

SOCIO-ECONOMIC INEQUALITY IN INDIA ACROSS GENDER- ANALYZING INCOME INEQUALITY FROM A GENDER LENS

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Abstract

India has gone through a series of transitions since industrialization. The advancement of the socio-economic situation increased awareness, and education attainment has attributed to increased acceptability of women's labour force participation. The accelerating growth of female participation can be a driving force of development. Gender equality serves as a bridge to make the Indian economy more competitive.

Countries overshadowed by discrimination and backwardness consider women to be less efficient. Analysis reveals that increased workforce participation in the female population can accelerate the economic growth rate of our country. As of today, India has extreme wealth and income inequality in the world. The scenario for women is highly discriminating since a substantial proportion of the feminine population suffers from poverty. The climb for gender parity is quite rough for India.

Keywords: Socio-Economic Inequality, Indian Economy, Heckman

JEL Classifications: J70, O100, C01

1. Introduction

When we speak of gender inequality in a country like India, there is an acute deficiency in an egalitarian view of gender roles in our society. Deaton (2003) argues that a symmetrical mindset can create a better socio-political atmosphere which may contribute to future prosperity. Women get discriminated against by the stereotypical judgments of our patriarchal society. These notions ingrained into the mind of Indians act like chronic viruses that spread over the generations. According to the Union budget 2022, the overall workforce participation rate is 20.3% the degree of women's employability is 51.44%. The reduction of women's work participation occurs due to domestic responsibility, childbirth, restriction of women from going out to work, and lack of employment opportunities. Most women choose to work in unorganized informal sectors of our country due to a lack of education. In rural areas, most women are engaged in unpaid care work and household services, which reflects the socio-economic disparity and patriarchal power structure. Families having a son and a daughter choose to provide education to the son compared to the daughters. Studies by Sen (1990), Duflo (2012), Kabeer (2016) and many others reveal that, at times economic development is unable to remove gender biasedness due to prevailing social, cultural, and legal institutions. The paper focuses on wage discrimination across gender caused by socio-economic factors by using the unit-level data of the Periodic Labor Force Survey 2019-20 (PLFS). We have tried to provide a synoptical view of

wage inequality across gender in terms of educational attainment and among various work sectors. However, the primary aim is to dig into the social factors causing inequality rather than productivity difference. The labour force participation is not likely to be random; as a result, we have carried out our estimation procedure using the Heckman technique.

2. Data

This study uses household and personal level information from periodic labour force surveys (PLFS) in India. The survey started in 2017-18, and the data for the third wave survey in 2019-20 was available recently in the public domain. It provides annual estimates of the key labour market indicators based on the Usual status and current weekly status approach. It provides quarterly estimates of these indicators in urban areas based on the current weekly status approach. The rational panel sampling of two years cycle is used here. The survey collects information on the hours worked each day of the reference week based on CWS.

The contrasting image:

The household level data of PLFS 2019-20 has a total sample size of 240,231 for the rural area and 539,054 for the urban area. The entire sample covers 50.76% of the male population and 49.21% of the female population in the urban area. It covers 50.95% male sample and 49.02% female population in the rural area. Table 1 below represents the male and female population according to their access to general and technical education in rural areas. Table 2 provides the same information for the urban area.

Table 1: Sample observation for rural areas in terms of education attainment (%)

	Male	Female
Sample size	51	49.02
Illiterate	21.2	33.95
Below primary	12.9	12.6
Primary	13.3	13.73
Middle school	20.3	17.89
Secondary	14.2	9.88
Higher secondary	10.1	6.99
Graduate	5.1	2.94
Post-graduation and above	1.06	0.72
Technical education	1.6	0.85

Source: calculation done by the author in terms of the PLFS 2019-20 data.

Table 2: Sample observation for urban area in terms of education attainment (%)

	Male	Female
Total sample	50.76	49.21
Illiterate	13	21.05
Below primary	10.19	9.83
primary	10.97	11.58
Middle school	17.88	17.21
Secondary	14.39	12.13
Higher secondary	12.52	11.18
Graduate	12.88	10.32
Post graduate and above	4.16	4.11
Technical education	5.36	3.22

Source: Calculations made by the author based on 2019-20 PLFS data.

Concentrating on the rural sample first, we observe that about 21.16% of the male population is illiterate. The illiterate female population is about-33.95% indicating a large proportion of the entire sample. People in rural areas get influenced by very rigid psychology. Sexism starts before a girl child is born. Empirical evidence shows a significant prevalence of domestic violence if a mother fails to give birth to a son. The lack of infrastructure in the rural area also acts as a hindrance to not attending school. Evidence shows that the non-availability of pucca road, distance to school, and proper transport system may influence education attainment negatively.

Various macroeconomic policies have been undertaken so that more girl children come to school, but such policies have not been able to make any widespread influence till now. Perhaps private investment and the emergence of various self-help groups may positively shape this cause.

If we observe Table 2, the figures for male and female illiterate in urban areas are much less than in rural areas. The contributing factors can be a better socio-economic environment, better education system, more private and public investment, better infrastructure, an increase in the average age of marriage for a girl child, etc. Corresponding to each successive level of education, the difference

observed between the male and female sample of a population is much smaller than that of the rural area. A much higher proportion of the female population goes for graduation, post-graduation, and above (14.43%).

Wage differential in terms of education attainment

We have taken mean wage as an indicator of the wage received by men and women for a particular level of

education. The table below provides a synopsis of wage differential for the rural and urban areas. For calculating the wage gap, we have used the following methodology.

Income gap among gender = [(Mean Income received by the male population - Mean income received by the female population)/ mean income received by male population] *100

Table 3: Mean monthly wage differential between regularly employed men and female in rural and urban areas

Education attainment	Rural area	Urban area
Illiterate	85.08	76.67
Primary	87.72	81.83
Middle	87.9	87.38
Secondary	85.7	88.1
Graduate	71.3	69.63
Postgraduate	50.07	49.89

Source: calculation done by the author based on PLFS 2019-20 data.

From the above table, it is evident that income inequality is far more prevalent in rural than urban areas at every level of educational attainment. As education attainment by a person gradually increases, the degree of inequality also diminishes, except in the case of middle and secondary education, where the polarity escalates. Now for a deeper view into our analysis, we shall estimate the gender wage inequality between rural and urban sectors across different sectors of

our economy. We have broadly categorized the total workforce of our economy into- self-employed groups, regular salaried workers, and casual workers. PLFS data provides the data of the monthly wages of the regular salaried and self-employed workers. The weekly wages in cash or kind of the informal sector workers are provided in the data, and from there, we have derived the daily wages. From the daily wages, we calculated the monthly wages of the casual workers.

Table 4: Monthly wage earnings of the urban and rural areas according to types of employment

Type of worker	Rural area Mean wage		Wage inequality	Urban area Mean wage		Wage inequality
	Male	Female		Male	Female	
Self-employed in household enterprise	9914.62	4768.76	51.9	14336.5	7050.27	50.81
Regular worker	15033.5	9831.32	34.73	19757.6	16240.8	17.79
Casual workers in public work	6038.32	3631.5	39.85	7023.53	4274.34	39.14

Casual workers in other type of work	6854.39	4078.1	40.5	7839.57	5217.88	33.44
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Source: calculation done by the author based on PLFS 2019-20 data.

In Table 4, we have measured the extent of inequality in each sector in the rural and urban areas. For the self-employed, the variation is more or less the same in rural and urban areas. The primary reason may be the covid situation, for which extensive unemployment of regular salaried employers occurred, followed by a marginal increment in the self-employed group. In the case of regular salaried work, we observed that both in the rural and urban areas, the wage received by women are less than those obtained by men. However, the wage earned by the urban female worker is much higher than the rural counterpart because of higher skill and education attainment. A much higher share of the female population is engaged in the informal sector in rural areas where they do not receive any social security benefits and are entitled to poor work conditions with a lower wage. In the rural sector, most women are unskilled, for which they are regarded as a cheap source of labour.

3. The Heckman Procedure: Empirical results

3.1. Estimating Mincerian Wage Equation:

We assume a finite population of discrete form represented as $i = [1, 2, \dots, N]$ where N is a large and finite number. We have used the Mincerian wage good equation as:

$$\ln wage = a_0 + a_1 dfemale + a_2 age + a_3 age^2 + a_4 drural + a_5 dfemale_dilliterate + a_6 dfemale_dprimary + a_7 dfemale_dsecondary + a_8 dfemale_dsecondary + a_9 dfemale_dgraduate + a_{10} dfemale_dpg +$$

$$a_{11} dfemale_dtechedu + a_{12} dfemale_dmedicine + a_{13} femaled_engg + a_{14} female_dhindu + a_{15} dfemale_dmuslim + a_{16} dfemale_dst + a_{17} dfemale_dsc + a_{18} dfemale_dabc + u_1 \quad (1)$$

$\ln wage =$ logarithmic form of wage received by a person. $U_1 =$ random error.

We have taken the variable age as a proxy for the experience. Age square is taken into consideration to access possible non-linear relationships. Through this model, we aim to analyse the factors that cause the observed wage gap in our economy that are not attributed to the difference in educational opportunity, experience, and skill; other factors can influence negatively. To minutely judge those, we have considered religion and social groups.

3.2. Estimating sample selection equation:

The selection equation may be represented as

$$\ln f = b_0 + b_1 female + b_2 hh \text{ size} + b_3 female \text{ illiterate} + b_4 female \text{ primary} + b_5 female \text{ secondary} + b_6 female \text{ graduate} + b_7 female \text{ pg} + b_8 female \text{ hindu} + b_9 female \text{ muslim} + b_{10} female \text{ st} + b_{11} female \text{ sc} + b_{12} female \text{ obc} + b_{13} female \text{ married} + b_{14} female \text{ widowed} + b_{15} female \text{ divorced} + b_{16} female \text{ rural} + u_2 > 0 \quad (2)$$

Here $\ln f$ is a dichotomous latent variable such that labour force participation occurs if the wage is

above a certain reserved level. We have assumed u_1 and u_2 to be interdependent such that the correlation does not turn out to be 0.

We assumed that the earnings received by a person depend on the human capital endowment of the person as the level of education, experience, training, skill, etc. Other factors influencing social standing in various ways include marriage, increased fertility rate, gender, caste, religion, and residence area, which are responsible for income inequality across India. The dataset has many people whose income are unobserved. If we carry out regression ignoring the household with no income in the form of wage, the sample becomes non-random, which can lead to the problem of sample selection bias. Hence, we have used Heckman's two-stage selection model to remove sample selection bias. In this two-step approach, we first conducted a probit model predicting whether an individual has participated in the labour market or not to calculate the Mill's ratio, followed by applying the OLS regression model. The predicted value of the inverse Mills' ratio is included in the original wage model to correct the sample selection bias. Hence, along with a main wage equation we have also constructed a selection equation. We have taken two additional variables in sample selection equation to that of the original wage equation- marital status and household size that does not have any bearing on the wage received by a person but may influence the labour force participation of a person.

In this sample study, we have excluded children up to age 15 and elderly above 60 years. We have provided the approximate result and the value of the

inverse mill's ratio, which implies the presence of sample selection bias in Table 6. The inverse Mill's ratio is significant at a 1% level. Therefore, it indicates the existence of a sample selection hazard. Hence, we need to incorporate such errors in the original wage equation.

dfemale is a dummy variable taken under study for measuring the marginal effect of gender bias influencing labour force participation. The female dummy represents attributes with dismissive consequences and is valid at a 1% significance level. The household size harms labour force participation, a larger family size prevents women from going out for work, and they mostly get engaged in unpaid household work or farm work. A larger family size depicts a high fertility rate in our economy. In the case of women, we observed that for a higher level of educational attainment, there is a gradual increment in labour force participation. When measuring the effect of religious restriction, we found that the consequences are unfavourable both for Hindus and Muslims. However, the adverse effects for Muslims are far more prominent, maybe because of their lower educational attainment or higher social restrictions. The variable *female rural* signifies the influence upon labour force participation if a woman comes from a rural area, and we observe that the place of residence influences the dependent variable negatively. This evidence is highly compatible with the real-life situation- women in rural areas face much more restrictions on work opportunities, education, and mobility than in urban areas. In the context of social groups,

labour force participation is higher for the ST and SC. We have also considered the marital status of women to be a determining factor of labour force participation, and the results are utterly intriguing. The labour force participation of married women is much lower than that of widowed and divorced. Hence marriage seems to reinforce traditional gender roles, and domestic and caregiving

responsibilities shape a women's position. Widowed and divorced women are more eager to become financially sovereign for caring for their children single-handedly. The value of the Wald Chi-square test is very significant, which signifies a correlation between the selection model and the original wage model. Therefore, Heckman's technique can provide us with a better result.

Table 5: Sample selection bias corrected original wage model

Variables	Coefficient	z- statistics	P>z
Intercept	8.390476	323.01	0.00
dfemale	-0.3203838	-16.92	0.00
age	0.0625292	54.19	0.00
age2	-0.0006494	-44.77	0.00
drural	-0.3902829	-95.63	0.00
dfemale_dilliterate	-0.3006032	-25.17	0.00
dfemale_dprimary	-0.3319556	-22.95	0.00
dfemale_dsecondary	0.0413215	3.32	0.00
dfemale_dgraduate	0.5896042	47.37	0.00
dfemale_dpg	0.808284	46.88	0.00
dfemale_dtechedu	0.3489849	29.17	0.00
dfemale_dmedicine	0.3216514	7.08	0.00
dfemale_dengg	0.3137627	8.19	0.00
dfemale_dhindu	-0.1151237	-8.89	0.00
dfemale_dmuslim	-0.2642422	-14.79	0.00
dfemale_dst	0.1455326	10	0.00
dfemale_dsc	-0.1609025	-13.03	0.00
dfemale_dobc	-0.0971556	-10.41	0.00

Source: author's calculation based on PLFS 2019-20 data.

We need to remove sample selection bias. Hence, we need to include the Inverse Mills ratio to the original wage determination equation before applying OLS. We have used the monthly earning of the workers in logarithmic form as the dependent variable. The female dummy variable has a negative and highly significant coefficient implying that a female worker receives a lower wage rate than her male counterpart, irrespective of any particular region. The dummy

variable for rural areas depicts the fact that the workers in the rural area get much lower wages than the urban area, regardless of gender. We have taken age as a proxy variable for the experience, which has a positive and significant coefficient implying that a worker is likely to get higher wages for higher experience. We have also considered the age square as a variable for measuring any effective non-linear relationship between wage received and experience. It signifies that over

time the returns of experience on wages gradually decrease.

Table 6: Probit model for estimating labour force participation

variables	Coefficient	z-statistics	P>z
Intercept	0.25	49.59	0.00
female	-1.295097	-95.52	0.00
Household size	-0.0419665	-44.25	0.00
Female illiterate	-0.0599555	-6.4	0.00
Female primary	0.0206765	1.85	0.07
Female secondary	-0.0850313	-8.49	0.00
Female graduate	0.4789422	49.24	0.00
Female pg.	0.8567453	64.02	0.00
Female Hindu	-0.1621508	-15.26	0.00
Female Muslim	-0.2869276	-20.95	0.00
Female ST	0.1156865	9.74	0.00
Female OBC	0.0320637	4.31	0.00
Female SC	0.0529629	5.36	0.00
Female rural	-0.0426796	-5.86	0.00
Female married	.1883173	23.51	0.00
Female widowed	.8181548	63.20	0.00
Female divorced	1.006512	33.67	0.00
rho	-0.39029		
sigma	0.7859265		
lambda	-0.3067397	-18.5	0.00

Source: calculation by the author based on PLFS 2019-20 data.

We have interacted gender dummy variable with the religion dummy variables, and both interactions have a negative and significant value. It implies that the Hindu and Muslim female workers received much lower wages than the male population. The female worker of the ST class receives higher wages than men, but the SC and OBC show a much higher level of wage inequality. At the lower level of education, the degree of income inequality is much higher, and when the level of educational attainment eventually increases, women receive more wages than men. Supplementary training enables female labour to attain higher wages than males. The coefficient for the female population opting for medical and engineering

education shows a positive and highly significant figure. Hence higher education, training, and government expenditure in such areas can diminish the wage inequality across gender irrespective of place of residence.

4. Conclusion

Based on the analysis, the study attempted to provide concrete evidence of whether gender inequality contributes to income inequality. The level of educational attainment appears to be a significant determining factor of labour force participation, and with the increase in educational attainment, gender income inequality is likely to diminish.

The female population receiving training in the engineering and medical field are at an advantage over the male

counterpart irrespective of place of residence. Since a large sample of people did not participate in the labour market, we have used Heckman's two-step classification model to remove sample selection bias. The marital status of women influences adversely; the widowed and divorced female population is more likely to have greater financial independence. Religious factors and attributes highly influence the decision to work. Hindu female workers are better positioned than Muslims due to various religious barriers.

Concentrating on the social groups, the relative position of the SC female population is much better than the ST and OBC. The larger the household size, the lesser the probability of workforce participation, and this also proves that an increased fertility rate acts as a deterring force to economic growth.

5. References

- Abraham, V. (2013). Missing labor or consistent "de-feminization"? Economic and Political Weekly. Amin M, Mattoo A. (2008). Human capital and the changing structure of the Indian economy. Policy Research Working Paper Number 4576, The World Bank.
- Bardhan, P. (1996). Efficiency, equity, and poverty alleviation:

6. Appendix

Table A1: explanations of variable used in Equation 1

Variables	Explanation
Dfemale	Gender dummy variable equals 1 for women and 0 for men.
Age	Age of worker as a proxy for experience.
Age2	Taken for observing the returns of experience over time.
drural	Dummy variable for rural areas is equal to 1 if the person resides in a rural area and 0 otherwise.
dfemale_dilliterate	Gender dummy variable for no education equals 1 for women

policy issues in less developed countries. The Economic Journal.

- Chaudhary R, Verick S. (2014). "Female labor force participation in India and beyond". International Labour Organization.
- Cotton, C J. (1988). "On the discrimination of wage differentials." Review of Economics and Statistics. Dollar D, Gatti R. (1999). "Gender inequality, income, and growth: are good times good for women?". Development Research Group, The World Bank: Washington, DC.
- Galor O, Weil DN. (1996). The gender gap, fertility, and growth. The American Economic Review.
- Heckman, J. (1976). "The common structure of Statistical models on truncation, sample selection and limited dependent variables and a sample estimator of such models".
- Mammen K, Paxson C. (2000). Women's work and economic development. Journal of Economic Perspectives.
- Mincer, J. (1958). "Investment in human capital and personal income distribution" Journal of Political Economy.
- Oaxaca, R. L. (1973). "Male-Female wage differential in Urban labor market". International Economic Review.

	with no education or 0 otherwise.
dfemale_dprimary	Gender dummy variable for primary level education equals 1 for women with primary level education or 0 otherwise.
dfemale_dsecondary	Gender dummy variable for secondary level education equals 1 for women with secondary level education or 0 otherwise.
dfemale_dgraduate	Gender dummy variable for graduate-level education equals 1 for women with graduate-level education or 0 otherwise.
dfemale_dpg	Gender dummy variable for postgraduate education equals 1 for women with post-graduate education or 0 otherwise.
dfemale_dtechedu	Gender dummy variable for the technical education dummy equals 1 for women with technical education or 0 otherwise.
dfemale_dmedicine	Gender dummy variable for technical equals 1 for women with medical and technical education or 0 otherwise.
dfemale_dengg	Gender dummy variable for technical education equals 1 for women with engineering technical education or 0 otherwise.
dfemale_dhindu	Gender dummy variable for Hindus equals 1 for Hindu women or 0 otherwise.
dfemale_dmuslim	Gender dummy variable for Muslims equals 1 for Muslim women or 0 otherwise.
dfemale_dst	Gender dummy variable interacted for ST equals 1 for ST women or 0 otherwise.
dfemale_dsc	Gender dummy variable for SC equals 1 for women who are SC or 0 otherwise.
dfemale_dobc	Gender dummy variable for OBC equals 1 for women who are OBC or 0 otherwise.

Table A2: explanation of variables used in Equation 2

Variables	Explanation
female	Gender dummy variable, equal to 1 for women and 0 otherwise.
hh size	Household size.
Female Illiterate	Gender dummy variable for no level of education, equal to 1 for women with no level of education and 0 otherwise.
Female Primary	Gender dummy variable for primary level education equals 1 for women with primary level education or 0 otherwise.
Female Secondary	Gender dummy variable for secondary level education equals 1 for women with secondary level education or 0 otherwise.
Female Graduate	Gender dummy variable for graduate-level education equals 1 for women with graduate-level

	education or 0 otherwise.
Female Pg.	Gender dummy variable for postgraduate education equals 1 for women with post-graduate education or 0 otherwise.
Female Hindu	Gender dummy variable for Hindus equals 1 for Hindu women or 0 otherwise.
Female Muslim	Gender dummy variable for Muslims equals 1 for Muslim women or 0 otherwise.
Female St	Gender dummy variable interacted for ST equals 1 for ST women or 0 otherwise.
Female SC	Gender dummy variable for SC equals 1 for women who are SC or 0 otherwise.
Female OBC	Gender dummy variable for OBC equals 1 for women who are OBC or 0 otherwise.
Female Rural	Gender dummy variable, equal to 1 if the women come from a rural area and 0 otherwise.
Female Married	Gender dummy variable for marital status, equal to 1 for married women and 0 otherwise.
Female Widowed	Gender dummy variable for marital status, equal to 1 for widowed women and 0 otherwise.
Female Divorced	Gender dummy variable for marital status, equal to 1 for divorced women and 0 otherwise.