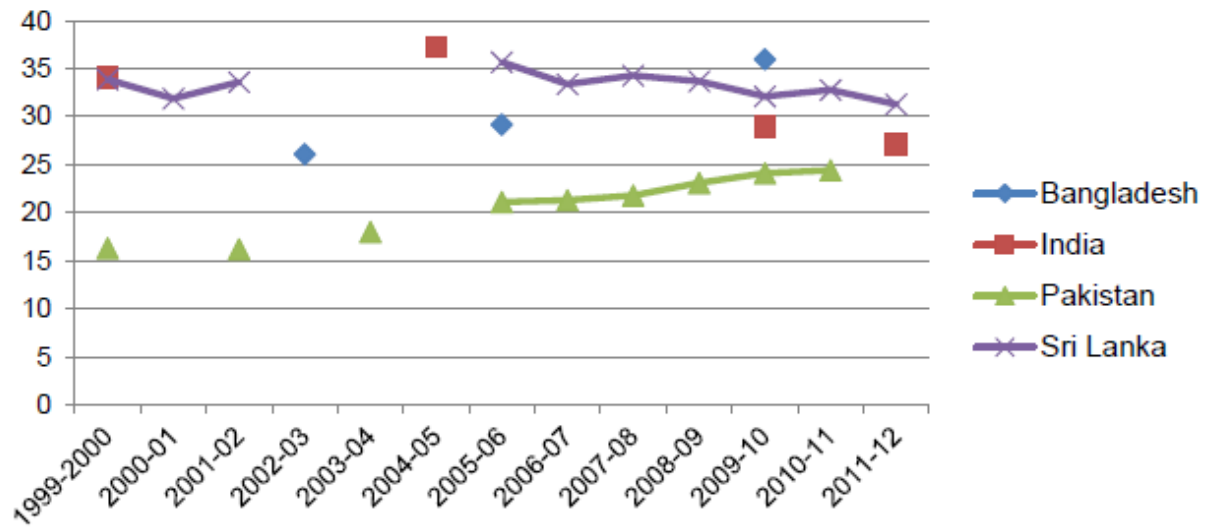
Note: LFPR = labour force participation rate.

Source: ILO, 2014.

Source: Chaudhary and Verick(2014)

Coming to South Asia, most South Asian countries perform poorly in female labour force participation. In their paper, Chaudhary and Verick (2014) mention that in 2012 the female LFPR in South Asia was just 31.8 percent, but the male LFPR was 81.4 percent. The FLFPR in South Asia was much lower than the global average of 51.1 percent. The cultural attitudes and social norms play opposing roles in female labour market participation in most South Asian countries, including India according to Chaudhary and Verick (2014).

Figure 1.4: Trends in female labour force participation rates across South Asia (%)



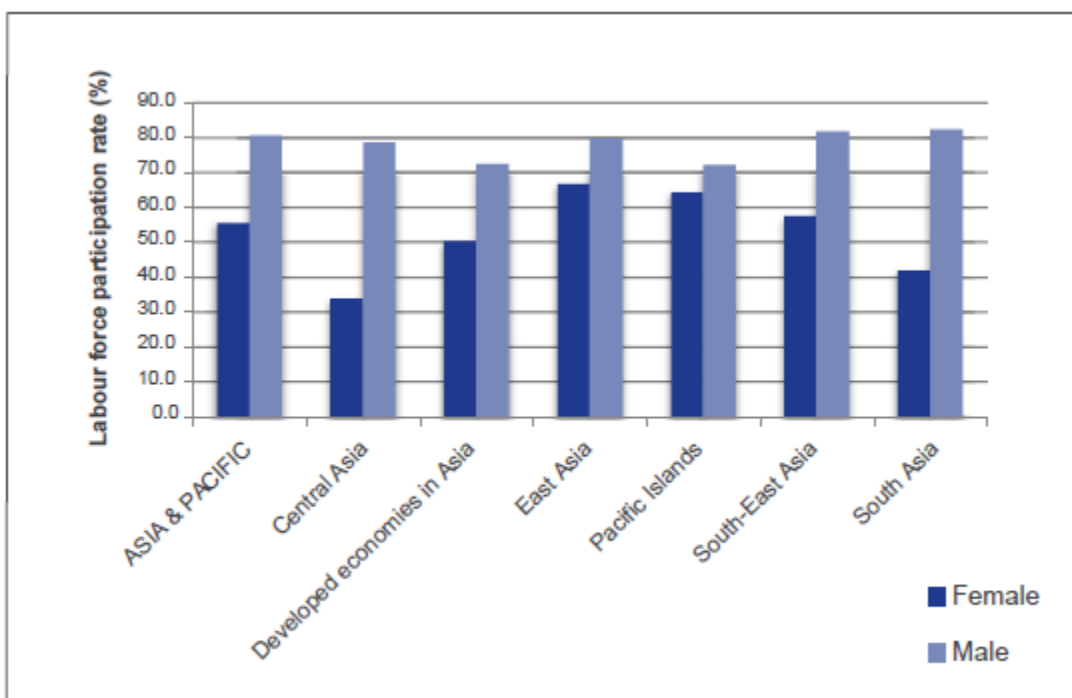
Note: Sri Lanka: 10+, excluding Northern and Eastern provinces.

Source: Based on data from national statistical offices.

Source: Chaudhary and Verick (2014)

The above figure depicts the picture of female LFPR in South Asian countries. It shows that India has a clear declining trend of FLFPR, especially after 2004-05. On the other hand, Bangladesh shows an encouraging picture, and it is visible that their FLFPR had increased. This happened due to the ready-made garment sector and increased rural female employment (Chaudhary and Verick, 2014; Rahman and Islam, 2013). Bangladesh had the highest FLFPR among the other South Asian countries in the latest years, shown in figure 1.4. In the case of Pakistan, the country started with a very low FLFPR, but the rate has been increasing in the country. The rate of FLFPR in Sri Lanka has been more or less stable over the years (Chaudhary and Verick, 2014; Najeeb et. al., 2020).

Figure 1.5: Labour force participation rate, Asia and sub-regions, by sex, 2009



Source: ILO, Trends econometric models, October 2010.

Note: Taken from ILO and ADB (2011)

In a report by ILO and ADB (2011), the gender gap in LFPR across sub-regions of Asia has been depicted in the above figure. It shows that among the Asian sub-regions, the highest gender gaps are present in South Asia and Central Asia. The female LFPRs in these sub-regions are among the lowest in Asia. Even within the sub-regions, the report identified the presence of a massive disparity of female LFPR. In South Asia, the highest FLFPR is 63.3 percent in Nepal and the lowest is 32.8 percent in India (ILO and ADB, 2011).

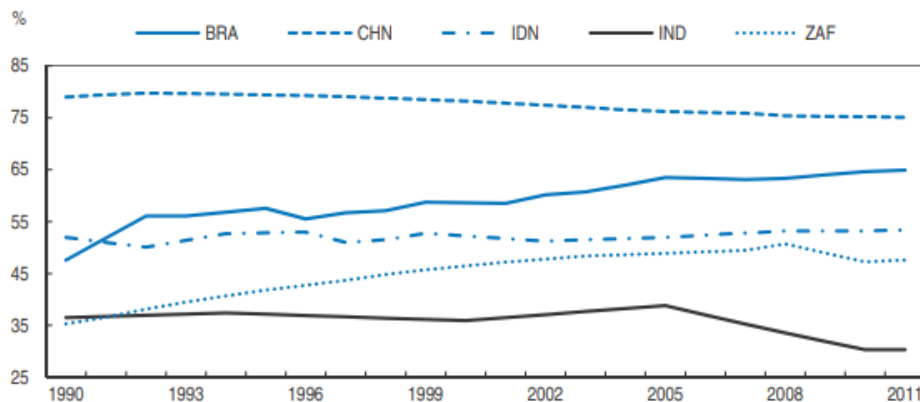
Thus, India's picture in terms of female labour force participation is not very encouraging. Further, there has been a clear declining trend of female LFPR in India. In an OECD working paper by Agenor et al. (2015), it has been argued that Indian women should be given more chances and motivation to participate more in the labour markets to achieve the inclusive growth

targets. Agenor et al. (2015) view that pro-growth and pro-women policies can boost the growth rate by two percentage points in India. Given the above facts, the poor performance of Indian females in labour markets has been a matter of concern in the era where the need of inclusive economic growth is reiterated by various policy forums.

1.3. India's female labour force participation rate

Afridi et al. (2016) show that only 32.6 of India's half a billion adult females are in the labour force (Afridi et al. 2016). India ranks 121 out of 130 countries in terms of Female Labour Force Participation Rate (FLFPR) according to ILO (2013) reports (Andres et al., 2017). OECD Economic Surveys on India report (2014) says that India's FLFPR lies at the bottom among the BRICS economies and is showing a declining trend. Figure 1.6 shows India's relative position in terms of female LFPR among BRICS nations. India's FLFPR is in fact half that of Brazil. The figure confirms that India's FLFPR has a clear declining trend, especially after 2005 (OECD, 2014).

Figure 1.6: Female LFPR³ in BRICS countries⁴



Source: International Labour Organization, Economically Active Population, Estimates and Projections (6th edition, October 2011). Cited from OECD Economic Surveys India (2014).

The existing data shows that in India, in the case of rural areas, FLFPR (UPS)⁵ dropped continuously from 32% in 1972-73 to 18.1% in 2011-12 except for the distress affected the year 2004-05 and urban FLFPR(UPS) was around 13-14% over the years (Abraham, 2013a). The urban component of FLFPR is significantly low (Bhalla and Kaur, 2011). The overall decline in FLFPR is driven more by the decline in the rural FLFPR, which was substantially higher than the urban FLFPR, to begin with. The female labour force participation rate was significantly lower than male LFPR in both urban and rural areas. This decline in FLFPR is visible across almost all the Indian states.

The trend associated with the Indian labour market is not smooth. It has various ups and downs. The period 1993-94 to 1999-2000 shows a phase of jobless growth. After this, robust employment growth covers 1999-2000 to 2004-05. This strong employment growth was distress driven (Abraham, 2009; Abraham, 2013a). Due to agricultural stagnation, income started falling below the normal level, forcing the non-working population to enter the labour market (Abraham, 2013a). After the distress years there was a dramatic collapse in employment during 2004-05 to 2009-10. It is quite surprising that despite the GDP growth rate of 8% per annum and an annual population growth rate of 1.74%, there was hardly any increase in the total labour force. Chandrasekhar and Ghosh(2011) termed it “dramatic collapse in employment”. There was a slowdown in the labour force, which happened because people were withdrawing from the labour force. This includes both employed and unemployed, which led to a decline in the labour force participation rate. Andres et al. (2017) point out that during 2004-05 to 2009-10, 19.6 million women and girls were not actively participating in the labour force. Many researchers argue that “missing female labour” is one of the most critical factors behind the slowdown (Chandrasekhar and Ghosh 2011; Rangarajan et al. 2011; Kannan and Raveendran 2012). Such

withdrawal of females from the labour force is generally termed as “de-feminisation” of the labour force (Abraham, 2013a), and this is consistent with the long term trend of declining FLFPR.

There have been studies which report that the decline in FLFPR is not only for a particular state or region, but the declining trend is visible across almost all states and regions of India (Lahoti and Swaminathan, 2013; NSSO EU Survey reports, 1987-88, 1993-94, 1999-2000, 2004-05, 2009-10, 2011-12). The various papers that study the FLFPR across different cohorts report that the decline happens among all educational levels when we see FLFPR across educational categories. There was a decline among illiterate and highly educated women (Abraham, 2013b). Looking at the FLFPR composition across social groups, it can be seen that the ST community had the highest participation, and at the same time, they had the highest rate of decline in terms of FLFPR. In rural areas, FLFPR for married women is higher than that of unmarried women, and the picture is opposite in urban India. The decline in FLFPR is visible across both categories in rural areas (Andres et al., 2017). Across the income groups’ analysis of FLFPR, it is observed that the highest income had the lowest participation. Still, the decline in FLFPR is the highest among the lowest income groups (Kapsos et al., 2014).

1.4. Female labour force participation rates in Assam

In terms of population Assam is the largest among all the North Eastern states of India. It has about 2.4% of the country’s geographical areas and 2.6% of total population of the country. The total population of Assam was 3.12 crore as per 2011 census. The statistical profile of women in Assam displays a mixed picture. Among Indian states the child sex ratio is the highest in Assam, but it has been declining at least since 1991. The rate of maternal mortality rate (MMR) has been

declining, but the rate was still the highest in 2013 in the country (World Bank, 2017). The overall position of women in Assam is not very encouraging. The life expectancy of females in Assam during 2012-16 was 66.8 years against national average of 70.2 years (RBI, 2020). Coming to the working profiles of women in Assam, as per 2011 census 22.17% females out of total women population were workers. In rural areas this share is 23.7% and in urban it is 14.9% (Govt. of India, 2012-13). Govt. of Assam's (2014) report identifies that in Assam there is a lack of productive and remunerative work opportunities and it is a major problem for the state. Unemployment rate is quite high among educated youth and females (Govt. of Assam, 2014). In 2013, FLFPR in Assam was among the lowest in India (World Bank, 2017).

Assam is not an exception to the decline in female LFPR observed at the all-India level. My calculations based on unit-level data⁶ of the NSSO Employment and Unemployment Survey show that in Assam, the trend of female LFPR(ps+ss) is consistent with the national trend. The Female LFPR (ps+ss)⁷ has declined from 20.61% to 12.60% during 2004-11. For rural females LFPR declined by 8.62 percentage points. In case of urban females this decline is of around 2.32 percentage points. The disaggregated analyses show that the highest decline occurred among the various social groups in the "other" category, including the "general caste". It may indicate that women from higher caste social groups are withdrawing more from the labour force than other social groups. During the 68th NSSO round (2011-12), a U shaped relationship⁸ between education and FLFPR was found. Such U shaped relationship is not visible in the 66th round data. The data shows a decline in female LFPR between highly educated and illiterate women. A similar picture is visible at all Indian levels (Abraham 2013b). During 2004-11 female LFPR declined across all age groups; it was not restricted to only school-going age groups. It indicates

that education can't explain the picture entirely. There may be some other factors that may better explain the decline in female LFPR.

The declining trend of female labour force participation in India and Assam is a surprising phenomenon that has been happening since the 1970s. Given the scenario of fast economic growth, declining fertility rate and increased women's educational enrollment, these figures are puzzling. It is a matter of concern and a serious topic to be explored thoroughly. India is in the phase of population dividend where the country has a larger share of the working-age population and fewer dependents. Fertility decline brings another puzzle to the phenomenon. With fewer children, women are expected to participate more in the labour markets, which is not happening. The urban component of FLFPR is significantly low (Bhalla and Kaur, 2011). Further, it is difficult to explain this declining trend, given the trend of high economic growth and increasing educational enrollment. High FLFPR is desirable for a country. Employment and earnings improve the bargaining power of women. The mother's labour market participation also impacts a child's nutrition and well-being. Given the facts and figures, the decline in FLFPR in India is creating severe threats to the well-being of females and the overall development of the economy.

1.5. Female labour force participation in theory: a concise summary

Boserup's (1970) book "Woman's role in economic development" was a starting point of theoretical analyses on female labour force participation rate. The famous U shaped hypothesis is an outcome of this. The hypothesis proposes that with development, female labour force participation initially declines and then after a point at a higher level of economic development, labour force participation increases. The substitution effect and income effect from mainstream economic theories explain this U-shaped hypothesis. Goldin (1995) presents another theoretical

framework on female labour force participation, where income and substitution effects explain the U shaped curve. Eswaran et al. (2013) provide an interesting model which uses Becker's utility-maximising framework. In India, social stigmas are attached with women's paid works and it is believed that these bring down the status of the family. Upward social mobility is generally accompanied with withdrawals of females from labour markets in India (Eswaran et al. 2013; Mies, 1984). This happens because the "upper-caste" people give more importance to sexual purity of their women and they prefer their women to stay at home. This is not the case with lower-class women (Boserup, 2008; Abraham, 2013a). Household and domestic activities are considered to be "status-producing" for a family (Eswaran et al., 2013; Papanek, 1979; Abraham, 2013a). Eswaran et al. (2013) consider caste as an indicator of status. They report that as we move up the caste hierarchy, the share of women's market works relative to that of husbands' declines. Besides, in the presence of status concern, an increase in the wealth will reduce women's market works relative to that of men at a faster rate. With an increase in women's education, women's time towards market works reduces to facilitate status production despite the fact that with education, their market wages increase (Eswaran et al., 2013). The non-mainstream economic theorists argue that the capitalist production process doesn't provide all the needs for a family. Hence, their very reproduction is crucially dependent on women's household work. Due to the lack of adequate wages, which brings income insecurity to a family and lacks adequate state support measures, women are forced to engage in subsistence production or "domestic economies" (Naidu and Osome, 2016; Naidu, 2016).

Like Kannan and Raveendran (2012) and Naidu (2016) Chattopadhyay and Chowdhury(2022) emphasised the lack of jobs in reducing FLFPR. Chattopadhyay and Chowdhury (2022)are of the opinion that one sided focus on supply side factors like status, school enrollment, income effect,

substitution effect etc. can't explain the whole picture of the decline in FLFPR. Their regression models show that even after controlling the supply side determinants like education, income there has been a drop in FLFPR. It led the authors to argue that demand side factors need to be incorporated into the picture to get a more clear understanding of the situation.

These available theoretical frameworks on female LFPR help conceptualise the problem statement of my research.

1.6. Motivation behind the study

Given the fast growth trajectory of India, the decline in female LFPR in the country is difficult to understand. The country is on the path of development, and most of the country's economic indicators have been showing positive results, at least since the 90s. What is causing such decline in this country seems interesting to look into. When I explored the available literature, I have inferred some facts. These facts are i) the decline in female LFPR in India as well as in Assam is most prominent in rural areas; ii) Various potential determinants of this decline have been identified in the available literature and hence it is a multi-dimensional issue; iii) In a caste conscious country like India where patriarchal norms and family values/status play a significant role in society the “status” concern of families sometimes act as a factor in determining their females' labour force participation decision; iv) There are insignificant numbers of literature which deal with female LFPR in Assam; v) Most of the available literature deal with empirical finding, there are very few theoretical models on female LFPR (Eswaran et. al, 2013; Goldin, 1995; Folbre, 1982; Menon, 1982, Boserup , 1970; Naidu and Ossome, 2016).

The various trends, patterns, composition and determinants of FLFPR seemed promising areas to explore. The thesis is motivated by the following factors. These factors also decide the structure

of the ensuing study. First, Indian states are diverse in terms of various characteristics. The decline in FLFPR across all major states in India is surprising given that they differ from each other in terms of their socio-economic and political natures. To explore the similarities and differences across states, a cross-state analysis has been considered to explore this phenomenon. Second, Das and Mishra (2018) is one of the few studies on Assam's female labour force. It focused on rural Assam exclusively and the workforce participation of women. It was felt that the gap missing in the paper could be fixed through my study if I consider both rural and urban Assam and FLFPR in both areas. In our study we examine female LFPR of rural as well as urban Assam. The nature and determinants of FLFPR in both areas may vary, given the diversity between these two sectors. That motivated me to explore the sectors separately in each of my analyses. Third, given the considerable socio-economic-political-cultural variations within Assam, it seems reasonable to explore the various patterns, and determinants of female LFPR in a state like Assam. Fourth, the "status" effect has been explored by Eswaran et al. (2013). It appeared as an interesting indicator to look into. Hence I devised an indicator capturing the compound effect of class and caste, named as "status", and examined if "status" affects women's labour force participation. Fifth, very few studies a theoretical framework based on the empirical findings. Hence with my research, I wanted to find an answer to this, and as a result, a theoretical framework has been developed.

1.7. Outline of the thesis

There is a total of 6 chapters, including the present one.

Chapter 2 presents a detailed and extensive literature review. It includes various theoretical and empirical findings of multiple studies that motivate us to conduct this research. A brief overview

from other countries' FLFPR has been presented in this chapter. Besides, this chapter lists out potential determinants of FLFPR from the available literature. This helps us target or choose variables for our regression models in the later chapters. The research questions of this thesis have been formulated in this chapter.

Chapter 3 discusses FLFPR across Indian states, including Assam. Various tables, graphs, and other tools to parse statistical data are used to overview trends, patterns, and changes in FLFPR in India and Assam. These results are based on the calculation from various Employment and Unemployment Survey data rounds of the NSSO. The detailed discussion on the sources and methodology adopted is presented in the chapter itself. The time frame of this chapter is 1987 to 2011. This chapter focuses on identifying potential determinants of FLFPR in rural and urban Indian states during the given period. To do so, panel regression, to be more specific, random effect regression, has been carried out.

Chapter 4 studies the factors responsible for the decline in female LFPR in the state of Assam. The trends and patterns of FLFPR across various cohorts based on NSSO unit-level data are presented in the chapter. In this chapter, two probit regressions have been deployed to determine the significant determinants of FLFPR in rural and urban Assam separately. Analyses of FLFPR across various cohorts in Assam based on NSSO EU survey micro data depict some interesting facts which have been presented in the chapter. This chapter addresses the second research question.

The empirical exercises give us an idea to develop a theoretical framework which would incorporate the inputs that we get from the previous chapters. As a result, chapter 5 presents a theoretical model on women's labour force participation. The theoretical model tries to examine

how the division of time by women gets affected in the presence of “status premium”. The model also examines the impact of the presence of subsistence consumption in determining women's time allocation. The model proposes that women's time towards market works diminishes due to income effects in more affluent households. These results are not general but dependent on specific properties of preference of the decision makers. These propositions are validated using a widely used utility function known as the Constant Elasticity of Substitution Utility function.

The next chapter, chapter 6, concludes the thesis with comments on the findings from the chapters. The chapter summarises the main arguments of all the chapters. As the decline in FLFPR poses significant policy concerns, suggestive measures are presented in this conclusion section. Major caveats of the study have been identified in this chapter, which opens up scopes for future research actions.

¹<https://sdgs.un.org/goals/goal8>

² Added worker effect: “Increase in the labour supply of married women who sought to compensate for the loss of family income when their husbands became unemployed” (ILO, 2016).

³ Considers working age population 15-64 years

⁴BRICS: India(IND), Brazil(BRA), China(CHN), Russian Federation(IDN), South Africa(ZAF)

⁵ Usual principal activity status: The reference period is 365 days preceding the date of survey.

The usual activity status relates to the activity status of a person during the reference period of 365 days preceding the date of survey. The usual principal activity status is that activity on which a person spent relatively long time (i.e. major time criterion) during the 365 days preceding the date of survey. For determining this first it is determined whether he is in the

working or unemployed or not in the labour force depending on the major time spent during the 365 days preceding the date of survey. Persons who are classified as not belonging to the labour force were assigned the broad activity status “neither working nor available for work” (not in the labour force). On the other hand persons who are in the labour force are given the broad activity status of either “working” (employed) or “not working but seeking and/or available for work” (unemployed) based on. NSSO 68th EU Survey Report says “Within the broad activity status so determined, the detailed activity status of a person pursuing more than one such activity was determined once again on the basis of the relatively long time spent on such activities”.

Usual subsidiary economic activity status: It may be possible that person whose usual principal status has been determined based on major time criteria can be involved with some other economic activities for a shorter period of not less than 30 days of time during the reference year preceding the date of survey or for a minor period. The status of such economic activity status is referred as subsidiary economic activity status of that person.

⁶ Unit Level Data refers to detail data in respect of the sampled units at the ultimate stage, along with the sampling weights for that stage. For example, in case of NSS household surveys, the lowest sampled units are households. Therefore, in this case unit level data means all data records in respect of each sample household, along with household-level multipliers posted in each

record. (https://www.saarcstat.org/sites/default/files/training/onsite/Onsite_Course_on_HH_Sample_Surveys/12.Familiarisation%20with%20Unit%20Level%20Data.pdf)

⁷ Usual activity status considering principal and subsidiary status taken together: When both the activity statuses are taken together then it is known as the usual status (ps+ss) of the person. A

person who is involved with some activity based on either principal or subsidiary status come under us(ps+ss) category. So even if a person is not a worker based on UPS can be a worker according to us(ps+Ss). Thus, a person who is not a worker in the usual principal status can be considered as worker according to the usual status (ps+ss), if the person is involved with some subsidiary economic activity for at least 30 days during 365 days preceding the date of survey.

⁸Bhaduri and Pastore(2017) says “U-shape relationship between educational status and women’s labour force participation at a given point of time emphasises the fact that among the poorly educated, women are forced to work to survive and can combine farm work with domestic duties (particularly in rural areas). Among the very highly educated, high wages induce women to work and stigmas against female employment may be low. Between these two groups, women may face barriers to labour force participation as there may be an absence of an urgent need for women to work (the income effect), and due to the presence of social stigmas associated with female employment.” This view was also given by Klasen and Pieters (2012).

Chapter 2: Literature Review

This chapter reviews the available literature relevant to my research topic. The chapter is divided into two sections: Theoretical frameworks and Empirical findings. The next section examines the various existing theoretical frameworks on female LFPR.

2.1. Theoretical frameworks

2.1.1. The mainstream economic theory

Boserup(1970) in her book “Woman’s role in economic development” analyses how with the process of development the role of women changes. This is the starting from where researcher started to analyze the role of women in a developing society and that’s how the idea of U shaped female labor force participation came into the picture.

The relationship between economic development and female labor force participation rate is often captured by the U curve theory. The FLFPR is initially high and as development proceeds it starts to decline. Then after some point the trend reverses and we get an increase in FLFPR. The main ideas behind this kind of theories are coming from mainstream economic theory of substitution effect and income effect. Mainstream economics definition says substitution effect is the “change in the demand due to the change in the rate of exchange” (Varian, 2010). On the other hand income effect definition says it is “the change in demand due to having more purchasing power” (Varian, 2010). At the initial level as development proceed with rise in household income, women get more purchasing power and it becomes affordable for them to stay away from market works. Therefore, with rise in income women withdraw themselves from market works and prefer to stay at home. This effect is quite prominent at the initial level of

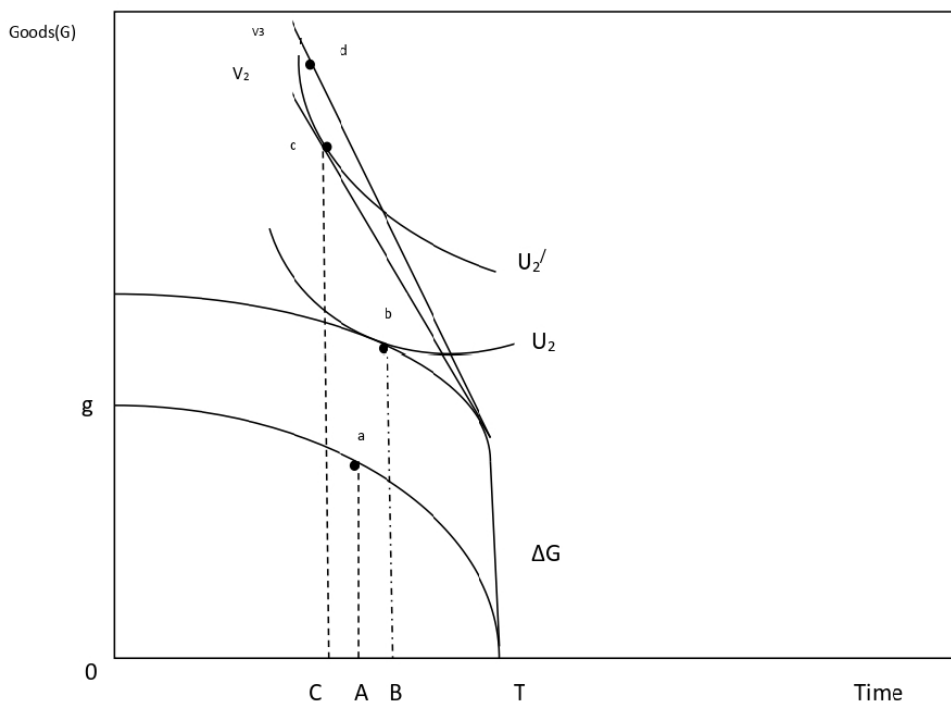
development. Hence we get a declining portion in the U shaped curve. When wage increases further then it is costlier for women to substitute market works. The opportunity costs of market works increases and hence women substitute domestic works for market works. Therefore their labor force participation rate increases. The subsequent paragraphs elaborate on why the income effect is more powerful initially and later it is dominated by substitution effect.

- *Goldin's model: the U curve*

Goldin's (1995) paper is one of the most prominent works on theoretical foundation of female labor force participation. The paper tries to explain the relationship between female labor force participation and economic development with a theoretical model. It shows along with the process of economic development, the adult women's labor force participation shows a U-shaped relationship. At a very low level of income, the participation of women in the labor force is significantly high. They are mostly unpaid workers on family farms. Sometimes they work as paid workers. As income starts rising women's labor force participation rate falls and later it increases. The initial decline in the participation is due to income effect which is quite strong at this phase. After a point of time the income effect weakens and the substitution effect becomes stronger. At this level the female LFPR starts to move up. At the initial level when the income effect is stronger, it is supported by the fact that demands for women in the agriculture decreases. Later, with the increase in female education the value of women's time in the market increases and hence they move to the paid labor force. This happens along the rising portion of the U-shaped hypothesis. The whole process shows a strong income effect at the initial stage and strong substitution effect at the later stage. The paper refers to two kinds of equilibrium. One is non-stigma equilibrium and the other is stigma equilibrium. Below we discuss the model in more detail.

The model has a good (G) that is produced by the family or by a firm. Women, mainly the wives work in the manufacturing unit as operatives (manual, blue-collar workers) or white collar workers when they are sufficiently educated. Other family members work either at home production or outside the home for the manufacturing unit.

Figure 2.1: model of household and market production with a non stigma and stigma equilibrium



Source: Goldin, 1995

There are three uses of time of women:

1. Production of G by the family
2. Production of G by the firm.
3. Child Care (C)

The production possibility frontier gaT indicates the production of G within the family. With the increase in income of other family members the PPF shifts upwards by ΔG . The woman herself decides about her time allocation and she considers the impact of her work on the social status of her family.

Let us assume her utility function is:

$$U = U(G,C) - \delta S$$

Where S is the utility value of stigma and δ is 0 or 1. It is the indicator variable.

$\delta = 1$, when wife produces G in the (manual or blue collar) wage sector.

There are three periods:

Period 1: No firm employment

Period 2: A firm offers a wage and income for families rises because other family members work for the firm. Here women get the option of working for the firm as operatives

Period 3: Wages for women increases further because of the increased level of women's education and they are offered jobs in the white collar sector of the economy.

The paper assumes that there is a relationship between LFPR and the number of hours of woman (wife) works and that hours worked are total hours spent in the production of G , independent of their source.

The above figure shows the time allocation choice for a woman (wife) who chooses point "a" where AT hours she devoted for home production of G and OA hours for child care in period 1.

When income increases by ΔG then it doesn't change her productivity, she just moves from point a to b. Therefore the time for home production of G decreases to BT. It is pure income effect.

The paper assumes that the wife is offered a wage to work outside the home. The next assumption is that the wage relative to the price of G, exceeds the slope of the PPF at b and it is given by the line v_2 . Along with this line the woman would choose either to work for the firm or do child care or just do child care alone. With a wage given by this line, there is no home production of G.

Thus in period 2 if the increase in family's income comes first, the woman would reduce her time in G production by AB by choosing point b. From the diagram it can be seen that when change in wage and change in family's income take place together then her total hours in the production of G increase by CA amount. At point c the hours she spent on producing G in the firm is CT hours. Therefore, the no stigma equilibrium shows the possibility of U-shaped labor force function. In the period 3, with increase in her education and her employment in white-collar jobs her wages increases more, given by the line v_3 . The paper assumes that the woman chooses point d along this line.

In case of stigma equilibrium, there may be some changes. These changes may occur along with the movement from period 1 to 2 and then from 2 to 3. The equilibrium in period 1 remains same, but the response to a wage change along with the appearance of firm in period 2 may change.

The model assumes that each family has a value of stigma, given by S. This S would be loss from social stigma of having a wife work for wages as a manufacturing operative or manual laborer. This stigma value doesn't depend on the number of hours at work. There is no better

option than “c” for the wife given the option of working along v_2 . Same argument is applicable for the point “b”. There is no better option in that situation. Therefore the question arises whether $(U_2' - U_2)$ is greater than or less than S.

Where U_2 is the utility level of the woman when the income of the family increases, but there is no change in her productivity. U_2' is the utility level of the woman when her productivity changes.

When the utility value of the stigma is greater than the gain from being at point c compared with point b, then the family will opt to stay at point b. When the wife works at manufacturing unit the family loses some utility and at point b this loss is more than offset by the gain in utility from an expanded choice set. Goldin argues that the probability that the stigma will be binding is more when the family income is low and the woman's wage is low.

The social stigma against wives working in paid manual labor outside the home mainly in male-intensive industries is quite widespread and prominent. Sometimes they are attached to female-intensive industry work also. This stigma is connected to many basic norms of the society. At times such stigma can't be found in widows and female children doing same kinds of work.

When the stigma equilibrium is binding, the woman will choose point b in period 2, but there is a drastic jump to point d when she is offered a white collar job. So the equilibrium moves from point a to b to d across three periods, which gives a U-shaped labor force participation function.

The explanation the paper puts behind the U shaped relationship is that when women's education hasn't reached an advanced stage then income effect is at work. At this level their only employment opportunities are outside home productions and manual labor jobs in manufacturing

and agriculture. Social stigma is attached to these kinds of works. Women's LFPR falls with increase in income and with increase in their own wage. When with their education women are capable of entering into white collar jobs and non manual works then only their labor force participation increases. The improved educational status of women with higher income enables them to work in prestigious sector and it strengthens the substitution effect and weakens income effect. The U curve will appear if there is non-stigma equilibrium as well.

Luci(2009) points out that there are mainly two theoretical approaches regarding female labor force participation. One is "Modernization Neoclassical Approach" suggested by Becker (1965). It suggests that growth has only positive effect on female labor force participation. Another approach is the U shaped feminization of labor force hypothesis. It was initially proposed by Boserup(1970). There are mainly three stages of this U shaped curve. When subsistence economies move towards developing economies, women withdraw themselves from the labour force and after a point the participation rates of women in the labor force starts rising. The explanation behind this hypothesis is that in subsistence economies there is double burden of work on women. They need to engage themselves in subsistence agricultural production as well as in unpaid domestic activities. With increase in income the women can now afford some leisure and they can now spend more time on household works. Hence women withdraw from the labor market. The opposite trend starts happening with high income because with high income the opportunity cost of paid labor increases and hence the LFPR of women starts increasing.

Goldin(1995), Mammen and Paxson(2000), Lahoti and Swaminathan(2013) and various other researchers argue that at stage one countries are mainly subsistence in nature and agriculture based. Subsistence economy makes heavy use of female labor force. This is because these

economies are mainly centered around home. Most women work in family farms or home workshop production. They are basically self-employed workers. Child care at home along with these home based works is possible at this stage. When the economy starts to grow then home based agriculture sector which is the main employer of female workers gradually declines. The urbanization and industrialization create gender differences in employment. Women become marginalized along with the process of development. Men get advantages in accessing better education and new technology. Besides, wages and job opportunities for men increase at a faster rate as compared to that of women. At the same time the growth of industry is generally slow at the initial level. Therefore even the industrial sector is not in a position to absorb those displaced workers. In addition to this men get the benefits of this new industrialization process because they get easy access to education which makes them eligible to get those skilled mechanized works. At this level along with childcare women find it costly to afford those industrial works. The reproduction responsibilities become impossible to carry out along with those factory works for women. The relative labor cost of those child bearing women workers is also more for the employers and so they prefer male workers (Luci, 2009). The social norms associated with women's market works also reinforce the process. All these result into income effects dominating the substitution effect. The decline in female labor force participation during the second stage of growth is generally accompanied by increasing educational enrollment and that delays the process of their participation in the labor markets. Hence, the labor force participation of females declines and this increases at a later stage of development when the service and government sector expands. These are considered as "socially acceptable" job opportunities for women. At this third stage employment opportunities for women increases and hence their opportunity cost of not working goes up. In addition to these the education level of women

catches up with the level of men's education by this time. Fertility also declines and finally FLFPR moves up. This results into U shaped Female labor force participation rate along with the process of economic development (Luci, 2009; Fatima and Sultana, 2009; Goldin, 1995).

Mammen and Paxson(2000)investigate the relationship between female labor force participation and economic growth. They argue that woman's labor supply is driven by two components: one is the opportunity cost of her time and another is "unearned income" or the income which is not earned by her. The increased opportunity cost causes substitution effect and hence increases FLFP. On the other hand increase in "unearned income" causes income effect which brings down FLFP. If wife's earning increases more than the increase in men's wages then substitution effect dominates the income effect. At the initial level of economic growth men's economic opportunities increases faster as compared to that of women and at the same time social norms and customs prevent women from taking up market works. Gradually women get sufficient education for white collar jobs and these jobs become available in the economy, at this point women's labor force participation increases because substitution effect now dominates the income effect.

Why is stigma attached to blue collared works is a question which interesting to investigate. Social norms favor only white collar jobs for women. It has been argued by Mammen and Paxson(2000) "norms may reflect women's preferences". Women sometimes don't prefer factory works. This may happen because for a woman along with the responsibility of the family, marriage and children it is not possible sometimes for her to carry out factory works. Women's preference is not always the sole explanation behind their dislikes towards factory jobs also. This is because sometimes manufacturing firms fire their women employees upon marriages (Mammen and Paxson, 2000). Further, Goldin(1995) argues that it is a common social belief

believed that only those wives are forced to take up blue collared jobs whose husbands who are lazy, negligent . Societies stigmatize such husbands, as well as the wives. This is because of powerful social norms which suggest that men are there to provide the needs of the family. Such stigmas are not usually attached to white collared jobs because women in these jobs have high education and in general their husbands are adequate providers (Mammen and Paxson, 2000). Besides these two explanations there is another explanation. While working in factories women need to bear high fixed costs of working away from home. The blue-collared jobs don't pay enough to compensate the loss in the fixed costs of working away from home.

- *Eswaran et al. (2013) and Becker's notion of household economy*

The model of Eswaran et al. (2013) is based on utility maximizing framework. They have a Stone-Geary form of household utility function, where there are two persons and they try to allocate their time between consumption and leisure. The utility function is

$$U(c, z, r_1, r_2) = (c - \phi)^\alpha z^\beta (r_1 r_2)^\gamma ; \quad \alpha, \beta, \gamma, \phi > 0$$

Where r_1 and r_2 denotes leisure of wife and husband respectively and C is the market good, Z is the status good. They maximize this w.r.t a budget constraints and derive the optimal choices.

Gary Becker (1965) was a pioneer of theoretical modeling of household economy, where household economy is engaged in the production of various outputs which are associated with various levels of activities which household members are engaged with. A household faces both the time and the budget constraints. His ideas have been extended to various analyses like production of human, capital children, health, the consumption of leisure on-the-job etc. Becker's idea allows researchers to broaden their analysis regarding consumer choice as well as substitution and income effects (Heckman, 2014). In their paper Eswaran et al. (2013) showed

empirically that when the education level of women improves, the labor supply of women relative to that of men within a household declines.

2.1.2. Non –mainstream perspectives

Household, markets and the state are the three agencies which interplay and interact with each other in the process of social reproduction. The family labour which includes unpaid labour supports the market works and also the reproduction of working classes. The capitalist production process doesn't provide all the needs for a family and hence their very reproduction is crucially dependent on women's household works. Due to lack of adequate wages which brings income insecurity to a family and also because of lack of adequate state support measures women are forced to engage in subsistence production or "domestic economies" (Naidu and Osome, 2016). These are mainly women's invisible works. The whole process subsidizes the capital accumulation process of capitalists given the presence of inefficient inadequate social welfare programme and the absence of living wage.

Table 2.1: Female usual activity status distribution (for all ages), 1983–2012

	Rural						
Activity status(PS)	1983	1987-88	1993-94	1999-2000	2004-05	2009-10	2011-12
Self employed& unpaid family worker(1)	21	22	18.5	11.4	13.6	10.2	9.4
Regular wage work(2)	1.6	2.1	1.3	0.9	1.2	1.1	1.3
Casual wage work(3)	18	17	17	11	9	9	6.8
all domestic(4)	29.8	27.3	34.4	36.3	35.5	39.9	42.2
domestic duties only(4a)	15.9	15.1	15.7	20.3	17.5	22	18.5
Domestic duties & allied activities(4b)	13.9	12.2	18.7	16	18	17.9	23.7
Unemployed(5)	0.6	1.4	0.5	0	0.8	0.5	0.5

Education(6)	7.6	7.2	11.7	18.4	21.3	23.8	25.1
Others(7)	21.4	23.1	16.2	22.4	18.4	15.6	14.7
WPR(1+2+3)	40.6	41.1	36.8	23.3	23.8	20.3	17.5
LFPR(1+2+3+5)	41.2	42.5	37.3	23.3	24.6	20.8	18

Source: Naidu and Osesome(2016), Originally taken from Abraham(2013a)

The table 2.1 shows that women's participation on "all domestic activities" has been increasing over the period, but their LFPR has been declining. Income effect is one of the hypotheses put forward by many researchers for this declining trend. However, this hypothesis doesn't seem to be very convincing. There has been a lack of adequate employment creation in the economy. The period 2004-05 to 2011-12 shows high rate of economic growth. Surprisingly around 30.3 million agricultural workers withdrew from the labor force in rural India. Out of that 24.6 million (81.6%) were women. Out of the 25.7 million total jobs created in the non agricultural sector in rural India, only 4.6 million were for women (Thomas, 2014; Naidu and Osesome, 2016). Kannan and Raveendran(2012) argue that out of all the women who withdrew from the labor force during the period a large share belongs to economically poor households of rural areas. A very tiny portion of women who withdrew is from economically well off households. This challenges the "income effect" hypothesis behind the declining trend. This leads us to admit that although the role of income effect can't be ignored in case of the decline in FLFPR in India, but the income effect alone can't explain the decline fully.

Further, during 2003 and 2013 there has been an increase in the income inequality between land rich and land poor households. Along with that there has been an increase in women's participation in "domestic and allied activities" during this period. It indicates households tried to compensate the loss in income or income deficit or the gap between incomes of poor and rich by increasing time spent by women in non-capitalists subsistence production. It implies withdrawal

of women from the market works is nothing but an indicator of reproductive crisis (Naidu and Osome, 2016; Naidu and Rao, 2018). Failure of Indian economy to provide decent livelihoods to people leads to women's withdrawal from labor force and become "invisible workers" in order to support the reproduction of the family. The reproduction of a household is dependent on the works of women. Neoliberal capitalist expansion hardly recognizes the reproductive aspects of women's labor. Household consumption can be considered as a function of a gender subsidy to capital. Women are trapped by this subsidy in reproducing household economy. Therefore these studies argue that decline in FLFPR is a result of reproductive crisis. In contrast to the literature covered so far which concentrate on the supply side factors behind decline of the FLFPR, this line of research pays attention to the demand side factors, as well as political economic changes.

It has been believed that the domestic and household works are "status producing" activities for the family. According to Abraham (2013a) and Papanek(1979) such status production activities include attending to children's education, healthcare of the family, engagement in rites and rituals and so on. Papanek(1979) identifies three categories of status works of women. The first category of status production activities of women includes the support works that occur from the demands of income earning activities by other family members. Second category of status production activities includes the training of children. Women's status-production work in this category includes training children in status-appropriate behavior, appearance, physical and intellectual skills, health, and presentation of the self. The third category of status production activities is known as "the politics of status maintenance". Examples can be exchanging formal and informal gifts between families that accompany ceremonies, conveying information: gossips that establishes or injures family status, preparation of feast that validate family status in a

society. The rituals and religious performances are included in this category. (Papanek,1979). Status is defined by this paper as “collectively shared assessment evaluation of a societal unit on the basis of certain objective characteristics of the unit.” (Papanek, 1979). All these activities enhance the social status of the family. However these “status producing activities” in Indian societies hinders the participation of women in the labor force (Eswaran et. al, 2013).

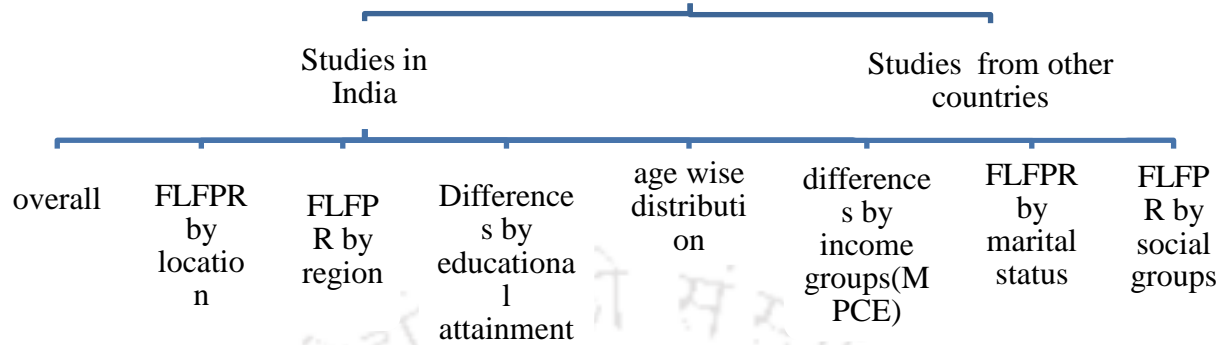
Hirway(2015) points out that unpaid domestic works of women are not recognized by production system. These are out of the regime of System of National Accounts⁹(SNA). Incorporating these works in the conventional macro economic framework is important. The time use survey of India indicates that the distributions of these unpaid works are unequal between men and women. It has been reported that for the age group of 15-59 years, about 60% of women, who were out of the labour force were part of domestic chores. For male this figure was less than 1% according to Periodic Labour Force Survey (PLFS) of 2017-18¹⁰. Besides, these unpaid works are low-productive and inferior in terms of working conditions, exposures, perks, benefits and all. The patriarchal traditions and gender norms are the factors behind the unequal division of works between the two genders. These unpaid non-SNA¹¹ works are “time tax” on women throughout her life cycle (Hirway, 2015).

2.2. Empirical findings

2.2.1. Trends of FLFPR in India

This section discusses the various trends associated with female labor force participation in India. The following diagram gives us the roadmap of this section.

FLFPR Empirical Trends



Empirical studies in India:

- *The overall trend:*

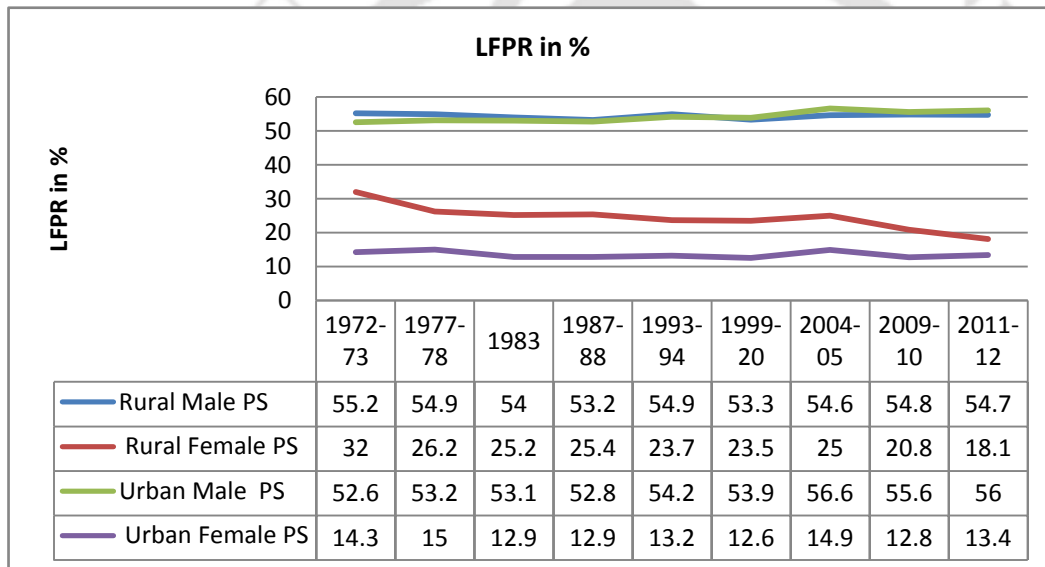
In the recent few decades the share of females in the labor force has been declining. The female LFPR has been significantly low and moving down at least since 1972-73. This has been called “de-feminization” of labor force (Abraham, 2013a).

The jobless growth period of Indian labour market i.e 1993-94 to 1999-2000 was followed by the period of robust employment growth covering from 1999-2000 to 2004-05. The fall in income due to agricultural stagnation forced the non working population to enter the labor market (Abraham, 2013a). The “dramatic collapse in the employment” during 2004-05 to 2009-10 was surprising given the GDP growth rate of 8% per annum and an annual population growth rate of 1.74% (Chandrasekhar and Ghosh, 2011). Both employed and unemployed were withdrawing from the labour force. Many researchers argue that “missing female labor” or withdrawals of females from labour force was one of the most important factors behind the slowdown (Chandrasekhar and Ghosh 2011; Rangarajan et al 2011; Kannan and Raveendran 2012). The existing data shows that in case of rural female the LFPR (UPS)¹² dropped from 32% in 1972-73 to 18.1% in 2011-12 except for the distress affected year 2004-05 (Abraham, 2013a).

In the following pages we review the behaviour of FLFPR across different dimensions in India: rural-urban, across regions, across age groups, across educational attainment groups, across per capita expenditure categories, marital status, caste, religion, etc.

- *FLFPR by location: Rural/urban*

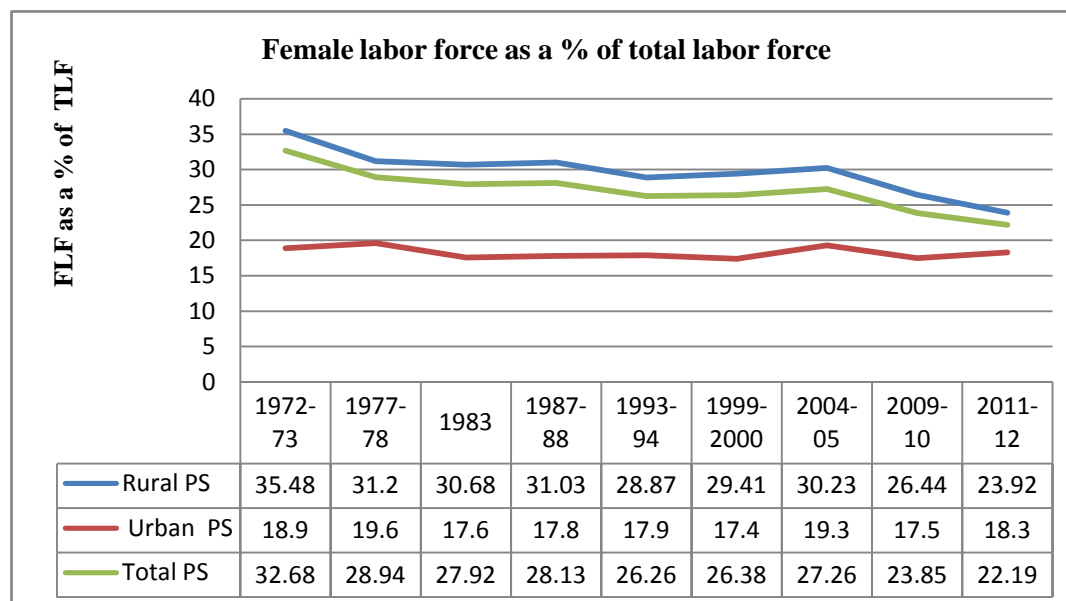
Figure 2.2/Table 2.2: LFPR in percentage



Source: Abraham (2013a)

The above table depicts that Rural female LFPR according to principal status has been declining since 1972-73 till 2011-12, except the sudden increase during 2004-05 which was mainly distress driven. In 1972-73 it was 32% and it came down to 18.1% in 2011-12. The urban FLFPR is always at a lower level than that of rural FLFPR. The decline in urban FLFPR is not that sharp. In 1972-73 it was 14.3% and it came down to 13.4%. During the whole period the trend was fluctuating around 13/14%.

Figure 2.3 / Table 2.3: Female labor force as a percentage of total labor force



Source: Abraham (2013a)

When we analyze the rural urban trends of female labor force as a percentage of total labor force then we can see that rural women's share in the total labor force (considering the principal status) came down from 35.48% to 23.92% during 1972-73 to 2011-12. The urban share is slightly declining, though almost stagnant around 18%.

- *FLFPR by region*

Table 2.4: Levels and trends in FLFPR by region (%)

Regions	Participation rates 2009-10			Change in participation rates, 1983-84 to 2009-10		
	Paid	unpaid	LFPR	paid	unpaid	LFPR
North	23.2	12.2	36	-16.2	-14.1	-14.3
Centre	22.6	18.4	41.1	-14.1	-30.3	-22.2
North-east	17.3	13	31.6	-19.2	120.3	14.9
East	15.3	7.1	22.6	-45.6	-34.9	-42.5

West	30.1	15.1	45.7	-25.1	-19.3	-22.7
South	38.5	11.4	51	-15.8	-19.1	-15.3
India	26	13.1	39.6	-22.8	-24.3	-22.7

All participation rates are based on UPSS

LFPR=sum of paid, unpaid¹³ participation rates and unemployment rate.

Source: Lahoti and Swaminathan(2013).

Lahoti and Swaminathan(2013) present a regional picture of FLFPR and its trends as well as compositions(Table 2.4). They consider the age group of 25-59 years for their analysis. Within regions the picture varies highly in terms of levels and trends of FLFPR. The FLFPR was the lowest in the Eastern states in 2009-10, South showed the highest participation rate. The decline or the change in FLFPR is the highest in the Eastern region itself. The decline is the least in the Southern states of India. It has been observed that in North Eastern region the long term trend of female labor force participation shows a positive change. This upward movement is driven by increase in the share of unpaid works which are mainly family farms and enterprises based works (Lahoti and Swaminathan, 2013).

Table 2.5: Levels and trends in sector wise composition of women by sector and region (%)

	Sector wise composition of women in the workforce 2009-10					Change in sector wise composition of women in the workforce 1983-84 to 2009-10				
	agri	manufac uring	Construct ion	Servic es	mini ng	Agri	Manufac turing	Construct ion	Servic es	Mini ng
North	70.1	6.4	2.4	20.9	0.2	-15.5	38.8	637.3	73.9	119.5
Centre	76.9	5.5	8.8	8.7	0.2	-11.4	-7.1	806.5	45.2	-61.4
North- east	67.9	4	9.6	18.3	0.2	-9.9	-55	2686.4	21.4	-37
East	59.4	18.7	4	17.4	0.6	-23.4	79.4	691.1	57.7	-2.9
West	72.3	5.9	1.8	19.9	0.2	-12.9	3.1	14.5	107	32.2
South	61.4	14	5.6	18.5	0.6	-18.6	33.6	428.8	45.8	37.3
India	68.4	9.8	5.6	15.8	0.4	-15.3	23.2	477.1	58.8	-8.1

Notes: Definition of Region: North – Jammu & Kashmir, Himachal Pradesh, Punjab, Haryana, Delhi and Chandigarh; Centre – Uttar Pradesh, Rajasthan and Madhya Pradesh; East - Bihar, Orissa and West

Bengal; West - Gujarat, Maharashtra and Goa; South – Andhra Pradesh, Karnataka, Tamil Nadu, Puducherry and Kerala; North-East – Sikkim, Assam, Arunachal Pradesh, Nagaland, Mizoram, Manipur and Tripura. Data for states created in 2000 (Jharkhand, Chhattisgarh and Uttarakhand) were merged with the original states to maintain comparability over time periods.

Source: Lahoti and Swaminathan(2013)

The Eastern region shows some peculiar trends. There is a huge share of women employed in manufacturing sector despite being one of the poorest parts of the country. The share of women employed in manufacturing in this region during 2009-10 was 18.7% which was almost double that of national average of 9.8%. This is probably because many women in this region are engaged in manufacturing of tobacco products and products out of woods (other than furniture) (Lahoti and Swaminathan, 2013). Women in North East India seem to be employed more in construction than manufacturing. The western region shows complete opposite trends where women employment share in construction is the lowest (Lahoti and Swaminathan, 2013; table 2.5).

Table 2.6: Levels and trends in type of employment among women in the workforce by region (%)

Type of employment among women in the work force,2009-10							
	self employment		contributing family workers		wage	casual workers	
	ag.	non ag.	ag.	non ag.		ag.	non ag.
North	33.1	6.1	32.1	2.4	17	4.9	4.4
Centre	13.7	4.7	41.6	3.2	5.5	21.4	9.8
North-east	12.1	7.3	39.6	3.2	14.2	12	11.6
East	8.5	13.9	24.4	7.3	10.3	26.1	9.5
West	7.7	7.3	30.3	3.1	12.7	34.2	4.7

South	5.7	9.6	16.5	6.3	12.5	39	10.5
India	10.7	8	29	4.6	10.5	28.4	8.8

Source: Lahoti and Swaminathan (2013)

The national aggregate level picture shows that in 2009-10 the highest employment share of women was in casual works when we combine both agriculture and non agricultural, followed by family enterprises or farms based works. In the North highest employment share was in agriculture based self-employment. In case of the Centre family based agricultural work share dominates other employment opportunities. The North-East gives the similar picture. In the East the share is highest in agricultural casual works. Even in the West the share is highest in agricultural casual works. The picture that we got from the South is also similar as the East and the West where agricultural casual works dominate.

Lahoti and Swaminathan(2013) report that during 1983-84 to 2009-10 in case of the North there were declines in agricultural self-employment workers share, though there was an increase in non agricultural self employed category workers. In the North East there is a huge increase in workers engaged in family farms or enterprises including both agriculture and non agriculture works. The Central India shows increase in casual workers mainly engaged in non agricultural works. Except the West, almost in all other parts of India non agricultural casual female workers' share increased during that period. This perhaps indicates a shrinking of employment opportunities in the agricultural sector in certain parts.

- *Age wise distribution*

Table 2.7: age wise distribution of Rural FLFPR per 1000 as per Usual Status

Age groups	1993-94	1999-2000	2004-05	2009-10	2011-12
5-9	14	7	3	4	1
10-14	142	96	75	36	30

15-19	371	314	331	195	164
20-24	470	425	435	314	297
25-29	528	498	530	404	369
30-34	587	557	593	434	431
35-39	610	579	642	497	481
40-44	607	586	627	498	482
45-49	594	566	616	492	484
50-54	543	515	562	485	444
55-59	468	450	509	411	394
60 and above	241	218	254	226	213
All(0+)	331	302	333	265	253

Source: Sanghi et al. (2015)

Table 2.7 shows for the age groups 5-9 years and 10-14 years there has been a continuous decline in FLFPR during 1993-94 to 2011-12. It is to be noted that rural females of this age group are in the school going phase. However, this decline was not restricted to this age group alone. All other age groups show declines in FLFPR during 2009-10 and 2011-12 after the sudden increase in 2004-05.

In order to find out what happened with the women of 15+ age group, who are not in education institutions, Sanghi et al.(2015) tried to see the trends of women employed in activity status “attended domestic duties” and “attended domestic and allied activities” as defined by NSSO.

The following table summarizes the findings:

Table 2.8: Females engaged in NSSO activity codes 92 and 93 per 1000 population (age group 15 plus)

NSSO Rounds	1993-94	1999-2000	2004-05	2009-10	2011-12
Urban	65	65	63	64	64
Rural	56	54	52	57	60

Note: Code 92: Attended to domestic duties only; Code 93: attended to domestic duties and also engaged in free collection of goods, sewing, tailoring, weaving etc for household use.

Source: Sanghi et. al (2015)

Table 2.8 shows that the proportion of rural females who reported to be engaged in domestic duties and also in domestic and allied activities has increased from 56 percent to 60 percent during the period 1993-94 to 2011-12. The urban figure is almost stable at around 64 percent. The age group considered here is 15 plus. Therefore, it implies women who are not in the school going phase their participation in the domestic and allied activities has increased, especially since 2004-05.

Table 2.9: Change in Female Labor Force Participation Rate in Rural and Urban India, by Age Group

age	Change in Rural FLFP Rate			Change in Urban FLFP Rate		
	1993-05	2005-12	1993-12	1993-05	2005-12	1993-12
a)15 to 24	-2.9	-14.2	-17.1	2.6	-6.3	-3.7
b)25-34	1.4	-13.6	-12.3	3.5	-3.8	-0.3
c)35-44	2.8	-12.9	-10.1	3.5	-6.5	-3
d)45-65	2.8	-9.7	-6.9	0.5	-3.5	-3.1
e)65 plus	1.4	-3.5	-2.1	0.7	-1.7	-1

Source: Andres et al.(2017), few calculations are added

The above table taken from Andres et al. (2017) shows the changes in FLFPR in rural and urban India by age groups. Across all the years both in rural and urban areas the highest decline occurred in 15-24 age group, when we consider this age group separately. The decline for the age group 25-65 years as a whole is the highest during 1987-1999 and 1999-2009 as argued by Afridi et al. (2016).

- *Participation by educational attainment*

Table 2.10: Level of Education Attainment and LFPR of Women excluding those undergoing Education

	1983	1987-88	1993-94	1999-2000	2004-05	2009-10
--	------	---------	---------	-----------	---------	---------

Rural						
Not literate	44.8	46.5	43.1	28.7	30.8	25.8
Literate but less than primary	44.7	35.6	44	28.6	33.2	30
Primary	43	45.3	41.9	30.8	33.2	30.6
Middle	37.5	41.8	36.2	25.5	32.2	28.7
Secondary	50.2	53.8	40.3	26.2	32	24.9
Graduate and above	56.7	63	61.2	46.2	41.9	32.4
Total	44.6	45.7	42.8	28.6	31.7	27.2
Urban						
Not literate	29.3	28.7	28.1	15.6	17.4	13.8
Literate but less than primary	29.3	27.4	28.5	15	19.2	16.6
Primary	26	26.9	27.1	14.4	19.6	17.6
Middle	22.4	25.1	23.8	13.5	15.3	16
Secondary	42.8	40.6	34.6	16.8	15.1	12.5
Graduate and above	61.1	61.6	57.2	33.7	32.3	26
Total	30.9	31.4	30.6	16.8	19.8	17.3

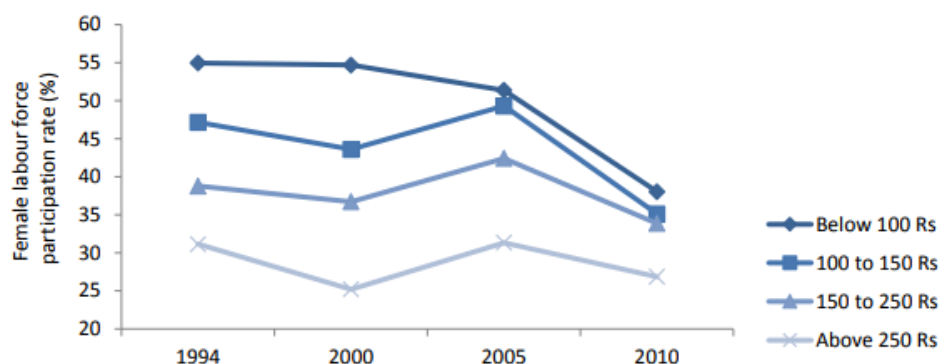
Source: Abraham(2013a)

In Table 2.10 LFPR has been calculated by excluding those women who are participating in education as they are not part of the current labor force. For graduates and above, in the rural areas, the LFPR has been declining since 1987 to 2009-10 from 63% to 32.4%. In case of urban areas this decline was from 61.6% to 26%. The table confirms that across all levels of education FLFPR declined. This makes the “increased educational enrollment” as an explanatory factor doubtful. This is because, we can see from the table that the decline happened not only among highly educated women, rather it happened even among illiterate.

- *FLFPR by expenditure groups(MPCE)*

Figure 2.4: Female Participation rate by monthly per capita expenditure (constant Rs.)

Figure : Female participation rates by monthly per capita expenditures (constant Rs.)



Source: Kapsos et al. (2014)

Considering MPCE data collected by NSSO (which can be taken as a proxy for household income) it is possible to see across income classes how female labor force participation varies. Kapsos et al. (2014) calculated the real value of MPCE using headline CPI deflators and the changes in living standards. It can be seen from the above figure that participation is the lowest among the highest income group and it is highest among the lowest income group. The notable thing is that the decline in FLFPR over time is sharpest in the lowest income category.

- *Female LFPR by marital status*

Table 2.11: FLFP Rate by Marital Status in Working Age Population

Years	Rural		Urban		
	Currently married	not married	Currently married	not married	Currently married
1993-94	37.3		49.2	25.2	22.8
1999-00	33.7		46.7	22.4	20.3
2004-05	37		50.8	28.2	24.9
2009-10	28.6		38.5	22.4	18.9
2011-12	26.7		38.4	24	20

Source: Andres et al. (2017)

It can be seen from the above table (table 2.11) that Female LFPR of currently married women in rural India is always higher than that of unmarried women. However the picture is different in urban India. In urban India the female LFPR of currently married women is always marginally lower than that of unmarried women. There is a clear declining trend in female LFPR in rural areas in both the categories, currently unmarried and married. There is no sharp declining trend in female LFPR in urban India. Irrespective of marital status the trend is fluctuating slightly or stagnant in urban India. The FLFPR in urban areas irrespective of marital categories is lower than that of rural FLFPR. There is an upward jump in female LFPR in all the four cases in 2004-05 and this can be distress driven.

- *Female LFPR by social groups*

Table 2.12: FLFP Rate by Social Group

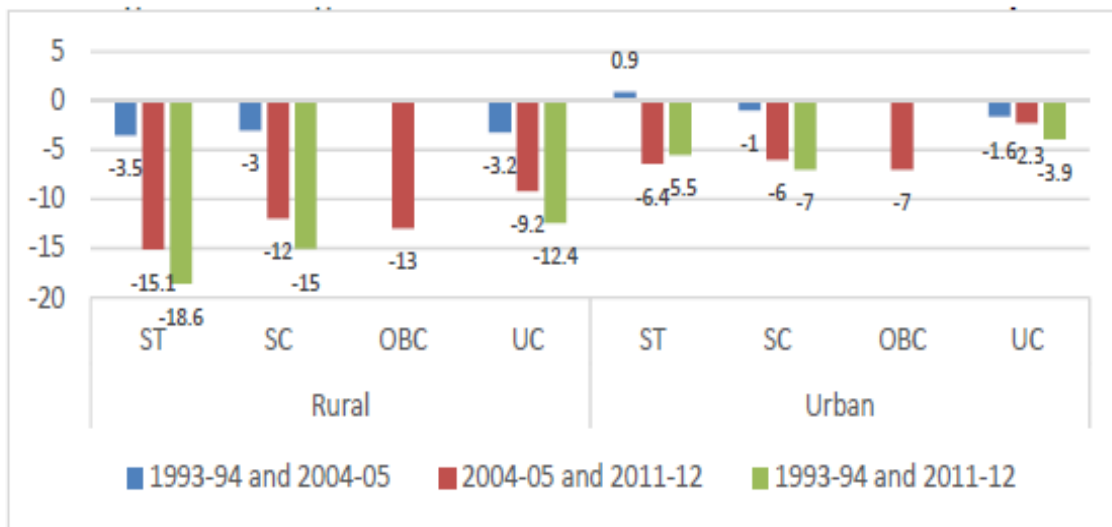
Years	RURAL FLFPR				URBAN FLFPR			
	ST	SC	OBC	UC	ST	SC	OBC	UC
1993-94	66	51.5	--	41.3	36.6	31.7	--	21.7
1999-00	62.7	48.8	43.6	32.2	34.5	27.2	24.4	16
2004-05	62.5	49	46.4	38.1	37.5	30.7	28.8	20.1
2007-08	54.6	44.1	40.7	30.7	33.1	23.5	21	15.7
2009-10	46.4	38	35.6	28.1	31.7	25.8	20.9	15.4
2011-12	47.4	37.3	33.4	28.9	31.1	24.7	21.8	17.8

Source: Andres et al. (2017)

Social groups and cultural norms seem to have significant impact on female labour force participation decision. In India caste is closely associated with the class or social and economic status of different communities. This is reflected in the data of caste and labour force participation rate (Table 2.12). Women belonging to “lower” castes generally have less income

and therefore they may be forced to enter the labour force. On the other hand “upper” caste women in Indian societies generally face social stigma attached to market works which prevents them from entering into the labour force. It can be seen from the above table (Table 2.12) as well as from the figure that FLFPR is the highest among ST women both in rural and urban areas followed by SC, OBC and Upper Caste.

Figure 2.5: Change in FLFP rate over time across social groups



Source: Andres et al.(2017)

It is observed that though ST women have the highest participation in labor force, they faced the highest drop or decline in rural areas by 18.6 percentage points during 1993-94 to 2011-12. The upper caste women had the lowest decline of 12.4 percentage points in rural areas and 3.9 percentage points in urban areas.

What is the overall, broad picture which can be inferred based on the above empirical observations and analyses? We offer the following comments. . It has been observed that the

rural female LFPR showed a sharp decline over last few decades. The urban FLFPR didn't show any sharp declining movement, but the rate has been always lower than that of rural figures. In terms of female LFPR and its compositions the regional picture in India is quite diverse. The Eastern part is the lowest performing region in terms of FLFPR and the Southern part is the best performer. Despite being one of the poorest parts, in Eastern region the highest employment share of women was in manufacturing sector. Looking at the FLFP composition across social groups, it can be seen that ST had the highest participation and at the same time they had the highest decline in terms of FLFPR. In rural areas, FLFPR for married women is higher than that of unmarried women and the picture is opposite in urban India. The decline in FLFPR is clearly visible across both the categories in rural areas. Across the expenditure groups, it is observed that the highest income had the lowest participation, but the decline in FLFPR is the highest among the lowest income groups. The age wise distribution shows that the 25-65 age group all together shows the highest decline in FLFPR. Sectoral composition of women workers in agricultural and non-agricultural sector shows that across all major regions of India, huge shares of women workers are engaged in agriculture sector as compared to non-agricultural sector. However, over the years the share of women workers in agriculture sector showed some declines and it was visible across all the regions.

2.2.2. Review of other countries' female LFPR

There are ample studies on female labor force participation across various parts of the world. The following section presents a brief overview of the trend, patterns and other aspects of female LFPR from various countries based on the available literatures.

- There are few works on female labor force participation in middle-east countries. Tansel(2001) found evidences in support of U shaped relationship between female labor

force participation rate and economic development in Turkey. Female education has a strong positive effect on FLFPR. Chapman(2015) points out that the female labor force participation rate in the Middle East and North African (MENA) region is significantly lower. The econometric analysis of this paper found evidences in support of U shaped relationship in that region. Cakir (2008) studies the effect of economic development on female LFPR during 1980-2000 in Turkey. Five different econometrics models have been used and some other variables in addition to economic development have been used to analyze their effects. Economic development, unemployment patterns, urbanization rate and total fertility rate have negative effects on female LFPR, as per his empirical results. On the other hand education and agriculture share in employment were found to have positive effects. Broadly, these studies confirm the existence of U shaped relationship between female LFPR and economic development in the middle-eastern countries.

- Coming to the African countries, Bbaale(2014) analyzed the relationship of FLFPR with female education and fertility rates for Uganda. Female education beyond secondary and post secondary level reduces the fertility level and it increases the probability of females to be engaged in the labor force. Kevane and Wydick(2001) argue that in Burkina Faso the social norms determine the time allocation decision of women workers. Their focus groups were two ethnic groups Mossi and Bwa. Among Bwa group husband's farm capital has significant impact on time allocation of woman labour, but that effect is not visible in case of Mossi group. No particular relationship between female LFPR and economic development has been identified in these African countries.
- There have been extensive works on female LFPR in South and East Asian countries. Cameron et al. (2001) investigates the role of education in female labor force

participation in five countries namely Korea, Thailand, Sri Lanka, Indonesia and Philippines. Their theoretical framework is based on collective model of household bargaining. They used probit analysis on their binary choice model where the dependent variable is a zero-one dummy variable where 1 is when wife participates in the labor markets. The relationship between the studied variables differs from country to country. It has been found that tertiary education has significant positive impact on females' participation in labor market in all the Asian countries except Korea, where it has very negligible role. Except Indonesia and Sri Lanka in all other countries primary and intermediate education has little impact. In countries where gender roles are very rigid increase in education seems to have no effect in increasing female LFP. Chaudhary and Verick(2014) present a comparative analysis of female labor force participation in South Asia, focusing on India. In Pakistan and Bangladesh FLFPR have increasing over the last decades. In Sri Lanka this rate is almost stable. Fatima and Sultana (2009) examine the relationship between female LFPR and economic development in Pakistan using pooled data. Some other control variables have been incorporated in their empirical tests. The results confirm that there exists an U shaped relationship between the two. Mujahid and Zafar(2012) analyze the relationship between economic growth and female LFPR in Pakistan over the period of 1980-2010. Their empirical tests confirm the U shaped relationship between the two variables both in long as well as short run. Their results of Granger Causality Test indicate that there exists a unidirectional causality from economic growth to female labor force participation in the long run. Mukhopadhyay(1999) has some interesting results on female works in South Asia, mainly from 5 South Asian Countries Bangladesh, India, Nepal, Pakistan, Sri Lanka. It has been reported that in this

region the women work longer than male counterparts. This is unfortunately not recorded in official data sources because the household works are not counted as 'productive'. Sasaki (2002) found that staying with own parents or in-laws have positive effect on female LFPR of Japanese married women when controlling for endogeneity of family structure.

- Clark et al. (1991) found that women in Latin American and Islamic countries participated less in the labor force during 1980s. This happened due to religious rigid norms regarding women's works in these countries.
- Brusentsev's (2006) paper is based on the US data and examined changes in the employment choice of prime working age women for the period of 1967 to 2003. There has been an increasing trend in female LFPR in the US which has been slowing down since 1990.

The picture on female LFPR across the world can't be generalized. Based on the above analysis we can see that the picture is quite diverse all around the world. Some major studies have confirmed existence of aU shaped relationship between female LFPR and economic development in middle-eastern countries. The existing literatures from African countries don't reveal any particular relationship between female LFPR and economic development. Among the South Asian countries, Pakistan and Bangladesh have increasing female LFPR over the last decades. In Sri Lanka the rate is stable. Existence of U shaped relationship in Pakistan has been identified by few papers.

2.2.3. Female LFPR in Assam: Trends and overview

There are not many studies on female labor force participation of Assam. The declining trend of FLFPR is visible in Assam like the rest of the country. This can be seen from NSSO data which we extracted from various NSSO Employment and Unemployment Survey rounds.

Table 2.13: LFPR (no of persons/person days in the Labour Force per 1000 persons/person days) for persons of age 15 years and above according to usual status (ps+ss) in Assam

year	Rural		Urban	
	Male	female	Male	female
2011-12	831	179	770	125
2009-10	872	256	806	149
2004-05	872	328	820	169

Source: Various reports of NSSO Employment and Unemployment Survey

The declining trend of FLFPR can be easily observed from the table 2.13. The female labor force participation rate is significantly lower than male LFPR both in urban as well as rural areas. Both in rural and urban areas the LFPR is declining. The decline in female LFPR in rural areas is faster than that of the decline in male LFPR. In urban areas this decline is not very sharp.

Table 2.14: Changes in the Rural Female LFPR (age 15+) and NSDP between 2004 and 2010

LFPR 2004/20 05	State Share of Total Populati on of Working - Age Rural Women 2004/20 05	LFPR 2009/20 10	State Share of Total Populati on of Working - Age Rural Women 2009/20 10	Percenta ge point change in LFPR	NSDP 2004/0 5	NSDP 2009/1 0	Percenta ge point change of NSDP per year

Arunachal Pradesh	64.9	0.1	44.68	0.11	-20.22	3185	4727	9.68
Assam	34.13	3.09	25.6	3.26	-8.53	47181	60653	5.71
Manipur	48.55	0.23	32.67	0.21	-15.88	4603	6083	6.43
Meghalaya	76.86	0.25	56.4	0.28	-20.46	5846	8568	9.31
Mizoram	63.66	0.06	59.7	0.06	-3.96	2400	3805	11.71
Nagaland	75.16	0.08	48.76	0.12	-26.4	5421	7739	8.55
Sikkim	47.93	0.06	47.45	0.06	-0.48	1511	2664	15.26
Tripura	18.71	0.42	33.57	0.41	14.86	8170	12210	9.89

Source: Neff et al.(2012)

It is noted that LFPR in Tripura increased from 2004-05 to 2009-10 (Table 2.14). All other NE states are in line with national declining trend. While it is a positive sign for the state of Tripura, Assam is the second last in terms of rural FLFPR for 15 plus age group during 2004-05 and it became the last one in 2009-10. The highest decline occurred in Nagaland. The low level of rural FLFPR in Assam, the biggest of the Northeastern states, is a challenge for the policy makers. It opens up the possibilities of relevant research questions for researchers which will be taken up later on in this chapter.

2.3. Various hypotheses behind the declining trend: the Indian context

Many papers suggest various hypotheses and explanations behind the declining trend of female labor force participation. The following section gives an overview of those factors behind the declining trend.

- *Educational effect*

This hypothesis suggests that the recent de-feminization of labor force has something to do with increased level of girls' educational enrollment. Data shows that educational enrollment has

increased in India. It has been put forward by researchers such as Rangarajan et al., (2011) that due to increased educational enrollment the LFPR has been declining. If we consider this argument as valid then it should be the case that the decline in female LFPR would be compensated by the increase in educational enrollment later on. This evidence has been supported by some studies (Mahapatro, 2013; Rangarajan et al., 2011). Rangarajan et al. (2011) points out that during 2004-05 to 2009-10 out of the women who withdrew from the labor force around 44% were engaged in education.

When we consider this hypothesis, there may be two effects. It may happen that girls are going to schools and hence they are withdrawing from the labor force. There can be another effect. Even after getting education and capable of working in the market, sometimes women withdraw themselves from the labor force. Both the effects are to be counted here.

It can be seen from the existing data that the female LFPR of the highest educated, graduates and above declined from 63% to 32.4% in rural areas and in urban areas it declined from 61.6% to 26% during the period from 1987 to 2009-10 (Abraham, 2013b).

It may be the case that in India higher education is playing the role of incentive towards withdrawal of women from the labour force. From the Table 2.15 it can be observed that due to educational enrollment there was a decline of 10.46 million women in the labour force and work force. This raises a question why educated women are getting discouraged to enter the labour market? Abraham (2013b) gives three lines of arguments. According to his paper education doesn't necessarily increase the autonomy of females, but sometimes it helps in internalizing and modernizing patriarchal norms. The second set of explanations point towards the various kinds of gender discrimination at the workplaces and also the stigma attached to women's paid work in

Indian societies. The third set of argument shows that in India societies parents prefer to send girls to general arts and science education, which have low market demand.

Increase in educational enrollment explains only part of the decline (Kannan and Raveendran, 2012). If we assume the same LFPR in 2009-10 that of 2004-05, there was a decline of 38.83 million women from the labor force. Only about 27% of the decline is due to educational enrollment (Kannan and Raveendran, 2012, refer Table 2.15). What happened to the remaining 28.38 million women is an issue which cannot be accounted for by higher enrollment. The withdrawal of women from the labor force happened mainly in rural areas than in urban areas. Besides the withdrawal is not restricted to one age group, but it occurred across all the age groups (maximum is in 30-34 age group). According to Kannan and Raveendran (2012) a large section of women who dropped out of the labor force are mainly from economically poor households and they are basically from rural areas.

Table 2.15: Accounting for the decline in labor force and workforce in 2009-10(in millions)

	male	female	total
A. Decline in Labor Force			
1. Decline in labor force	12.81	38.83	51.56
2. Decline due to education	12.75	10.46	23.20
3. Decline due to reasons other than 2		28.37	28.45
4. Share of those in 3 belonging to rural area(%)		83.00	
B. Decline in Workforce			
1. Decline in workforce	13.07	39.93	53.00
2. Decline due to education	12.75	10.46	23.21
3. Net decline after deducting 2	0.32	29.47	29.79
4. Addition to activity status 92 and 93	0.17	29.19	29.36
5. Residual	0.15	0.28	0.43

Source: Kannan and Raveendran(2012)

Table 2.16 gives some explanations on whether increased educational enrollment is capable enough to explain the declining trend of female LFPR across all the age groups or not. Andres et

al. (2017) calculated Combined Participation Rate (CPR) which is the sum of female LFPR and percentage of young females participating in Schools. They define CPR as the sum of “percentage loss of working age females from the labor force and the percentage gain in schools”.

Table 2.16: Female Labor Force Participation and School Attendance

	FLFP (1)	Rate (%)	% Young Females (15-24) in Schools (2)		Combined Participation Rate (%)(CPR) (1+2)	
	Rural R1	Urban U1	Rural R2	Urban U2	R1+R2	U1+U2
Panel I: Young Cohort(15-24)						
1993-94	42	18.3	10.7	31	52.7	49.3
2004-05	38.2	19.7	17.8	35.2	56.1	54.9
2011-12	22.7	14.5	32.8	45.7	55.5	60.2
Panel II: All(15 & above)						
1993-94	49	23.7	3.3	9.7	52.3	33.4
2004-05	49.4	24.4	4.9	9.9	54.3	34.3
2011-12	35.8	20.5	8.5	12	44.4	32.6

Source: Andres et al. (2017)

From Panel I, for the age group of 15-24 during 1993-94, the rural CPR was 52.7 percent and it increased to 55.5 percent during 2011-12 (Table 2.16). When we see the FLFP in rural areas for this age group then there is a decline from 42% to 22.7% over the period of time. This decline was more than compensated by the increase in educational enrollment gain. The increase in enrollment for the age group 15-24 was from 10.7 to 32.8%. In case of urban areas, the increase in CPR was 11 percent (from 49.2 to 60.2 percent). The decline in FLFP was very small from 18.3 to 14.5% which is around 3.8 percentage points during 1993-94 to 2011-12. There has been some increase in educational enrollment for this age group in urban areas as well. Therefore it

seems that the increased educational enrollment hypothesis is capable enough to explain the decline in female LFPR in case of 15-24 age group (Andres et al., 2017).

When the argument is extended to the entire working age group(15 and above) female then this hypothesis is not very appealing or sound. For this entire working age group the decline in rural CPR was 52.3 to 44.4 percent, while urban CPR declined from 33.4 to 32.6 percent. In case of rural areas we can see that the decline in FLFP was from 49 to 35.8 percent which is around 13.2 percentage point decline. This huge decline is not compensated by the increase in educational enrollment from 3.3% to 8.5% which is only 5.2 percentage point increase. It justifies the point that in case of working age females the decline in LFP was not because of increase in educational enrollment. It has been reported that in rural areas 62% of the total drop in FLFP during 1993-94 to 2011-12 was not because of educational enrollment, but due to some other factors (Andres et al., 2017).

All these facts lead us to conclude that educational enrollment is not a strong explanation behind the declining trend of female LFPR.

- *Social orthodoxy and domestication of women*

In India women's paid work is considered to represent low status of the family and is stigmatized (Abraham, 2013b ; Eswaran et al., 2013). With the path of upward social mobility a family status is represented by domestication of females and labor market participation of males (Eswaran et al., 2013 ;Mies 1982). The upper caste and class give importance to sexual purity and hence they prevent women from going for market work and as a consequence they stay in domestic works. The patriarchal norms which have been continuing since the past in Indian societies stigmatize

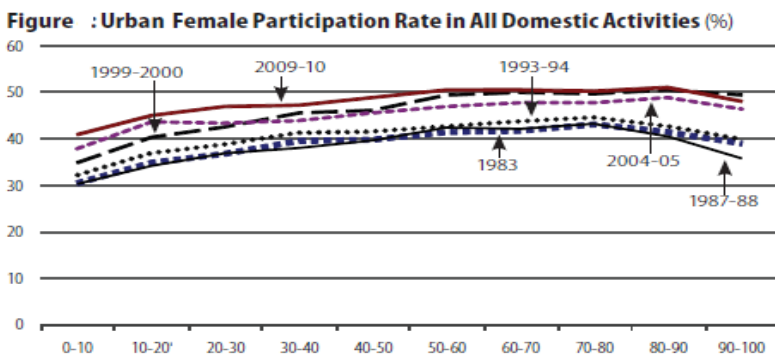
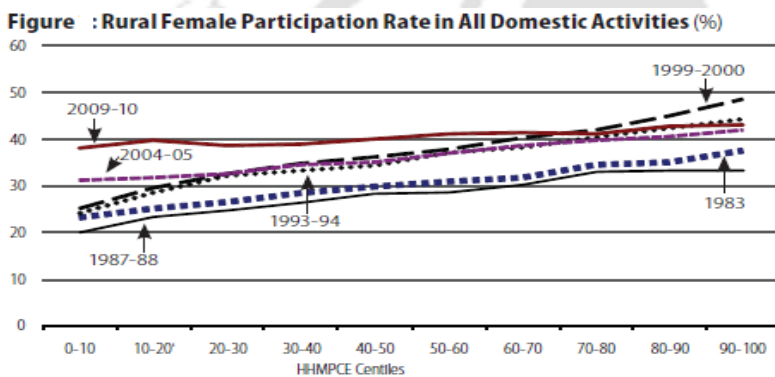
the paid works of women and it is considered that contacting the males from outside is “polluting”. It is believed that when women avoid paid works and stay at home that brings “sexual purity” to them and it creates higher status for the family (Eswaran et al., 2013). This is not the case with lower class women (Boserup, 2008; Abraham, 2013a). There may be the case that even the poor sometimes withdraw themselves from the labor force due to “sanskritization” effect. The idea behind the concept of Sanskritization is that the lower caste and class households sometimes imitate the status driven behavior of upper caste households in order to achieve higher status in the society (Eswaran et al., 2013). With rising household income the intra household income distribution becomes more skewed. In such situations women tend to substitute paid work in favour of “domestic status production activities”. The family’s desire to maintain its status is one of the determining factors of women’s time allocation between market works and unpaid domestic works (Eswaran et al., 2013).

There is a historical process in patriarchal societies and it assigns some gender specific roles to both its members. Women are assigned unpaid domestic works by this process. With rising household income the patriarchal norms can become stronger and women withdraw themselves from paid work and start to engage in status production activities. It is believed that the status of the family will go up with the domestic unpaid activities of women. These status producing activities are particular kinds of women’s works, which help in enhancing and maintaining the family’s social standing (Papanek, 1979). When a societal unit reaches a certain level of income, then only these activities are undertaken. At this level of income the family gets sufficient control over scarce resources to ensure the survival of the family.

It is reported that around 30% of the rural women were engaged in unpaid domestic activities in 1983, but it became 42% in 2011-12, for urban women it increased from 38.5% to 48%

(Abraham, 2013a). This increase occurred across all the age groups except the school going 5-15 age group. The relation between household income and women’s participation in domestic activities can be seen from the following figure (figure 2.6). It is clear that with rising income the participation rate has been increasing, both in urban as well as rural areas. The increased “domestication” of women can be a signal of the status creation concern that is attached to domestic works in Indian societies.

Figure 2.6: FLFPR in all domestic activities



Source: Abraham (2013a)

Eswaran et al. (2013) tested the role of status with empirical tests, backed by a theoretical framework. The theoretical model predicts the effects of caste based status concern on time

allocation of women. As one moves up along the caste hierarchy the ratio of women's market work to that of men declines. The ratio further declines with higher wealth.

- *Lack of generation of adequate productive employment*

This hypothesis proposes that due lack of generation of productive employment FLFPR has been declining. There has not been enough generation or availability of productive employment opportunities in India. Existing literatures and data show that a large chunk of women who dropped out of labor force are from rural areas and they belong to economically poor households. The number of upper class women who withdrew from the labor force is quite insignificant. Hence Hirway (2012) argues "withdrawal is not just social orthodoxy". Such withdrawal indicates that there is lack of generation of adequate productive employment in the economy (Hirway, 2012; Kannan and Raveendran, 2012). Chatterjee et al. (2015) similarly argues that the recent decades in India can be characterized by dramatic collapse in the number of farming jobs and there is not simultaneous emergence of non-farm employment opportunities.

The growth strategy of Indian economy generally targets the organized sector and the unorganized sector is neglected. This process creates a large section of workers who don't get benefits of this growth process. The growth path of Indian economy is not creating sustainable job opportunities to the labor force. Chowdhury(2011) opines that the financial crisis of 2008 hit the Indian labor market severely. Indian women who have been working in the export sectors were thrown out of work due to the crisis. Due to lack of enough employment opportunities in the later years, their jobs were not restored.

Apart from the above hypothesis, many researchers criticize the NSSO data for its inability in capturing the trend of female labour force accurately (Hirway, 2012). NSSO categorizes "non workers" or persons who are out of the labor force in eight segments. These are 91, 92, 93, 94,

95, 97, 98 and 99 categories. “91” category includes people who attended educational institutions, “92” includes people who attended domestic duties only, “93” category comprises of those people who are engaged in “domestic and allied activities as (a) free collection of goods such as vegetables, roots, firewood, cattle feed, etc, and (b) sewing, tailoring, weaving, etc. Rentiers, pensioners, remittances recipients, etc comes under 94 category ; 95 category includes people who do not able to work due to disability; 97 comprises of beggars, prostitutes ; 98 is a group of people did not work due to sickness and finally children of 0-4 age group comes under 99 category. The persons who come under “93” category are not considered as “workers” despite the fact that these activities come under the production boundary of United Nations-System of National Accounts (UN-SNA). It is not supportable to treat them as “non workers” according to Hirway(2012).

The whole analysis opens up various questions related to the “de-feminization” of labor force in Indian labor market that has been happening in the last few decades. It will be useful to sum up the possible explanatory variables which have the potentials to explain the changes in female LFPR. The next section will present a summary.

2.4. Determinants of Female LFPR: a concise sum up

Women’s labor force participation rate is influenced and affected by various socio- economic and cultural factors. Many of these factors have been identified and discussed by existing literatures. The following table presents the possible factors which can affect the female labor force participation rate.

Variable	Role of that variable	Empirical findings
<p>Education of the woman and her spouse/male</p>	<p>If the education is an investment in human capital then the recipient has to work in order to recover costs of education. If education is a consumption activity then the person will be encouraged to work because with higher education potential opportunity cost of not working is higher (Tansel, 2001, 2002; Bhalhotra and Aponte, 2010; Psacharopoulos and Tzannatos, 1989).</p> <p>With education initially the potential earning increases and hence the opportunity cost of not working rises. Thus the duration of work increases. As income further increases then income effect takes place. With higher income now people can afford some leisure and hence work less. (Tansel, 2001, 2002; Tsani et al., 2013).</p> <p>The theoretical model of Cameron et al. (2001) points out two channels through which education can affect LFPR: wage effect and the effect of enhanced bargaining power of the wife. They have a theoretical framework on this.</p> <p>Klasen and Pieters(2013) is of the view that at a very low education level women are forced to work. Women with very high level of education get very high income and that's why they are attracted towards market work. The women who are lying in between these two extremes don't face the need to</p>	<p>In Korea education have negligible effect on LFPR. Except Indonesia primary and intermediate education have negligible effect on LFPR in all other countries. In Asia no particular and single relationship can be observed between LFPR and education (Cameron et al., 2001).</p> <p>One year increase in female's education improves LFPR by 0.6 percentage points and each extra year of male education pulls down participation rate by 1 percentage point (Bhalla and Kaur,</p>

earn for the family, rather they face social stigma associated with market work and therefore they don't feel like entering into the market work. Mammen and Paxson(2000), Bhalla and Kaur(2011) suggest that high education level of men leads to a reduction in women's labor force participation, whereas if women's education increases it induces more women to enter into the labor market. (2011). Eswaran et al.(2013) reported that for higher caste households the effect of education on market works participation is weaker.

Wages of female and the male/spouse

When male wages increase it enhances the income of the family and due to income effect the female counterparts of the family withdraw from the labor market. When females' wages increase the relative strength of the income and substitution effect determines the labor force participation decision (Mammen and Paxson, 2000; Tansel, 2001). Negative relationship has been found between husband's wage and FLFPR (Mincer, 1962).

Initially men's education level increases by more than that of women's. Women's wages and opportunities to work change at a slower speed and hence negative income effect dominates the positive substitution effect and FLFPR declines initially (Klasen and Pieters, 2013, 2015).

There exists a positive relationship between wives' wages and their labor force participation rate. When husbands' current earnings are below the permanent earnings, then wives tend to work more. When the education level of the family head is

high, then response of labor force to both permanent and transitory income is low (Mincer, 1962).

Unemployment Rate	<p>The effect of unemployment on female labor force participation depends on the relative strength of “discouraged worker effect” and “added worker effect” (Tansel, 2001; Chapman, 2015; Cakir, 2008).</p> <p>With high unemployment rate women find it difficult to find a job as job search costs go up. Hence, women may feel discouraged to look after a job and they may drop out of labor force.</p> <p>The added worker hypothesis says that with the rise in local unemployment rate when men lose their jobs, then wives may join the labor force to compensate the loss of family income. Hence, there may be a positive impact of unemployment rate on female labor force participation rate.</p>	<p>Ozerkek (2013) shows that in European countries a long run relationship exists between LFPR and unemployment rate. The empirical results support presence of discouraged workers effects.</p>
Status Creation	<p>Bhalla and Kaur(2011) are of the view that in case of India as income increases higher income families prefer their women to stay at home. It is believed in Indian society that if women stay at home it enhances family’s status in the society.</p> <p>The restrictions on women activities outside the house has</p>	<p>The empirical results show negligible impact of cultural factors on FLFPR (Das and Desai, 2003).</p>

been carried out from past as an outcome of patriarchal norms as it has been considered that contact of females with males outside the house is “polluting” (Eswaran et al., 2013). Das and Desai (2003) argue that higher income families educate their daughters but these families are highly governed by social and cultural norms and hence restrict their daughters’ physical mobility outside their home. They use “caste” as a proxy for the cultural norms.

The ratio of women to men’s market works decline as one move up along with caste hierarchy (Eswaran et al., 2013).

Fertility

Chapman (2015) is of the view that when economy is dominated by agriculture sector then even if fertility is high it allows women to work in the family farms along with raising their children. As economy improves high fertility may be a hindrance in LFPR. This is because moving from agriculture to industry women with more children mayn’t find it possible to carry out industrial works along with her children. This is further constrained by slow growth in females’ education during the early stages of development. At a very high level of economic growth fertility declines and females’ get sufficient education to be employed in the white collar jobs. At this level FLFPR improves again (Hosney, 2016; Cakir, 2008; Pampel and Tanaka, 1986) High fertility is associated with the declining phase of U shaped relationship and low fertility coincides with the rising portion of U shaped relationship

The empirical findings of Chapman (2015) confirm the negative correlation between high fertility and female LFPR.

(Lahoti and Swaminathan, 2013).

Urbanization

The number of jobs available to women is determined by the degree of urbanization. Urban areas create more employment opportunities and in these areas social norms and stigmas are relaxed. Women face less restriction in their mobility outside the home in urban areas. Therefore higher the rate of urbanization higher will be the FLFPR. (Chapman, 2015; Tsani, 2013).

Chapman (2015) found an insignificant small positive effect of urbanization on LFPR of women. Here urbanization is measured as the total number of people living in urban areas over the total population of each country.



Marital Status

Marital status is found to have a great impact on female LFPR. Generally married women tend to have lower participation. Theories predict divorcee have higher participation rate (Johnson and Skinner, 1986).

Semyonov(1980) finds that divorce rate has strong effects on female participation.

Parkman (1992) argues based on his empirical results that in the US unilateral divorce rate resulted into higher participation of women in the market works.

Johnson and Skinner (1986) show from their panel data estimation that divorce probability increases labor supply of women. They have found that prior to 3 years of divorce women increases their labor supply in the USA.

Social

sector Higher social sector spending results into higher rate of FLFP In states where social

spending	(Das et al., 2015).	sector spending as a share of NSDP is one percentage point higher, there FLFP is 1.5 percentage points higher (Das et al., 2015).
Labor market flexibility	Das et al. (2015) argue that higher labor market flexibility ensures high rate of female labor force participation. Their probability of being employed also increases with labor market flexibility. To measure the flexibility of labor market they have used OECD's Employment Legislation Index.	Das et al.(2015) found evidence in support of their argument.
National Employment Guarantee Scheme(MNREGA)	<p data-bbox="487 1150 1222 1314">Kapsos et al. (2014) say that household who get access to MGNREGA work their women are more likely to participate in the labor market.</p> <p data-bbox="487 1478 1222 1776">MGNREGA has the provision of equal payment to both men and women along with child care facilities at the working site. Therefore it has been found that there has been a positive impact on female labor force participation rate (Lahoti and Swaminathan, 2013).</p>	<p data-bbox="1247 1150 1531 1451">A paper by Khera and Nayak(2009) show that in states like Bihar and UP women are prevented from joining MGNREGA works because of social norms. Despite all these social barriers MGNREGA jobs are relatively more</p>

attractive and acceptable for women. The paper found from the field survey that women consider these works as something which give some kinds of independence.

Presence of children in the household and child care cost The working mothers face the problem of choosing between child care and market work. (Garcia-Moran, 2010).

Powell (1997) found that child care cost has significant negative effect on married women's labor force participation decision and hours of work. Ribar(1992) found that the number of children and the presence of younger children have significant negative effects on married women's labor supply. In case of presence of older children this

effect is positive.

Child care cost discourages women to participate in the labor market (Ribar, 1992; Blau and Robins, 1988).

Labor demand/Employment opportunities Only supply side factors are not adequate enough to explain the changes in FLFPR. This is because these factors can't capture structural changes in the economy which result in changes in labor demand. Hence, this can be an important determinant of female LFPR. (Chatterjee et al., 2015)

The results from Chatterjee et al.(2015) confirms that the decline in job opportunities in India is capable of explaining the declining trend of female LFPR in the recent decades. Kannan and Raveendran (2012) and Naidu(2016) also emphasized on low employment generation

		for women.
Security of household income	A secured income earning household may not prefer to send their women to market works (Klasen and Pieters, 2013).	Negative relationship between secured household income and FLFPR has been found. (Klasen and Pieters, 2013).
Whether the woman is living with her in laws or not	If the woman is living with her in-laws she can share the child care responsibilities with them. At the same time it may happen that in a country like India living with in-laws may restrict her decision making power (Klasen and Pieters, 2013).	

The literature review opened up various gaps and questions that need to be addressed. Based on the inputs that I have got from literature survey I came up with following research questions.

2.5. Research Objectives and Questions

Research Objectives:

1. To explore the factors behind the changing female LFPR in India using panel data analysis.
2. To explore the nature of female LFPR in Assam using the unit level data of NSSO.
3. To develop a theoretical model of changing labour force participation of women utilizing the empirical inputs.

To comprehend the above objectives the following Research Questions have been formulated:

1. What are the factors behind the declining trend of female LFPR in India and how significant are they?
2. What are the important factors which affect the female LFPR in Assam?
3. Can a theoretical model of women's labour force participation be constructed to capture the empirical inputs??

The next chapter, i.e. Chapter 3 deals with the 1st research question. The second research question will be addressed in the Chapter 4. Chapter 5 targets the 3rd research question.

The research questions have been formulated in a way so that these can contribute something new to the existing research in this field and can fill the following gaps of existing literature.

- Considering almost all major Indian states in a panel study: very few studies have examined the causes of the decline of FLFPR across Indian states. The panel regression which will be presented in chapter 3 covering 15 states and time period from 1987 to 2011 is an extensive work.
- Assam specific studies on FLFPR are limited in number. My study on Assam using unit level data of NSSO Employment and Unemployment Survey fills that gap and it presents various insightful findings.
- The “status” concern, which maps to the caste hierarchy in India society, of Indian families is a very interesting and hugely relevant aspect to our research in that it is closely related to women's participation in labour market. That is a phenomenon should be

examined thoroughly. In my study a “status” variable has been devised and its role has been examined empirically.

- How to channelize the empirical findings to building theory is a frequently missing piece in the existing literatures. That gap has been filled with the theoretical model that I will present in chapter 5 which uses the insights and inputs received from empirical findings.

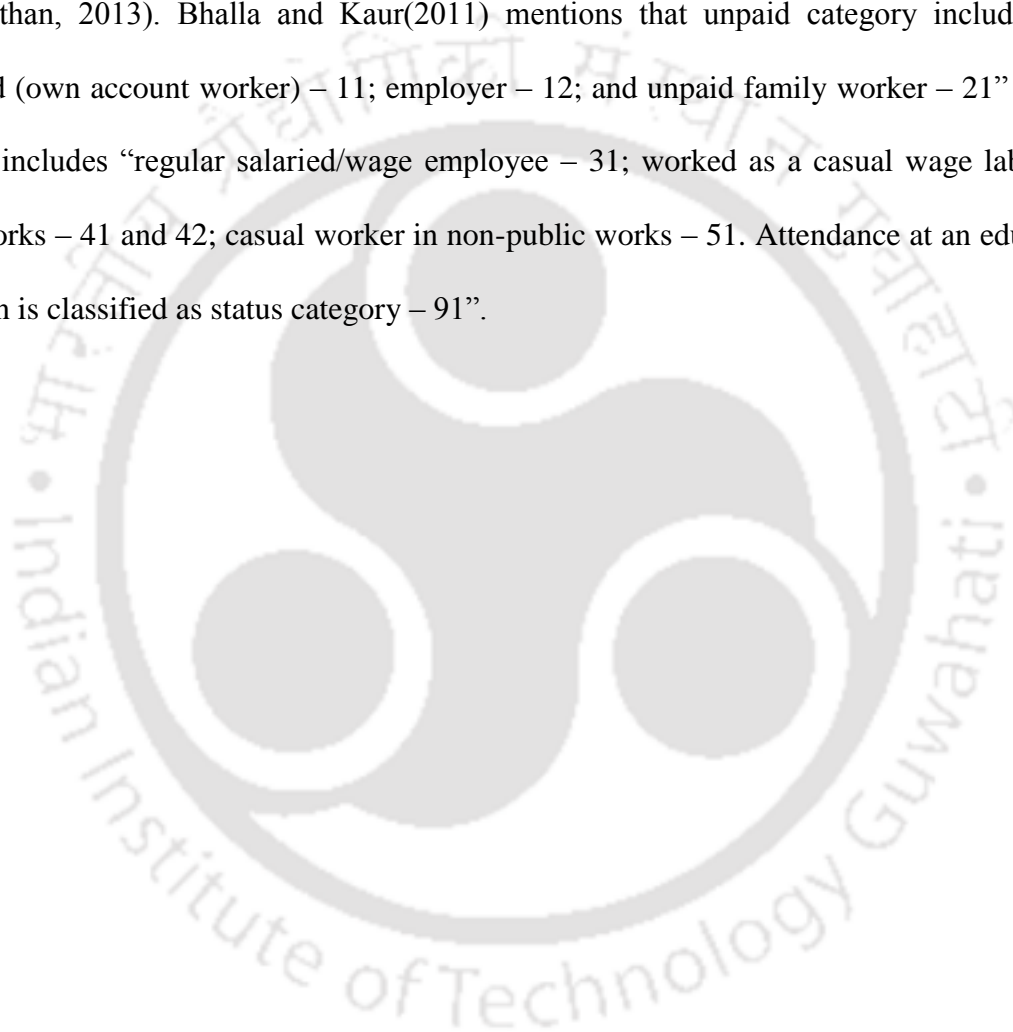
⁹The System of National Accounts (SNA) is the internationally agreed-upon standard set of recommendations on how to compile measures of economic activity in accordance with strict accounting conventions based on economic principles (UN 2008). This document defines the “production boundary,” which determines what goods and services must be included in national income accounts. This boundary is also known as the boundary of SNA. Non-SNA work is defined as all work carried out outside the production boundary that can be delegated to others (Hirway, 2015)

¹⁰ <https://timesofindia.indiatimes.com/business/india-business/share-of-women-in-labour-force-continues-to-drop/articleshow/73824545.cms>

¹¹ “..... domestic and personal services, such as doing the laundry, preparing meals, caring for adults and children, managing and upkeep of the household, etc., as well as unpaid volunteer services are taken as productive in an economic sense and fall within the SNA general production boundarybut outside its economic production boundary(para. 6.16). Such services are referred to as “non-SNA production....”(https://www.ilo.org/wcmsp5/groups/public/---dgreports/---stat/documents/publication/wcms_087902.pdf)

¹² “A person is considered in the labourforce on Usual Principal Status (UPS) if he/she has spent relatively longer time (i.e., major time criterion) one economic activity during 365 days preceding the date of survey.” (NSSO)

¹³ Unpaid works are those works which are centered on family farms or enterprises. (Lahoti and Swaminathan, 2013). Bhalla and Kaur(2011) mentions that unpaid category includes “self-employed (own account worker) – 11; employer – 12; and unpaid family worker – 21” and paid category includes “regular salaried/wage employee – 31; worked as a casual wage labourer in public works – 41 and 42; casual worker in non-public works – 51. Attendance at an educational institution is classified as status category – 91”.



Chapter 3: Female Labour Force Participation across Indian States: variation and causes

This chapter addresses the first research question, which we reproduce below.

What are the factors behind the declining trend of female LFPR in India and how significant are they?

While addressing this question it is important to give a background of the Indian scenario. The following section presents that picture briefly.

3.1. An overview

In India female labour force participation is typically low. More importantly, this participation rate has been declining over the last few decades. This phenomenon is alarming and undesirable for the economy. The decline has been happening across almost all Indian states. The declining trend of FLFPR is mostly driven by the decline in rural counterparts. The urban FLFPR is more or less stagnant over the years. In this chapter an attempt has been made to analyze significant determinants of decline in Female Labour Force Participation across 15 Indian states¹⁴ covering the time period from 1987-2011¹⁵. The analysis is based mainly on the secondary sources of data. The main sources are various quinquennial rounds NSSO EU Survey reports for the above mentioned period. Separate empirical analyses have been carried out for rural and urban areas. This is because the nature of FLFPR and their determinants may differ between rural and urban areas.

In this introductory part of this chapter a brief trend analysis on female LFPR across some Indian states has been presented. NSSO EU Survey reports show figures of female LFPR in Indian

states according to UPS and these figures are depicted in the table below (Table 3.1). Table 3.2 below shows the changes of female LFPR per 1000 during 43rd round (1987-88) and 68th round (2011-12). From there it can be seen that almost all the states showed a decline in female LFPR during the period. Tripura is an exception. In case of Assam although the percentage change shows positive figures, if we compare the 68th round figure(2011-12) with 50th round figure(1993-94) there has been a decline in rural FLFPR except the distress driven growth years.

Table 3.1: FLFPR (number of persons/person-days in the labour force per 1000 persons/ person-days) for persons of age 15 years and above according to Usual Status(PS) for each State/UT

	68th		66th		61st		55th		50th		43rd	
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
Andhra Pradesh	534	226	545	234	613	293	618	233	645	244	612	274
Arunachal Pradesh	409	200	434	215	639	211	436	174	634	211	433	181
Assam	124	117	196	122	186	130	153	157	152	143	113	97
Bihar	54	55	72	56	147	76	219	108	204	98	204	102
Gujrat	292	155	340	167	444	168	455	158	375	151	438	133
Haryana	88	120	190	160	181	119	52	94	96	119	189	108
Karnataka	365	224	475	228	567	245	517	236	469	223	466	250
Kerala	269	251	288	276	336	334	262	277	280	265	338	281
Maharashtra	406	198	485	195	591	234	582	188	602	209	618	212
Manipur	231	247	263	198	345	260	222	223	337	233	264	188
Meghalaya	596	303	497	338	735	411	690	303	726	294	618	313
Punjab	69	129	67	116	83	324	61	105	58	95	119	105
Rajasthan	341	133	331	122	419	191	411	142	428	160	603	219
Tamil Nadu	409	258	516	246	606	312	538	279	554	301	581	282
Tripura	238	320	185	233	159	286	106	111	166	200	140	136
Uttar Pradesh	138	108	143	85	205	110	203	108	209	111	267	113
West Bengal	152	170	128	148	161	150	178	148	135	171	177	157

Source: NSSO EU Survey various rounds reports, thechange has been calculated by the author

Table 3.2: Change in FLFPR between 43rd and 68th rounds

Change in FLFPR between 43rd and 68th rounds		
	Rural	Urban
Andhra Pradesh	-78	-48
Arunachal Pradesh	-24	19
Assam	11	20
Bihar	-150	-47
Gujrat	-146	22
Haryana	-101	12
Karnataka	-101	-26
Kerala	-69	-30
Maharashtra	-212	-14
Manipur	-33	59
Meghalaya	-22	-10
Punjab	-50	24
Rajasthan	-262	-86
Tamil Nadu	-172	-24
Tripura	98	184
Uttar Pradesh	-129	-5
West Bengal	-25	13

Table 3.3: State Female Labor Force Participation Rankings, Per Capita Net State Domestic Product, and Gender Ratio

	Rural FLFPR(2009-10) (Lowest=1)	Real Per Capita NSDP(2009-10) Rank (Lowest=1)	Gender Ratio 2011- Rank(Lowest=1)
Bihar	1	1	6
Goa	2	28	18
West Bengal	3	11	13
Assam	4	3	15
Jharkhand	5	4	13
Uttar Pradesh	6	2	5
Manipur	7	6	24
Tripura	8	13	16
Punjab	9	20	4
Kerala	10	23	28
Orissa	11	8	22

Haryana	12	26	1
Jammu & Kashmir	13	10	2
Madhya Pradesh	14	5	11
Arunachal Pradesh	15	15	8
Sikkim	16	22	3
Gujarat	17	25	7
Nagaland	18	18	12
Karnataka	19	17	18
Tamil Nadu	20	24	27
Maharastra	21	27	9
Meghalaya	22	12	23
Rajasthan	23	7	10
Chhattisgarh	24	9	25
Uttarakhand	25	19	17
Mizoram	26	14	21
Andhra Pradesh	27	16	26
Himachal Pradesh	28	21	20

Source: Neff et. al. (2012)

Neff et. al. (2012) has some interesting discussions on rural FLFPR and how it varies across Indian states (refer to table 3.3). Labour market outcomes in case of rural women differ from state to state in India. The state Bihar had the lowest rural FLFPR during 2009-10. Assam occupied the fourth rank from the bottom. The highest rural FLFPR was recorded in Himachal Pradesh. Neff et. al(2012) argue that differences in labour demand across states led to such regional variations in female labour market outcomes. The paper considers real per capita NSDP as an indicator of labour market opportunities or labour demand conditions of a state. Their analyses from table 3.2 show that NSDP ranking and FLFPR ranking of most of the states are consistent. If we consider the case of Bihar, it has the lowest ranking in both the categories. Hence, it seems logical to argue that the low demand of labour hinders the labour market participation process of rural women in this state. The paper found some negative outliers and these are Goa, Punjab, Kerala and Haryana. In these states the real per capita NSDP is quite high, but their rural FLFPRs are low. Lack of employment opportunities was put forwarded as an

explanation behind this phenomenon by Neff et. al. (2012). On the other hand, Rajasthan, Chattisgarh, Mizoram, Andhra Pradesh had low to middle real per capita NSDP, but their rural FLFPRs were relatively higher. These are the positive outliers. In a report by World Bank(2010), it has been mentioned that in India there is a large regional variations in female LFPR and the coefficient of variation of female LFPR is around 15 to 20 times higher than that of men. The report points out that the rate is significantly low in states like Bihar, Uttar Pradesh, Jammu and Kashmir and some parts of North-East India.

3.2. Data and Methodology

3.2.1. Data

The first research question tries to probe the probable determinants of declining female labour force participation in India. Cross- Indian states analysis on female LFPR covering a long time span is very minimal. Lahoti and Swaminathan (2013) is one of the few. However, Lahoti and Swaminathan(2013) targets to study the relationship between economic development and FLFPR. Their focus is not on identification of probable factors behind the decline of FLFPR. This gap has been filled up in my research. Sarkar et. al(2017) is another paper which considers an individual level panel data set covering time period 2005-12. In my study, I have covered a long period of almost 25 years and also covered 15 Indian states. Identification of determinants of FLFPR based on such a large dataset covering 15 states and 25 years of time period in Indian context is almost minimal. Hence my research adds up new insights to the existing field of research. This also helps in getting a broader picture of the problem. For this a pure empirical approach has been adopted in this chapter. Neff et. al(2012) sheds some light on the puzzling

decline of FLFPR across Indian states during 2004-05 to 2011-12. Their explanatory analyses give insight of many important findings, but the paper admits that more in-depth focus on determinants of FLFPR are needed for a better understanding of the problem. In this chapter based on the literature survey, few probable determinants of female labour force participation have been identified. It has been found that the available literatures on panel analysis of FLFPR haven't considered these probable variables all together (Lahoti and Swaminathan, 2013; Sarkar et.al, 2017; Neff et. al, 2012). In my case to get more in-depth answers to the issue most of the probable variables have been incorporated. The impact of urbanization on FLFPR has been recognized by very few papers (Mansour et. al, 2020). In Indian context its impact has been hardly tested by researchers. In my study an attempt has been made to fix this gap by incorporating the "urbanization" variable. Besides, the various other probable determinants of FLFPR identified by different researchers have been brought together into my analyses and their impact has been tested with my regression model. This opens up a broader view of the problem. The probable determinants which are considered in this analysis can be listed as follows. We have discussed each of these in the following pages.

- Education level of male/female
- Wages of female and the male/spouse (Proxied by average daily earnings of men/women)
- Unemployment Rate of men/female
- Fertility
- Urbanization
- Social sector spending
- Household wealth(Proxied by average land area possessed)
- Average MPCE in real terms.

The following table sums up these variables with their expected sign of regressors and other necessary remarks.

Variable name	Expected sign	Remarks and Description
LFPR of female	Not applicable, it is the dependent variable	number of persons/person-days in the labour force per 1000 persons/person-days
Education level of female	Based on the reference category, the literate category should have a negative sign	illiterates (reference category), and the literates (includes literate & upto primary, middle educated, secondary & higher educated per 1000 persons
Square of education variable	Positive	.This is taken to see whether there exists a U shaped relation between education and FLFPR in our case or not
Wages of female	Negative, if income effect dominates substitution effect	Proxied by average daily earnings of women and it includes both cash and kind (Rs/day)
Wages of male/spouse	Negative	Proxied by average daily earnings of men and it includes both cash and kind (Rs/day)
Unemployment Rate of men	Can be either positive or negative. Depends on added worker and discouraged worker effect.	Unemployment rates (per 1000 men)
Unemployment Rate of female	Can be either positive or negative. Depends on added worker and discouraged worker effect.	Unemployment rates (per 1000 females)
Fertility	Negative	It is in terms of Total Fertility Rate (TFR)
Urbanization	Positive	In terms of share of urban population to total population
Social sector spending	Positive	Real per capita social sector spending: Deflated with GDP Deflator values of India for those years

Household wealth	Negative	Proxied by average land area possessed (hectares)
Average MPCE in real terms.	Negative	Average monthly per capita consumption expenditure on food items and it is in real terms.

The unit of analysis in our study is the “state”. For the analysis I have taken 15 states of India. Mainly the large states for which the relevant data are available are considered for the study. The states for my analysis are:

Andhra Pradesh, Assam, Bihar, Gujarat, Haryana, Karnataka, Kerala, Maharashtra, Manipur, Punjab, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal.

The data of each variable have been collected across states and over time covering time period 1987-2011.

All the data are from secondary sources. The data set covers last six large sample or quinquennial NSSO Employment and Unemployment rounds¹⁶. Some major variables have been collected from these NSSO rounds. Information on other variables for those NSSO round years have been taken from other sources and these are mentioned specifically in the subsequent paragraphs.

The NSSO large sample Employment and Unemployment rounds which are covered in this study are:

- Employment and Unemployment :(1) NSS 68th round, July 2011- June 2012; (2) NSS 66th round, July 2009 - June 2010; (3) NSS 61st Round, July 2004 - June 2005; (4) NSS

55th Round, July 1999 - June 2000; (5) NSS 50th Round, July 1993 - June 1994; (6) NSS 43rd Round, 1987-88

The subsequent paragraphs explain in detail the sources of data and their specific definitions that have been used in this study for each variable separately.

- *Labour Force Participation Rate male/female and Rural/Urban*

These data have been taken solely from NSSO Employment and Unemployment Survey large sample rounds covering time period 1987-2012. The LFPR is measured in NSSO report in terms of number of persons/person-days in the labour force per 1000 persons/person-days. It covers all the age groups. We can define the different categories of this variable considered in this study as follows

- LFPR (number of persons/person-days in the labour force per 1000 persons/ person-days) according to usual status(PS)/usual status(ps+ss)¹⁷
- *Education level of male/female and Rural/ Urban*

The only data source of this variable for my study is NSSO Employment and Unemployment Large Sample Rounds as mentioned above. The education variables that are listed in the NSSO reports are as:

- Illiterate, literate & upto primary, middle educated, secondary & higher educated per 1000 persons

Because of multicollinearity problem all three literate categories have been combined and has been taken as one variable. In short, only two categories are considered, first, the illiterates (reference category), and second, the literates.

- *Unemployment Rate of Men/Female, Rural/Urban*

The source of this variable is Employment and Unemployment Survey large sample rounds of NSSO. The Unemployment rates are calculated per 1000 persons. The unemployment variables can be defined as

- Unemployment rates (per 1000) according to usual status (ps)/ usual status(adjusted)¹⁸ have been compiled separately.

- *Real per capita social sector spending*

The original source was various Issues of Handbook of Statistics on State Government Finances and State Finances published by Reserve Bank of India.

Social Sector Expenditure includes expenditure on social services, rural development, food storage and warehousing under revenue expenditure, capital outlay and loans and advance by the State Governments. Social service has various components along with expenditure on medical and education.

The data has been converted into per capita terms by dividing the population of the states for that corresponding year. Then real values of the Per capita Social Sector Spending have been calculated by deflating the values with GDP Deflator values of India for those years. These GDP Deflator values are taken from World Bank's data on World Development Indicators (2018).

- *Average land area Possessed¹⁹(hectares)(rural)*

This is the proxy variable for household wealth. These two indicator variables are considered:

- Average area of land possessed (hectares) (rural), for Female headed households
- Average area of land possessed (hectares) (rural), all households

These data are collected from NSSO Employment and Unemployment Surveys listed above.

- *Average MPCE in real terms*

Data on average monthly per capita consumption expenditure on food items by states have been collected from various round Consumption Expenditure Survey reports of NSSO (GOI,1996,1996a, 2000, 2000a, 2006a, 2011a, 2012, 2014, 2014a). Then the rural and urban figures have been deflated separately with CPI-AL and CPI-IW with base 1986-87=100. For Tripura and Manipur 1993, 2004,2009 figures are calculated by linear interpolation.

- *Fertility*

It is in terms of Total Fertility Rate (TFR). The original source of this data set is a report from Ministry of Health & Family Welfare, Govt. of India. Fertility figures are in terms of total fertility rate (TFR). This has been extracted from indiastat.com. The data has been originally taken from reports of Ministry of Health & Family Welfare, Govt. of India (n.d.).

- *Urban population*

The data has been compiled from various Census reports. The data for corresponding NSSO EU Survey years are not available as Census is conducted in ten years gap. Hence linear interpolation has been done. The linear interpolation equation is:

$$y = y_0 + (x - x_0) \left(\frac{y_1 - y_0}{x_1 - x_0} \right)$$

Here y is the urban population and x is the year.

Interpolation has been done for urban population as well as total population figures. Then urban population share out of total population of the states has been calculated. There are two variables for urbanization

- Total urban population absolute figures
- Share of urban population to total population

In the regression the share of urban population to total population is used as a regression. This is because the absolute figures are non-comparable across states.

- *Average Daily Earnings of Men/Women*

This is the proxy variable for wages of female and the male/spouse. The main source of this set of data is Rural labour Enquiry Reports published by Labour Bureau. There are two categories here

- Average daily earnings of men(includes both cash and kind (Rs/day)
- Average daily earnings of women(includes both cash and kind (Rs/day)

The nominal values have been deflated with CP-AL of India as states level CPI-AL data for all the years are not available. The base of CPI-AL has been converted to the same base as 1980.

In case of states Bihar & Jharkhand and UP & Uttarakhand, for the years 2000 onwards weighted aggregates of variables have been calculated and those values replace the original figures of states Bihar and UP. For some variables like social sector spending, urban population simple addition has been done to replace the values of Bihar and Jharkhand 2000s onwards.

The weighted average method we used is explained as follows:

In case of Bihar, we have calculated weighted average of variables (say LFPR) of Bihar and Jharkhand. The same thing has been done in case of Uttar Pradesh where we have calculated the weighted average of UP and Uttarakhand to get the aggregate figure for UP. The weights are the population of both the states. Say X is the population of Bihar and Y is the population of Jharkhand.

$$\left(\frac{x}{x+y}\right) * \text{value of variable in Bihar} + \left(\frac{y}{x+y}\right) * \text{value of variable in Jharkhand}$$

For 61st (2004) and 66th rounds (2009) 2001 population figures have been used. For 68th round (2011) 2011 population figures have been used. The same weighted average method has been used to calculate the figures for UP.

3.2.2. Methods:

The motivation behind constructing a panel data lies on following factors:

- As panel data combines both time series and cross section components hence it gives more information.
- As mentioned by Baltagi (2008) “Panel data give more informative data, more variability, less collinearity among the variables, more degrees of freedom and more efficiency” (p.6).

In Panel data analysis there are basically three types of Regression models: Pooled Regression, Fixed Effect Regression and Random Effect Regression Models.

3.2.3. Which model is appropriate?²⁰

The pooled regression model ignores cross sectional and time effects and pools all the values and run normal OLS with an intercept α and slope coefficients β s constant across states and time. However if we want to consider cross section and time heterogeneity in this model then this can be done by using a two way error component assumption for the disturbances, u_{it}

Where $u_{it} = \mu_i + \lambda_t + v_{it}$

The first component μ_i indicates cross sectional heterogeneity and the second component λ_t denotes time heterogeneity. The remaining part is a random error term.

Depending on the assumptions about these error terms, whether they are fixed or random, there are two types of models. The first is the Fixed Effects model and the second is the Random Effects Model.

If we assume that μ_i and λ_t are fixed parameters to be estimated and the random error term v_{it} is IID with mean 0 and constant variance σ^2 then the above equation gives two way error component model. If, we assume that μ_i and λ_t are random components just like a random error term and all three of the error terms are IID then it becomes Random Effect model.

Instead of two way error components the models can be one way error components model as well with the appropriate assumptions on the error components.

To make comparisons between Pooled, Fixed and Random Effects model there are various test. The FE model reports F statistics. Fixed effects are tested by this F test. If the null hypothesis can't be rejected then we can favor the pooled model over fixed effect. On the other hand Random Effects are tested with the LM test suggested by Breusch Pagan. Here also if we can't reject the null hypothesis then we have to favor pooled over RE (Park, 2011 and Vijayamohan, 2016).

In order to choose between FE and RE we use Hausman Test. Here the null hypothesis assumes that random effects would be consistent and efficient. If we can't reject the null hypothesis in this case RE is preferable. In the analysis the above mentioned tests have been applied. Table 3.4 gives the results of these tests for rural and urban data separately.

- *Hausman Test: FE or RE?*

H0: Random effects would be consistent and efficient

H1: Random effects would be inconsistent

- *Breusch Pagan test: Pooled or RE?*

H0: $\sigma_u^2=0$, we can't pool the data and hence select RE model.

H1: we can pool the data and select pooled model

- *F test: Pooled or FE?*

H0: $\mu_i=0$

If we reject it we prefer FE.

Table 3.4: Hausman test, Bresuch Pagan test, F test

Hausman test: FE or RE?	
	Which model?
FE vs RE(RURAL)	We don't reject null hypothesis, RE is better
FE vs RE(URBAN)	We don't reject null hypothesis, RE is better

Bresuch Pagan Lagrange Multiplier test: Pooled or RE?

	Which model?
Rural	We reject the null and select RE
Urban	We reject the null and select RE
F test: Pooled or FE?	

	Which model?
FE vs pooled(RURAL)	FE
FE vs pooled(RURAL)	FE

For Rural,

Fixed Effect is preferred over Pooled

Random Effect is preferred over Pooled

And Random Effect is preferred over Fixed Effect, Hence in case of Rural, we choose Random Effect (the results of the RE Rural area regression are reported in Table 3.6 below).

For Urban,

Random Effect is preferred than Pooled

Random Effect is preferred than Fixed Effect

Fixed Effect is preferred to Pooled, Hence, we get Random Effect is better suited than Fixed Effect, which is preferred over Pooled.

We select the RE model in case of Urban as well. (the results of the RE Urban area regression are reported in Table 3.6 below)

Coming to the problem of multicollinearity, Baltagi(2005) mentioned as cross section dimension adds lots of variability hence in panel data the problem of multicollinearity is very low.

There is another issue which is of unit roots. Since the panel for this study is micro panel with 15 states and 6 time periods hence as suggested by Baltagi(2005) the unit root tests may not be very effective here. Baltagi(2005) mentions that with large N and large T macro panel the issue of stationary deserves more attentions. Therefore for the time being the problem of non stationary dimension hasn't been dealt with²¹.

Let us now define Random Effect (RE) Model:

- *Random Effects*

In RE model, it is assumed that entity-specific effects or time specific effects or both are distributed independently of the regressors and they are part of error term. It can be one way error model or two way. The RE model can be written as

$$y_{it} = \alpha + X'_{it}\beta + (\mu_i + \lambda_t + v_{it})$$

Here all three error terms are IID.

Rural: Equation 1

$$Y_{it} = \alpha + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + \beta_6 X_{6it} + \beta_7 X_{6it} + \beta_8 X_{8it} + \beta_9 X_{9it} \\ + \beta_{10} X_{10it} + \beta_{11} X_{11it} + (\mu_i + \lambda_t + v_{it})$$

Urban: Equation 2

$$Y_{it} = \alpha + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + \beta_6 X_{6it} + \beta_7 X_{7it} + \beta_8 X_{8it} + \beta_9 X_{9it} \\ + \beta_{10} X_{10it} + (\mu_i + \lambda_t + v_{it})$$

The variables are defined as:

In case of Rural Regression:

Y_{it} : Rural females LFPR (per 1000 persons according to US(PS) in i^{th} state of t^{th} period

X_1 : Rural females “literate” per 1000 persons

X_2 : Squared term of Rural females “literate” per 1000 persons²²

X_3 : Total fertility rate

X_4 : Rural male Unemployment rate (per 1000) US (ps)

X_5 : Rural female Unemployment rate (per 1000) US (ps)

X_6 : Real per capita Social Sector spending

X_7 : Average area of land possessed (hectares) in rural areas (All households)

X_8 : Real average MPCE

X_9 : share of urban population

X_{10} : Real Average daily earnings of men (both cash and kind)

X_{11} : Real Average daily earnings of women (both cash and kind)

In case of urban regression:

Y_{it} : Urban females LFPR (per 1000 persons according to US(PS)

X_1 : Urban females “literate” per 1000 persons

X_2 : Squared term of Urban females “literate and upto primary” per 1000 persons

X_3 : Total fertility rate

X_4 : Urban male Unemployment rate (per 1000) US (ps)

X₅: Urban female Unemployment rate (per 1000) US (ps)

X₆: Real per capita Social Sector spending

X₇: Real average MPCE

X₈: share of urban population

X₉: Real Average daily earnings of men (both cash and kind)

X₁₀: Real Average daily earnings of women (both cash and kind)

Here,

$i=1,2,3,\dots,15$ and $t=1,2,3,\dots,6$

Land possession regressor has been dropped for the urban model because land areas are typically small. The pooled regression²³ model ignores cross sectional and time effects and pools all the values and run normal OLS with an intercept α and slope coefficients β s constant across states and time. We have run the Pooled OLS for Rural and Urban separately. This regression has been performed to show the state specific results. The results are reported in table 3.5.

3.3. Results and Analysis

The following table 3.5 reports the pooled regression results to show the state specific results. As per Table 3.5 the RE model best suits our data, therefore for the final analysis of this section RE results are reported in Table 3.6 and these are considered for interpretation.

Table 3.5: Pooled Regression with state dummies

Pooled Regression from Rural Areas		Pooled Regression from URBAN Areas	
FLFPR(Y_{it})	Coef.	FLFPR(Y_{it})	Coef.

Rural Female	-.31**	Urban Female	
literate		literate	-.78
Square of Rural Female	.00	Square of Urban Female	
literate		literate	.00
Total Fertility Rate	-1.49 **	Total Fertility Rate	-1.73**
Rural Male	.99**	Urban Male	
Unemployment Rate		Unemployment Rate	.19
Rural Female	-.07	Urban Female	
Unemployment Rate		Unemployment Rate	.17
Real per capita social	608092.7	Real per capita social	1163323 **
sector spending		sector spending	
Average land	15.08	Real Avg. MPCE	-29.18
possessed(hectares)	in	Share of urban population	4.77
rural		Average daily earnings of	
Real Avg. MPCE	-12.51	men(both cash and kind)	-23.68
Share of urban population	3.53	Average daily earnings of	
Average daily earnings of	480.69**	women(both cash and kind)	87.08
men(both cash and kind)		_cons	374.48
Average daily earnings of	-139.70		
women(both cash and			
kind)			
_cons	397.69 ***		
Assam	-229.30***	Assam	-44.77
Bihar	-241.90***	Bihar	-70.41
Gujrat	-155.01***	Gujrat	-91.80**
Haryana	-336.55***	Haryana	-110.82***
Karnataka	-92.33 ***	Karnataka	-28.10
Kerala	-235.88***	Kerala	-91.49

Maharastra	-70.75	Maharastra	-127.13***
Manipur	-223.17***	Manipur	-118.26**
Punjab	-372.34***	Punjab	-148.73***
Rajasthan	-145.24 ***	Rajasthan	-50.46
Tamil Nadu	-70.10**	Tamil Nadu	-82.16
Tripura	-250.20***	Tripura	-97.00
Uttar Pradesh	-249.54***	Uttar Pradesh	-75.42
West Bengal	-299.44 ***	West Bengal	-107.54***
F test that all $u_i=0$:	F(25, 64) = 56.35	F test that all $u_i=0$:	F(24, 65) = 6.10
	Prob > F = 0.000		Prob > F = 0.0000
R-sq:	within = 0.9565	R-sq:	within = 0.6924

*** significant at 1 % ($p<0.01$) and **significant at 5 % ($p<0.05$)

Note: Square term of education variable is incorporated. State dummies are there for checking the state effects

In order to capture the state effects the pooled regression has been run. It can be seen that as compared to the base state “Andhra Pradesh” the female LFPR of all states has been less in rural areas, though the coefficient of “Maharastra” is not significant. However the coefficients of all the states in urban areas are not significant. It implies there is no significant difference in urban female LFPR of those states in comparison with urban FLFPR of “Andhra Pradesh”.

As the best suited model for our analyses is the Random Effect Model, hence the results of RE regression from the following table will be considered for interpretation. A table comprising of summary outputs of pooled, fixed effect and random effect models is attached in the appendix section of this chapter.

Table 3.6: Random Effect Regression

Regression from RURAL(Equation 1)		Regression from URBAN(Equation 2)	
FLFPR(Y_{it})	Coef.	FLFPR(Y_{it})	Coef.
Rural Female	-0.35***	Urban Female	-0.87
literate		literate	
Square of Rural Female	.00	Square of Urban Female	.00
literate		literate	
Total Fertility Rate	-1.64**	Total Fertility Rate	-2.21***
Rural Male	1.16 ***	Urban Male	
Unemployment Rate		Unemployment Rate	-0.02
Rural Female	-0.14	Urban Female	
Unemployment Rate		Unemployment Rate	.15
Real per capita social	732489.2 **	Real per capita social	921640.7***
sector spending		sector spending	
Average land possessed(hectares) in rural, All HH	14.57	Real Avg. MPCE	-34.62**
Real Avg. MPCE	-24.25	Share of urban population	2.80***
Share of urban population	5.42***	Average daily earnings of men(both cash and kind)	54.81
Average daily earnings of men(both cash and kind)	474.71**	Average daily earnings of women(both cash and kind)	-264.52
Average daily earnings of women(both cash and kind)	-181.06	_cons	465.03**
_cons	183.00**		

	Wald chi2(11) = 95.82		Wald chi2(10) = 577.90
	Prob > chi2 = 0.0000		Prob > chi2 = 0.0000
R-sq:	within = 0.3496	R-sq:	within = 0.2670

*** significant at 1 % ($p < 0.01$) and **significant at 5 % ($p < 0.05$)

The regression result from rural areas based on equation 1 (table 3.7) shows that the variable “Rural female literate” is negative and significant. It implies higher the share of rural females in “literate” category lower will be the female LFPR in rural areas. This result is line with the observation found in the literature that with education the labour force participation of women declines, for various reasons (we need to remember however that here the unit of analysis is not individual but state). The square of the literate variable is not significant. Thus, no U-shape hypothesis regarding FLFPR and education can be supported from our regression results. Total fertility rate coefficient is significant and negative. Higher the rate of fertility of a woman in a state lower will be labour force participation rate in that state. When the share of rural unemployed male increases it significantly reduces the female labour force participation rate in rural areas in a state. This perhaps bolsters the thesis found in Naidu (2016) that under difficult circumstances women withdraw themselves from the labour market to sustain the household. The real per capita social sector spending came out to be positive and significant and hence there exists a positive relationship between real per capita social sector spending and female LFPR. Mehrotra and Parida (2017) emphasize on the positive relation between these two. They argue that with increased share of public sector spending on health care sector the female labour share goes up. Besides, the paper also highlights the Sarva Shiksha Abhiyan (SSA) and Rashtriya Madhyamik Shikshya Abhiyan (RMSA) of India and argues that these schemes may act as real

boosters of female's labour market participation especially in education sectors in India (Mehrotra and Parida, 2017). Das et. al. (2015) argue in favour of boosting social sector spending especially in education sector. Their paper hints that such investment will create more female human resources and it in turn boost the rate of labour force participation of females. Share of urban population share has a significant positive impact on female LFPR in rural areas. Urbanization is expected to impact female LFPR in a positive impact and it has been argued by papers like Klasen and Pieters (2015), Mansour et. al. (2020). With urbanization diversity of economic opportunities increases and urban settlements offer more comfortable working environments. As a result of these females' participation in the labour market goes up (Mansour et. al, 2020). It has been found that when average daily earnings of men (both in cash and kind) increases it induces the females to go for market works. This is a somewhat surprising finding. Most of the available literature show the opposite picture that with increase in income of the family goes up and due to income effect the female counterparts of the family withdraw from the labor market. (Mammen and Paxson, 2000; Tansel, 2001). Negative relationship has been found between husband's wage and FLFPR (Mincer, 1962).

In case of regression model for the urban areas, it has been reported that TFR coefficient is significant and negative. With rise in TFR the female LFPR declines in urban areas. Real per capital social sector spending has significant positive result and with its rise, female LFPR increases in urban areas. In addition to these two another significant and positive coefficient is of the variable "share of urban population". It implies when the share of urban population increases the female LFPR in urban areas increases in a state.

3.4. Conclusion

Based on available literatures and data from various sources, it has been observed that female LFPR in India shows a declining trend over the last few decades. Most of the Indian states are in line with this trend and the rural female LFPR has played the major role in the decline. In this chapter, we saw that almost all major Indian states showed a declining trend. This chapter attempted to find the underlying factors of the fall in FLFPR of India, that could be operative at the state level. Consequently, our unit of analysis is the state. We selected a number of large states which cover about 80.87 percent (Economic Survey, Govt. of India, Various rounds) of the Indian population. NSSO EUS of various rounds from 1987 to 2011 and other data sources were used. We used Random Effect (RE) model for our regression analysis of state level data of India. This is because the various selection tests suggest that in our case Random Effect model is the best suited regression model. The Pooled regression which was conducted to capture state effects showed that compared to base state “Andhra Pradesh” all states (except “Maharashtra”) had a lower value in FLFPR especially in rural areas. The RE Model regression analysis shows more the “literate” females in a state, lower will be the FLFPR in it. High fertility brings down FLFPR both in rural and urban areas of a state. It suggests, in a country like India if birth control measures, family planning schemes, child care support systems at home and workplaces are implemented properly, these will definitely boost females’ participation in the labour force. When in rural areas male unemployment rate increases, women withdraw themselves from labour markets. It may be the case that as explained by discouraged worker effect with lower jobs in the market, females are discouraged to continue their job search. The unemployed section of the females are withdrawing from the labour market. Or, they could be withdrawing to support

the running of household in trying times. Effective policy tools to address the unemployment issues such as MGNREGS employment generation programmes could make a difference. Men's earnings induce women to go for the market works in rural areas. Boosting social sector spending can be a solution to increase females' participation in the labour markets. Our results show that in rural and urban areas social sector spending has a positive impact on FLFPR.

This state-level empirical study has hinted at the various avenues through which policy makers can attempt to boost up female LFPR. The positive trend of FLFPR in Tripura and what was/were the driving force(s) behind this can be the topic of a separate study. In the next chapter, from the all-India level, we concentrate on the specific state of Assam.

¹⁴Some major Indian states have been chosen, according to the availability of data. Their population shares(2011) are presented in the table below:

States	Population share-2011
Andhra Pradesh	6.985229445
Assam	2.577187194
Bihar	8.597148296
Gujarat	4.991514261
Haryana	2.093644573
Karnataka	5.045608269
Kerala	2.758876992
Maharashtra	9.280549694
Manipur	0.235866392
Punjab	2.291190935
Rajasthan	5.661123751
Tamil Nadu	5.958351743
Tripura	0.303421962
Uttar Pradesh	16.50172812
West Bengal	7.538144534
ALL INDIA	1210855

Source: Economic Survey, Govt. of India, Various rounds

¹⁵ The declining trend of FLFPR has been visible at least since 1980s. Hence from 1987 onwards the data has been taken. The years prior to 1987 have not been included due to non-availability of some data.

¹⁶ Although NSSO data have relied upon in this research, there are some shortcomings of these data that one has to be cautious about. Mehrotra(2022) points out the issues with NSSO methodologies in capturing females' work. NSSO's Employment and Unemployment Surveys (EUS) and also the recent Periodic Labour Force Survey (PLFS) follow the frameworks and definitions adopted at the 13th International Conference of Labour Statisticians (ICLS) in 1982. These frameworks consider mainly two statuses of a person: employed and unemployed or economically inactive. Mehrotra(2022) points out that these categories are not capable of capturing the contribution of women to the economy and towards the well-being of a household. At the 19th ICLS in 2013 new definitions and frameworks have been adopted which were more gender sensitive, but the NSSO continued with the earlier methods and definitions. NSSO questionnaires are based on those earlier definitions and frameworks. The author demonstrates with a comparison of the definitions of Indian System of National Accounts (ISNA) and the UN System of National Accounts (UNSNA) that, if NSSO would have followed UNSNA's definitions then FLFPR would have been much higher. The range of economic activities considered under ISNA is narrower than the range considered in the UNSNA. Besides these, the informal employment of women which are mostly scattered, temporary, short and unstable in nature are not captured in the questionnaire adopted by NSSO surveys. Hence, the author emphasizes on the need of revisiting the existing questionnaires. These questionnaires of NSSO

also fail to capture the multiplicity of works done by women simultaneously, which results into underestimation of women's work.

¹⁷ “Usual Status: Usual principal status: A person is considered in the labour force on Usual Principal Status (UPS) if he/she has spent relatively longer time (i.e., major time criterion) on economic activity during 365 days preceding the date of survey. Persons classified as not belonging to the labour force are assigned the broad activity status of ‘neither working nor available for work’. The activity status of persons, who belong to the labour force, of working or not ‘working but seeking and/or available for work’, is ascertained on the basis of major time criterion. UPS unemployment rate is the proportion of those classified as unemployed on this basis expressed as a percentage of those classified as being in the labour force. On this criterion, a person can be counted as unemployed even though he/she may have been employed for part of the year.” (Employment and Unemployment Survey, NSSO)

“Usual principal and subsidiary status: A person, whose principal usual status has been determined on the basis of major time-criterion, could have pursued some economic activity for a relatively short time during the reference period of 365 days preceding the date of survey. The status in which such economic activity was pursued is termed the subsidiary status of that person. This is a more inclusive measure which covers, in addition, participation in economic activity on a more or less regular basis, of those classified as unemployed on the UPS as well as those as being outside the labour force on the same criterion. This criterion is termed as Usual Principal and Subsidiary Status (UPSS). This would result in a higher proportion of the population as being in the labour force with a higher proportion of workers and lower unemployment rates relative to the UPS criterion.” (Employment and Unemployment Survey, NSSO)

¹⁸“Unemployment Rate (UR): UR is defined as the number of persons/person-days unemployed per 1000 persons/person-days in the labour force (which includes both the employed and unemployed).” (Key Indicators of Employment and Unemployment in India 2009-2010, 66th round, NSSO)

“Usual status adjusted UR: Unemployment rates for the reference period of 365 days, i.e., in usual principal status (ps) approximate an indicator of chronically unemployed. Some of the persons categorised as unemployed according to the usual principal activity status might be working in a subsidiary capacity. Therefore, another estimate of the unemployed excluding those employed in a subsidiary capacity during the reference period can be derived. The former is called the usually unemployed according to the principal status (ps) and the latter, the usually unemployed excluding employed in subsidiary status or usual status adjusted i.e., us (adjusted), which would conceptually be lower than the former.”(Key Indicators of Employment and Unemployment in India 2009-2010, 66th round, NSSO)

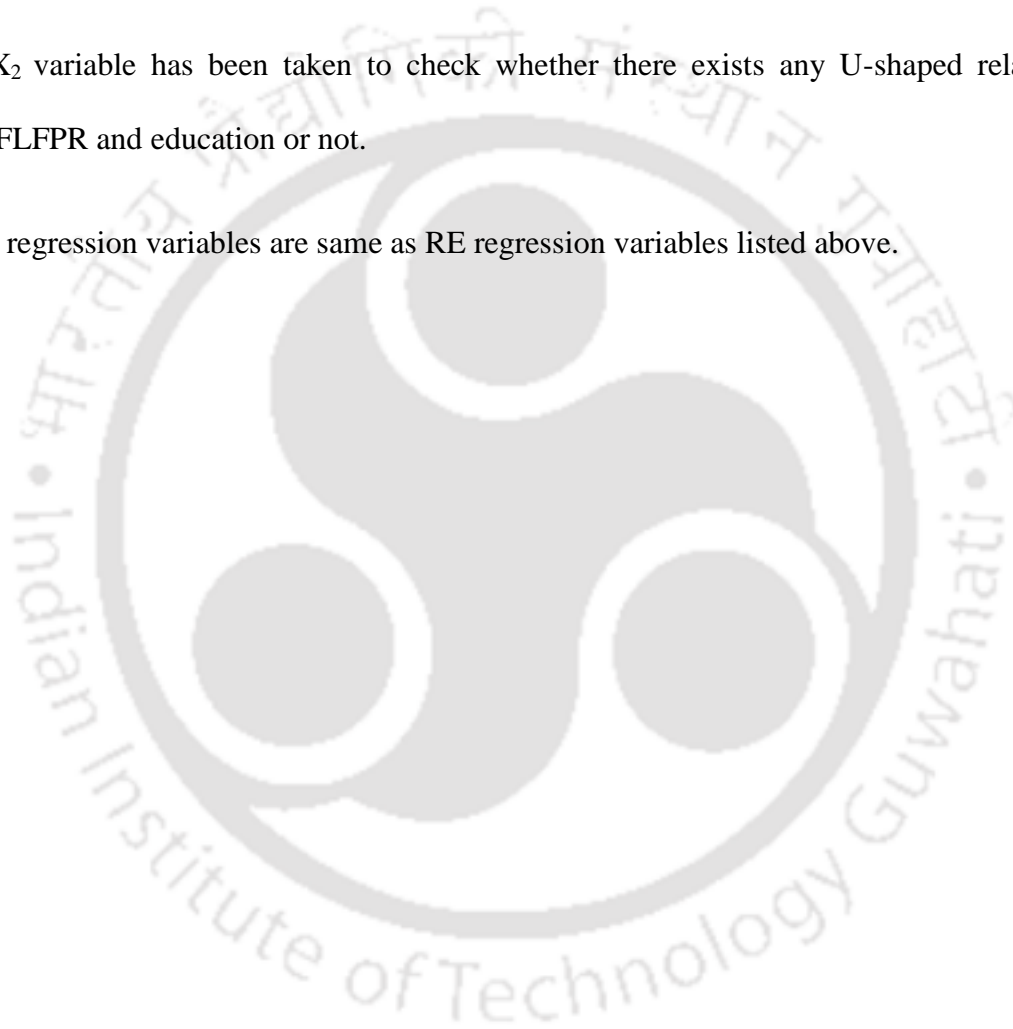
¹⁹ Land possessed by the household(NSSO Definition): The area of land possessed included land “owned”, “leased in” and “land neither owned nor leased in” (i.e. encroached) by the household but excluded land 'leased out'.

²⁰ Only RE model results are reported in the draft. However in other to show the state specific results Pooled Regression Results are reported.

²¹While checking for unit roots few variables are found to have unit roots and they became stationary after taking their first difference. These modifications have not been incorporated in the regressions we have run so far. Hence, in the near future there may be some chances of modifying the results we have got so far.

²² This X_2 variable has been taken to check whether there exists any U-shaped relationship between FLFPR and education or not.

²³ Pooled regression variables are same as RE regression variables listed above.



Appendix

1. The table compares the outputs of random effect, fixed effect and pooled regression models. The results are more or less similar. The results that we reported are therefore quite robust.

Table A3.1: Comparative summary of random effect, fixed effect and pooled regression results

Variable	Random Effect(base)		Fixed Effect		Pooled with state dummies	
	Rural	Urban	Rural	Urban	Rural	Urban
female literate	-.35***	-0.87	-0.31**	-0.78	-0.31**	-0.78
Sq. of female literate	0	0	0	0	0	0
Total Fertility Rate(TFR)	-1.64**	-2.21***	-1.50**	-1.73**	1.49 **	-1.73**
Male Unemployment Rate	1.16 ***	-0.02	0.97**	0.20	0.99**	0.19
Female Unemployment Rate	-0.14	0.15	-0.07	0.17	-0.07	0.17
Real per capita social sector spending	732489.2 **	921640.7***	608092.7	1163323**	608092.7	1163323 **
Average land possessed(hectares) in rural, All HH	14.57		15.08		15.08	
Real average Monthly Per Capita Expenditure	-24.25	-34.62**	-12.51	-29.18*	-12.51	-29.18
Share of urban population	5.42***	2.80***	3.53	4.77*	3.53	4.77
Average daily earnings of men	474.71**	54.81	480.69	-23.68	480.69**	-23.68
Average daily earnings of women	-181.06	-264.52	-139.70	87.08	-139.7	87.08

*** significant at 1 % ($p < 0.01$) and **significant at 5 % ($p < 0.05$) and *significant at 10% ($p < 0.10$)

2. The standard errors clustered by the states of our random effect model are reported below:

Table A3.2: Clustered standard errors of random effect model

Variable	Clustered standard errors by the states	
	Rural	Urban
female literate	-0.17	0.33
Sq of female literate	-0.00	0.00
Total Fertility Rate(TFR)	0.65	1.19
Male Unemployment Rate	0.38	0.36
Female Unemployment Rate	0.08	0.07
Real per capita social sector spending	306921	255676.2
Average land possessed(hectares) in rural, All HH	25.45	
Real average Monthly Per Capita Expenditure	21.57	11.73
Share of urban population	1.43	1.26
Average daily earnings of men	174.52	172.03
Average daily earnings of women	210.44	177.52

Chapter 4: Female Labour Force Participation in

Assam

4.1. Introduction

This chapter will attempt to address the second research question. The main target of the second research question is to analyze the important factors which affect the female LFPR in Assam. The focus of this research question is on Assam. The state like the rest of the country has experienced a declining FLFPR. However, given the considerable socio-economic-cultural variations within Assam and paucity of research with Assam's data exploring the patterns and determinants of female LFPR in this state appears to be a pertinent research goal.

The analysis of this chapter is based on the unit level data of NSSO Employment and Unemployment Surveys. The analysis in the chapter covers only the latest three rounds covering time period 2004 to 2012. The calculations based on the unit level data show that in Assam the trend of female LFPR(ps+ss) is consistent with the national trend. The Female LFPR(ps+ss) has declined from 20.61% to 12.60% during 2004 to 2012. In rural areas the rate of decline in female LFPR(ps+ss) was 8.62 percentage points and in urban areas it was 2.32 percentage points during 2004 to 2012. This chapter includes analyses of various trends and patterns of Female LFPR across cross sections such as age cohorts, economic groups, social groups etc.

This chapter specifically studies two aspects of the female labour force participation rates of Assam. First, the trends and patterns of FLFPR; and second, the factors behind its decline. It's difficult to find many studies on Assam's female labour force participation. Das and Mishra (2018) is one of the exceptions. Their paper used an instrumental variable probit model approach

and found that higher levels of education and land possession have a significant positive impact on female workforce participation rate. It focused on rural Assam exclusively. My study seeks to fix this gap. The present chapter examines female LFPR of rural as well as urban Assam. I ran two separate regressions for urban and rural Assam using the latest round of available data (2011-12). Two separate regression models were taken because the nature of female LFPR in the rural and urban areas is different. The regressors of rural and urban sectors also differ in my models. I have taken a host of possible dimensions along which women's labour force participation might vary: land possession, education level, religion, caste, region, marital status, age. Moreover, I devised an indicator capturing the compound effect of class and caste, named as 'status', and examined if status affects women's labour force participation. This is the contribution of the thesis to the growing literature of female labour force participation in India.

As per my finding, rural women of Assam from households with more land have a greater chance to join the labour force. Mildly educated women have a less probability to join the labour force than illiterates and barely literates – while higher educated women are more likely to join the labour force. This describes a U-shaped curve, often mentioned in the literature of women's work participation (Goldin, 1994). As age rises women become more likely to be in the labour force, but the probability falls for very elderly women. Christian women are found to participating more in the labour force than the Hindus. Currently married women are less likely to be in labour force than women who are never married. Caste of women does not appear to affect their labour force participation. Although caste alone does not affect, caste combined with class does affect women's labour force participation – in a negative manner, hinting at status concerns of landed upper caste families, which impedes women's work participation. In urban

Assam the results are similar, with some exceptions. The multifarious findings I obtained point towards the need for a multi-pronged policy approach to promote women's labour force participation.

4.2. Data and methodology

This section describes various data and methods used for different analyses included in this chapter.

In this chapter trends and compositions of female LFPR across various dimensions have been estimated based on 61st(2004-05), 66th(2009-10) and 68th(2011-12) round NSSO "Employment and Unemployment Survey" Unit level data.

The unit level data of "Employment and Unemployment Survey" were collected based on Schedule 10 which includes various aspects of employment and unemployment situation of all parts of the country. Some additional information on monthly household consumption expenditure is also available there. My current analyses are purely based on Assam. Therefore the data on this particular state have been taken out from all India level micro data and then calculations have been carried out. The necessary modification required for preparing the unit level data for empirical analyses have been done. The trends and patterns of Female LFPR from 2004/05 to 2011/12 have been analyzed. Trends and patterns of female LFPR across various characteristics such as economic, social, religion have been explored. Probit regression models separately for rural and urban sectors have been carried out in order to identify significant determinants of FLFPR in Assam. Table 4.5 gives an overview of the variables which have been used to analyze the trends and patterns of Female LFPR.

The LFPR in our study is in terms of Usual Principal and Subsidiary Activity Status²⁴. Based on the Principal Activity status and Subsidiary Activity status data available in micro data set LabourForce Participation Rates have been calculated. The Labour Force includes all Work Force Activity Status and Unemployed Activity Status. “Work Force” activity and “Unemployed” activity status are defined in the endnote²⁵ Section.

Probit models have been deployed in order to examine the determinants of FLFPR in the rural and urban areas. The dependent variable in the model is a binary variable: whether the person concerned is in the labour force or not. For the urban and rural areas I have used two different models. The model for the rural areas is,

$$[1] \quad Pr(Y_{ih}^R=1|X_{ih}^R) = Z(\alpha_0 + \beta_1 X_{1ih}^R + \dots + \beta_{20} X_{20ih}^R)$$

Here Y is the dependent binary variable. The subscript i denotes an individual and h is the household. Y_{ih}^R takes value 1 and 0, where 1 indicates that i -th individual of h -th household in rural areas takes part in labour force and 0 indicates that i -th individual of h -th household in rural areas doesn't take part in labour force. Here α_0 is the intercept parameter; β_1 to β_{20} are the coefficients of the regressors, whereas X_{1ih} to X_{20ih} are the regressors. Z is the cumulative standard normal distribution function. There are 20 regressors or explanatory variables in the above regression model. The set of regressors differs in rural areas from urban areas as can be seen below.

For the urban areas,

$$[2] \quad Pr(Y_{ih}^U=1|X_{ih}^U) = Z(\alpha_0 + \beta_1 X_{1ih}^U + \dots + \beta_{18} X_{18ih}^U)$$

Y_{ih}^U is a binary variable which takes value 1 and 0, where 1 indicates that i -th individual of h -th household in urban areas takes part in labour force and 0 indicates that i -th individual of h -th household in urban areas doesn't take part in labour force. Like before, α_0 is an intercept parameter; β_1 to β_{18} are the coefficients of the regressors, X_{1ih} to X_{18ih} are the regressors. Z is the cumulative standard normal distribution function.

Like before, in this probit regression the dependent variable is a binary variable. It indicates the labour force participation of an individual. The rural and urban areas have different set of regressors. The details of the variables are listed and explained in table 4.5.

The unit of our analysis is "Individual". The total observations (individuals) surveyed in Assam during the 68th round (2011- 12) was 15803. In Table 4.2 description of the data has been provided. There were 78.81% rural individuals and 21.19% of urban individuals in all. In religion categories highest number of persons, both male and female, were recorded in the category "Hindu". The "Currently married" women have the highest frequencies both in rural as well as in urban areas. "Marginal land possessed" households of 72.05% and 98.50% shares could be found in the rural and urban areas. Share of rural females having "Graduate and higher" level of education is very low (0.21%), however in urban areas it is relatively high (9.19%).

Table4.1: Descriptive Statistics

Items	Percentage
Rural respondents	78.81%
Urban respondents	21.19%

<i>Social groups</i>	Male	Females
ST	14.28%	14.09%
SC	11.46%	11.88%
OBC	24.65%	16.00%
Others	49.51%	48.03%
<i>Religion</i>	Male	Females
Hindu	64.35%	66.81%
Muslim	32.40%	38.26%
Christian	2.85%	2.55%
Others	0.40%	0.38%
<i>Marital Status</i>	Rural Female	Urban Female
Never married	42.64%	39.74%
Currently married	50.61%	51.76%
Widowed	6.43%	8.23%
divorced/separated	0.31%	0.26%
<i>Land Possessed</i>	Rural	Urban
Marginal	72.05%	98.50%
Small	18.19%	1.00%
Semi-medium	7.98%	0.51%
Medium	1.60%	
Large	0.18%	
<i>Education categories</i>	Rural Male	Rural Female
Not literate & others	17.52%	26.34%
Below Primary & primary	43.16%	42.35%

Middle	19.98%	18.62%
Secondary & higher secondary	16.71%	11.35%
Diploma	0.21%	0.21%
Graduate & above(rural male)	2.43%	1.12%
	Urban Male	Urban Female
Not literate & others	11.57%	16.57%
Below Primary & primary	27.49%	28.79%
Middle	20.17%	18.04%
Secondary & higher secondary	26.43%	27.34%
Diploma	0.69%	0.08%
Graduate & above	13.66%	9.19%

Source: NSSO 68th round EU Survey unit level data

4.3. What affects the Female LFPR?

Education of women and their spouses are often considered to be probable determinants of women's labour force participation. There are multiple routes via which education may operate. If the education is considered to be an investment in human capital then the recipient has to work in future in order to recover the costs of education. With attainment higher education, opportunity cost of not working is also higher (Tansel, 2001,2002; Bhalhotra and Aponte, 2010; Psacharopoulos and Tzannatos, 1989).The theoretical model of Cameron et al. (2001) points out two channels through which education can affect FLFPR: the wage effect and the effect of enhanced bargaining power of the wife. Klasen and Pieters(2013) are of the view that at a very low education level women are forced to work. Women with high level of education get more income and that's why they are attracted towards labour market. The women who are in between

these two extremes don't face the need to earn for the family, rather they face social stigma associated with works outside the household and therefore they don't enter the labour force. This is similar to the U-shaped curve hypothesis elaborated by Goldin (1994). Mammen and Paxson(2000), Bhalla and Kaur(2011) point out that high education level of men leads to a reduction in women's labour force participation, whereas if women's education increases it induces more women to enter into the labour market. Klasen and Pieters (2013, 2015) argue men's education level increases by more than that of women's as a society begins to develop. Women's wages and opportunities to work change at a slower speed and hence negative income effect dominates the positive substitution effect and thus FLFPR declines initially.

Education is related to wage. Wages of women and their spouses have a strong effect on decision to work outside the household. When male wages increase it enhances the income of the family and due to income effect the female counterparts of the family can withdraw from the labour market. On the other hand, when females' wages increase then the relative strength of the income and substitution effect affects the labour force participation decision (Mammen and Paxson, 2000; Tansel, 2001).

'Status creation' plays an important role in determining female FLFP decision according to Bhalla and Kaur(2011). In India as income increases it's observed that families prefer that their women to stay at home, for it raises the status of the family in the eyes of the society. The restrictions on women's activities outside the household have been historically considered as a marker of family honour. Such patriarchal norms play a role, as it has been considered that contact of females with males outside the house is "polluting". The effect of such taboos on agricultural operations in developing economies has been recognized for a long time: see Bardhan (1973), Bardhan and Rudra (1980), Das (2009). It is related to social factors such as

caste as well: the ratio of women to men's market works decline as one move up along with caste hierarchy (Eswaran et al., 2013). Das and Desai (2003) argue that high income families educate their daughters but these families are governed by traditional social and cultural norms and restrict their daughters' physical mobility outside their home.

Women's fertility plays a significant role as a determinant of female LFPR as well. Chapman (2015) observed that when economy is dominated by the agriculture if fertility is high, women can work on the family farms, along with raising their children. As the economy transforms, high fertility may prove to be a hindrance to labour force participation. Women with more children may not find it possible to carry out industrial works. This is further constrained by slow growth in females' education during the early stages of development. At a high level of economic development fertility declines and women get sufficient education to be employed in white collar jobs, FLFPR improves again (Hosney, 2016; Cakir, 2008; Pampel and Tanaka, 1986). High fertility is associated with the declining phase of U-shaped relationship and low fertility coincides with the rising portion of U-shaped relationship (Lahoti and Swaminathan, 2013).

At the same time, social groups and cultural norms have a significant impact on the female labour force participation decision. FLFPR is the highest among ST women both in rural and urban areas followed by SC, OBC and Upper Caste (Andres et. al, 2017).

Marital status impacts female LFPR. Married women tend to have lower labour market participation. Semyonov(1980) finds that divorce rate has a strong effect on female participation. Johnson and Skinner (1986) show in their panel data estimation that divorce probability increases labour supply of women. They have found that prior to three years of divorce women increases their labour supply.

Land ownership has important role to play in labour force participation decision as it creates rental income in the old age. People with land may decide to leave labour market early than landless persons (Grantham, 2012). It has been found that land holding has strong negative effect on FLFPR. The “unearned income” lowers the need of women to work in the labour markets. (Grantham,2012)

FLFPR could be affected by the demand side factors in the job market as well. Chatterjee et al. (2015), among others, confirm that decline in job opportunities is capable of explaining the declining trend of female LFPR in the recent decades in India. However, in this chapter we shall concentrate only the supply side factors, due to lack of availability of data of economic indicators which reflect the demand side of the labour market.

4.4. Trends and patterns of FLFPR in Assam

Table 4.2: LFPR in percentage by Sex and by Sector(Rural/Urban) in Assam

Rounds	Male	Female	Total	Rural		Urban	
				Male	Female	Male	Female
61st round(2004-05)	56.7	20.61	39.71	56.45	59.13	21.56	11.98
66th round(2009-10)	57.03	16.63	37.8	57.3	55.04	16.8	10.65
68th round(2011-12)	56.49	12.6	35.8	56.4	57.29	12.94	9.66
Percentage Points change (2004-12)	-0.21	-8.01	-3.91	-0.05	-1.84	-8.62	-2.32

Source: calculated using unit level data of 68th, 66th and 61stround EU Survey, NSSO

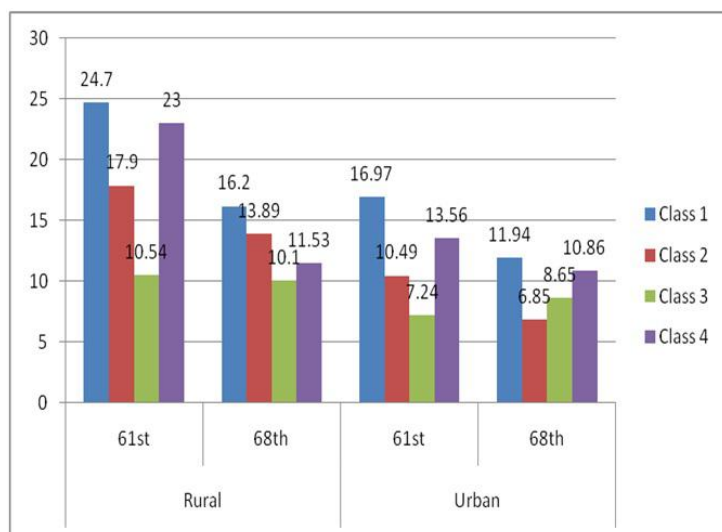
There was a decline of around 8 percentage points in female LFPR from 2004 to 2011 (Table 4.2). There was a sharp decline in female LFPR of 8.62 percentage points among rural females, and a decline of 2.32 percentage points among urban females. Overall decline in female LFPR in

Assam was largely driven by decline in rural female LFPR, just like the all-India level data. The urban female LFPR was lower than the rural component throughout the years. This matches with the all-India pattern (Boruah and Das, 2022; Abraham, 2013a; Kannan and Raveendran, 2019).

- *Consumption expenditure classes:*

Change in the female LFPR by real monthly per capita expenditure (MPCE) classes²⁶ during 2004 to 2011 has been analyzed to see if female labour force participation differs between households with high MPCE and households with low MPCE. There are four MPCE classes which we have constructed. The range of lowest MPCE class is 559-3730 rupees, where 3730 is the first quartile, 25% people with lowest monthly per capita expenditure spend 3730 rupees or less. Ranges of next three quartile classes are 3732-4723, 4725-6480 and 6481- 89123 rupees respectively. In the rural areas, the highest decline in FLFPR during 2004-11 occurred in the top MPCE class. The decline was of 11.47 percentage points. In contrast, in urban areas the highest decline occurred in the lowest MPCE class during that period (Figure 4.1). The decline was of about 5.03 percentage points. It is interesting, that the fall in female labour force participation occurred among the relatively rich cohorts in rural areas.

Figure 4.1: Female LFPR by real MPCE classes, 2004-05 to 2011-12



Source: Calculated using NSSO EU Survey unit level data

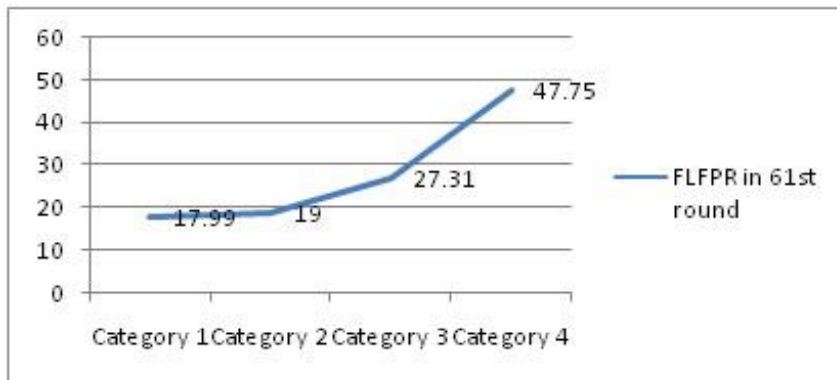
- *Education:*

For the educational parameter we have formed the four categories as follows:

1. Not literate+ literate without formal schooling: EGS (education guarantee schemes)/ NFEC (non-formal education courses)/AEC (adult education centres)+others= Category 1, called “Not Literate and others”
2. Below primary+ primary = Category 2, called “Below Primary and Primary”
3. Middle+Secondary+Higher Secondary = Category 3, called “Middle/Secondary and Higher secondary”
4. Diploma/certificate course+ Graduate +post graduate and above = Category 4, called “Above HS”

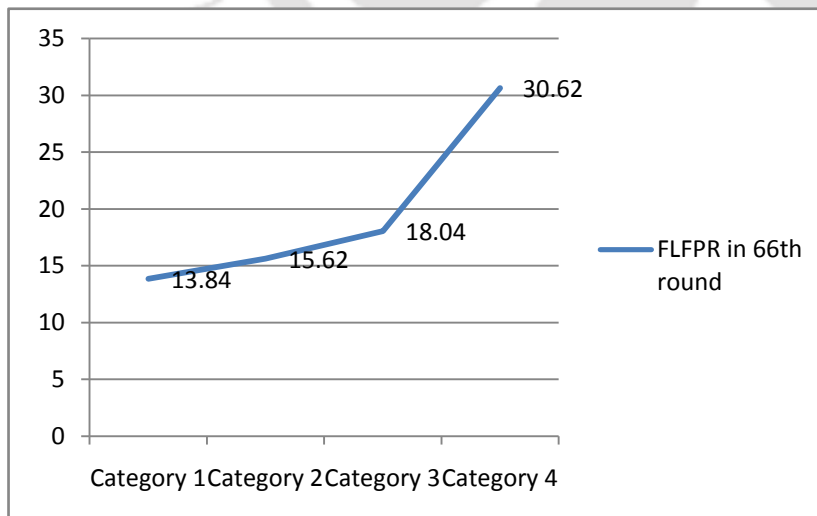
These categories are mutually exclusives. A mildly U-shaped relation between education level and female LFPR could be discerned in the 68th round data. Such U-shaped relationship is not visible in the other rounds.

Figure 4.2 : Female LFPR in percentage in the 61st round (2004-05) across Educational Categories



Source: Calculated using unit level data of EU Survey, NSSO

Figure4. 3: Female LFPR in percentage in the 66th round (2009-10) across Educational Categories



Source: Calculated using unit level data of EU Survey, NSSO

Figure 4.4: Female LFPR in percentage in the 68th round (2011-12) across Educational Categories



Source: Calculated using unit level data of EU Survey, NSSO

In the 68th round, the female LFPR declined from the first to the second category. It started rising gradually after “Below Primary and Primary” education category. The data also shows that a decline in female LFPR in these seven years happened not only among highly educated women, it also happened among the least literate (Boruah and Das, 2022). A similar picture was found at the all India level as well (Abraham 2013a).

- *Activity status:*

The activity status of a person is broadly divided into three categories: In the work force, Unemployed and Not in the labour force²⁷.

Table 4. 3: Distribution of people out of total population in various activity status(ps+ss) in Assam

Activity status	61st round (2004-05)				68th round (2011-12)			
	Rural	Rural	Urban	Urban	Rural	Rural	Urban	Urban

		Male	Female	Male	Female	Male	Female	Male	Female
In the	1	39.26%	14.69%	24.96%	2.87%	38.36%	7.84%	29.76%	4.21%
Labour	2	5.15%	1.76%	23.83%	5.94%	5.62%	2.14%	19.13%	4.03%
Force	3	10.69%	4.44%	6.29%	2.08%	10.00%	2.22%	5.34%	0.74%
	4	55.10%	20.89%	55.08%	10.89%	53.98%	12.20%	54.23%	8.98%
	5	1.34%	0.67%	4.05%	1.09%	2.42%	0.74%	3.07%	0.68%
	6	56.45%	21.56%	59.13%	11.98%	56.40%	12.94%	57.29%	9.66%
Not in	7	0.50%	20.04%	0.07%	22.16%	0.18%	16.28%	0.26%	36.97%
Labour	8	0.17%	17.03%	0.04%	23.19%	0.26%	33.72%	–	16.06%
Force**	9	43.55%	78.44%	40.87%	88.02%	43.60%	87.06%	42.71%	90.34%

** All sub-activity statuses are not reported here. 1: Self-employed: worked in household enterprises, 2: Regular salaried/wage employee, 3: Casual wage labour, 4: Total in workforce (1+2+3), 5: Didn't work but seeking and/or available for work, 6: Total in labour force, 7: Attended domestic duties only, 8: Attended domestic duties + engaged in free collection of goods/tailoring/sewing etc., 9: Total of not in labour force.

Source: Own calculations based on NSSO EU survey unit level data

From the table 4.3 it can be seen for rural females “Total in the labour force” declined by 8.62 percentage points. In case of urban females this decline is of around 2.32 percentage points. The sharp decline of rural females in “labour force” is driven by the decline in category 4, i.e., “work force” which is summation of first 3 categories. The “unemployed” category, i.e., category 5, had played minimal role here. In other words, women in Assam quit the labour force because works disappeared. There was a sharp decline of 6.85 percentage points among rural females who were “self employed or worked in household enterprise”.

The data of share of population “Not in labour force” gives some interesting results. Women who are not in labour force are mostly involved with “Domestic duties only” and “Domestic duties

along with free collection of goods/tailoring/sewing etc”. The share of women both in rural and urban areas across all the years in these two categories was high. If we look at the data in “Not in the labour force” categories we can see in the category “Attended domestic duties + engaged in free collection of goods/tailoring/sewing etc” there has been an increase of 16.69 percentage points among rural females. In case of urban females their share increased in the category “attended domestic duties only”. The total increase in rural and urban females’ share in the category “Not in the labour force” can be seen from the last row of the table 4. It shows there was an increase of 8.62 percentage points among rural females who were “Not in the labour force” and among urban females the increase was of 2.32 percentage points. In short, women’s share in the labour force had declined and their share in “Not in labour force” increased during 2004-11, both in rural and urban areas. Those who joined the “Not in labour force” category were mainly engaged in domestic duties. This observation is in line with Naidu (2016).

- *Age:*

Table 4.4: Percentage Point Change in Female LFPR during 2004-11

Age Group	Percentage Point Change
9 to 14	-1
15-19	-10.43
20-24	-11.11
25-29	-15.24
30-34	-12.18
35-39	-22.2
40-44	-20.8
45-49	-12.25
50-54	-16.04

55-59	-5.01
60-65	-4.59

Source: NSSO EU Survey Unit level data

Table 4.4 shows that during 2004-11 female LFPR declined across all age groups, it was not restricted to only school going age groups. It indicates that educational enrollment cannot explain the decline in FLFPR fully. There was a dramatic fall in the age groups of 35-39 and 40-44, which are not school-going age groups. Kannan and Raveendran (2012) likewise argued that at all India level, during 2004-09, only 27% decline in FLFPR could be attributed to educational enrolment.

- *Regional variation:*

Due to the small sample size and other issues sometimes district level analysis are not useful for the NSSO micro level data. We have clubbed the districts in order to get a meaningful data set. For the 68th and 66th rounds, the districts of Assam have been divided into four groups. These are as follows.

(1)Category one: “Eastern Plains” covers following districts: Lakhimpur, Dhemaji, Tinsukia,Dibrugargh, Sibsagar, Jorhat, Golaghat.

(2)Category two: “Western Plains” covers following districts: Kokrajhar, Dhubri, Goalpara,Bongaigaon,Barpeta, Kamrup Rural, Nalbari, Chirang, Baksa,KamrupMetro.

(3)Category three: “Cachar Plains” covers following districts: KarbiAnglong, NC Hills,Cachar, Karimganj,Hailakandi.

(4)Category four: “Central Brahmaputra Plains” covers following districts: Darrang, Morigaon, Nagaon,Sonitpur, Udalguri.

In 61st round there were mainly three divisions of districts in Assam. The divisions were like below

Assam	Plains	Lakhimpur	Jorhat
	Eastern	Dhemaji	Golaghat
		Tinsukia	Cachar
		Dibrugarh	Karimganj
		Sibsagar	Hailakandi
	Plains	Kokrajhar	Nalbari
	Western	Dhubri	Darrang
		Goalpara	Marigaon
		Bongaigaon	Nagaon
		Barpeta	Sonitpur
		Kamrup	
	Hills	KarbiAnglong	North Cachar Hills

This classification has been reclassified into four regions taking 68th round's division as base.

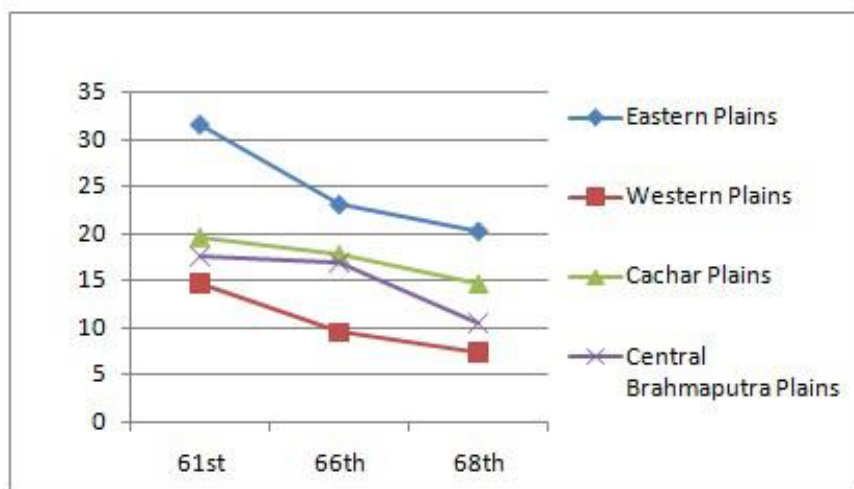
So the new classification for 61st round is as follows:

New additional districts added in 68 th rounds			
Plains	Lakhimpur	Jorhat	
Eastern	Dhemaji	Golaghat	
	Tinsukia		
	Dibrugarh	Sibsagar	
Plains	Kokrajhar	Nalbari	(baksa was created by carving out parts of Nalbari,

			Barpeta, Kamrup and small part of Darrang)
Western	Dhubri	Barpeta	
	Goalpara	Kamrup	Kamrup has been bifurcated into Kamrup-Rural and metro)
	Bongaigaon		(by carving out some parts of Bongaigaon Chirang has been created)
Hills (renamed as Cachar plain)	Karbi Anglong	North Cachar	
	Karimganj	Hills, Cachar	
		Hailakandi	
Central Brhamaputra Plain	Darrang	Marigaon	(Udalguri has been created by bifurcating Darrang)
	Nagoan	Sonitpur	

An attempt has been made to analyze the LFPR at the four sub groups level mentioned above, instead of analyzing it at districts levels.

Figure 4.5: Female LFPR in percentage across sub-regions in Assam

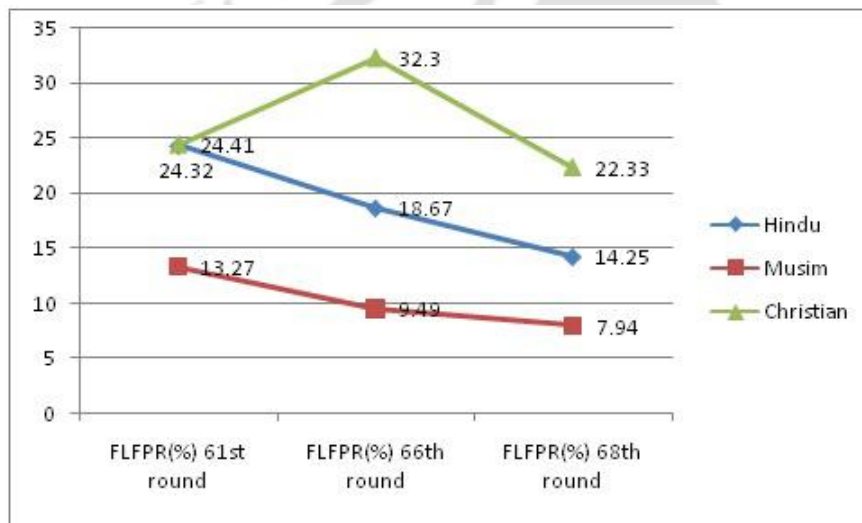


Source: NSSO EU Survey Unit level data

In terms of change in percentage point, as can be observed from Figure 4.5, the highest decline in female LFPR happened in Eastern Plains followed by Central Brahmaputra Plains. The Cachar plains had the lowest decline. It is noteworthy the Eastern Plains has maintained the leading position as far as FLFPR is concerned among all regions. Also note, all regions underwent a fall in FLFPR over the period (Boruah and Das, 2022).

- *Religion and Social categories:*

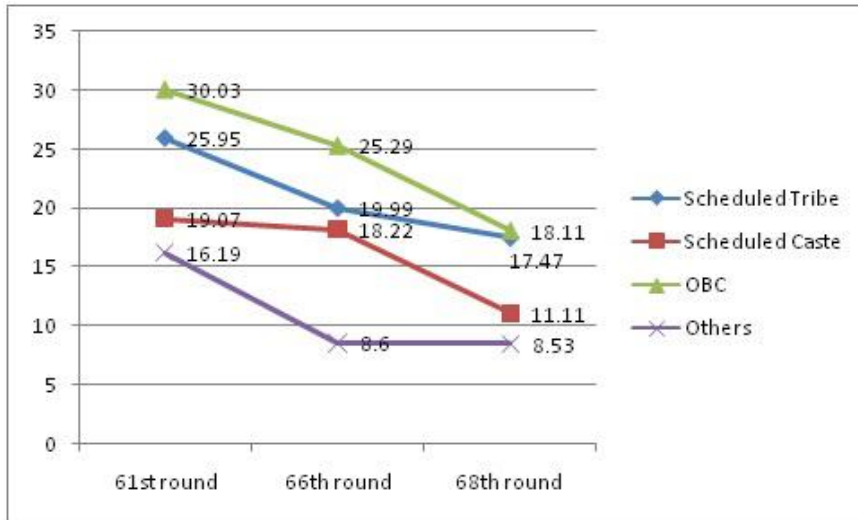
Figure 4.6: Female LFPR in percentage by Religion in Assam



Source: Calculated using unit level data of EU Surveys, NSSO

As far as religion-wise break up is concerned, LFPR of Hindu women declined drastically and the decline was of 10.07 percentage points (Figure 4.6). The LFPR of Muslim women has been always lower than other religion categories. LFPR of Christian women has been higher than that of Muslims and Hindus throughout. The decline in LFPR of Christian females was the lowest. For all religious categories there was a distinct fall in the FLFPR over the period.

Figure 4.7: Female LFPR in percentage by Social Groups in Assam



Source: Calculated using unit level data of EU Surveys, NSSO

Figure 4.7 shows the change of FLFPR of different social (caste) groups. The FLFPR has been the lowest in “Other” group. This resonates with the contention of previous research that “upper caste” families which are included in the “Other” group are less willing to allow women to enter the labour force due to their more conservative outlook concerning social pollution and sexual purity (Eswaran et. al, 2013). The female LFPR in Assam declined across all social groups during 2004-11. The highest decline occurred in the “OBC” category, women from “OBC” castes were withdrawing more from the labour force as compared to other groups. The decline was of 11.92 percentage points (Boruah and Das, 2022).

- *Marital status:*

Figure 4.8: Female LFPR in percentage by Marital Status in Assam



Source: Calculated using unit level data of EU Survey, NSSO

A fall of FLFPR was registered in all four marital status groups, namely, Never married, Currently married, Widowed, Divorced/separated. There was a drastic decline in the female LFPR of 15.28 percentage points during 2004-11 in the “currently married” women. The reason of married women’s lower participation in the labour market has been explored by various papers. According to one line of literature (Becker, 1985) the burden of child care falls mainly on the married women, men are likely to devote more time in the labour market. Another line (Lundberg and Rose, 2002) suggests that with more children value of parents’ time as input in the production of a “child good” rises. Hence presence of children reduces the labour supply of husbands and wives in terms of time and energy. It is notable that we did not find a low FLFPR of married women compared to other groups. But it declined fast. It’s possible that married women were finding it difficult to devote time to the work outside the household due to lack of child care facilities. The women who were Divorced/separated at that time had the second highest decline of 9.87 percentage points during 2004-11. The rate of decline of this category is followed by that of Widowed and Never married category(Figure 4.8) (Boruah and Das, 2022).

4.5. Probit regression analysis

The variables used in the probit model have been described in Table 4.5.

Table 4.5: Variables used in the probit regressions

Variables	Description and comments	Expected sign
Labour participation ²⁸	force A binary variable, which takes the value 1, if the individual is in the labour force, and 0, if not.	Not applicable, it's the dependent variable.
Religion(rural)	Hindu, Muslim, Christian, Others (4 groups). Hindu is reference category.	Not possible to predict the sign.
Religion(urban)	Hindu, Muslim, Christian and others (3 groups, because of insignificant observations).	Not possible to predict the sign.
Region	Eastern Plain, Western Plain, Cachar Plain, Central Brahmaputra Plain. Eastern Plain is reference category.	Negative.
Social Groups	ST, SC, OBC, Others (includes 'upper castes'). SC+ST is reference category.	Negative.
Land possession categories ²⁹	Marginal, Small, Semi-medium, Medium, Large. Marginal is reference category.	Negative.
Education(rural)	Not literate and others, Below primary and primary, Middle, Secondary and HS, Diploma/certificate, Graduate & above. Not literate and others is reference category.	U-curve: negative, then positive.
Education(urban)	Not literate and other, Below primary and primary, Middle, Secondary and HS+ Diploma & certificate, Graduate & above.	U-curve: negative, then positive.
Age group	15-24, 25-34, 35-44, 45-54, 55-64 years. 15-24	Inverted U-curve: positive and then

	is reference category.	negative.
Status	Land possessed ×social groups ³⁰ . Land has 2 categories here, marginal and non-marginal(others clubbed together). Social groups have 2 categories SC+ST and OBC+Others. This was necessitated to avoid multicollinearity.	Negative, due to status concern.

How did all these factors play out when all of these were allowed to vary simultaneously, as they actually did in real life? How did the FLFPR correlate to each of these factors, individually? One may resort to regressions to answer such questions. Accordingly, a regression analysis has been carried out to examine the probable determinants of female LFPR from among the set of variables discussed here. The data source for this analysis is 68th round NSSO EU Survey micro data of 2011-12. The econometric models that have been tested are [1] and [2] as specified in Section 3.

$$[1] Pr(Y_{ih}^R=1|X_{ih}^R) = Z(\alpha_0 + \beta_1 X_{1ih}^R + \dots + \beta_{20} X_{20ih}^R)$$

$$[2] Pr(Y_{ih}^U=1|X_{ih}^U) = Z(\alpha_0 + \beta_1 X_{1ih}^U + \dots + \beta_{18} X_{18ih}^U)$$

Table 4.6: Probit Regression Results(Rural)

		Coefficients	Marginal Effects
Land possession (reference: Marginal)	Non Marginal	0.57***	0.07***
Education(reference: Not literate and others)	Below primary and primary	-0.16**	-0.04**
	Middle	-0.40***	-0.09***

	Secondary and Higher secondary	-0.27***	-0.07***
	Diploma/certificate course	-0.34	-0.08
	Graduate and above	0.56***	0.18***
Religion (reference: Hindu)	Islam	-0.07	-0.02
	Christian	0.34***	0.09***
	Others	0.28	0.07
Age (reference:15-24)	25-34	0.36***	0.08***
	35-44	0.36***	0.08***
	45-54	0.15	0.03
	55-64	-0.66***	-0.09***
Marital Status(reference: Never married)	Currently married	-0.23**	-0.05**
	Widowed+ divorced/separated	0.63***	0.19***
Social group(reference: ST+SC)	OBC+Others	0.09	-0.02
Region (reference: Eastern Plain)	Western Plains	-0.66***	-0.15***
	Cachar Plains	-0.28***	-0.08***
	Central Brahmaputra Plains	-0.28***	-0.08***
Status(Reference: Marginal Land*ST+SC)	Non marginal land*(OBC+Others)	-0.46***	
	chi2(25)	298.94	
	Prob> chi2	0.00	
	Pseudo R2	0.0923	

*** significant at 1%(p<0.01), ** significant at 5%(p<0.05), * significant at 10%(p < 0.1)

Table 4.6 lists the coefficients and marginal effects³¹ of the probit regression of rural Assam. The land possession has a significant effect on FLPRR. In comparison to marginal land category (less than one hectare) women of households who possess non-marginal land parcels have 7% higher

probability to be in the labour force. However, there are contrary findings available in literatures. Grantham(2012) suggests that labour force participation of female family members of land-owning households is lower than landless households. They have found land holding has a negative effect on FLFPR. The “unearned income” lowers the need of women to work in the labour markets. This kind of effect is not visible in rural Assam. It is possible that “non-marginal” land holdings in rural Assam may not be large enough to create a strong enough negative income effect (Assam Development Report, n.d.).

For education categories the reference group is “Not literate and others”. For “Below primary and Primary”, “Middle”, “Secondary and Higher secondary” and “Graduate and above” the effect on FLFPR was found to be statistically significant. The coefficients of the first three categories are negative, for the last education category it is positive. The marginal effects are—4%, -9%, -7%, 18%. This is close to the elusive U-shape curve often mentioned in the literature (Goldin, 1994). The probability of being in the labour force as compared to base category declines at a faster rate up to the education level “Middle”. Then the probability of joining the labour force starts rising (Boruah and Das, 2022). It partially tallies with the findings of Das and Mishra (2018) that higher land and education raises FLFPR although their paper investigated only the rural population of Assam.

For religion, compared to “Hindu”, women from “Christian” religion have 9% higher probability to be in the labour force. In “Age Groups” the base age group is 15-24 years. Age group categories 25-34, 35-44 have positive and 55-64 have negative significant coefficients. Women in these age groups have 8%, 8% higher and 9% less probability respectively to be in the labour force compared to the base category. For marital status, the base category is “Never Married”. Women who are “Currently married” and “Divorced/Separated/Widowed” have negative and

positive coefficients respectively. “Currently Married” women have 5% less chance and “Divorced/Separated/Widowed” have 19% higher chance to be in the labour force. Some studies report almost similar findings. They argue that divorce rate has strong positive effects on female participation (Boruah and Das, 2022; Semyonov,1980; Johnson and Skinner, 1986).

The caste variable seems to have no significant impact on FLFPR. Coming to the regional variation, in comparison with reference category “Eastern Plain” other plains in Assam have lower female LFPR. Western Plain, Cachar Plain and Central Brahmaputra Plain women have 15%, 8% and 8% less chance of entering labour force. This is not surprising since the eastern part of Assam is economically, educationally relatively well-off (Assam Human Development Report,2014). We sought to measure the effect of status (land possessed interacted with caste) on labour force participation. It is found to be negative as was expected. Compared to women of SC and ST castes with marginal land holding, women from OBC and other castes with non-marginal lands have lesser probability of being in the labour force (Boruah and Das, 2022). It has been argued in the literature that in India the family’s desire to maintain status determines the time allocation of women between market and household works (Eswaran et al.,2013a). Women’s paid work is sometimes considered to represent low status of the family and is stigmatized (Abraham, 2013a; Eswaran et al., 2013). A family status is represented by domestication of females and labour market participation of males (Abraham, 2013a). This relates to the notions of sexual purity. When caste interacts with wealth (land in our case) then this effect gets intensified, for such patriarchal norms are stronger among the “upper caste” households(Bardhan, 1973; Das, 2009). We can see people from OBC and other castes with relatively larger land holding have lowFLFPR as compared to people from SC and ST caste with marginal land. This is consistent with available theoretical framework on sanskritisation.

Table 4.7: Probit Regression Results (Urban)

		Coefficients	Marginal Effects
Land possession(reference: Marginal)	Non- Marginal	1.49	0.08
Education: (reference: Not literate and others)	Below primary and primary	-0.18	-0.03
	Middle	-0.37*	-0.06*
	Secondary and Higher secondary and Diploma/certificate course	-0.23	-0.04
	Graduate and above	0.66***	0.18***
Religion(reference: Hindu)	Islam	-0.26	-0.04
	Christian & others	0.10	0.02
Age (reference: 15-24)	25-34	0.90***	0.14***
	35-44	0.90***	0.14***
	45-54	0.78***	0.11***
	55-64	0.29	0.03
Marital Status (reference: Never married)	Currently married	-0.75***	-0.15***
	Widowed+ divorced/separated	0.41	0.12
Social group(reference: ST+SC)	OBC+Others	-0.10	-0.03
Region (reference: Eastern Plain)	Western Plains	0.21	0.04
	Cachar Plain	-0.41**	-0.06**
	Central Brahmaputra Plains	0.29*	0.06*
Status(reference: Marginal Land*ST+SC)	Non marginal land*(OBC+Others)	-1.69**	

chi2(19)	122.52
Prob> chi2	0.0000
Pseudo R2	0.1736

*** significant at 1%(p<0.01), ** significant at 5%(p<0.05), * significant at 10%(p < 0.1)

Table 4.7 reports the regression results of urban Assam. Women with “Graduate and above” and “Middle” level education women have 18% higher chance and 6% less chance to be in the labour force than “Not literate and others”. The age groups 25-34, 35-44, 45-54 have significant positive coefficients in comparison to the base age group 15-24, women in these age groups have 14%, 14% and 11% higher chance to be a part of labour force respectively. “Currently Married” women have 15% less chance to join labour force compared to the “Never Married”. The caste variable has no significant impact like in the rural areas. As compared to the reference category “Eastern Plain” women from the “Cachar Plain” have 6% less probability to be in the labour force. Like rural areas, in urban areas the “Status” variable has a significant negative impact. Women from OBC and “Other” castes, with more land are less likely to be a part of labour force as compared to women from SC, ST castes with marginal land holdings. The role of status has been examined by Eswaran et al.(2013), who reported that the ratio of women to men’s market works decline as one move up along with caste hierarchy. Our result is an affirmation of the presence of such factors, for both urban areas and rural areas (Boruah and Das, 2022).

The robust standard errors are reported in the appendix section of this chapter.

4.6. Conclusion

There are amalgamations of economic, social, political, cultural variables which might affect the decision of women to participate in labour force. In Assam how FLFPR moved over the years

from 2004 to 2011 and how diverse factors have influenced women's labour force participation decision has been explored in this paper. The study of female LFPR in a specific regional context is important, for it gives an idea as to how to formulate policies suitable in that specific context.

The chapter discerned a decline in female labour force participation rates in Assam, in both rural and urban areas. A sharp decline was noticed among the "Other" castes (which include the "upper castes"); among "Hindu" women; among "Currently Married" women. Women who were not in labour force were mostly involved in "Domestic duties only" and "Domestic duties along with free collection of goods/tailoring/sewing etc". This section went on rising with time, worryingly. In both rural and urban areas, women with high education especially "graduate and above" category had greater chance of being in the labour force. However, intriguingly, in rural areas, compared to "Not literate and others", women who are little bit more educated have less chance of being in the labour force; whereas women who are much more educated have higher chance of being in the labour force. Higher level of land possession is associated with higher probability for a woman to be a part of labour force in rural areas. This is however not true in urban areas. Currently married women generally have less chance of being the labour force compared to never married women both in rural and urban areas. "Widowed, Divorced/Separated" women have comparatively higher chance of being in the labour force in comparison with "Never Married" women only in rural areas. Status concerns have impeded women's labour force participation, both in rural and urban Assam. The OBC and higher castes with moderately higher land holdings seem to be more "status" concerned as compared to SC, ST households with marginal lands.

These empirical findings are interesting and useful from a policy perspective, We shall have the occasion to comment further on these empirical findings and their implications in the concluding chapter of this thesis.

²⁴LFPR is measured in terms of UPSS status. It is the percentage of population in the Labour Force comprising activity codes 11 to 81.

There are different approaches used in NSSO to determine activity status:

The three approaches are: Usual Status Approach, Current Weekly Status Approach and Current Daily Status. For the analyses of this draft only the concept of “Usual Status Approach” has been used. NSSO EU Survey Report of 68th Round defines it as follows:

Usual principal activity status: The reference period is 365 days preceding the date of survey. The usual activity status relates to the activity status of a person during the reference period of 365 days preceding the date of survey. The usual principal activity status is that activity on which a person spent relatively long time (i.e. major time criterion) during the 365 days preceding the date of survey. For determining this first it is determined whether he is in the working or unemployed or not in the labour force depending on the major time spent during the 365 days preceding the date of survey. Persons who are classified as not belonging to the labour force were assigned the broad activity status “neither working nor available for work” (not in the labour force). On the other hand persons who are in the labour force are given the broad activity status of either “working” (employed) or “not working but seeking and/or available for work” (unemployed) based on. NSSO 68th EU Survey Report says “Within the broad activity status so determined, the detailed activity status of a person pursuing more than one such activity was determined once again on the basis of the relatively long time spent on such activities”.

Usual subsidiary economic activity status: It may be possible that person whose usual principal status has been determined based on major time criteria can be involved with some other economic activities for a shorter period of not less than 30 days of time during the reference year preceding the date of survey or for a minor period. The status of such economic activity status is referred as subsidiary economic activity status of that person.

Usual activity status considering principal and subsidiary status taken together: When both the activity status are taken together then it is known as the usual status (ps+ss) of the person. A person who is involved with some activity based on either principal or subsidiary status come under us(ps+ss) category. So even if a person is not a worker based on UPS can be a worker according to us(ps+Ss). Thus, a person who is not a worker in the usual principal status can be considered as worker according to the usual status (ps+ss), if the person is involved with some subsidiary economic activity for at least 30 days during 365 days preceding the date of survey.

²⁵Activity Status: The detailed activity statuses under each of the three broad activity statuses (viz. "employed", "unemployed" and "not in labour force") and the corresponding codes are as follows:

Codes	Descriptions
Working(or employed): Self employed	
11	worked in household enterprises (self-employed) as own-account worker
12	worked in household enterprises (self-employed) as an employer
21	worked in household enterprises (self-employed) as helper
Working: regular employed	
31	worked as regular wage/salaried employee
Working: Casual workers	

41	worked as casual labour in public works other than MGNREG public works
51	worked as casual labour in other types of works
Not working but seeking/available for work (or unemployed)	
81	sought work or did not seek but was available for work (for usual status approach)
Neither working nor available for work (or not in labour force)	
91	attended educational institutions
92	attended to domestic duties only
93	attended to domestic duties and was also engaged in free collection of goods (vegetables, roots, firewood, cattle feed, etc.), sewing, tailoring, weaving, etc. for household use
94	rentiers, pensioners, remittance recipients, etc.
95	not able to work owing to disability
97	Others (including beggars, prostitutes, etc.)
98	did not work owing to sickness (for casual workers only)
99	children of age 0-4 years

²⁶MPCE is deflated with CPI-AL and IW for rural and urban areas separately and then four MPCE classes have been formed. The base year for CPI-IW and CPI-AL is 1987-88.

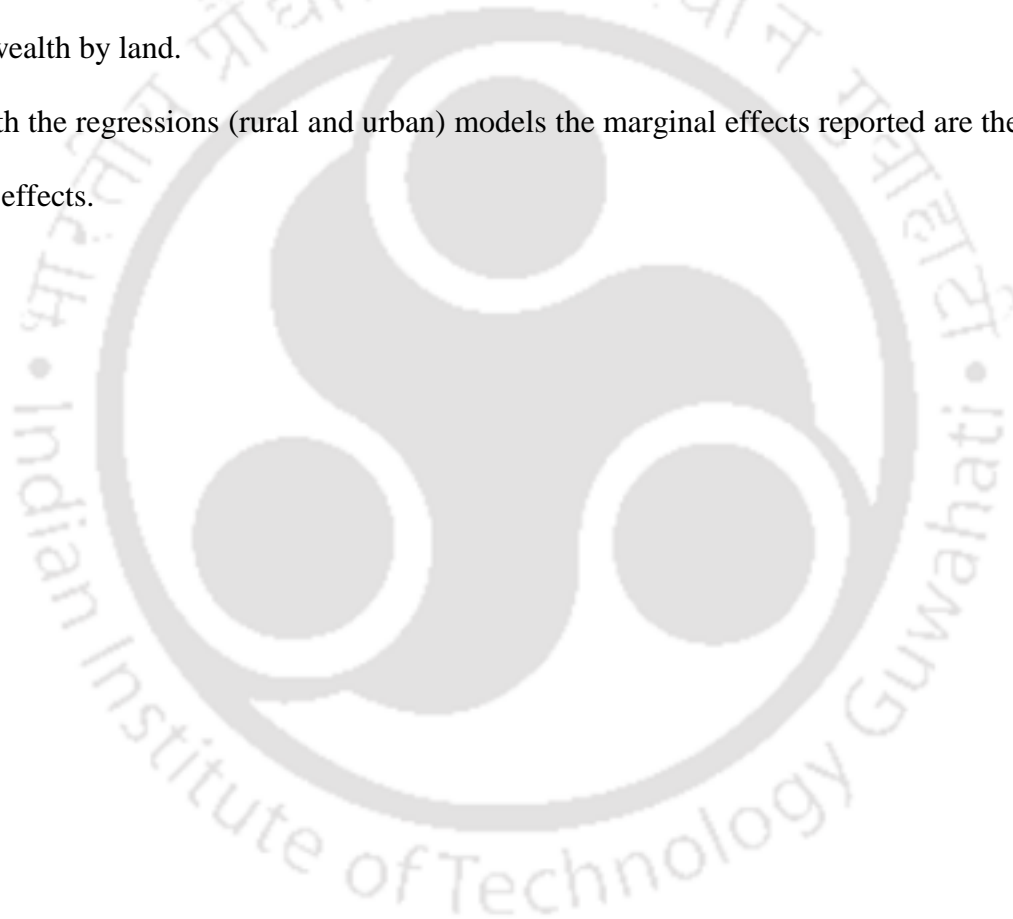
²⁷The first two categories i.e., the work force and the unemployed together form the total “labour force”.

²⁹In NSSO the area of land possessed is defined as land “owned”, “leased in” and “land neither owned nor leased in” (i.e. encroached) by the household but 'leased out' land is excluded. (NSSO

EU Rounds Reports). The categorization is as follows: marginal: below 1 hectare, small: 1 to 2 hectare, semi-medium: 2 to 4 hectare, medium: 4 to 10 hectare, large: more than 10 hectare.

³⁰My aim is to capture whether women from household with large land possession and high caste social group behave differently in terms of their FLFP decision. It is suggested by Eswaran et al. (2013) that when caste/social group is correlated with wealth it signifies status concerns. I proxied wealth by land.

³¹ For both the regressions (rural and urban) models the marginal effects reported are the average marginal effects.



Appendix

Table A4.1: Robust Standard Errors of the coefficients of Probit Regression (rural area)

		Robust Standard Errors
Land possession (reference: Marginal)	Non Marginal	0.09
Education(reference: Not literate and others)	Below primary and primary	0.07
	Middle	0.08
	Secondary and Higher secondary	0.09
	Diploma/certificate course	0.37
	Graduate and above	0.16
Religion (reference: Hindu)	Islam	0.07
	Christian	0.11
Age (reference:15-24)	25-34	0.09
	35-44	0.10
	45-54	0.11
	55-64	0.17
Marital Status(reference: Never married)	Currently married	0.09
	Widowed+ divorced/separated	0.15
Social group(reference: ST+SC)	OBC+Others	0.07
Region (reference: Eastern Plain)	Western Plains	0.07
	Cachar Plains	0.08
	Central Brahmaputra Plains	0.07
Status(Reference: Marginal Land*ST+SC)	Non marginal land*(OBC+Others)	0.11

Table A4.2: Robust Standard Errors of the coefficients of Probit Regression (urban area)

	Robust Standard
	Errors
Land possession(reference: Marginal)	0.48
Non- Marginal	
Education: (reference: Not literate and others)	0.19
Below primary and primary	
Middle	0.20
Secondary and Higher secondary and	0.19
Diploma/certificate course	
Graduate and above	0.20
Religion(reference: Hindu)	0.18
Islam	
Christian & others	0.34
Age (reference: 15-24)	0.22
25-34	
35-44	0.26
45-54	0.27
55-64	0.33
Marital Status (reference: Never married)	0.21
Currently married	
Widowed+	0.27
divorced/separated	
Social group(reference: ST+SC)	0.12
OBC+Others	
Region (reference: Eastern Plain)	0.14
Western Plains	
Cachar Plain	0.17
Central Brahmaputra Plains	0.16
Status(reference: Marginal Land*ST+SC)	0.68
Non marginal land*(OBC+Others)	

Chapter 5: A theoretical model

In this chapter a theoretical model on women's time allocation between market works and household works has been presented. The model follows the framework of household utility maximization. In the model it has been assumed that women divide their time in between market works and household works. The theoretical model tries to examine how the division of time by women gets affected in the presence of "status premium"³². This premium is measured in terms of women not working outside the house and it reflects the status of a family as perceived by the society, the peer groups, or the family itself (Das and Desai, 2003; Eswaran et. al, 2013). Further, the model examines the impact of subsistence consumption in determining the time allocation of women as well. The model also proposes that in more affluent households the time women devote towards market works diminishes due to income effect. As we shall see, these results are not general but are dependent on specific properties of the nature of preference. These propositions are tested using a very widely used utility function, the Constant Elasticity of Substitution (CES) Utility function. As a disclaimer, it should be made clear that the focus of our study here is on the supply side. Thus, the fall in job opportunities on the demand side of the labour market and how it affects the FLFPR is not being discussed in this chapter. Rather, how the decisions of the suppliers of labour are influenced by some selected parameters such as social taboo, economic affluence is the subject of our study.

5.1. Background of the theoretical model

There has been a declining trend of female labour force participation rates in India as well as in Assam. Various researchers had identified various factors, causes and hypotheses behind the declining trend of female LFPR.

Many studies including Abraham (2013a), Eswaran et al.(2013) recognize that in India and many other countries women's paid work is considered to represent low status of the family and is stigmatized. With the path of upward social mobility a family's status is represented by domestication of females and labor market participation of males (Eswaran et al. 2013; Mies 1984). The upper class, upper caste households often give more importance to sexual purity and hence it prevents women from going for market work and as a consequence they stay in domestic works. The patriarchal norms which have been continuing since the past in the Indian and many other societies of the world stigmatize the paid works of women and it is considered that contacting males from outside the household is "polluting". In India it is believed that when women avoid paid works and stay at home that brings "sexual purity" to them and it creates higher status for the family (Eswaran et al., 2013). This taboo is not so much prevalent among lower caste women (Boserup, 2008; Abraham, 2013a). There may be however cases that even the low-caste women sometimes withdraw themselves from the labor force due to "sanskritization" effect. The idea behind the concept of sanskritization is, people from marginalized castes sometimes imitate or emulate the status driven behavior of upper caste households in order to achieve higher status in the society (Eswaran et al., 2013; Srinivas, 1952). Thus, with rising household income of the family, due to aspirations of attaining social or caste "status" women tend to substitute paid work for "domestic status production activities". The family's desire to maintain its status could be one of the determining factors of women's time allocation between market works and unpaid domestic works (Eswaran et al., 2013). This tends to be supported by our empirical analysis of the previous chapter.

Caste can interact with education level in influencing labour market participation. Eswaran et al.(2013) reported that for higher caste households the effect of education on market works is weaker. In a paper by Das (2009) it has been argued that women from high caste farmer households participate less in the rural labour markets as compared to women from low caste farmer households.

It is believed that the domestic and household works are “status producing” activities for the family. According to Abraham (2013a) and Papanek(1979) such status production activities include children’s education, healthcare of the family, engagement in rites and rituals and so on. Papanek(1979) discusses various “work” and “non-work” performed by a woman in a family. Out of these, family’s status producing activities are mentioned exclusively. Her paper is not based on any particular society or country. Papanek (1979) identified three categories of status works of women. The first category of status production activities of women includes the support works that occur from the demands of income earning activities by other family members. The second category of status production activities includes the training of children. Women's status-production work in this category includes training children in status-appropriate behavior, appearance, physical and intellectual skills, health, and presentation of the self. The third category of status production activities is known as “the politics of status maintenance”. Examples of these can be exchanging formal and informal gifts between families that accompany ceremonies, conveying information: gossips that establishes or injures family status, preparation of feast that validate family status in a society. The rituals and religious performances are included in this category. Status is defined by this paper as “collectively shared assessment evaluation of a societal unit on the basis of certain objective characteristics of the unit.”

(Papanek, 1979). These status producing activities are particular kinds of women's works, which helps in enhancing and maintaining the family's social standing (Papanek, 1979). When a societal unit reaches a certain level of income, then only these activities are undertaken. At this level of income the family gets sufficient control over scarce resources to ensure the survival of the family. The existence of threshold level of economic wellbeing is noteworthy, for it gives a clue as to why the withdrawal of women from the labour market takes place after a point.

Eswaran et al. (2013) tested the role of status with some empirical tests backed by a theoretical framework. The theoretical model predicts the effects of caste based status concern on time allocation of women. The main arguments of their theoretical model are: (a) caste is the indicator of status here; (b) as we move up the caste hierarchy, the share of women's market works, relative to that of husband should decline; (c) In the presence of status concern, an increase in the wealth will reduce women's market works relative to that of men at a faster rate; (d) With an increase in women's education women's time towards market works reduce in order to facilitate status production despite the fact that with education their market wages increases. They tested their hypotheses using NSSO large sample round unit level data of the year 2004-05 and the Time Use Survey data of 1998-99 covering six states. The empirical model they used is as follows:

$$y_{hv} = x_{hv}\alpha + z_{hv}\beta + \gamma_v + \varepsilon_{hv}$$

Here h is the household, v is the village and γ is the village fixed effect and ε is the disturbance term. The dependent variable y is the ratio of labour supplied by females to that of males in a household. The dependent variable considers only married women above age 14. In the equation x is a vector which contains variables on caste, wealth, female education and also interactions

among some of them. It has been assumed by the authors that through these variables the status effect operates. The vector z has all the control variables. The empirical findings of the paper show that market works of women relative to that of men declines as people move up the caste hierarchy. With education of women the relative labour supply of women further declines. The theoretical prediction of the paper was supported by their empirical findings.

Another related group of literatures argues that people with more wealth and income can afford more to keep their women at home for household works. The affluence can come in many forms. It can be in terms of wealth, income or wages, education of husband or wife and so on. When the household becomes more affluent the women can afford some leisure and they withdraw themselves from the labour market. It may be the case that to maintain the rising affluence or income of the household the men of the household need to engage themselves in income earning activities and hence only the female counterparts withdraw from labour market. This is also because with rising income of the household the income effect works strongly and hence women withdraw from labour market. Considering MPCE data collected by NSSO as a proxy for household income it is possible to see across income levels how female labor force participation varies. Kapsos et al. (2014) calculated the real value of MPCE using headline CPI deflators and the changes in living standards. They found that participation is the lowest among the highest income group and it is highest among the lowest income group. Their econometric analyses of probit model, the heteroskedastic probit model and the Oaxaca-Blinder decomposition model confirm that a woman in a rural household with low consumption expenditure have higher probability to be in labour market compared to a woman from higher levels of household expenditure (Kapsos et. al, 2014). There have been similar studies with similar findings which show that with rising income or affluence female LFPR declines and hence females' time

towards domestic works increases. Affluence or income or wealth can get affected by the education level of husband or wife, which indirectly affects the female labour force participation decision. With rise in education initially the potential earning increases and hence the cost of not working also rises. Thus the duration of work increases. As income further increases then income effect takes effect. With higher income now people can afford some leisure and hence work less (Tansel, 2002; Tsani et al., 2013; Bhalhotra and Aponte, 2010; Psacharopoulos and Tzannatos, 1989).

From the above we can list out the following conclusions: (a) status production of the household could be a function of women staying at home; if the family prioritises this kind of status production, women's workforce participation can go down. (b) Higher income and wealth of the household are associated with low female workforce participation, *ceteris paribus*.

A theoretical model is presented below which tries to capture these observations in terms of an analytical framework.

5.2. The Theoretical Model

The theory on allocation of time was originally developed by Gary Becker (Becker, 1985). Becker developed a functional modeling framework of time allocation for households. There are many further developments on time allocation theory. In the following sections a model of time allocation is presented..

To begin with let us assume that the total time available to a woman is T and the amount of time she devoted to labour market is l . Therefore $T-l$ amount of time is left for domestic works and we denote the time available for domestic works is v , in other words, $T-l=v$ (there is no leisure in this model, or alternatively that time is fixed). Wage rate in the labour market is denoted as w .

We get the budget constraint as follows.

$$w.T - w.v = x \quad [1]$$

Where x is the goods purchased whose price is normalized to 1 (one). Since wage rate is w and T is the total time with the woman, if all of T was used for market work, the woman could have got $w.T$ money. With this money she could purchase goods (there is no saving in this model). With v amount of time actually devoted to domestic work, her actual earning goes down to $w.T - w.v$, which she can use to buy the private goods. Thus amount that she can buy, which is same as the budget constraint is,

$$w.T - w.v = x$$

This can be written as

$$x = w.l \quad [2] \quad (\text{Using } T-l = v)$$

It is assumed that there is no borrowing and savings.

The utility function is considered as follows, with the usual assumptions and declining MRS.

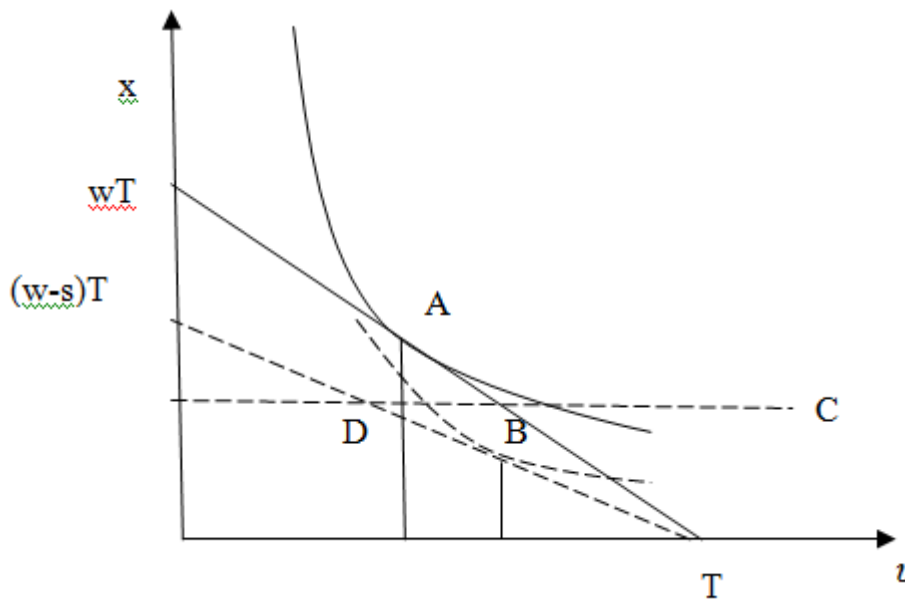
$$U = U(v, x) [3]$$

In a household the social “status” is assumed to be measured in terms of the women of the household not working in the labour market. In such cases when status is equated with women not going for market works, the opportunity cost of domestic works i.e w falls. This happens because when there is one unit labour not sold in the market, it causes monetary loss, but at the same time there is gain in “status”. This “status premium” is measured by s per unit of labour.

This means when there is 1 unit of labour not going to market and staying at home, it enhances the family's status by "s" unit. So the net opportunity cost = $w - s$.

The standard labour-leisure framework diagram below explains the above mentioned phenomenon.

Figure 5.1: Utility maximization with and without status premium



In the above diagram when there is no status premium the optimal point is attained at A because at that point the initial budget line is tangent to the initial indifference curve and hence this is the point of utility maximization. Let us assume that now there is status premium attached and hence the budget line pivots inward because now the budget line cuts the y axis at the $(w-s).T$ point. Due to this the optimal point moves from A to B. At point B the new budget line touches the new indifference curve and hence it is the new equilibrium point. At point B, the time for domestic work (v) has gone up. It implies that in households where more status premium is attached in terms of women not working in the labour market, the time devoted towards domestic works

goes up. Hence, in other words, labour supply for market works goes down due to the appearance of status premium. This is the case where the substitution effect is dominating the income effect. As opportunity cost of domestic work $w-s$ falls, by substitution effect the woman should spend more time at home. But income also falls when s is high which should reduce time at home. It is obvious that the equilibrium positions of A and B depend on the nature of the utility function. If the Indifference curves are very steep, i.e. for one hour of time at home, large amount of x needs to be compensated, and then we can expect an outcome as depicted in Figure 5.1.

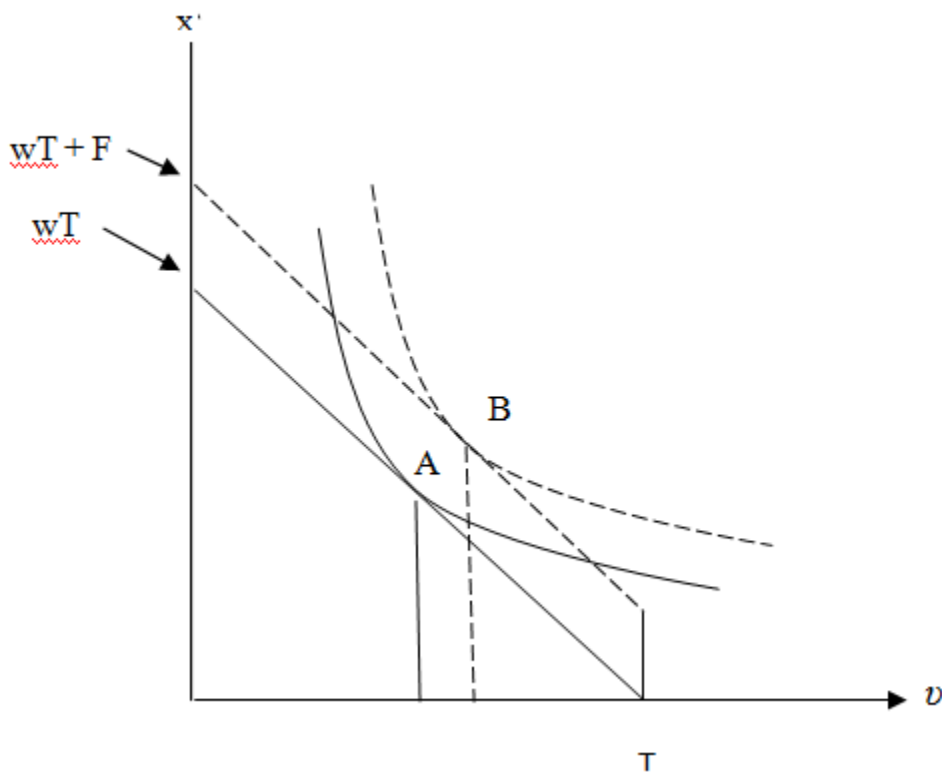
The increase in the amount of v , the time spent at home, can be restricted by putting some threshold limit on the downward movement of x . Suppose it is assumed that x can't be reduced below a certain limit, let us say, the limit is represented by line C as depicted in the diagram. In this case the equilibrium can't be attained at B. In such cases equilibrium is settled at an intersection point of the new budget line and the line C as given in Figure 5.1. The new equilibrium is at point D.

Few conditions are required for such downward rigidities to happen. There can be a situation when the equilibrium consumption of x at A is close to the minimum consumption level, or in other words, the household is poor. In such cases there can be rigidities in downward movement of x . This indicates that the rise in v due to social status premium, which was our original result, is dependent on the level of affluence. For poor families, the attainment of social status, which can be obtained by sacrificing x , the private good, could be difficult. Interestingly, this inability of the poor families to afford status in itself may increase the desirability of status for the affluent families, which are in a position to afford the status. In other words, the poor families' not reducing women's time allocation for market work reinforces the value that middle class and

upward mobile families place on the aforementioned social status (of not permitting women to take part in labour market).

Affluence may affect v in a different way. Let us assume that the income of the woman is dependent on the income of the household, or say on the educational level of the husband, which is a proxy of his income. In such cases, families with more wealth or households with more educated husbands can decide on a higher level of domestic time for women.

Figure 5.2: Change in the optimal point due to income/wealth change of the household



Let us denote the rise of family income by F in terms of the private good x . The budget line from equation [1] becomes,

$$w.T + F - w.v = x \quad [4]$$

This budget equation is valid with the restriction that $v \leq T$. The maximum value of v is obtained when $x = 0$. At that point, $v = T$, like before.

The budget line in Fig 5.1 now shifts vertically up, as shown in Fig 5.2.

From the Figure 5.2, it can be seen that after increase in income the budget line shifts up vertically and new equilibrium is attained at point B with higher level of v . It can be argued that families with more wealth or households with more educated husbands can afford more domestic times for the female household members and hence less labour market times for females. This is because v is a normal good and more of v is always preferable. Therefore its income effect is positive.

While summing up, two propositions can be offered. These are as follows:

1. For a host of preference types, the social status premium defined in terms of women not working in the labour market leads to less labour supply. But, in the presence of minimum subsistence requirements, for poor households, status concern does not necessarily reduce time allocation to labour market.
2. In case of rise of wealth/income of families, due to the income effect the time allocated by women to labour market may fall.

Now we can take a specific functional form of utility functions and explore under what conditions the above proposition (1) gets satisfied. A fairly general utility function which has been used frequently in the microeconomic literature is the constant elasticity of substitution (CES) utility function.

We have already defined women's time available for domestic works as v and x denotes the consumption of private good.

The specific form of CES utility function we are taking is

$$U(v, x) = 1/\rho \log (x^\rho + v^\rho)$$

With the presence of status premium the utility maximization problem becomes

$$\text{Maximize } U(v, x) = 1/\rho \log (x^\rho + v^\rho)$$

w.r.t

$$(w-s)T = (w-s)v + x \quad [5]$$

Hence the lagrange problem is

$$L = \frac{1}{\rho} \log (x^\rho + v^\rho) + \lambda [(w-s)T - (w-s)v - x] \quad [6]$$

$$\frac{\partial L}{\partial v} = w - s = \left[\frac{v}{x}\right]^{\rho-1} \quad [7]$$

$$\text{We have } (w-s)T = (w-s)v + x$$

Hence we get

$$w - s = \left[\frac{v}{x}\right]^{\rho-1}$$

$$\Rightarrow \frac{v}{x} = (w - s)^{\frac{1}{\rho-1}} \quad [8]$$

$$\Rightarrow x = \frac{v}{(w-s)^{\frac{\rho}{\rho-1}}} [9]$$

Putting the value of x in equation [5] we get

$$\Rightarrow \frac{v}{(w-s)^{\frac{\rho}{\rho-1}}} = (w-s)T - (w-s)v$$

$$\Rightarrow T - v = \left[\frac{v}{(w-s)^{\frac{\rho}{\rho-1}}} \right]$$

$$\Rightarrow T = v \left[1 + \frac{1}{(w-s)^{\frac{\rho}{\rho-1}}} \right]$$

$$\Rightarrow T \cdot (w-s)^{\frac{\rho}{\rho-1}} = v \left[1 + (w-s)^{\frac{\rho}{\rho-1}} \right]$$

$$\Rightarrow v = \left[\frac{(w-s)^{\frac{\rho}{\rho-1}}}{(w-s)^{\frac{\rho}{\rho-1}} + 1} \right] \cdot T \quad [10]$$

- *Propositions*

1. For a host of preference types, (a) the social status premium defined in terms of women not working in the labour market leads to less labour supply. (b) In the presence of minimum subsistence requirements, for poor households, status concern does not necessarily reduce time allocation to labour market.

Proving Proposition 1:

Part (a):

We have,

$$v = \left[\frac{(w-s)^{\frac{\rho}{\rho-1}}}{(w-s)^{\frac{\rho}{\rho-1}} + 1} \right] \cdot T \quad [10]$$

$$\begin{aligned} \Rightarrow \frac{\partial v}{\partial s} &= \frac{\partial}{\partial s} \left[\frac{(w-s)^{\frac{\rho}{\rho-1}}}{(w-s)^{\frac{\rho}{\rho-1}} + 1} \right] \cdot T \\ \Rightarrow \frac{\partial v}{\partial s} &= \left[\frac{\{(w-s)^{\frac{\rho}{\rho-1}} + 1\} \cdot \frac{d}{ds} (w-s)^{\frac{\rho}{\rho-1}} - (w-s)^{\frac{\rho}{\rho-1}} \cdot \frac{d}{ds} \{(w-s)^{\frac{\rho}{\rho-1}} + 1\}}{\{(w-s)^{\frac{\rho}{\rho-1}} + 1\}^2} \right] \cdot T \\ \Rightarrow \frac{\partial v}{\partial s} &= \left[\frac{\{(w-s)^{\frac{\rho}{\rho-1}} + 1\} \cdot \{\frac{\rho}{\rho-1} (w-s)^{\frac{\rho}{\rho-1}-1}\} (-1) - (w-s)^{\frac{\rho}{\rho-1}} \cdot \{\frac{\rho}{\rho-1} (w-s)^{\frac{\rho}{\rho-1}-1}\} (-1)}{\{(w-s)^{\frac{\rho}{\rho-1}} + 1\}^2} \right] \cdot T \\ \Rightarrow \frac{\partial v}{\partial s} &= \left[\frac{(-1) \{(w-s)^{\frac{\rho}{\rho-1}} + 1\} \cdot \{\frac{\rho}{\rho-1} (w-s)^{\frac{\rho}{\rho-1}-1}\} + (w-s)^{\frac{\rho}{\rho-1}} \cdot \{\frac{\rho}{\rho-1} (w-s)^{\frac{\rho}{\rho-1}-1}\}}{\{(w-s)^{\frac{\rho}{\rho-1}} + 1\}^2} \right] \cdot T \\ \Rightarrow \frac{\partial v}{\partial s} &= \left[\frac{-(w-s)^{\frac{\rho}{\rho-1}} \cdot \frac{\rho}{\rho-1} (w-s)^{\frac{\rho}{\rho-1}-1} - \frac{\rho}{\rho-1} (w-s)^{\frac{\rho}{\rho-1}-1} + (w-s)^{\frac{\rho}{\rho-1}} \cdot \frac{\rho}{\rho-1} (w-s)^{\frac{\rho}{\rho-1}-1}}{\{w^{\frac{\rho}{\rho-1}} + 1\}^2} \right] \cdot T \\ \Rightarrow \frac{\partial v}{\partial s} &= \left[\frac{(-) \frac{\rho}{\rho-1} w^{\frac{1}{\rho-1}}}{\{w^{\frac{\rho}{\rho-1}} + 1\}^2} \right] \cdot T \quad [11] \end{aligned}$$

The term on the right hand side in (11) is positive when ρ lies between 0 and 1. In that case when status premium s rises, v certainly increases. The condition that ρ should lie between 0 and 1 has special implication. In a case of the CES utility function as mentioned above the elasticity of substitution is defined as:

$$\text{Elasticity of substitution} = \frac{1}{1-\rho}$$

When rho is 0 the elasticity of substitution is 1 and when rho is 1 then elasticity of substitution goes to infinity. Therefore, when rho takes the value between 0 and 1 it implies the substitution effect is quite strong. We have already seen from the diagrammatical analysis as well that due to the dominating substitution effect, when the status premium is assigned, the women's domestic time increases and time for market works decreases. Therefore we can say that the proposition has been satisfied both mathematically, as well as intuitively.

Now, let us check how the value of x changes when status premium changes.

Putting the value of v from (10) in (9) we get

$$x^* = \frac{(w-s)T}{1+(w-s)^{\frac{\rho}{\rho-1}}} \quad [12]$$

And

$$\frac{\partial x}{\partial s} = \frac{T[-1 - (w-s)^{\frac{\rho}{\rho-1}} + \frac{\rho}{\rho-1}(w-s)^{\frac{\rho}{\rho-1}}]}{\{1 + (w-s)^{\frac{\rho}{\rho-1}}\}^2}$$

This value of the third term in the numerator is negative for $\rho < 1$. Hence when $\rho < 1$ we get $\frac{\partial x}{\partial s}$ as negative.

Therefore for any given value of $\rho < 1$ as s increases x falls.

Now, we need to verify the second order condition of constrained maximization³³. This is demonstrated in the Appendix at the end of the chapter.

From equation [9] we have

$$\Rightarrow x = \frac{v}{(w-s)^{\frac{1}{\rho-1}}}$$

And from [10] we have

$$\Rightarrow v = \left[\frac{(w-s)^{\frac{\rho}{\rho-1}}}{1+(w-s)^{\frac{\rho}{\rho-1}}} \right] \cdot T$$

So putting the value of v from [10] in [9] we get

$$x^* = \frac{(w-s)T}{1+(w-s)^{\frac{\rho}{\rho-1}}}$$

This x^* is the equilibrium value of x which is a declining function of the status premium s .

Therefore when status premium s increases, then value of x should decline.

Let us assume $x^* > \bar{x}$, minimum subsistence level of consumption of the x good.

Here x is the equilibrium value of x without status premium and x^* is the equilibrium value of x with status premium.

Now, as s increases the value of v tends to rise and x^* falls (as we have a downward sloping IC as one rises the other must fall). Hence at some point of time value of x^* cuts \bar{x} . If \bar{x} is the minimum consumption then x^* can't go further below. Therefore, as x is not declining, hence the value of v can't increase more either as s rises.

Hence due to minimum subsistence requirements of the poor households, status concern does not necessarily reduce labour supply.

Proving Proposition 2:

In case of rise of wealth/income of families, due to the income effect the time allocated by women to labour market may fall.

We have

$$\text{Max } U(v, x) = 1/\rho \log (x^\rho + v^\rho)$$

Maximizing this utility with respect to the new budget constraint,

$$(w-s).T + F = (w-s).v + x$$

Here, F denotes the rise in income of the household.

$$\frac{\partial L}{\partial v} = w - s = \left[\frac{v}{x}\right]^{\rho-1}$$

$$\frac{\partial L}{\partial x} = v = (w - s)^{\frac{1}{\rho-1}} \cdot X$$

We have

$$(w-s).T + F - (w-s).v = x$$

Hence

$$\Rightarrow v = (w - s)^{\frac{1}{\rho-1}} [(w-s) T + F - (w-s)v]$$

$$\Rightarrow v = (w - s)^{\frac{1}{\rho-1}} (w-s) T + (w - s)^{\frac{1}{\rho-1}} F - (w - s)^{\frac{1}{\rho-1}} (w-s)v$$

$$\Rightarrow v = \frac{[(w-s)^{\frac{\rho}{\rho-1}}.T + (w-s)^{\frac{1}{\rho-1}}.F]}{1+(w-s)^{\frac{\rho}{\rho-1}}} \quad [13]$$

We get

$$\frac{\partial v}{\partial F} = \frac{\left\{1+(w-s)^{\frac{\rho}{\rho-1}}\right\}[(w-s)^{\frac{1}{\rho-1}}]}{\left\{1+(w-s)^{\frac{\rho}{\rho-1}}\right\}^2}$$

$$\frac{\partial v}{\partial F} = \frac{[(w-s)^{\frac{1}{\rho-1}}]}{\left\{1+(w-s)^{\frac{\rho}{\rho-1}}\right\}} \quad [14]$$

The right hand term in equation [13] is positive for $\rho < 1$

Hence, we conclude that both the propositions are satisfied when $0 < \rho < 1$.

According to empirical literature and results women's decision to divide their time between market works and household works is determined by various factors. The theoretical model that has been presented in this chapter explains why and how some of such factors affect the decisions of women. In Indian societies it is believed that the "status" of the family is highly valued and it is sometimes measured by the time that a woman of the households spends in household activities. In particular, the family status may get adversely affected if women of the household go out to work, as it is believed to damage the "purity" of women. The model theorizes this concept and it shows that in the presence of status premium women's time allocation for market works go down. However, there are some qualifiers to this result. The status effect may not be visible in the poor families which live close to subsistence consumption.

Secondly, in the presence of rising household wealth or income, women of the household may allot less time to the labour market, and spend that time in household work. We end this chapter with the important disclaimer that the analysis in this chapter does not deal with the demand side of the labour market. It focuses on the decision of an individual woman, assuming that if she chooses to allocate some time to labour market, there will not be any hindrance in getting employed.



Appendix

Let's assume

$$f(x, v) = U(x, v) = \frac{1}{\rho} \log(x^\rho + v^\rho)$$

And

$$g(x, v) = (w - s)v + x - (w - s).T = 0$$

And

$$L = \frac{1}{\rho} \log(x^\rho + v^\rho) + \lambda[(w - s)T - (w - s)v - x]$$

We have the Bordered Hessian as

$$|\overline{H}| = \begin{vmatrix} 0 & g_x & g_v \\ g_x & L_{xx} & L_{xv} \\ g_v & L_{vx} & L_{vv} \end{vmatrix}$$

$$|\overline{H}_1| = \begin{vmatrix} 0 & g_x \\ g_x & L_{xx} \end{vmatrix}$$

$$|\overline{H}_2| = \begin{vmatrix} 0 & g_x & g_v \\ g_x & L_{xx} & L_{xv} \\ g_v & L_{vx} & L_{vv} \end{vmatrix}$$

$|\overline{H}_1|$ is negative. We need $|\overline{H}_2|$ should be positive. Then we can say the optimal values of x, v give the maximum utility.

We have,

$$g_x = 1$$

$$g_v = w - s$$

$$L_{xx} = \frac{(x^\rho + v^\rho)(\rho - 1)x^{\rho-2} - (x^{\rho-1})\rho x^{\rho-1}}{(x^\rho + v^\rho)^2}$$

Hence

$$L_{xx} = \frac{(x^\rho + v^\rho)(\rho - 1)x^{\rho-2} - \rho x^{2\rho-2}}{(x^\rho + v^\rho)^2}$$

$$L_{xv} = \frac{-\rho(x^{\rho-1})v^{\rho-1}}{(x^\rho + v^\rho)^2}$$

$$L_{vx} = \frac{-\rho(x^{\rho-1})v^{\rho-1}}{(x^\rho + v^\rho)^2}$$

We get

$$L_{xv} = L_{vx}$$

And we have

$$L_{vv} = \frac{(x^\rho + v^\rho)(\rho - 1)v^{\rho-2} - (v^{\rho-1})\rho v^{\rho-1}}{(x^\rho + v^\rho)^2}$$

$$\Rightarrow L_{vv} = \frac{(x^\rho + v^\rho)(\rho - 1)v^{\rho-2} - \rho v^{2\rho-2}}{(x^\rho + v^\rho)^2}$$

$$|\overline{H_2}| = \begin{vmatrix} 0 & 1 & w-s \\ 1 & \frac{(x^\rho+u^\rho)(\rho-1)x^{\rho-2}-\rho x^{2\rho-2}}{(x^\rho+u^\rho)^2} & \frac{-\rho(x^{\rho-1})u^{\rho-1}}{(x^\rho+u^\rho)^2} \\ w-s & \frac{-\rho(x^{\rho-1})u^{\rho-1}}{(x^\rho+u^\rho)^2} & \frac{(x^\rho+u^\rho)(\rho-1)u^{\rho-2}-\rho u^{2\rho-2}}{(x^\rho+u^\rho)^2} \end{vmatrix} =$$

$$-(\rho-1) \left[\frac{v^{\rho-2}}{(x^\rho+u^\rho)} - \frac{(w-s)^2 x^{\rho-2}}{(x^\rho+u^\rho)^2} \right] + \rho \left[\frac{v^{\rho-2}}{(x^\rho+u^\rho)^2} - \frac{2(w-s)x^{\rho-1}v^{\rho-1}}{(x^\rho+u^\rho)^2} - \frac{(w-s)^2 x^{2\rho-2}}{(x^\rho+u^\rho)^2} \right]$$

Putting the values of x and u in the above equation we get,

$$= -(\rho-1) \left[\frac{\left(\frac{(w-s)\frac{\rho}{p}}{(w-s)\rho^{-1}+1} \right)^{\rho-2}}{\frac{(w-s)T\frac{\rho}{p} + \frac{(w-s)\rho^{-1}}{p}}{1+(w-s)\rho^{-1}}} - \frac{(w-s)^2 \left(\frac{(w-s)T\frac{\rho}{p}}{1+(w-s)\rho^{-1}} \right)^{\rho-2}}{\frac{(w-s)T\frac{\rho}{p} + \frac{(w-s)\rho^{-1}}{p}}{1+(w-s)\rho^{-1}}} \right]$$

$$+ \rho \left[\frac{\left(\frac{(w-s)\frac{\rho}{p}}{(w-s)\rho^{-1}+1} \right)^{\rho-2}}{\left(\frac{(w-s)T\frac{\rho}{p} + \frac{(w-s)\rho^{-1}}{p}}{1+(w-s)\rho^{-1}} \right)^2} - \frac{2(w-s) \left(\frac{(w-s)\frac{\rho}{p}}{(w-s)\rho^{-1}+1} \right)^{\rho-1} \left(\frac{(w-s)T\frac{\rho}{p}}{(w-s)\rho^{-1}+1} \right)^{\rho-1}}{\left(\frac{(w-s)T\frac{\rho}{p} + \frac{(w-s)\rho^{-1}}{p}}{1+(w-s)\rho^{-1}} \right)^2} - \frac{(w-s)^2 \left(\frac{(w-s)T\frac{\rho}{p}}{(w-s)\rho^{-1}+1} \right)^{2\rho-2}}{\left(\frac{(w-s)T\frac{\rho}{p} + \frac{(w-s)\rho^{-1}}{p}}{1+(w-s)\rho^{-1}} \right)^2} \right]$$

The value of $|\overline{H_2}|$ is positive for rho less than 1.

³² In the previous chapters the empirical analyses explored why the status concern of a family plays a role in determining females' labour market participation decisions. "Status premium" is nothing but an outcome of social stigmas and concerns around women's work and family's status. The theoretical model of chapter 5 explores the effect of "status premium".

³³The second order condition of constrained maximization (Simon and Blume, 1994):

Say we have the objective function as

$$z = f(x_1, x_2, x_3, \dots, x_n) \text{ subject to}$$

$$g(x_1, x_2, \dots, x_n) = c$$

Given the bordered Hessian

$$|\bar{H}| = \begin{vmatrix} 0 & g_1 & g_2 & \dots & g_n \\ g_1 & z_{11} & z_{12} & \dots & z_{1n} \\ g_2 & z_{21} & z_{22} & \dots & z_{2n} \\ \dots & \dots & \dots & \dots & \dots \\ g_n & z_{n1} & z_{n2} & \dots & z_{nn} \end{vmatrix}$$

Its successive bordered principal minors can be defined as

$$|\bar{H}_2| = \begin{vmatrix} 0 & g_1 & g_2 \\ g_1 & z_{11} & z_{12} \\ g_2 & z_{21} & z_{22} \end{vmatrix}$$

$$|\bar{H}_3| = \begin{vmatrix} 0 & g_1 & g_2 & g_n \\ g_1 & z_{11} & z_{12} & z_{13} \\ g_2 & z_{21} & z_{22} & z_{23} \\ g_3 & z_{31} & z_{32} & z_{33} \end{vmatrix} \text{ Etc.}$$

d^2z is then

$$\begin{pmatrix} \text{Positive definite} \\ \text{Negative definite} \end{pmatrix} \text{ subject to } d_g = 0$$

Iff

$$\left(\begin{array}{l} |\bar{H}_2|, |\bar{H}_3|, \dots, |\bar{H}_n| < 0 \\ |\bar{H}_2| > 0, |\bar{H}_3| < 0, |\bar{H}_4| > 0 \text{ etc.} \end{array} \right)$$

A positive definite is sufficient to establish a stationary value of z as its minimum, whereas a negative definite is sufficient to establish it as a maximum.



Chapter 6: Conclusions and policy implications

6.1. Concluding remarks

The role of women in economic development has been identified by various researchers. Boserup's (1970) work was the starting of this. Economic participation of women and economic development are dependent on each other. Hence females' participation in labour market gains attentions from policymakers and researchers. The global scenario of female labour force participation rate (FLFPR) is not very satisfactory and the rate declined worldwide from 52.4 percent to 49.6 percent during 1995-2005 (ILO, 2016). In South Asia, India's performance in FLFPR is really disappointing; in fact the decline of FLFPR in South Asia is mainly driven by India. India's FLFPR(UPS) dropped from 32% in 1972-73 to 18.1% in 2011-12 except the distress affected years (Abraham, 2013a). The rural FLFPR has been significantly low throughout the years. The overall decline in FLFPR is mostly driven by the rural figures. After 2004-05 the years were crucial because that years had a "dramatic collapse" in employment (Chandrasekhar and Ghosh,2011) and women were withdrawing from labour force. Assam is not an exception to this decline. In rural Assam during 2004-11, NSSO Employment and Unemployment Survey various rounds' unit level data show that there was a decline of 8.62 percentage points in FLFPR and in urban Assam the decline was of 2.32 percentage points.

My study has attempted to shed some light on the declining female labour force participation rate in India as well as in Assam. The decline of female LFPR has coincided with the phases of rapid economic growth, periods of declining fertility and also along with the other signs of economic development in India and Assam. This is paradoxical and hence it was worth exploring the various trends, compositions and determinants of FLFPR in the country and in Assam. The

dismal picture of female labour force participation in India has been studied by many researchers. However, as far as Assam concerned, such studies are minimal in number. In my study, the gaps of the available studies have been identified and accordingly I formulated the research questions and objectives.

Boserup's (1970) work brings out the idea of famous U shaped hypothesis of FLFPR. Along with the path of economic development FLFPR declines initially and then it increases. Goldin(1995) presents a theoretical framework on FLFPR which offers income and substitution effect as the explanation for U shaped curve. Eswaran et. al(2013) is another interesting paper and it presents a theoretical model on FLFPR. This paper introduced, in India, how family's desire to maintain its "status" affects FLFPR decision within the family. Non-mainstream economic theories argue that the reproductive nature of women's work is not recognized by the capitalist class and women are trapped in the reproductive system of household economy which is nothing but a subsidy to capital (Naidu and Osome, 2016; Naidu and Rao, 2016).

My study identified the probable determinants of FLFPR from the literature survey and then it tested their significance in determining FLFPR in the context of India and Assam. The decline in FLFPR is a complex and multidimensional issue. There are multiple factors behind the decline. On the other hand, the decline in FLFPR has its adverse effects on the women as well as on the development process of an economy.

We did an analysis on FLFPR across major Indian states. Almost all major Indian states had a downward trend of FLFPR during the study period of 1987-2011. The regional picture of FLFPR varies across various regions of India. FLFPR was the worst in the Eastern region during 2009-10 and the South had the highest female LFPR (Lahoti and Swaminathan, 2013).

Our Random Effect regression model for all India data shows that more the ‘literate’ females in a state, lower will be the FLFPR in a state. High fertility brings down FLFPR both in rural and urban areas of a state. It has been found that in a state when in rural areas unemployment rate of males increases, women withdraw themselves from labour markets. It may be the case that as explained by discouraged worker effect, with lower jobs in the market- reflected in higher unemployment rate among males, females are discouraged to continue their job search. That is, the unemployed section of the females are withdrawing from the labour market. It has been also argued by many that women are withdrawing from labour force to sustain the household which is under bigger pressure (high male unemployment could be reflecting this).

Our probit regression analysis, which used NSSO Employment and Unemployment Survey Assam specific unit level data of various rounds of the period 2004-11, shows that rural women of Assam from households with more land have a greater chance to join the labour force. Mildly educated women have a less probability to join the labour force than illiterates and barely literates – while higher educated women are more likely to join the labour force. Christian women are found to participating more in the labour force than the Hindus. Currently married women are less likely to be in labour force than women who are never married. Caste of women does not appear to affect their labour force participation. I devised an indicator capturing the compound effect of class and caste, named as “status”, and examined if status affects women’s labour force participation. Although caste alone does not affect, caste combined with class does affect women’s labour force participation – in a negative manner, hinting at status concerns of landed upper caste families, which impedes women’s work participation. In urban Assam the results are similar, with some exceptions. Finally, we propose a theoretical model. The “status” of the family is highly valued and it is sometimes measured by the time that a woman of the

households spends in household activities. Women's economic participation in the labour market hampers their "sexual purity" which disrupts the "status" of the family. The model tries to capture this idea, along with other determinants of FLFPR. The model proposes (1) For a host of preference types, the social status premium defined in terms of women not working in the labour market leads to less labour supply. In the presence of minimum subsistence requirements, for poor households, status concern does not necessarily reduce time allocation to labour market and (2) In case of rise of wealth/income of families, due to the income effect the time allocated by women to labour market may fall. With the help of CES utility function these propositions have been proved. We have demonstrated the validity of these propositions in our model.

6.2. Policy Implications

It has been found that high fertility works as a hindrance to participation of females in labour market. In a country like India if birth control measures, family planning schemes, child care support systems at home and workplaces are implemented properly, these might boost females' participation in the labour force. Introducing child care support systems at the work place could encourage married women to enter the job market. If the work places in India introduce system like in house crèche, then working women will find it affordable to carry out market works along with childcare responsibilities. In India, child care or other household works have been assigned a gendered identity and hence in general these have been tagged as "women's works". It is the need of the hour to make the masses sensitive towards such norms and it should be normalized that such works are not meant only for females. In order to achieve such targets awareness among general masses is necessary. The prevailing polices sometimes reflect such gendered stratification of jobs between men and females. We can take up an example here. The difference of duration of maternity leave and paternity leave in India indirectly hints that we have been

assigning child care duties primarily to the mothers. In such circumstances sometimes Indian mothers are trapped in the web of childcare responsibilities and they end up losing their jobs. Sometimes they withdraw themselves to take care of their child as their husbands are busy with market jobs. Hence, equal sharing of childcare responsibilities should be the prime focus areas while designing policy tools in India. Besides, unemployment of men found to have a discouraging effect on FLFPR in a state. Hence, effective policy tools to address the unemployment issues are the need of the hour. Boosting social sector spending can be a solution to increase females' participation in the labour markets. This is because our results show that in rural and urban areas social sector spending has positive impact on FLFPR in a state. More job opportunities can be created with targeted social sector spending and this will create more demand for labourers.

My study of female LFPR in Assam shows that the decline in FLFPR has been caused by interplay of various socio-economic factors. It follows that a multi-pronged approach needs to be taken to address the problem. This would call for a focus on boosting higher education among women, inter alia. Patriarchal norms need to be addressed carefully while designing the policy tools, as status concerns affect the labour force participation decision of women.

6.3. Caveats of the present study and possibilities for future research

Here I note the caveats of this study. Due to paucity of data the labour market demand conditions were not taken into account. The lack of jobs in the market forces people to go without jobs, a phenomenon called involuntary unemployment. In such situations women find it difficult to find any job, even if there are no other constraints. Thus, a decline in job availability could be an

important factor for the decline of FLFPR. This caveat can be mitigated through a primary data survey. Moreover, in order to probe how effects of explanatory variables changed over the years; one can conduct an inter-temporal study. These could be taken up in a future project.

It has been found that Tripura is an exception in terms of FLFPR decline in the states. The state has been showing a positive trend of FLFPR. The positive trend of FLFPR in Tripura and what was/were the driving force(s) behind this can be a separate study. This may bring about some interesting facts.

We did a probit regression analysis for only NSSO 68th round (2011-12) in case of Assam. This gave us some interesting findings on determinants of FLFPR in rural and urban Assam. However the changing dynamics of these determinants over time could have been captured by analysing the previous rounds NSSO data. The non availability of unit level data of some variables in the earlier rounds was a problem and hence we could not run a time series analysis on unit level data.

The Period Labour Force Survey reports of recent years have opened up new research avenues in my field. Incorporating these surveys in my study will enlighten us with more recent picture of FLFPR. This was not incorporated in my thesis mainly because of the time constraint. Hence, I have kept this as a future research agenda.

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