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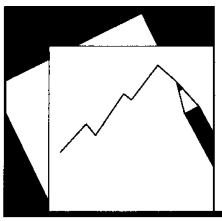

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Women Workers in India: Why So Few Among So Many?

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Women Workers in India: Why So Few Among So Many?

Prepared by Sonali Das, Sonali Jain-Chandra, Kalpana Kochhar, and Naresh Kumar[1]

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Abstract

This paper examines the determinants of female labor force participation in India, against the backdrop of India having one of the lowest participation rates for women among peer countries. Using extensive Indian household survey data, we model the labor force participation choices of women, conditional on demographic characteristics and education, as well as looking at the influence of state-level labor market flexibility and other state policies. Our main finding is that a number of policy initiatives can help boost female economic participation in the states of India, including increased labor market flexibility, investment in infrastructure, and enhanced social spending.

JEL Classification Numbers: J16, J48, O17

Keywords: Female labor force participation, labor market regulation, informal labor markets, India.

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I. INTRODUCTION

The Indian labor market displays several striking features: very low rates of female labor force participation; considerable variance in rates of female labor force participation across Indian states; and a large share of both women and men working in the informal sector.[2] [3] The literature on female labor force participation in India has traditionally focused on how demographic characteristics and educational attainment affect the labor force participation decisions of women. In a separate literature, well-known rigidities in Indian labor markets have been put forth as the reason for the high share of informal employment in overall employment—for example, about 85 percent of India's non-agricultural workers are employed in informal sector jobs. Studies have noted the lack of medium-sized enterprises in India, and have linked firm hiring decisions, growth, and productivity outcomes to cross-state differences in labor market regulations.

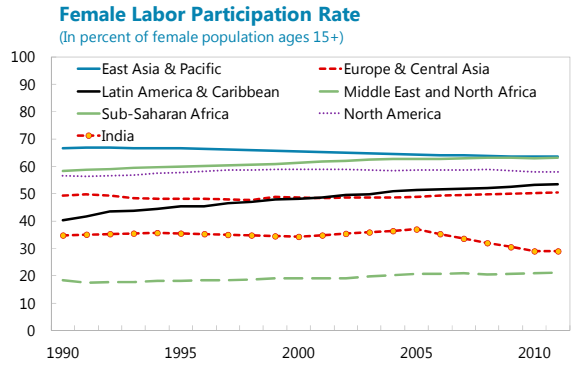
This paper builds on IMF (2015a, 2015b) and revisits the determinants of female labor force participation in India, analyzes how labor market rigidities affect female labor force participation, and also studies the drivers of formal versus informal sector employment. The cross-state differences in labor force participation rates and labor market regulations allow us to study how labor market rigidities relate to labor force participation, and whether there are policies that any given state can implement to increase female participation.

India has one of the lowest female labor force participation (FLFP) rates— typically measured as the share of women that are employed or seeking work as a share of the working-age female population — among emerging markets and developing countries. At around 33 percent at the

[2] Informal sector workers are defined typically as working in unincorporated enterprises, which are usually small. The informal and formal sectors are alternatively referred to as unorganized and organized sectors in the Indian literature and in the remainder of this paper. Labor force and employment statistics in India are derived from surveys which do not clearly distinguish between participation in the formal and informal sectors.

[3] The 28 states and 4 Union Territories of India analyzed here are: Andaman & Nicobar Islands, Andhra Pradesh (Andhra Pradesh refers to the undivided state comprising the present states of Andhra Pradesh and Telangana), Arunachal Pradesh, Assam, Bihar, Chandigarh, Chhattisgarh, Delhi, Goa, Gujarat, Haryana, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Odisha, Puducherry, Punjab, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh, Uttarakhand, West Bengal. These comprise 99.9 percent of India's 2011/12 measured population of 1.21 billion persons.

national level in 2012, India's FLFP rate is well below the global average of around 50 percent and East Asia average of around 63 percent. India is the second-most populous country in the world with an estimated 1.26 billion persons at end-2014. Accordingly, a FLFP rate of 33 percent implies that only 125 million of the roughly 380 million working-age Indian females are seeking work or are currently employed (see Census of India 2011 for additional details). Moreover, India's gender gap in participation (between males and females) is the one of the widest among G-20 economies at 50 percent. Furthermore, female labor force participation has been on a declining trend in India, in contrast to most other regions, particularly since 2004/05. Drawing more women into the labor force, along with other important structural reforms that could create more jobs, would be a source of future growth for India as it aims to reap the "demographic dividend" from its large and youthful labor force.[4]



Source: World Bank, World Development Indicators, 2013; Key Indicators of the Labour Market (KILM), ILO.

That gender equality plays an important role in economic development has long been understood in the literature. Various studies have highlighted how lower female labor force participation or weak entrepreneurial activity drags down economic growth, and that empowering women has significant economic benefits in addition to promoting gender equality (Duflo 2005; World Bank 2012). The World Economic Forum's 2014 *Global Gender Gap Report* finds a positive correlation between gender equality and per capita GDP, the level of competitiveness, and human development indicators. Seminal work by Goldin (1995) explored the U-shaped relationship between female labor supply and the level of economic development across countries. Initially, when the income level is low and the agricultural sector dominates the economy, women's participation in the labor force is high, due to the necessity of working to provide for consumption of goods and services. As incomes rise, women's labor force participation often falls, only to rise again when female education levels improve and

[4] The demographic-dividend refers to the potential benefits to a country from an increase in the working-age population relative to the number of dependents, with the latter defined as those aged less than 15 years or over 65 years old. The falling fertility rate in India will result in an increase in the working-age population share in India, as well as in its share of the population, through the next 35 years or so.

consequently the value of women's time in the labor market increases. This process suggests that, at low levels of development, the income effect of providing additional labor dominates a small substitution effect, while as incomes increase, the substitution effect comes to dominate.[5] Gaddis and Klasen (2014) explore the effect of structural change on FLFP using sector-specific growth rates. They find a relationship consistent with a U pattern, but small effects from structural change.

This paper also analyses whether India's largest public employment program, resulting from the enactment of the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) in 2005, has resulted in higher female labor force participation.[6] Launched as one of the world's largest employment programs, MGNREGA offers 100 days of guaranteed wage employment in every financial year for all registered unskilled manual workers (both women and men). The MGNREGA includes pro-women provisions as it seeks to ensure that at least 33 per cent of participating workers are women, and stipulates equal wages for men and women. In addition, there are also provisions for facilities such as childcare at worksites, so as to reduce the barriers to womens' participation (Government of India, 2014). As well, there are other aspects of the MGNREGA that may make such work attractive for women, for example, the stipulation that work is to take place within 5 kilometers of an applicant's residence.

The key contributions of this paper are to link the issue of female labor force participation in India to the broader literature on labor market rigidities in India, and to study formal and informal sector employment, which has not been the focus of previous studies (see Section II). An important contribution is that the study uses a detailed and very large Indian household survey dataset, with surveys conducted by the National Sample Survey Organization (NSSO)—this data and associated stylized facts are described in Section III. Several methodological contributions to the literature are also made, which will be described in Section IV on the

[5] The income effect is the change of hours of work of an individual with respect to a change in family income. The own-substitution effect is the change in hours of work of an individual with respect to a change in their wage, holding income constant.

[6] The Act came into force in February 2006 and was implemented in a phased manner across the country. In Phase I it was introduced in 200 of the most backward districts in the country. It was implemented in an additional 130 districts in Phase II during 2007-2008. The Act was notified in the remaining rural districts of the country from April 1, 2008 in Phase III. All rural districts in India are now covered under MGNREGA.

empirical methodology. Section V presents the results of the empirical analysis, while Section VI concludes and offers some considerations for public policy.

II. Related Literature

There is a growing literature on the economic implications of gender participation gaps (summarized in IMF, 2013). This literature stresses that gender gaps in labor force participation, entrepreneurial activity, or education act to impede economic growth (e.g. Cuberes and Teignier, 2012, 2014; Esteve-Volart, 2004, and Klasen and Lamanna 2008, among others). Cuberes and Teigner (2014) examine the quantitative effects of gender gaps in labor force participation on productivity and living standards. They simulate an occupational choice model with heterogeneous agents that imposes several frictions on female economic participation and their wages, and shows that gender gaps in entrepreneurship and in labor force participation significantly reduce per capita income. For India, they find that gender gaps lower overall per worker incomes by about 26 percent. In recent work, Agenor (2015) uses an overlapping generations model in which time use is modeled over three phases (childhood, working and retirement) and simulates the effect of public policies (including public investment in infrastructure and efficiency of spending on health and education) on participation choices and economic growth (via impact on human capital, productivity and labor input directly). This paper finds these policies raise female labor force participation rates, and depending on the relevant policies, economic growth could increase by between 1.5–2.4 percentage points per annum.

Turning to theoretical underpinnings, female labor supply is often modeled using the framework of the time allocation model (Becker, 1965), which posits that women make their labor supply decisions not only considering leisure and labor tradeoffs, but also home-based production of goods and services (including caring for children). Most studies also include wages as a key driver of female labor supply (Heckman and MaCurdy, 1980). However, as Jaumotte (2003) points out, working for a wage is chosen by women only if earnings at least make up for the lost home production (and the associated costs), implying a higher elasticity of female labor supply to wages. Many studies have emphasized the importance of education in models of female labor supply. Eckstein and Lifshitz (2011) estimate a dynamic stochastic female labor supply model with discrete choice (contained in Eckstein and Wolpin, 1989), and find that changes in

education (accounting for a third of the increase in female employment) and wages (explaining about 20 percent) play a large role in explaining female employment.

A number of empirical papers have examined low and declining female labor force participation in India, with many focusing on the role of educational attainment (Mammen and Paxson, 2000). Klasen and Pieters (2012) find that for urban Indian women, participation in the workforce at lower education levels is dictated by economic necessity, and there is a pull factor coming into play for highly-educated women entering the workforce. Bhalla and Kaur (2013), find that the education level of the spouse has a larger negative effect (each extra year of male education means a drop in female participation of 1 percentage point) than the positive effect on participation of increasing female education. They also find some evidence of a depressing effect of the emerging middle class on female labor force participation. More broadly, previous research (Goldin, 1995; Mammen and Paxson, 2000) suggests that rising household incomes could lead to a withdrawal of women from the labor market. Klasen and Pieters (2013) study the decline in female labor force participation in urban India between 1987 and 2009, and find that demand and supply factors were at play. On the labor supply side, the main drivers were rising household incomes, husband's education, and the stigma against educated women seeking menial work. On the labor demand side, they find that employment in sectors appropriate for educated women grew less than the supply of educated workers, leading to many women withdrawing from the labor force.

The literature also finds a link between female labor force participation and legal and social institutions, as well as the existence of gender-based differences in laws. In recent IMF work, Gonzalez, Jain-Chandra, Kochhar and Newiak (2015) find that the presence of gender-based legal restrictions, in particular, restrictions on womens' rights to inheritance and property, as well as legal impediments to undertaking economic activities (such as opening a bank account or freely pursuing a profession) are strongly associated with larger gender gaps in labor force participation. Furthermore, social institutions with more gender equality have been associated with better development outcomes and higher living standards. Indeed, the OECD's Social Institutions and Gender Index (SIGI) scores countries on 14 indicators, grouped into five sub indexes—discriminatory family code, restricted physical integrity, bias toward sons, restricted

resources and assets, and restricted civil liberties—using different dimensions of social institutions related to gender inequality. India ranks relatively low on the OECD SIGI index.

A strand of this literature also focuses on the role of female entrepreneurial activity in India. Ghani, Kerr and O'Connell (2012) use detailed micro-data on the unorganized enterprises[7] and analyze the spatial determinants of female entrepreneurship in India in the manufacturing and services sectors. That paper finds that adequate infrastructure and education levels predict higher female entry and that there are strong agglomeration effects in both manufacturing and services sectors, where higher female ownership among incumbent businesses within a district-industry pair predicts a greater share of subsequent entrepreneurs will be female. Higher levels of female entrepreneurial activity in turn have been associated with stronger economic growth. Indeed, Esteve-Volart (2004) uses panel data on Indian states to show that the ratio of female to male workers (and managers) is positively correlated with both growth and living standards.

III. Data and Stylized Facts on Indian Female Labor Force Participation

The main dataset used in this paper's analysis is household level data from India's National Sample Survey (NSS) Organization's five Employment and Unemployment Surveys, covering the years 1993/94, 1999/00, 2004/05, 2009/10, and 2011/12. Following detailed data gathering and organization, we present stylized facts from all five survey rounds, while the empirical estimation of the determinants of labor force participation is conducted on the most recent round of the survey, that being for 2011/12.[8] The Employment and Unemployment Surveys of the NSS are primary sources of data on various labor force indicators at national and state levels. NSS surveys with large, nationally representative sample sizes have been conducted every five years all over the country. The survey period spans over a year and the sample covers more than 100,000 representative households in each of the five surveys. The number of households surveyed in the latest round of the survey (NSS-68th round, July 2011 to June 2012) was 101,724 (59,700 households in rural areas and 42,024 households in urban areas), and the number of

[7] An unorganized enterprise is defined by Ghani et al. (2012) as a manufacturing business with fewer than ten employees and uses electricity. If it does not use electricity, the threshold is 20. The unorganized sector accounts for 90 percent of manufacturing establishments in India.

[8] Labor force participation rates based on usual principal status are presented throughout the paper, unless otherwise specified. See Ministry of Statistics (2014) for additional details on the NSSO's employment surveys.

persons surveyed was 456,999 (280,763 in rural areas and 176,236 in urban areas). This makes India's NSS surveys among the world's largest employment surveys.

According to NSS definitions, individuals are classified into various activity categories on the basis of activities that they pursue during specific reference periods. Three reference periods are used in NSS surveys: (i) one year; (ii) one week; and (iii) each day of the reference week. The activity status determined on the basis of the reference period of one year is known as the usual activity status (US) of a person; that determined on the basis of a reference period of one week is known as the current weekly status (CWS) of the person; and the activity status determined on the basis of the engagement on each day during the reference week is known as the current daily status (CDS) of the person.

Under the usual activity status a person is classified as belonging to the labor force if he or she had been either working or looking for work during the longer part of the reference year. For a person already identified as belonging to the labor force, the usual activity status is further divided into usual principal activity status (UPS) and usual secondary activity status (UPSS). The activity status on which a person spent relatively longer time during the 365 days preceding the date of the survey is considered the usual principal activity status of the person.

A person whose principal usual status is determined on the basis of the major time criterion may have pursued some economic activity for 30 days or more during the reference period of 365 days preceding the date of survey. The status in which such economic activity is pursued during the reference period of 365 days preceding the date of survey is the subsidiary economic activity status of the person. In case of multiple subsidiary economic activities, the major activity and status based on the relatively longer time spent criterion will be considered.[9]

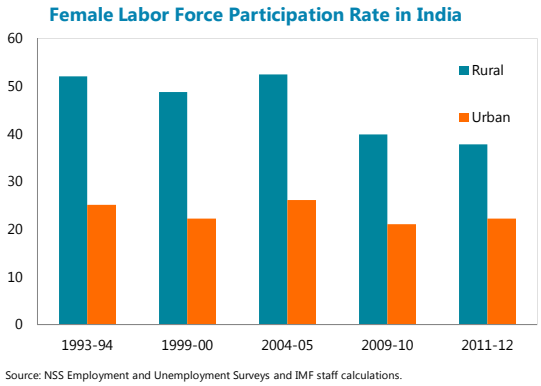
In this context, this paper measures the labor force through the usual principal activity status which is more suitable to the study of trends in longer-term employment. Generally, government programs and policies are focused towards generating more stable jobs and encouraging a shift

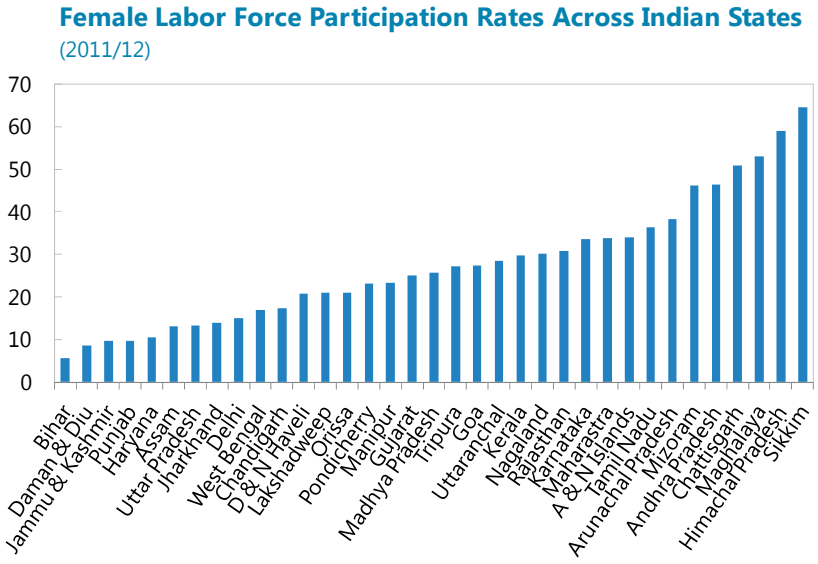
[9] The Report of the Committee of Experts on Unemployment Estimates submitted to the Planning Commission in 1970 states that "In our complex economy, the character of the labor force, employment and unemployment, is too heterogeneous to justify aggregation into single-dimensional magnitudes".

from informal sector to formal sector jobs. Moreover a reference period of just one-day or one-week may capture well the employment intensity for that particularly short period, but may not reflect the overall pattern and level in terms of months or days worked round the year. Therefore, each of the smaller reference periods, except the long (one-year) reference period, may not be completely representative of the employment patterns and incidence for the concerned year, and moreover may not be suitable for comparison across reference periods of varying lengths over time.

Stylized Facts. The following stylized facts emerge from the household survey data:

- *Female labor force participation rates vary widely between urban and rural areas*. Labor force participation of women in rural areas is much higher than women in urban areas (see text figure). Over time, the gap between urban and rural areas has narrowed moderately, with most of the convergence being driven by the fall in participation rates in rural areas. As a result, taken together, female labor force participation rates nationwide have fallen since the mid-2000s.

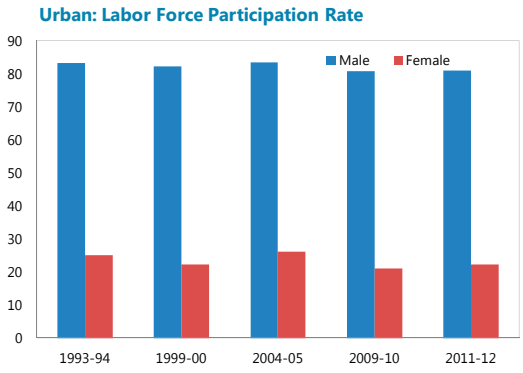


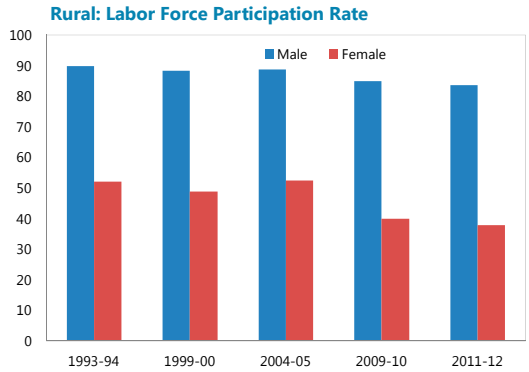


Source: Authors' calculations; NSS Employment and Unemployment Surveys.

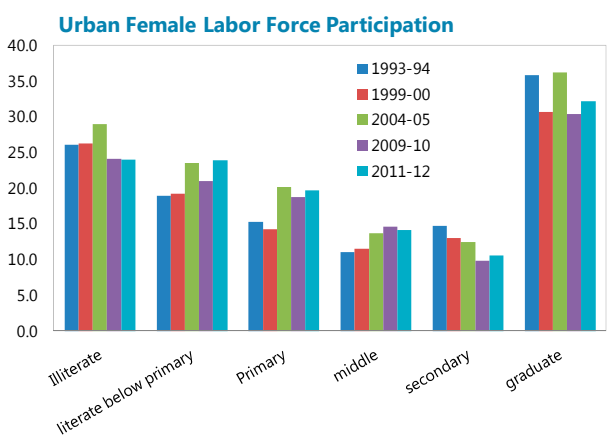
- *There is a large range of female labor force participation rates across Indian states (text figure)*, with states in the South and East of India (such as Andhra Pradesh, Tamil Nadu, Sikkim) generally displaying higher participation rates than those in North India (such as Bihar, Punjab and Haryana).

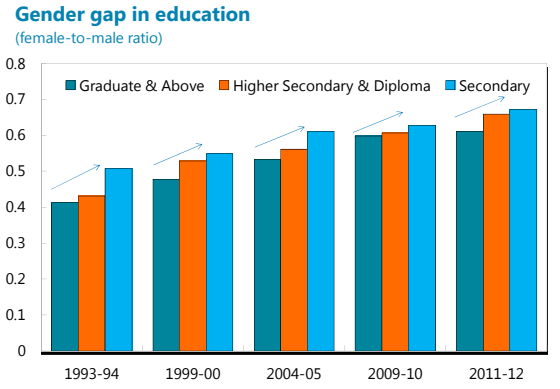
- *There is also a growing gap between male and female labor force participation rates* (text figures). These gender gaps are particularly pronounced in urban areas, where they are wider, and average some 60 percentage points. In rural areas, participation gaps between males and females average around 45 percentage points.





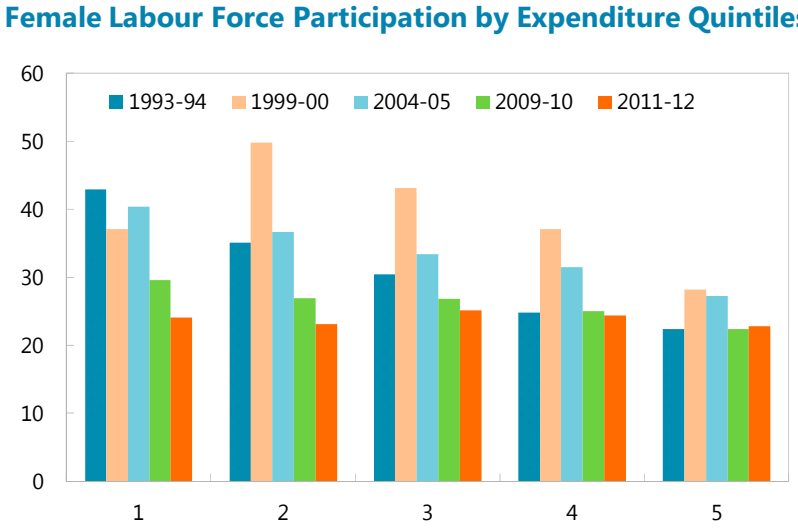
- *There is a U-shaped relationship between education and labor force participation rates of women* (left text chart below). With increasing education, labor force participation rates for women first start to decline and then pick up among highly-educated women (particularly university graduates), who experience the pull factor of higher-paying white-collar jobs. The gender gap in education in India still remains but has been narrowing over time (right text chart below). As the gender gap in education closes further, particularly at higher education levels, female labor force participation rates can be expected to rise. In addition to raising labor input, the resulting human capital accumulation should boost potential output.





Sources: NSS Employment and Unemployment surveys and authors' calculations

- *Income has a dampening effect on female labor force participation rates,* with participation rates higher among low-income households due to largely economic necessity (see text chart below).[10] With rising household incomes, participation rates for women start to drop off.



Source: NSS Employment and Unemployment Surveys and IMF staff calculations.

Labor market flexibility. It has been widely noted that relatively inflexible labor markets have weighed on employment generation in India (Dougherty 2009, Kochhar et al. 2006), affecting

[10] The analysis uses monthly per capita consumption as a proxy for household income.

firm hiring decisions (Adhvaryu et al. 2013) and resulting in lower productivity (Gupta et al. 2009). Moreover, there is considerable cross-state heterogeneity in labor market rigidities. To gauge the differences in flexibility of labor markets in Indian states, we use a state-level index produced by the OECD. The OECD's Employment Protection Legislation (EPL) index is based on a survey of labor market regulations. The index covers 21 of India's 29 states, which comprise 97.5 percent of India's 2011/12 NSSO measured population of 1.21 billion.[11] The index is constructed by counting amendments to regulations that are expected to increase labor market flexibility. This includes amendments to key pieces of labor market regulation: the Industrial Disputes Act (IDA),[12] the Factories Act, the Shops Act, and the Contract Labor Act. For example, with respect to the IDA, the index would take a higher value for states that: require a shorter amount of time to give notice to terminate employment; have made amendments allowing certain exemptions to the Act; that have lowered the threshold size of the firm to which chapter V-B applies; that exclude the complete cessation of a certain function from the definition of retrenchment; that have instituted a time limit for raising disputes; or that have instituted other amendments to the procedures for layoffs, retrenchment, and closure that should ease planning for firms. The OECD's EPL index also captures differences in the ease of complying with regulation (e.g. rules on dealing with inspectors, registers, filing of returns). As in Dougherty (2009), we scale the index, which takes values from 14 to 28, by its maximum value, thus ending with a variable that ranges from 0.5 to 1.

Categorizing employment as formal or informal. We use three alternative classifications to identify which workers in the sample are in the informal or formal sector, and create an indicator variable equal to one when the conditions for each of these classifications hold. The Employment and Unemployment Survey conducted in the 68th round of the NSS, from July 2011 to June 2012, asked workers for information on various characteristics of the enterprises in which they

[11] The 21 states covered are: Andhra Pradesh (Andhra Pradesh refers to the undivided state comprising the present states of Andhra Pradesh and Telangana), Assam, Bihar, Chhattisgarh, Delhi, Goa, Gujarat, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, Uttarakhand, and West Bengal.

[12] Chapter V-B of the Act requires firms employing 100 or more workers to obtain government permission for layoffs, retrenchments and closures (as of 1984).

were employed (e.g. type of enterprise[13], number of workers in the enterprise), and questions on the conditions of employment of the regular wage/salaried employees (whether an individual has a job contract, is eligible for paid leave, etc). Our categorizations of formal sector jobs are based on these questions about conditions of employment. Since there is no explicit question on the existence of informality, we infer its existence using three different methods. Our first categorization of formality refers to jobs are those where the worker has a formal contract or is eligible for paid leave. Our second categorization variable indicating formal employment is based on the location of the workplace. For example, workers that work on "the street with a fixed location" would be classified as informal sector employees. Our third categorization of formality comes from India's Ministry of Statistics and Programme Implementation (2014), which classifies workers in either proprietary or partnership enterprises (small firms, usually owned by individuals, family members, or their close associates) as employed in the informal sector.

Labor force participation rates can also be influenced by wage differentials facing women. As expected, wages in the informal sector are lower than in formal sector jobs. The NSS survey data contains information on wage and salary earnings, from which a daily wage can be calculated for about 15,000 female workers and 54,000 male workers. In the sample, the daily wage for women in formal jobs is over four times as high as for women in informal jobs (see following text table). Notably there is a gender wage gap in both the formal and informal sectors, with male workers earning a higher wage on average in both sectors.

Average Daily Wage (Rupees)		
	Formal 1/	Informal
Female workers	481.9	120.3
Male workers	632.2	194.2

Source: NSS Employment and Unemployment Survey and author's calculations. 1/ Classified as a formal job if employee has a contract or is eligible for paid leave.

[13] This includes: proprietary; partnership; government/public sector; public/private limited company; co-operative societies/trust/other non-profit institutions; employer's households (i.e., private households employing maid servant, watchman, cook, etc.) and others.

IV. ECONOMETRIC SPECIFICATION

In the empirical analysis, we ask the following questions:

- What are the determinants of female labor force participation in India in both urban and rural areas?
- Is female labor force participation higher in Indian states with less stringent labor market regulations?
- Do these factors affect whether employment occurs in the formal or informal sectors?

Similar to Klasen and Pieters (2012), the following two-stage estimation procedure is used to analyze the above questions. In the first stage, an individual's expected wages are estimated as follows:

$$w_i = \theta_1 + \theta_2 Z_i + \eta_i \quad \rightarrow \quad E(w) = \hat{w}$$

where w is the log of daily wages and Z is a vector of individual and household characteristics variables including: age and age squared, dummy variables representing literacy, levels of educational attainment, martial status, presence of children aged 0 to 4, and 5 to 16, whether the individual lives a rural or urban area, and district level dummy variables to capture regional differences in labor markets that affect wage determination (such as varying minimum wages in different parts of the country). Expected wages are estimated since the second stage regressions seek to explain the labor force participation decision of individuals and individuals that are not in the labor force will not have an actual wage. Thus their expected wage conditional on their individual and household characteristics is used an explanatory factor in the second stage.

In the main specification, the probability of being in the labor force is then estimated as follows:

$$\Pr\{L_i = 1\} = \alpha + \beta_1 \hat{w}_i + \beta_2 EPL + \beta_3 X_i + \nu_s + \varepsilon_i$$

where $L_i = 1$ if individual i is in the labor force, $\hat{w}$ is the log of daily wages, EPL is the OECD's employment legislation index mentioned above, and X is a vector of individual and household characteristics variables including:

- Age, dummy variable representing whether the individual is married, or has children
- Dummy variables representing literacy, and levels of educational attainment

- The natural log of monthly per capita household expenditure to proxy for the income level of the household
- The square of the natural log of monthly per capita household expenditure to capture nonlinearities in the income effect
- The natural log of per capita state domestic product (SDP) is also included to control for the state's level of development.
- State-dummies are included in some specifications, to control for unexplained differences in labor force participation across states.

We estimate weighted logit models to ensure the estimates represent the population, and standard errors are clustered at the household level. Previous papers that study the effect of labor market policies or other policy variables on labor participation in India do not include expected wages as an explanatory variable. This would result in biased estimates of the coefficients of interest in the event that wages and labor market flexibility are correlated. One would expect that wage determination is affected by labor market rigidities, making it important to include expected wages as a determinant. Khera and Nayak (2009) in a survey in rural areas find that many women do not engage in paid work because of lower wages.

In addition to analyzing the effect of individual characteristics and labor market flexibility on female labor force participation, the extent of informality is also studied. In later specifications, the dependent variable is instead $FL_i = 1$ when individual *i* is in the formal labor force, according to the three classifications of employment into formal and informal discussed in the previous section. Finally, this paper analyzes the effects of various state-level policies on female labor force participation. These include state expenditure on the social sector, as well as state-level differences in infrastructure. This paper also analyses whether India's leading public employment program, the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGA), engenders higher female labor force participation.

V. RESULTS

Benchmark. The benchmark regressions (Table 1) show the impact of individual and household characteristics on the probability of being in the labor force, for both women (first three columns) and men (final three columns). The estimated coefficients are as expected. Expected

wages have a significant and positive effect on the probability of being in the labor force for urban females. Married women are less likely to be in the labor force, while married men are more likely to be in the labor force. The coefficient of -0.452 on the dummy variable for married women indicates that married women are 8 percentage points less likely than men to be in the labor force (translating the logit coefficients into marginal effects). Both women and men with young children are less likely to be in the labor force. Illiterate individuals of both sexes are less likely to be in the labor force, and the probability of being in the labor force increases with higher levels of education for both sexes. Consistent with the stylized facts, females in households with higher per capita spending, which is a proxy for their income, are less likely to be in the labor force. However, this negative effect is non-linear and decreases as income increases, as shown by the positive coefficient on the square of the log of household spending. This nonlinear relationship between income and participation appears to be driven by urban females. Combined with the coefficient on predicted wages, this suggests that the substitution effect is relatively more important for urban females than rural ones. Note that male labor force participation is not significantly related to household spending.Finally, the coefficient on log(SDP per capita) indicates that labor force participation is higher in more developed states.

Labor market flexibility. More flexible labor markets are associated with higher female participation in the labor force (left panel of Table 2), as well as with a higher probability of being employed (right panel). The coefficient of 0.360 on the EPL variable implies that the probability of being in the labor force for women increases by about 3 percentage points when the EPL index increases from 0.5 to 1 (with the rest of the variables at their means). The coefficient on the EPL index is not statistically significant in the male labor force participation regressions, indicating that flexibility does not affect male participation as strongly as it does female participation. The coefficients on the other explanatory variables are similar to those in the benchmark estimation results of Table 1. When examining the probability of being employed, however, the coefficient on the ELP index is significant for both men and women, with the effect on female employment being stronger. In other words, flexibility increases the probability of women being employed.

Formal sector employment. The chance of being employed in the formal sector, as opposed to the informal sector, also increases in more flexible state labor markets. Tables 3a, 3b, and 3c

show the probability of being in the formal sector for each of the three categorizations of formal sector employment. In each, the estimates indicate a higher probability of being employed in the formal sector in states with higher EPL.

Social sector spending. Table 4 shows the relationship between state social sector expenditure (as a share of NSDP) and FLFP, as well as several components of total social sector spending. The coefficient of 0.093 on total social spending indicates that FLFP is 1.5 percentage points higher in states where social sector spending (as a share of NSDP) is one percentage point higher. Similarly, the coefficient on education spending suggests that FLFP rises by 2 percent points with an increase in spending on education of 1 percent of NSDP.

State level initiatives. Table 5 studies the effect of state infrastructure spending on employment, as well as including all state-level variables that can be influenced by policy in the same specification. The two measures of state infrastructure are the log of total surfaced road lengths in a particular state, and the transmission and distribution losses (T&D losses) of state power utilities (as a fraction of generating capacity). Higher T&D losses suggest a lower quality of infrastructure and institutions in a state (Kochhar et al. 2006). The statistically-significant results indicate that poor infrastructure has a dampening effect on female labor force participation: women living in states with greater access to roads are more likely to be in the labor force, and those in states with higher T&D losses are less likely to be in the labor force. This result is consistent with the findings of Agenor and Canuto (2013).

National Rural Employment Guarantee. Finally, Table 6 shows that, in rural areas, both women and men that hold an MGNREGA card are more likely to be in the labor force, as expected. The statistically-significant increase in probability is higher for women than men, possibly due to the female-friendly provisions in the Act.

VI. CONCLUSION

Female labor force participation in India is lower than many other emerging market economies, and has been declining since the mid-2000s. Moreover, there is a large gap in the labor force participation rates of men and women in India. This gender gap should be narrowed to fully harness India's demographic dividend. In addition, a related literature also finds that greater economic partipation of women leads to higher economic growth.

A number of policy initiatives could be used to address this gender gap in Indian labor force participation. These include increased labor market flexibility (which could lead to the creation of more formal sector jobs) allowing more women, many of whom are working in the informal sector, to be employed in the formal sector. In addition, supply-side reforms to improve infrastructure and address other constraints to job creation could also enable more women to enter the labor force. Finally, higher social spending, including investment in education, can also lead to higher female labor force participation by boosting female stocks of human capital.

Table 1. Determinants of Labor Force Participation

Dependent variable = 1 if in labor force

	Female			Male		
	All	Urban	Rural	All	Urban	Rural
Predicted wage	0.001	0.153**	0.038	0.270***	-0.022	0.410***
	(0.041)	(0.064)	(0.051)	(0.091)	(0.129)	(0.119)
Married	-0.452***	-0.787***	-0.374***	2.651***	2.647***	2.659***
	(0.038)	(0.057)	(0.050)	(0.061)	(0.076)	(0.081)
Children	-0.155***	-0.167***	-0.077*	-0.115**	0.041	-0.204***
	(0.035)	(0.052)	(0.045)	(0.046)	(0.067)	(0.063)
Illiterate	-1.221***	-0.845***	-1.315***	-1.813***	-1.163***	-2.026***
	(0.067)	(0.105)	(0.086)	(0.103)	(0.156)	(0.129)
Some Education	0.631***	0.493***	0.706***	1.663***	1.432***	1.774***
	(0.064)	(0.100)	(0.083)	(0.062)	(0.085)	(0.083)
Post-secondary education	1.240***	1.271***	1.034***	1.071***	1.299***	0.859***
	(0.073)	(0.106)	(0.108)	(0.075)	(0.097)	(0.107)
log(Expenditure per capita)	-1.126***	-2.461***	-0.841	0.159	-0.093	0.513
	(0.384)	(0.510)	(0.565)	(0.562)	(0.682)	(0.927)
log(Expenditure per capita) squared	0.045*	0.141***	0.035	-0.037	-0.019	-0.067
	(0.026)	(0.033)	(0.039)	(0.036)	(0.043)	(0.063)
log(SDP per capita)	1.090***	0.546***	1.351***	0.226***	0.138*	0.276***
	(0.038)	(0.051)	(0.048)	(0.054)	(0.071)	(0.074)
Observations	133,220	52,509	80,711	133,947	53,890	80,057

Robust standard errors in parentheses, clustered at household level, *** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' calculations.

Table 2. Labor Market Flexibility

Dependent variable = 1 if in labor force	Female All	Male All
EPL	0.360***	-0.033
	(0.114)	(0.160)
Predicted wage	-0.019	0.282***
	(0.043)	(0.097)
Married	-0.437***	2.633***
	(0.040)	(0.063)
Children	-0.169***	-0.107**
	(0.036)	(0.048)
Illiterate	-1.234***	-1.830***
	(0.070)	(0.106)
Some education	0.634***	1.677***
	(0.067)	(0.065)
Post-secondary education	1.255***	1.075***
	(0.076)	(0.078)
log(Expenditure per capita)	-1.205***	0.247
	(0.389)	(0.567)
log(Expenditure per capita) squared	0.051*	-0.043
	(0.026)	(0.037)
log(SDP per capita)	1.104***	0.219***
	(0.039)	(0.055)
Observations	112,119	112,497

Robust standard errors in parentheses, clustered at household level, *** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' calculations.

Dependent variable = 1 if Employed	Female All	Male All
EPL	0.515***	0.255*
	(0.116)	(0.148)
Predicted wage	0.003	0.326***
	(0.043)	(0.090)
Married	-0.337***	2.743***
	(0.041)	(0.059)
Children	-0.152***	-0.066
	(0.037)	(0.045)
Illiterate	-1.356***	-1.964***
	(0.073)	(0.103)
Some education	0.731***	1.652***
	(0.070)	(0.062)
Post-secondary education	1.076***	0.592***
	(0.080)	(0.072)
log(Expenditure per capita)	-1.580***	-0.480
	(0.391)	(0.553)
log(Expenditure per capita) squared	0.077***	0.013
	(0.026)	(0.036)
log(SDP per capita)	1.110***	0.239***
	(0.040)	(0.050)
Observations	112,119	112,497

Robust standard errors in parentheses, clustered at household level, *** p<0.01, ** p<0.05, * p<0.1.

Table 3a. Formal and Informal Employment: Contract Employees

Dependent variable = 1 if employed with contract or eligible for paid leave.

		Female	
	All	Urban	Rural
EPL	2.443***	-0.713	4.404***
	(0.896)	(1.838)	(1.165)
Predicted wage	1.255***	1.499***	1.014***
	(0.116)	(0.157)	(0.166)
Married	-0.780***	-0.996***	-0.417***
	(0.095)	(0.115)	(0.159)
Children	0.117	-0.041	0.399***
	(0.081)	(0.103)	(0.132)
Illiterate	0.305	-0.759***	1.127***
	(0.196)	(0.247)	(0.291)
Some education	0.057	0.266	-0.224
	(0.145)	(0.181)	(0.221)
Post-secondary education	0.960***	0.879***	1.036***
	(0.126)	(0.174)	(0.190)
log(Expenditure per capita)	0.322***	0.248***	0.427***
	(0.066)	(0.079)	(0.139)
Observations	98,555	41,165	57,390

Robust standard errors in parentheses, clustered at household level, *** p<0.01, ** p<0.05, * p<0.1. All specifications include individual and household control variables and log of per capita SDP.

Source: Authors' calculations.

Table 3b. Formal and Informal Employment: By Location

Dependent variable = 1 if employed in formal sector. 1/

		Female	
	All	Urban	Rural
EPL	2.077***	1.446	2.547***
	(0.691)	(1.369)	(0.853)
Predicted wage	0.702***	0.917***	0.530***
	(0.078)	(0.122)	(0.098)
Married	-0.749***	-0.889***	-0.596***
	(0.075)	(0.086)	(0.124)
Children	-0.037	-0.152*	0.072
	(0.069)	(0.078)	(0.120)
Illiterate	-0.577***	-0.906***	-0.394**
	(0.115)	(0.162)	(0.171)
Some education	0.360***	0.356**	0.331*
	(0.120)	(0.146)	(0.184)
Post-secondary education	1.294***	1.191***	1.268***
	(0.105)	(0.139)	(0.164)
log(Expenditure per capita)	-0.101**	-0.171***	-0.159*
	(0.048)	(0.058)	(0.090)
Observations	98,555	41,165	57,390

Robust standard errors in parentheses, clustered at household level, *** p<0.01, ** p<0.05, * p<0.1. 1/ Formality categorized using location of workplace. All specifications include the log of per capita SDP.

Source: Authors' calculations.

Table 3c. Formal and Informal Employment: Small Enterprises

Dependent variable = 1 if employed in formal sector. 1/

		Female	
	All	Urban	Rural
EPL	5.720***	4.825**	5.753***
	(1.667)	(2.045)	(2.182)
Predicted wage	-0.006	0.289*	-0.105
	(0.107)	(0.154)	(0.138)
Married	0.812***	0.722***	0.791***
	(0.100)	(0.105)	(0.167)
Children	0.175*	0.306***	0.122
	(0.104)	(0.106)	(0.178)
Illiterate	0.974***	0.791***	1.201***
	(0.180)	(0.256)	(0.256)
Some education	-0.618***	-0.313	-0.865***
	(0.195)	(0.247)	(0.293)
log(Expenditure per capita)	0.355***	0.622***	0.417***
	(0.070)	(0.088)	(0.125)
log(SDP per capita)	-7.819***	-4.789**	-8.322***
	(2.249)	(2.363)	(3.180)
Constant	80.346***	44.470*	85.797**
	(23.814)	(24.757)	(34.145)
Observations	98,555	41,165	57,390

Robust standard errors in parentheses, clustered at household level, *** p<0.01, ** p<0.05, * p<0.1. 1/ Formal sector defined as workers employed in enterprises other than proprietary or partnership enterprises. All specifications include the log of per capita SDP.
Source: Authors' calculations.

Table 4. State Expenditure on Social Sector

Dependent variable = 1 if in labor force

	Female			
Social sector spending / NSDP	0.093***			
	(0.003)			
Education spending / NSDP		0.114***		
		(0.007)		
Health spending / NSDP			0.550***	
			(0.022)	
Family welfare spending / NSDP				4.802***
				(0.373)
Observations	132,187	132,187	132,187	132,187

Robust standard errors in parentheses, clustered at household level. *** p<0.01, ** p<0.05, * p<0.1, All specifications include individual and household control variables, predicted wages, and the log of per capita SDP.
Source: Authors' calculations.

Table 5. State Infrastructure

Dependent variable = 1 if in labor force

	Female			
EPL			1.601***	0.130
			(0.616)	(0.556)
Social sector spending			0.065***	0.038***
			(0.006)	(0.012)
log (Road)	0.136***			
	(0.017)			
T&D losses		-0.061***		-0.149***
		(0.004)		(0.042)
Predicted wage	0.062	0.145***	0.170***	0.158***
	(0.046)	(0.045)	(0.047)	(0.050)
Observations	117,352	125,864	112,119	105,796

Robust standard errors in parentheses, clustered at household level, *** p<0.01, ** p<0.05, * p<0.1. All specifications include individual and household control variables, and the log of state domestic product per capita.

Source: Authors' calculations.

Dependent variable = 1 if Employed

	Female			
EPL			3.926***	2.949***
			(0.638)	(0.575)
Social sector spending			0.061***	0.044***
			(0.006)	(0.012)
log (Road)	0.168***			
	(0.017)			
T&D losses		-0.066***		-0.100**
		(0.004)		(0.043)
Predicted wage	0.097**	0.163***	0.221***	0.211***
	(0.046)	(0.045)	(0.048)	(0.050)
Observations	117,352	125,864	112,119	105,796

Robust standard errors in parentheses, clustered at household level, *** p<0.01, ** p<0.05, * p<0.1. All specifications include individual and household control variables, and the log of state domestic product per capita.

Table 6. National Rural Employment Guarantee

Rural areas only. Dependent variable = 1 if in labor force

	Female	Male
MGNREG jobcard holder	1.387***	1.319***
	(0.063)	(0.123)
Married	-0.538***	2.341***
	(0.074)	(0.122)
Children	-0.013	-0.315***
	(0.070)	(0.105)
Illiterate	-0.771***	-1.683***
	(0.145)	(0.170)
Some education	0.465***	1.689***
	(0.142)	(0.123)
Post-secondary education	0.526**	1.180***
	(0.207)	(0.184)
log(Expenditure per capita)	-0.120	-0.399***
	(0.073)	(0.136)
log(SDP per capita)	1.139***	0.191
	(0.098)	(0.150)
Observations	29,918	30,406

Robust standard errors in parentheses, clustered at household level, *** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' calculations.

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