

Gender Discrimination and the Biased Indian Labour Market

Wage and Occupational Inequalities in Regular and Casual Workers: Evidence from the National Sample Survey

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Abstract

Gender gaps in wages is a reflection of gross inequality and discrimination. This exists across location (rural and urban), sector (public and private), type of work (regular and casual), occupations, industry and other divisions. Discrimination however, is a presence of inequalities between male and female worker for the same job with same level of skills. Therefore only understanding wage inequality may be looking at the problem partially. Using the National Sample Survey Organisation (NSSO) 2011-12 quinquennial surveys on “Employment and Unemployment”, the paper empirically examines the facets of not only gender-based inequality but also discrimination across location, sector, type of work and occupation for the regular and casual workers in the Indian labour market. By using Three Fold Oaxaca decomposition methods, the paper analyses gender discrimination in both income (*wage discrimination*) and employment (*job discrimination*). The results show that significant level of discrimination against women rule the Indian labour market. The inequalities and discrimination is greater in regular employment as compared to casual employment, more in urban sector as compared to rural and gets worse at lower level of occupations. It is also observed that women workers are discriminated against on the basis of age, and gender inequalities are worse than social inequalities.

Key words: Inequality; discrimination; gender wage gaps; Theil index; Oaxaca decomposition; wage discrimination; job discrimination; NSSO (E&U) 68th round; NCO 2004; returns to education.

“Gender inequality constitutes one of history’s most persistent and widespread forms of injustice. Eliminating it will call for one of history’s biggest movements for change.”

-United Nations of India SDG 5: Gender Equality.

1. Introduction

Gender inequalities and discrimination prevail in distinct forms across sectors and divisions all over the world. These inequalities and discrimination ensure that women are kept outside the realm of opportunity to partner in building prosperous societies and economies (UN in India, SDG 5:Gender Equality).

Although, women in India constitute about half the total population, it is unfortunate that women’s contributions to the economy in terms of *paid labour*¹ are far lower than that of men.

¹ To account for unpaid labour and the time spent in doing such work, a Time Use Survey could tell more accurately how and where men and women spend their time, what kind of unpaid activities and paid activities are they doing.

Women in India currently spend upto 352 minutes per day on domestic duties, 577% more than men (52 minutes) and at least 40% more than women in South Africa and China, according to Organisation for Economic Cooperation and Development (OECD) data. The Female Labour Force Participation Rate (LFPR) in the country has been consistently sub-par when compared to that of other developing and middle-income nations and also below that of males within the country. India's female LFPR – the share of working-age women who report either being employed or being available for work-has fallen to the low of 23.3% in 2017-18, which implies that over three out of four women in the age group of 15 to 59 years, in India are neither working nor seeking work. A shocking decline is seen especially in the rural-areas where female LFPR crashed by seven percentage-points, while male LFPR remained roughly the same.

The Indian labour market remains burdened with vast inequalities, on the lines of gender identity differences are manifested through unequal access of opportunities to those with equal capacities to work and manifested through unequal pay for equal tasks. Majority of India's female workers figure either in abysmally poor remunerating jobs of the unorganised informal sector, where they are neither entitled to maternity leaves and overtime pay, nor to a safe and dignified working environment; or in unpaid jobs as primary care-givers in the family.

Whatever the causes, whether this decline is due to supply side constraints or contraction in demand, has colossal reverberations on the understanding of the country's economy and its policy formation initiatives. If it is a matter of 'personal choice' to drop out of the workforce due to 'rising' family incomes, then it is not an issue requiring policy interventions and its impact on the economy might not be as deleterious. But, if more women stay out of the workforce due to unavailability of jobs in the market or unfavourable working circumstances, then we seriously need to review our policies and take relevant measures to encourage women to join the workforce in order to make up for the economic losses resulting thereof.

Gender gaps in wages is a reflection of gross inequality and discrimination, that exists across location (rural and urban), sector (public and private), type of work (regular and casual), occupations, industry and other divisions, the later (discrimination) though is a presence of inequalities between male and female worker for the same job with same level of skill. Therefore only understanding wage inequality may be looking at the problem partially. Using the National Sample Survey Organisation (NSSO) 2011-12 quinquennial surveys on "Employment and Unemployment", this paper examines the facets of not only inequality but also discrimination across gender, location, sector, type of work and occupation.

NSSO itself becomes inadequate because it does not take into account women's double burden of cooking, cleaning and other domestic duties. "It just asks about your 'principal activity status'" (Jayanti Gosh 2019).

The main motivation of this paper is to set as base the gender disparities in wage and working conditions to subsequently understand and measure the extent of discrimination against women in the regular and casual employment in Indian labour market. Hence, while looking at the dynamics of job polarisation in India, it becomes imperative to look at how this phenomenon, results in and also is a consequence of gender wage inequalities and discrimination that exist.

In the subsequent sections, an overview of literature and characteristics of workers through a gender lens is provided in section 3. Section 4 provides an overview of the data sources and methodology giving a brief review of Theil index, its decomposition method and Oaxaca decomposition methods. The paper analyses gender discrimination in both income (*wage discrimination*) and employment (*job discrimination*) and documents the extent of inequality in general and gender inequality in particular present in employment share, conditions and quality of work across sector and region. I then use the methods of Theil Index, to determine the male-female inequalities at aggregate levels and decomposed Theil Index into within group and between group components to identify the source of overall inequality in wage rate (Lama 2018). Subsequently Oaxaca decomposition technique is used to analyse disparity in wages and employment due to endowment and discrimination effects. Section five gives results and Section 6 concludes.

2. Literature

Wage disparities exist across occupations, regions and sector and nature of jobs, however the existence of inequality among men and women for same job with same level of skill reflects an unfair existence of not only discrimination, but also bias. Much has been observed and documented for increase in wages and incomes in India over time; however, the gender inequalities have not been bridged. At the same time, a simultaneous presence of downward pressure on wages due to the availability of surplus labour and employers' attempt to avoid adverse selection (Rustagi 1998) that tends to push wage levels upwards makes it unclear whether wage rates ought to move upward or downward. Wage determination can be peculiar to employment contexts, informal contracts and informal arrangements. (Binswanger and Rosenzweig eds., 1984; Dreze et al., 1986; Fonseca, 1975; Rustagi, 1999).

Jose, 1987; Dev, 2002; Maatta, 1998, have documented that the wage imbalances across men and women remain despite changes in women's workforce participation influencing the remuneration and returns due to them. Studies as early as 1957 by Becker, 1957 and those by Phelps, 1972 & Stiglitz, 1973 and during the 1980s by Rubery, 1987 have studied gender differentials in wage payments, especially among workers with same levels of educational

attainments and for undertaking similar jobs are a clear indication of discrimination against women due to noneconomic considerations. Later, studies that have extended labour theories to labour market segmentation or gender based division of labour have found women in certain specific occupations or tasks with differential wage payments, making some theoretical explanations redundant (Craig et al., 1985; Bardhan, 1985).

Research on factors determining women's labour supply is complicated and multi-dimensional. It is complexified by the individual's work orientation, effort, leisure or even wage remuneration based considerations (Rustagi 2005; Majumder 2011). Understanding of inequality based on wage inequality alone may not sufficiently reflect the inequality in the overall labour market, unless an examination of other non wage (i.e conditions of employment, in terms of different social security provided to the workers) inequality conditions of labour market among male and female workers. It is necessary to mention here as studied previously (Tinker ed.,1990; Agrawal, 1993), that in most cases labour supply decisions especially for women need to be seen from the household point of view, since women have the additional responsibility as domestic caregivers.

Even though the impact of education on job opportunities and wages is not a new idea, the relationship between supply of female labour force and education level among Indian females is not extensively documented. Nevertheless, few attempts have focused on 'intrinsic' advantages of education, and analysing investment decisions on education among females in India. Sidkar (2019) is a recent extensive attempt to determine wage differentials in 'formal' and 'informal' sectors classified on the basis of gender, showing an insignificant relationship between wages and education levels, and yet persons with higher educational level are able to get better jobs, and interestingly this remains largely true for those who are part of the socially deprived sections, but not for females, thus showing a higher gender discrimination as compared to social discrimination in the Indian labour market.

This makes a women's labour supply behaviour distinct from that observed for male labour in terms of age of entry, inherent human capital attributes, marital status and social class position affecting their mobility in public spaces, fertility or reproduction and so on (Rustagi 2008). Interestingly enough, Sundaram, 2001 establishes that a part of the delay in age at entry into the labour market also relates to the educational pursuits among women as well as men. At higher educational levels, women are outperforming men (Rustagi, 2003) and yet the gender disparity in the educational status of the labour force is more skewed as compared to the overall population due to the association with income status.

Job polarisation – i.e. the increase in employment shares both at the bottom and at the top of the skill distribution, combined with a decline in the mid level jobs (Autor et al. 2006, Acemoglu and Autor 2011, Autor and Dorn 2013), is a phenomenon that is increasingly being noticed in the 21st century. While the existing literature sheds light on the trends, causes and consequences of job polarisation, the research on its relation with female labour force participation, is yet in its nascent stage; and more so when it comes to the situation in India. The space for unbiased consideration and gender based comparison is not only constricted by data inadequacies but is nullified due to the perceptions derived from the patriarchal role stereotyping that precedes any deliberation on women's contribution to the economy, necessitating the recognition of these elements as precursors to such analysis on gender inequalities.

More recently, Balakarushna, Mishra & Urmi, 2019 have studied the pattern of the wage gap between gender in India's urban labour market for regular and casual workers following Blinder-Oaxaca decomposition. They found considerable disparity in employment and earning standards showing female workers at a disadvantage position vis-a-vis male counterparts, and establishing that the role of discrimination component effect larger than endowment component across both regular and casual workers.

Cerina et al. (2018), with reference to the US, show that the differential patterns of shares of men and women can be accounted for by a model of skill-biased technological change (SBTC) in which educated women initially devote a higher fraction of their time to home-based production. By fostering an increase in the labour market hours of skilled women, SBTC accounts for most of the increase of employment shares at the top of the skill distribution. This increase indirectly generates additional demand for low skilled labour through two different channels. First, the reduction in home production generates the need for the household to replace home services with some substitutes provided in the market. Second, the increase of high skilled labour, by production complementarity, generates an additional demand of low skilled labour within the firm, needed to support the productivity of the former (as also argued by Eeckhout et al. 2014). As the changes in employment shares at the top and the bottom of the skill distribution are positive, the changes of employment shares in the middle turn out to be negative.

However, what remains to be seen is whether a similar model can be suited in the Indian context, where as mentioned by Sundari (2020) in the paper titled 'Structural Changes and Quality of Women's Labour in India' there is no 'U' curve of female labour supply in response to GDP growth and expansion of female literacy, implying that economic growth has not generated adequate jobs for women. Hence, unlike the rising female labour force participation in countries

like the US, India is paradoxically, witnessing a declining trend in female labour force participation rate despite a rise in its economic growth.

Moreover, there exists a significant gap in the existing literature with regards to analysing how the dynamics of job polarisation function in the Indian context, given that female LFPR is actually declining despite economic progress. The main focus of this paper is to consider the gender disparities in wage and condition of works in the formal and informal labour market settings in India and to understand the existence of discrimination against women. This paper aims to delve deeper into that very aspect with the objective of filling the gap that exists in the current literature.

Eliminating gender inequalities in incomes and wages, require concentrated support and conscious efforts at altering attitudes towards women's roles and contribution that are harboured by different agents within the labour markets. The discrimination and biases against women witnessed in social spheres gets mirrored on to economic spaces (Lama and Majumdar 2018) not only in conventional established ways but also via the resilience in perceptions and mindsets among the agents of the labour markets that reconfigure to retain elements of gender imbalances (Das 2012; Deshpande 1999).

3. Characteristics of Workers in Indian Labour Market

3.a. Labour Force Participation and Gender Inequalities

Employment of women is considered as a measure of women's economic empowerment and is also an important indicator of women's contribution to economic development. However, the work participation rate (WPR) of women of India has shown a dwindling trend in the last few decades, both across rural and urban regions.

Three interesting trends are revealed from Table 1 where I document the worker participation for male and female workers separately divided by rural and urban sectors. First, starting from the 55th round, it is observed that the workers participation for males is about twice the female participation for the rural sector. This however gets worse if we account for the urban sector, where the concentration of female workers is about a quarter (27.02%) of the male labour force. Second, it is observed that over the studied years, the overall male worker participation has remained quite stable and consistent, moving from 52.7% of the total to 52.1% of the total employment share. The participation of women in the labour force falls shockingly. We observe that from a quarter share of female workers, it has reduced to 16.5% of the total workforce. Third, even though the trend shows significant overall reduction of female workers, the

participation of females in the urban sector has in fact marginally increased. A movement from 13.9% in 1999-00 to 14.2% in 2017-18.

Several studies regarding the falling female LFPR in India have highlighted the fact that this decline is engendered due to an increase in household income and increase in enrolment of women in both rural and urban India². Higher attendance in schools by girls has resulted in the withdrawal of mothers from the labour force to look after the younger siblings (Krishna et al. 2016). There is also evidence that the mechanisation of agriculture has contributed to the decline in demand³ for female agricultural labour (Verick 2018). Socio-cultural norms as well, dissuade women's participation in the labour force (Srivastava and Srivastava 2010). Thus, cumulatively, many factors influence the entry and exit of women from the labour market in India. However, a few studies also posit that the decline is owing to absence of employment opportunities, particularly for rural women, in the non-farm sector (Ramesh and Srivastava 2014; Kannan and Raveendran 2012).

Table 1. Trends in Work Participation Rate in India according to usual status 1999-00 to 2017-18 (figures are in percentage)

NSS rounds/period	Male workers			Female workers		
	Rural	Urban	Total	Rural	Urban	Total
55th Round (1999–2000)	53.1	51.8	52.7	29.9	13.9	25.9
61st Round (2004–2005)	54.6	54.9	54.7	32.7	16.6	28.7
66th Round (2009–2010)	54.7	54.3	54.6	26.1	13.8	22.8
68th Round (2011–2012)	54.3	54.6	54.4	24.8	14.7	21.9
PLFS (2017–2018)	51.7	53	52.1	17.5	14.2	16.5

Source: Own compilation using various rounds nss reports 1999-00 to 2011-12, 2017-18 is taken from period Labour Force Survey report, Ministry of Statistics and Programme Implementation, National Statistical Office, GOI. Notes: all figures represent usual status ps+ss

3.b. Education and Gender Inequalities

² See Chatterjee et al. 2015; Thomas 2012; Bhalla and Kaur 2011 for details.

³ However, a few studies also posit that the decline is owing to absence of employment opportunities, particularly for rural women, in the non-farm sector (Ramesh and Srivastava 2014; Kannan and Raveendran 2012).

Gender inequality in the realm of employment and earnings can be deciphered by examining the trends in labour force participation and average wages earned by males and females for the same level of task with similar levels of educational and occupational efficiency.

Table 2 shows the trends in worker population ratio by educational classification. The data reveals that the share of workers with higher secondary and secondary levels of education, regardless of the gender divide, has fallen most significantly as compared to the other levels of education. However, analysing the trend through a gender lens underscores how across all levels of education the participation of women in the workforce has been abysmally poor, depicting the vast gender based inequality that exists in that sphere. While the proportion of graduate men participating in the workforce has been more than three-fourths across the decades from 1999 to 2018, the participation of women has gone declining and is merely close to 15% by 2017-18. The falling trend in women's labour market participation has grave implications for the economy because the benefits of the demographic dividend are likely to be hindered if women stay out of work⁴.

Table 2. Worker Participation Ratio by Educational Classification 1999-00 to 2017-18.

Level of Education	1999-2000				2004-05				2011-2012				2017-2018			
	Rural		Urban		Rural		Urban		Rural		Urban		Rural		Urban	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
not literate	89.5	51.3	83.9	27.1	89.2	55	83.1	30.4	88	41.8	83.2	24	78.7	29.1	76.2	21.6
literate upto primary	88	40.3	83	17.7	89.5	44.9	85.5	23.4	89.2	36.1	84.7	22.3	85.1	26	80.2	21.7
middle	76.8	29	73.2	12.9	80.2	37.1	76	16.1	77	27.6	76.5	15.8	73.3	18.3	73.8	13.8
secondary	73.7	25.7	66.8	12.4	73.2	30.5	67.3	12.3	66.8	22.2	65.1	11	61	15.6	62.1	10.6
higher secondary	71.3	20.6	60.8	12.4	70.9	25.2	60.8	12.9	61.8	17.6	58.3	10.8	54.4	12.5	51.5	9.9
diploma	-	-	-	-	82.1	52.3	79.8	48.6	74.8	40.8	69.1	34.4	59.7	34.9	69.8	32.8
graduate	83.6	31	80.6	27.3	84.1	32.4	78.1	26.6	76.9	26.7	77.1	23.7	66.2	18.6	71.1	22.8
post graduate and above	-	-	-	-	89.1	42.3	84.3	36.3	82.8	41.6	84.4	39.5	75.9	31.1	77.6	35.7

Source: same as table 1

⁴ It is also imperative to note in this context that the mere entry of women into the labour market need not necessarily imply the economic well-being and upliftment of women.



3.c. Occupations and Gender Inequalities

Looking into the dynamics of women's employment across occupational divisions (NCO 2004 NSS classification) in Table 3, we observe skewed participation of male workers in highly skilled jobs such as that of legislators and professionals. From 1999 to 2018 the proportion of women employed as legislators and senior officials in urban areas has rather dwindled from 14.4% to 9.8%; while in that across a mid-level job of office clerk, it has declined from 8.8 to 4.8%. Their concentration remains across elementary occupations and jobs that require moderate levels of skill despite there being an increase in the number of women completing their graduate and postgraduate studies in the country. This raises a question regarding the quality of education provided by institutions of tertiary education in the country which ultimately impacts the employability of educated women in the workforce.

Despite a rise in GDP and structural changes in the Indian economy there is neither a quantitative nor a qualitative improvement in women's employment over time in India (Sundari, 2020). This remains a striking revelation because the initiatives to promote female education were mainly aimed at promoting gender inclusive workplaces and encouraging female labour force participation. However, unfortunately, such policy mechanisms have not yielded the desired results.

Looking at the overall discrimination and inequality in the labour force, we observe that 91.89% of the rural males in the informal sector, followed by 89.14% rural females in the sector, linger divested from access to any form/s of social security at work. Around 91.40% of rural women workers in the informal sector do not receive any maternity benefits. The numbers are not very satisfactory in urban areas either, where 88.85% of the female works remain deprived of the opportunity to be beneficiaries of the state's Maternity Benefits Act. It is more astonishing to see the fact that almost 43.85% of the urban males and 41.16% of urban females in the formal sector also do not possess any official/formal written contract of their employment status, with the situation being grimmer in rural areas where 53.11% and 53.85% of males and females respectively are placed in a similar condition.

Table 3: Division of Workers by Broad occupational Division (NCO 2004) Segregated by Rural and Urban sector. 199-00 to 2017-18

	1999-2000				2004-05				2011-2012				2017-2018			
	Rural		Urban		Rural		Urban		Rural		Urban		Rural		Urban	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Legislators & Senior officials	2.59	1.6	7.5	15.73	2.5	1.76	7.82	14.34	4.2	2	17	10.8	5.1	2.9	15.4	9.8
Professionals	1.6	0.9	9	5.41	1.93	0.97	10.23	5.26	1.9	1.1	8.1	11.6	2	1.8	8.4	13.1
Technicians & Associate professionals	1.99	0.4	9.5	7.62	1.63	0.34	8.14	5.73	1.8	1.9	6	9.6	2	4	6.6	11.7
Clerks	4.99	1.9	18.4	9.02	6.24	2.1	19.99	9.17	1	0.3	4.9	5	1.2	0.4	4.1	4.8
Service workers & shop workers	2.39	2.7	7.9	18.04	2.35	2.16	7.8	18.16	5.6	2.7	15.4	11.5	7	4.1	16.6	15.3
Skilled agri & fishery workers	70.19	83.23	6.9	14.82	66.3	83.17	6.18	18.1	38.8	47.9	4.1	6.4	40.5	47.1	3.8	4.9
Craft & selected trade	2.79	3.09	7.5	10.22	2.82	3.46	7.72	14.05	11	10	19	19.9	10	6.6	18.8	16.7
plant and machine operators	2.49	0.5	9.6	1.7	2.71	0.49	8.93	1.84	4.1	0.6	10.8	2.7	5.6	0.5	11.1	1.9
Elementary occupations	8.08	2	16.1	8.42	10.06	1.97	15.17	5.32	31.4	33.5	14.7	22.5	26.6	32.6	15.2	21.9
Rest of Divisions 7,8,9	2.79	3.59	7.6	9.02	3.46	3.56	8.02	8.03	-	-	-	-	-	-	-	-
Total	99.9	100	100	100	100	99.98	100	100	99.8	100	100	100	100	100	100	100.1

Source: Authors own compilation using NSS data various rounds.

Note: M=male worker; F=female worker. All figures in percentage. Few rounds do not show a round off total to 100, these are documented as per numbers given by the NSS various rounds report.

4. Data Sources and Methodology

Data for this paper comes from 55th (1999 - 2000), 60th (2004 - 2005) and 68th (2011 - 2012) rounds of the quinquennial Employment and Unemployment Surveys conducted by the National Sample Survey Organisation (NSSO). The quinquennial survey on Employment and Unemployment is one of the most important surveys conducted by the NSSO. These data provide reasonably comparable measures of the prior round's annual incomes, employment and unemployment rates, along with offering the longest high-frequency data series enumerating employment, unemployment trends and income in the Indian economy. To analyse for a more recent year we derive data from the Periodic Labour Force Survey⁵ (2017 - 2018). These two data sources provide substantially larger samples therefore they are better suited for a fine-grained analysis of changing occupational employment patterns within detailed demographic groups.

Micro-individual data file for the 68th round (2011-12)⁶ is accessed to calculate both Theil index and its decomposition, and Oaxaca decomposition which is explained in detail in the subsequent section.

It is important to provide a brief description of the available variables and the modification done for this analysis. In NSS the data for wages is available only for employed persons in the regular salaried jobs or casual workers. Wages are reported as received or receivable for the work done during the week (in Rs.). The survey does not provide for information on hours of work, and no correction for hours worked has been made in this paper. For analysis purposes, we focus on wages paid in cash and kind; calculated for daily payment. The wage and salary earnings as current weekly status (CWS) available in the NSSO data has been converted to daily rate, by using the intensity of either half or full day work for each activity in a day or for all days

⁵ Considering the importance of availability of labour force data at more frequent time intervals, the National Statistical Office (NSO) launched the Periodic Labour Force Survey (PLFS) in April 2017. We use the annual report of the PLFS 2018. The objective of PLFS is primarily twofold: 1). To estimate the key employment and unemployment indicators (viz. Worker Population Ratio, Labour Force Participation Rate, Unemployment Rate) in the short time interval of three months for the urban areas only in the Current Weekly Status (CWS). 2). To estimate employment and unemployment indicators in both usual status (ps+ss) and CWS in both rural and urban areas annually.

⁶ The 68th round carried out during July 2011 - June 2012 is the ninth quinquennial survey in the series covering the subjects of (i) Household Consumer Expenditure and (ii) Employment and Unemployment. The survey covered 1,01,724 households and enumerated 4,56,999 persons.

of the week⁷. Total wage (in cash and kind) that is received during the reference week has been divided by total number of days in each activity to get the daily wage by person in the sample⁸.

The scope of study includes both rural and urban categories of persons, belonging to regular wage salaried and casual workers (excluding self employed workers) between 15 to 59 years of age from nationally representative sample data collected by NSS (E&U) for 55th, 60th and 68th rounds.

For the purpose of Theil decomposition and Oaxaca Decomposition analysis, we use data from micro data only from the NSS 68th (2011-12) round for regular salaried and casual workers. For all empirical calculations this study includes individuals with incomes greater than zero belonging to rural and urban sectors, within the age group of 15 to 60 years.

For industry classification, we consider the groups from the NIC 2008 code. These are primary (agri, forestry, fishing, mining, quarrying), secondary (manufacturing, construction, electricity gas and water supply), and tertiary (trade, transport, financing, insurance , real estate, insurance, storage and communication, social and personal services) sectors.

We exclude social and religion segregation from this analysis.

Three approaches are used in this paper to analyse discrimination in wage and employment. First, the paper examines the extent of inequality in general and gender inequality in particular. We build the case by presenting employment shares of male and female workers. This share of employment leads us to understanding the composition and extent of sex-composition in education, occupations and industry. Deep seated gender based labour-market discriminations are rooted in pre-existing discriminations in human capital formation and to some extent this is reflected in educational attainments and subsequently in difference in wages for workers with similar educational attainments or workers employed in similar occupational divisions.

Second, disparities at aggregate levels are examined by Theil index in wage distribution by gender, sector, region and activity status of the workers. Although Gini Coefficient and the Theil index of inequality (originally proposed by Theil 1967) are two most frequently used inequality measures (Charles-Coll 2011), Theil index is preferred (Allison 1978) and widely applied in social sciences more so due to its decomposability (Liao 2016). Subsequently decomposing the Theil index into 'within' and 'between' components are done separately for female workers and male

⁷ The information used in nss is employed to derive the total number of days worked in each activity during the reference 7 days. The nss survey considers full day if the person is engaged in a specific activity within a day for four hours or more and half day for less than four hours but more than one hour.

⁸ Daily wage is thus derived as a ratio of recorded weekly wage and number of full day work in the reference week.

workers. This method allows us to determine the extent of gender discrimination attributable to 'within groups' or 'between groups' component. The extent of inequality prevalent in the rural and urban sectors, public and private and regular casual are analysed separately for female and male workers in the Indian labour market.

The third approach is to employ a decomposition technique⁹ that segregates the observed wage gap into "endowment" and "coefficient" components. Differences in productivity variables represent differences in wages due to skill, whereas differences in coefficients represents potential discrimination. Although this method was first developed by Blinder and Oaxaca (1973), it has been further developed into an "expanded approach" incorporating occupational distribution into earnings estimation (Brown, Moon and Zoloth (1980)). The advantage of using this expanded approach is that both job discrimination (differential access to certain occupations) and wage discrimination (differential earnings within the same job) is estimated simultaneously (Madheswaran and Attewell 2007)¹⁰. Madheswaran and Attewell (2007) have examined the regular salaried wage workers in the urban sectors. We fill this gap by including casual workers and also including the rural sample and incorporating three way decomposition for both sectors.

To estimate the earnings differences attributed to discrimination, we use Mincerian earnings function separately for female workers and male workers as mentioned in the NSS 68th round. For notification purposes, we use f for female workers, and m for male workers. We take the value of the dependent variable of probit (selection) as 1 if an individual wage is >0, and 0 otherwise. Therefore we include workers with non-zero income in the age bracket of 15 to 60 years and belonging to the regular salaried and casual labour market¹¹. The natural logarithm of the daily wage rate is used as the dependent variable, while age, levels of education, region, sector, occupation and industry were predictors.

⁹ Ben Jann (2008) in his paper summarized and analyzed the technique of decomposing wage gap between sex, popularized by Blinder (1973) and Oaxaca (1973) and introduced a new Stata command 'Oaxaca' which implements Blinder - Oaxaca decomposition. Accordingly, gender wage gap is the total gap between of the average wages of men and women, which may be decomposed into (1) explainable factors (occupational segregation) and (2) unexplainable factors (direct gender discrimination). For empirical work in this paper we used stata command implementing Blinder - Oaxaca decomposition.

¹⁰ Madheswaran and Attewell 2007, have refined the expanded decomposition approach by combining Oaxaca and Ransom (1994) and Brown, Moon and Zoloth (1980) to produce a more detailed decomposition analysis of occupational and wage discrimination in their paper mentioned under references.

¹¹ Regular salaried category of workers are coded as 31, 71 and 72 in the Key Indicators section of Employment and Unemployment in India, 2011-12.

Theil's Decomposition Method

The Theil index can be clearly decomposed into two additive parts of between-group and within-group inequality.

The total inequality measured by Theil's T is written as:

$$T = \frac{1}{N} \sum_{i=1}^N \frac{x_i}{X} \ln \left(\frac{x_i}{X} \right) \quad \dots 1$$

where x_i is the income of the individual i , X is the overall mean and N is the sample size.

Using the same notation, equation (1) can be decomposed into between group component as follows:

$$T = \sum_{k=1}^K y_k \left(\frac{X_k}{X} \right) \ln \left(\frac{X_k}{X} \right) + \sum_{k=1}^K y_k \left(\frac{X_k}{X} \right) T_k \quad \dots 2$$

where y_k is k^{th} group's income share expressed as a proportion of the sample or population total income, X_k is the mean income of group k and within component decomposition can be written as:

$$T = \sum_{k=1}^K y_k \left(\frac{X_k}{X} \right) \ln \left(\frac{X_k}{X} \right) + \sum_{k=1}^K y_k \left(\frac{X_k}{X} \right) \sum_{i=1}^{n_k} \frac{x_{ik}}{X_k} \ln \left(\frac{x_{ik}}{X_k} \right) \quad \dots 3$$

where x_{ik} is the income share of the i^{th} individual within the k^{th} group and X_{ik} is the i^{th} individual's income within the k^{th} group.

Blinder Oaxaca Decomposition Method

Blinder-Oaxaca decomposition breaks down the wage gap between high-wage and low-wage workers into several components. Decomposition enables analysing the wage differential between two groups of male workers (the high-wage group in this case) and female workers (low-wage group). Taking female classification as " f " this paper going forward, while decomposing between m/f , and separation of this wage differential into component of wage that is attributable to differences in skills and the component that is potentially attributable to

discrimination (this portion cannot be explained by differences in individual characteristics). The gross wage differential can be written as:

$$Q = \frac{Y_m - Y_f}{Y_f} = \frac{Y_m}{Y_f} - 1 \quad \dots 4$$

where Y_m and Y_f represent wages of male individuals and wages of female individuals respectively. In absence of labour market discrimination, the m and f wage differential would reflect productivity (or differences in wages due to skill) and can be written as:

$$Q^0 = \frac{Y_m^0}{Y_f^0} - 1 \quad \dots 5$$

Whereas superscript denotes absence of bias or market discrimination. The market discrimination coefficient (D) is then defined as a proportionate difference between $Q+1$ and $Q+1$.

$$D = \frac{(Y_m/Y_f) - (Y_m^0/Y_f^0)}{(Y_m^0/Y_f^0)} = \frac{(Y_m/Y_f)}{(Y_m^0/Y_f^0)} - 1 \quad \dots 6$$

The above equations (4 to 6) point to the following logarithmic decomposition of the gross earnings differential:

$$Q(Q + 1) = Q^0(Q^0 + 1) + D(Q^0 + 1) \quad \dots 7$$

The unexplained component is the difference in the shift coefficients between the two wage equations. Being in explicable, this component can be attributed to discrimination. However, Blinder also argued that the explained component of the wage gap also contains a portion that is due to discrimination. To examine this Blinder decomposed the explained component into:

1. Difference in endowments between the two groups “as evaluated by the high-wage group’s wage equation” (see equation 9 below); and
2. “The difference between how the high-wage equation would value the characteristics of the low-wage group, and how the low-wage equation actually values them”

To estimate the earnings differences due to discrimination, we use augmented Mincerian earnings functions separately for male workers and female workers in both regular/ salaried and

casual labour market in rural and urban regions. The logarithmic of daily wage rate is the dependent variable while age, level of education, sector, region, type of work and occupations are taken as predictors. Using the Mincer (1974)¹² semi-logarithmic regression earnings equation, the decomposition is applied within the framework of Ordinary Least Squares (OLS), the male wage equation can be written as:

$$\ln \bar{w}_{m} = \sum \hat{\beta}_{m} \bar{x}_{m} + \varepsilon_{m} \quad \dots 8$$

And the female wage equation can be written as:

$$\ln \bar{w}_{f} = \sum \hat{\beta}_{f} \bar{x}_{f} + \varepsilon_{f} \quad \dots 9$$

where $\ln \bar{w}$ denotes the geometric means of the earnings, \bar{x} the vector of mean value of regressors, $\hat{\beta}$ the vector of coefficients and ε is the error term with zero mean and constant variance. Substituting the values of D and Q in equation (7) and combining equations (4) (5) and (6), the gross differential in the logarithmic term is given by:

$$\ln(\bar{w}_{m} + 1) - \ln \bar{w}_{m} = \sum \hat{\beta}_{m} \bar{x}_{m} - \sum \hat{\beta}_{f} \bar{x}_{f} \quad \dots 10$$

The difference in coefficients of the two earnings function can be considered as discrimination. In absence of discrimination if for a given endowment males and females are paid at par, then a hypothetical female earnings function can be written as:

$$\ln \bar{w}_{f} = \sum \hat{\beta}_{m} \bar{x}_{f} \quad \dots 11$$

Subtracting equation (11) from equation (10) we get:

$$\ln \bar{w}_{m} - \ln \bar{w}_{f} = \sum \hat{\beta}_{m} (\bar{x}_{m} - \bar{x}_{f}) + \sum \bar{x}_{f} (\hat{\beta}_{m} - \hat{\beta}_{f}) \quad \dots 12$$

¹² The Mincerian Earnings equation introduced by Mincer(1974) is widely used in standard empirical literature of labour economics, including contributions by Senna (1976), Blackburn and Neumark (1993) and Card (1999), among others. These studies have analysed returns to education and experience on earnings-hour received by the worker. Originally Mincer proposed that distribution of earnings of workers among their different occupations is positively related to the amount of investment made in human capital (understood as a set of attributes acquired by education, skill and experience) which has an impact on productivity and economic growth. (Cunha et.al 2017)

alternatively the decomposition equation can be written as:

$$\bar{w}_{22} - \bar{w}_{12} = \sum \hat{\beta}_i (\bar{w}_{22i} - \bar{w}_{12i}) + \sum \bar{w}_{22i} (\hat{\beta}_{22i} - \hat{\beta}_{12i}) \quad \dots 13$$

Estimation of both wage and job discrimination using expanded decomposition method

Our approach of previously using Oaxaca (1973), Cotton and Neumark (1988) decompositions do not distinguish between wage discrimination and job discrimination. Following the methodology as proposed by Attewell (2007), by “combining elements” from Oaxaca and Ransom (1988) and Brown et al (1980) to form a more detailed decomposition method to distinguish between occupation and wage discrimination¹³. Using an advanced decomposition was in a way one step ahead to combine the consequence of unequal access to certain jobs and unequal pay within jobs, to examine discrimination (Attewell and Madheswaran 2007). Since our concern is estimating occupation discrimination and wage discrimination, the proportion of *males* (P_{im}) and proportion of *females* (P_{if}) in each occupation i are included in decomposition. Using the expanded method from Attewell (2007) adopted from that used in Brown et al (1980) and Banerjee and Knight (1985), the decomposition can be written as:

$$\bar{w}_f (\bar{w}_m + 1) = \sum_i \bar{w}_{22i} (P_{22i} - \hat{P}_{22i}) + \sum_i \bar{w}_{22i} (P_{22i} - P_{12i}) \quad \dots 14$$

The first term on the right hand side of the equation represents wage differences attributed to differences in occupational distribution, the second term is attributable to differences in wages within occupations). Each of the two terms contain explained and unexplained components. If suppose the *females* had the same occupation attainment function as the *males*, then \hat{P}_{if} will be the proportion of *female* workers that *would* be in occupation i . And thus the expanded decomposition can be written as:

¹³ Banerjee and Knight (1985) used this decomposition by using a multinomial logit model which could estimate both wage and job discrimination for migrant labourers in India. The occupational discrimination entails unequal pay for workers with similar economic backgrounds or educational attainments due to being employed in different jobs.

$$w_{it} + 1) = \sum_{i \in m} \bar{w}_{it} (\hat{w}_{it} - \bar{w}_{it}) + \sum_{i \in f} \bar{w}_{it} (\hat{w}_{it} - \bar{w}_{it}) + \sum_{i \in m} \bar{w}_{it} (\bar{w}_{it} - \bar{w}_{it})$$

The first term on the right hand side represents part of the gross wage differential attributable to the difference between *male (m)* occupation distribution and occupation distribution that *female (f)* would occupy (had *females* the same occupational function as the *males*). The second term is the part of wage differences not explained on the basis of personal characteristics, therefore can be termed as discrimination. The third term is the within occupation wage difference¹⁴.

Estimating The Return to Schooling using Mincerian Earning Function

The Mincerian wage equation is most commonly used in empirical literature to explain and estimate employment earnings as a function of schooling and labour market experience (Patrinos 2016). Earnings can be explained as a function of schooling and labour market experience. Being a flexible model, other than showing the relationship between wages and education, it has allowed us to use other variables such as age (used here following conventional literature as a proxy for experience), region (rural and urban classification), gender, sector of employment (public and private), caste and occupation. We added categorical dummy variables to the Mincer wage earnings equation to yield estimates of earnings differences across each category.

The average rate of return to each level of education is calculated as follows:

$$\gamma_e = \frac{\beta_e - \beta_{e-1}}{e - e_{e-1}} \quad \dots 16$$

Where, e is the level of education at primary, secondary, HSC, grad, diploma and postgraduate. β_e is the corresponding coefficient in the wage regression and S_e is the years of schooling at each educational level e . If, suppose the rate of return for primary education will be calculated, it can be denoted as follows:

¹⁴ This third term is normally decomposed into wage discrimination and productivity term, however Attewell separates this part further into overpayment term, underpayment term and within occupation wage differential explained by productivity characteristics of two groups. In order to calculate these three terms the pooled methodology of Oaxaca and Ransom (1994) is used.

$$\gamma_{\text{between}} = \frac{\beta_{\text{between}}}{\beta_{\text{within}}}$$

....17

5. Results: Wage disparities between group and within group

In order to identify the source of overall inequality in wages we have decomposed Theil index into ‘between group’ and ‘within group’ inequalities. Income or wage inequality between gender is commonly estimated in literature, by the difference in average income or wage or decomposition in total amount of inequality in ‘between groups’ and ‘within groups’ components using an inequality measure such as Theil index (Liao 2016). We have used a quantile based approach to evaluate dispersions in inequality. At times, income distributions are skewed, therefore researchers have typically used a quantile method that involves a two step decomposition¹⁵.

A recent phenomenon of a wider pay gap in the higher income groups is better known as the “glass ceiling” effect and has been a focus of much research. A similar pattern is found at the bottom end of the pay distribution known as the “glass floor” or “sticky floor effect” indicating that one social group (in this paper we have assumed females as low income earners) is more likely than the other to be low income earners (See for eg., Christofides et. al. 2013 and Melly 2005). The conventional Theil fails to measure such “glass ceiling” and “glass floor” effects.

Table 1: Gender wage inequality using 90:10, 90:50 and 10:50 quantile ratios on the basis of Theil index decomposition of average daily wage 2011- 2012

	<i>p90/p10</i>	<i>p90/p50</i>	<i>p10/p50</i>
All Observations	8.889	3.810	0.429
Rural	4.762	2.381	0.500
Urban	10.417	4.167	0.400
Public	10.714	2.143	0.200
Private	5.476	2.465	0.450

¹⁵ We focus on a method used in Tim Liao 2016, so that we can meaningfully compare between the group component of a top or a bottom quantile with the same component of the middle quantile. The two commonly used inequality measures are 90:50, 50:10 (or 10:50) ratios, Leigh (2007).

Regular	10.000	3.846	0.385
Causal	3.500	1.739	0.497

Source: Author's own calculations based on NSS 2011-12 data.

In Table 1, we mention the 90:10, 90:50 and 10:50 quantile ratios in their 2 x natural logarithmic form and we use the middle ratio as referent, that illustrate the gender gap in the income distribution. The results show that inequalities are greater in urban sectors and for regular workers. The gender wage inequalities are not so high in the casual sector workers because of the prevalence of substantially lower wages of casual workers as compared to regular salaried earners in the first place. The lower wage earned by such casual workers (both females and males) is largely due to cost cutting rather than differences in labour productivity. As compared, therefore the gender gaps between the highest paid regular worker and the lowest paid regular worker are more pervasive in comparison to the wage gaps between highest to lowest in the casual sector.

The decomposition of Theil index into within-group and between-group components is observed in Table 2. The results are generally consistent with priori expectations. First stark observation is the percentage employment shares of female and male workers, notice how across sector, groups and employment type, male workers make up for more than two-third of the total employment share. This disparity and extreme inequality is higher in urban areas as compared to rural areas; higher for the private sectors as compared to the public sectors and higher for regular workers as compared to casual workers. Notwithstanding, casual sector gaining traction as a main source of employment to an increasing labour market, we see that even among the 23% workers who are salaried or regular wage workers, 71% have no written job contract and 54% are not eligible for paid leave, half of them do not have any social security benefits (Hindustan Times Survey Report 2020).

Next we observe the inequalities in wages as determined by Theil index, and we notice that gender inequalities are higher in urban areas as compared to rural areas. Gender wage discrimination is more apparent in the private sector than the public sector, although the difference between these two is not very large in itself. The provision of reservations for women and a more organised nature of such a sector could reflect a lower inequality for the public sector in comparison to the private sector. Not only the share of male workers constituted for more than two thirds of the total working population, their mean wages are significantly higher than females across sectors, irrespective of the sector or type of work. However, it is observed that regular and casual female workers upto primary level of education are better off in comparison to their male counterparts.

Rural sector absorbs a higher percentage of women workers as compared to the urban sector, along with a lower between group inequality for both sectors with a slightly higher between group inequality observed for the rural sector, 5.35% of total inequality. Another interesting thing we observe is that the contribution of within group inequality is more than the contribution of between group inequalities in total wage across the divisions. For rural regions, between group inequality accounts for 5.35% of total inequality, for urban workers the between group gender inequality is almost negligible, almost all inequality is attributed to within groups.

Table 2: Theil Decomposition of wage disparity based on gender (within and between components)

Social Group	Employment Share	Mean Wage	Gini index	Theil index	Within Group		Between Group	
Female	21.53%	179.17805	0.53709	0.59316				
Male	78.48%	268.84459	0.48136	0.45736				
Total Inequality			0.49949	0.49014	0.47835	97.59%	0.01179	2.41%
Rural Female	23.01%	113.08278	0.38934	0.33674				
Rural Male	77.00%	184.81223	0.38856	0.30669				
Total Inequality			0.40286	0.32894	0.31134	94.65%	0.01760	5.35%
Urban Female	18.97%	317.86908	0.56114	0.55490				
Urban Male	81.03%	406.96716	0.48677	0.43498				
Total Inequality			0.50224	0.45774	0.45352	99.08%	0.00422	0.92%
Private Female	21.25%	134.06220	0.45462	0.47654				
Private Male	78.75%	209.70280	0.41736	0.38362				
Total Inequality			0.43505	0.41122	0.39729	96.61%	0.01392	3.39%
Public Female	23.09%	414.20512	0.51040	0.44092				
Public Male	76.91%	611.58205	0.39106	0.27565				
Total Inequality			0.42169	0.31517	0.30357	96.32%	0.01159	3.68%
Regular Female	19.43%	307.71816	0.55286	0.53682				
Regular Male	80.57%	417.07557	0.47146	0.39873				
Total Inequality			0.48931	0.42595	0.41959	98.51%	0.00636	1.49%
Casual Female	23.28%	89.28698	0.26993	0.12206				
Casual Male	76.72%	138.44427	0.25659	0.11261				
Total Inequality			0.27527	0.12865	0.11416	88.74%	0.01449	11.26%

Source: Authors own calculations based on NSS 2011-12 data.

Notes for table 2:

Earnings function OLS Results

Table 3 provides earnings function results for the year 2011-12. We have shown descriptive statistics and dummy variables in Appendix 1. The NSS E&U survey data provides the completed level of education for every individual. A previous round of NSS (64th round), documents participation and expenditure in education along with the years of formal schooling among the population covered in the survey between age 5 to 29 years. The level of 'general education' provides the maximum level of education completed, which is similar to the NSS 68th round employment and unemployment survey. Codes¹⁶ assigned for all levels of education are as follows: Primary -06, middle-07, secondary-08, higher secondary-10, diploma/ certificate course-11, graduate-12 and postgraduate and above-13.

We use different dummy variables for controlling the household characteristics like gender, type of employment (regular/ casual), sector (rural/ urban), to get better estimates for establishing relationship between education level and wages, using the Mincerian wage equation. To give a better representation to the main determinants of wage along with individual characteristics, education and sector, we also include job characteristics and occupational division of workers. For classification of occupations: dummy variable groups are formed for 9 divisions of occupational classification. For the purpose of classifying these occupations based on the intensity of task and skill component, we bring together these 9 classifications as three broad classifications; grouping them into high skilled, middle skilled and low skilled occupations¹⁷.

Notwithstanding the fact that one does acquire better work life and standards with higher education level, considering wage as an important element, we relate wage with educational level, separately for female and male workers in the Indian Labour market. There are few studies in the past that have attempted returns to education in India by gender and sector, limited studies calculate returns to education over time.

Table 3 also provides insight on the relationship between average years of schooling and wages among workers segregated by two gender groups. There seems to be a significant relationship for all divisions and at all educational levels, however, interestingly the impact of higher levels of education is significant for female workers as compared to male workers. Even when we compare between the two groups, females show higher levels of significance regardless of the educational levels contrary to the males depicting the importance of increasing incentives and

¹⁶ Please note that codes assigned are not the same as average years of education. These codes as mentioned in the unit level data of NSS 2011-12, correspond to a level of education.

¹⁷ For details of this pls see notes.

promoting female employment opportunities in the skewed labour market. However, it should be noted that the female workers document a lower base level as compared to the male worker.

The summary statistics of the independent variables are presented in the appendix table 1. The mean log wages are 5.203 for male workers and 4.688 for female workers. The gender wage gap between female and male workers is - 0.715 implying a significantly lower level of female wage. As expected, all the characteristic variables are significant factors of wage for male and female, the gender gap portrays that this gap varies across variables of education, sector, industry and type of work.

Table 3 also documents varied and uneven disparities across occupation i.e., presence of job discrimination between male and female worker. The negative coefficients signify an advantage for female workers, and this is visible at middle and low skilled occupations (NCO 5 and below). However, an advantage to male workers for both regular and casually employed in occupations requiring high and middle to high skills (NCO 1 to NCO 4), and also low skill (NCO 9). It should be noted that, interesting despite the advantage to female workers in certain occupations, the absolute advantage is not very significant. The regular sector contributes more towards inequality as compared to the casual sector, which is contrary to the popular perception of higher wage inequalities and discrimination in casual employment.

Since our data accounts for both regular salaried and casual workers, the increase in wages as an additional educational level are quite high for highschool level of education as compared to graduate, showing the inflated contribution of middle level educated workers as part of casual employment. Also interestingly a significant gender discrimination is observed for regular salaried employees and those working in the public sector as compared to private sector.

Table 3: Earnings function OLS results in regular salaried and casual workers segregated by gender (2011- 12)

	Males				Females			
	coeff	std err	t-value	P> t	coeff	std err	t-value	P> t
Age	0.024773	0.001524	16.26	0.00	0.013878	0.003470	4.00	0.00
Agessq	-0.000198	0.000021	-9.54	0.00	-0.000096	0.000047	-2.05	0.04
Bprim	-0.009764	0.008702	-1.12	0.26	0.068213	0.020210	3.38	0.00
Prim	0.020245	0.007850	2.58	0.01	0.050584	0.019270	2.62	0.01
Secon	0.156918	0.008394	18.69	0.00	0.221950	0.025026	8.87	0.00
Hsc	0.215699	0.010639	20.27	0.00	0.428002	0.031406	13.63	0.00
Grad	0.574489	0.011433	50.25	0.00	0.943504	0.026835	35.16	0.00
Diploma	0.491060	0.016828	29.18	0.00	0.830421	0.043580	19.06	0.00
Postgrad	0.805547	0.015551	51.80	0.00	1.153291	0.032156	35.87	0.00
NCO_1	0.520062	0.047406	10.97	0.00	0.233303	0.099552	2.34	0.02
NCO_2	0.490435	0.047172	10.40	0.00	0.436872	0.099418	4.39	0.00
NCO_3	0.236435	0.046974	5.03	0.00	0.225496	0.099681	2.26	0.02
NCO_4	0.196814	0.047008	4.19	0.00	0.097898	0.101664	0.96	0.34
NCO_5	0.032000	0.046213	0.69	0.49	-0.133924	0.098781	-1.36	0.18
NCO_6	-0.104214	0.046501	-2.24	0.03	-0.240565	0.098280	-2.45	0.01
NCO_7	0.142181	0.045659	3.11	0.00	-0.146047	0.097473	-1.50	0.13
NCO_8	0.205834	0.046037	4.47	0.00	-0.103308	0.099511	-1.04	0.30
NCO_9	-0.026188	0.045446	-0.58	0.56	-0.094254	0.096761	-0.97	0.33
Public	0.473425	0.008291	57.10	0.00	0.354835	0.018472	19.21	0.00
urban	0.175490	0.006233	28.15	0.00	0.211325	0.015731	13.43	0.00
Regular	0.214137	0.007478	28.63	0.00	0.007714	0.017548	0.44	0.66
_cons	4.137947	0.052505	78.81	0.00	4.033239	0.114095	35.35	0.00
R-squared	0.5157				0.4662			
Adj- R2	0.5155				0.4653			
Observations	50,746				13,178			

Source: Author's own calculations using NSSO data 2011-1

Notes: p>0.10 = insignificant variable ; 0.01 < p < 0.05 = significant at 90% level of confidence; 0.01 < p < 0.05 = significant at 95%; p<0.01 = significant at 99% level of confidence.

Table 4: Average Rate of return on education for males and females (2011-12) Figures in percentage

	Males	Females
Prim	0.40%	1.01%
Secon	4.56%	5.71%
Hsc	2.94%	10.30%
Grad	11.96%	17.18%
Postgrad	11.55%	10.49%
Diploma (after HSC)	13.77%	20.12%

Source: Author's own calculation using NSS data 2011-12

Note: The rate of return is calculated as relative to the previous level of education (additional years of schooling is taken to estimate the return on education), the figures are not absolute terms. The levels of education are at par with the standard years used in existing literature. The omitted category of dummy variable for education is workers who are illiterate or have less than 2 years of formal schooling or less than 2 years of formal education. We consider below primary education for those individuals who have not completed below primary or have less than 4 formal years of schooling. Additional year of schooling is considered as follows. 05 for primary; 03 for secondary; 02 for HSC; 02 for diploma; 03 for graduation and 02 for post graduation.

Blinder Oaxaca Decomposition Results

As discussed in methodology section, we use Blinder Oaxaca decomposition to break down the wage gap between high wage¹⁸ and low wage¹⁹ workers into several components. Blinder called the first part of the amount 'attributable to the endowments' and the second part the amount 'attributable to the coefficients', he argued that the second part should be viewed as reflecting discrimination. The third, unexplained portion of the differential (U) is the difference in constants between female and male workers.

In Table 5a results are presented using the original formulation of E, C, U and D given by Blinder-Oaxaca (1973). Along with portion of endowment and discrimination, an unexplained portion of discrimination (U) is given. The results indicate a high raw wage differential of 51.5%. Raw wage differential is divided into three components of which the endowment component as a percent of raw differential is significantly low at 3.1% percent and a much higher indispensable discrimination (coefficient) is 37.9. The third component, or the interaction term is the unexplained portion of the raw differential is 10.5%. The results are a glaring witness to significantly high levels of discrimination against females in the Indian labour market.

¹⁸ taken here as male workers

¹⁹ taken here as female workers

Table 5b summarises endowment, discrimination and interaction components as a percentage of total difference in wage. Results indicate a negligible endowment component as compared to discrimination component. The endowment component is 3.59% as part of total difference in the wage gaps. Nevertheless discrimination explains almost 94% of lower wages and interaction is 2.42%. However, it is important to note that the difference in endowments itself may be a result of past discrimination that can be difficult to measure directly. Comparing the results with similar literature using NSS data for previous rounds, show a greater and increasing share of discrimination over the decades against female workers; with the share of unexplained difference- as part of total discrimination- also increasing over the years. Lama (2018)

This leads us to some important points that are worth mentioning here. A pre-market labour discrimination exists in terms of education, nutrition and health attainments, and these pre-market factors can be more crucial in explaining wage differentials than labour market discrimination. Although the endowment difference seems to be decreasing over the years from 1983 to 1999-00.

Table 6 examines the relative contribution of each individual independent variable to the observed wage gap. Here, decomposition results of endowment, coefficient (discrimination) and a third interaction components in the earnings function is shown. The results show which part of the wage differential can be attributed to endowments and which part is due to differences in rewards²⁰ in the earnings function. The positive numbers indicate advantage to male workers and negative numbers indicate advantage to female workers. Looking at levels of education, graduation and post graduation are rather prominent in their effects on earnings difference. Females show an earning advantage of 5.79% and 5.65% at graduate and postgraduate levels of education. Although this small contribution in favour of females is more than offset by the large constant term (20.33%) favouring the male workers.

²⁰ The term 'rewards' has been used in standard literature to show discrimination as a component of differential in Blinder Oaxaca decomposition.

Table 5a: Summary of Blinder-Oaxaca Decomposition Results (as %)2011-12

Components of Decomposition	Males vs Females
Amount attributable:	41.0
- due to endowments (E):	3.1
- due to coefficients (C):	37.9
Shift coefficient (U):	10.5
Raw differential (R) {E+C+U):	51.5
Adjusted differential (D) {C+U):	48.4
Endowments as % total (E/R):	6.0
Discrimination as % total (D/R):	94.0

Source: Author's own calculations based on NSS data 2011-12

Notes: 1. The results from decomposition are presented using Blinder's (1973) original formulation of E,C,U and D; The endowments (E) component of the decomposition is the sum of (the coefficient vector of the regressors of the high-wage group) times (the difference in group means between the high wage (Male) and low wage (female) groups for the vector of regressors); The coefficients (C) component is the sum of the (group means of the low-wage group for the vector of regressors) times (the difference between the regression coefficients of the high-wage group and the low-age group); U is the unexplained portion of differential (difference between model constants); D is the portion of differential due to discrimination (C+U); the raw (or total) differential is E + C + U.

Table 5 b: Blinder- Oaxaca Decomposition Results Components as a percentage of Total Difference

Components of Decomposition	Males vs Females	%
Due to endowment	0.01851	3.59%
Due to coefficients	0.48408	93.99%
Due to interaction	0.01246	2.42%
Total Difference	0.51505	100.00%

Source: Author's own calculations based on NSS data 2011-12

Discrimination on the basis of age against females is not only high, it shows an increasing bias with age. Age factor is observed to have a significant impact on gender discrimination. Also interesting observation is that gender discrimination is greater in regular sectors as compared to casual sector, and this is quite contrary to usually understood phenomenon of discrimination for casually employed workers. The amount attributable to coefficients is greater for graduates, post graduates and regular workers, while the first two favour the female worker, the later is a significant discrimination against the female workers.

Table 6: Relative contribution to decomposition using different variables, 2011-12

	Endowments	%	Coefficients	%	Interaction	%	Total Difference
Age	-0.011236	-2.18%	0.386804	75.10%	-0.008821	-1.71%	71.21%
Agesq	0.004923	0.96%	-0.140292	-27.24%	0.005241	1.02%	-25.27%
Bprim	0.000777	0.15%	-0.007314	-1.42%	-0.000889	-0.17%	-1.44%
Prim	0.001474	0.29%	-0.003308	-0.64%	-0.000884	-0.17%	-0.53%
Secon	0.013926	2.70%	-0.004182	-0.81%	-0.004081	-0.79%	1.10%
Hsc	0.013861	2.69%	-0.009256	-1.80%	-0.006876	-1.33%	-0.44%
Grad	0.005707	1.11%	-0.033313	-6.47%	-0.002232	-0.43%	-5.79%
Diploma	0.004139	0.80%	-0.007155	-1.39%	-0.001691	-0.33%	-0.91%
Postgrad	-0.014510	-2.82%	-0.018885	-3.67%	0.004375	0.85%	-5.63%
NCO_1	-0.002758	-0.54%	0.013719	2.66%	-0.003389	-0.66%	1.47%
NCO_2	-0.005227	-1.01%	0.003267	0.63%	-0.000641	-0.12%	-0.51%
NCO_3	-0.001115	-0.22%	0.000599	0.12%	-0.000054	-0.01%	-0.11%
NCO_4	0.001515	0.29%	0.003000	0.58%	0.001531	0.30%	1.17%
NCO_5	-0.002475	-0.48%	0.009759	1.89%	0.003066	0.60%	2.01%
NCO_6	0.007745	1.50%	0.011912	2.31%	-0.004390	-0.85%	2.96%
NCO_7	-0.006903	-1.34%	0.033618	6.53%	0.013623	2.65%	7.83%
NCO_8	-0.005101	-0.99%	0.014331	2.78%	0.015263	2.96%	4.76%
NCO_9	0.006524	1.27%	0.033584	6.52%	-0.004711	-0.91%	6.87%
Public	-0.004926	-0.96%	0.019098	3.71%	-0.001646	-0.32%	2.43%
urban	0.011730	2.28%	-0.011566	-2.25%	-0.001989	-0.39%	-0.35%
Regular	0.000436	0.08%	0.084949	16.49%	0.011657	2.26%	18.84%
constant	0.000000	0.00%	0.104708	20.33%	0.000000	0.00%	20.33%
Subtotal	0.018507	3.59%	0.484078	93.99%	0.012463	2.42%	100.00%

Source: Author's own calculations based on NSS data 2011-12

Differentiated wage rate across age, sector, type of work, level of education is noted. In case of gender wage gap, differences are mostly because of discrimination against female workers, shown by a significantly higher coefficient component for such workers. After education, the wage differentials are substantially greater for NCO divisions 7,8 and 9²¹ and favour the male workers, showing a more pronounced wage gap. Using the wage structure of the male worker,

²¹ Division 7, 8 and 9 are Craft & Related trade workers; Skilled Agri and Fishery workers; and Elementary Occupations respectively.

we find that 18.84% of total difference is attributable to the regular sector. Within the regular wage structure, 0.08% difference is attributable to characteristics (or endowments) and 16.49% is attributable to discrimination. An unexplained part of the wage differential is 2.26%. There is a marginal yet favourable treatment of female workers in NCO divisions 2 (professionals) and division 3 (Technicians and associate professionals), the adjusted differential of 0.12% and 0.01% respectively shows a miniscule earning advantage favouring the female workers in these divisions. Within the occupational divisions, there seems to be highest inequalities and observed significant discrimination at NCO division 7 (craft and related trade workers) accounting for 7.83% of total wage differential.

We find that discrimination component is greater than endowment component in most variables, yet the entire unexplained component cannot be considered as adequately discriminatory. This is because the data does not adequately capture human capital differences in workers in the Indian labour market. Many women, for example, remain out of the labour force due to caring and other household obligations (Kingdon 1998, Agarwal 2013). The exceptions are urban sector where the discrimination component is negative and favours the female and middle to higher levels of education, where both endowments and discrimination components are negligible but favour the female worker.

Pre-labour market discrimination affects earnings indirectly by means of lower out of school investments, low quality of education, accessibility to higher education, poorer nutrition and health outcomes, overall a lower social capital (Das and Dutta 2007). As noticed earlier, large coefficient differential observed in case of most variables, suggest a discriminatory attitude towards women that has existed for generations and encompassed centuries of unfavourable status of women in the economic and social structure of the country. It is otherwise documented in literature that unequal labour market outcomes are stemming from some discrimination in the past that has limited the earnings and maintained deprivation for women workers. The findings provided by these decomposition provide important insights into prevalent discrimination in education, sector, occupation and type of work.

6. Discussion and Conclusion

The Sustainable Development Goal 8 deals with the creation and sustenance of 'productive employment' that incorporates achieving full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value". In context of present Indian scenario, Goal 8 calls for a comprehensive approach to improving labour market outcomes for women through improving access to and relevance of education and training programs, skills development, access to child care,

maternity protection, and provision of safe and accessible transport, along with the promotion of a pattern of growth that creates job opportunities.

Beyond standard labour force participation rates, policy-makers should be more concerned about whether women are able to access better jobs or start up a business, and take advantage of new labour market opportunities as a country grows. A policy framework encouraging and enabling women's participation should be constructed with active awareness of the "gender-specific" constraints that face most women. Gender responsive policies need to be contextually developed. Ultimately, the goal is not merely to increase female labour force participation, but to provide opportunities for decent work that will, in turn, contribute to the economic empowerment of women. Investment on basic infrastructure such as provision of child care, transport, water and sanitation as well as social security benefits like cash transfers to women and guaranteed maternity benefits for women in the informal sector is also essential to increase their participation in the labourforce.

Appendix Table 1.

Variables	Description of the Variables	Persons		Male		Female	
		Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
l wage	Logarithm of daily wage (in rupees)	5.092916	0.8540266	5.203781	0.8089961	4.688734	0.891212
Age	Age in years	34.86678	10.75851	34.69251	10.80917	35.50212	10.54779
agesq	Age squared	1331.436	789.1122	1320.406	792.179	1371.648	776.5325
<Primary	if completed below primary education=1; 0 otherwise	0.1027378	0.3036184	0.1051904	0.3068017	0.093796	0.2915557
Primary	if completed primary education=1; 0 otherwise	0.131901	0.3383857	0.1381715	0.3450833	0.1090405	0.3117018
Secondary	if completed secondary education=1; 0 otherwise	0.1135371	0.3172507	0.1270431	0.3330245	0.064298	0.2452924
HSC	if completed higher secondary=1; 0 otherwise	0.0690117	0.2534761	0.0759827	0.264973	0.0435975	0.2042056
Grad	if completed graduation=1; 0 otherwise	0.0950231	0.2932491	0.096325	0.2950394	0.0902765	0.2865884
Diploma	if completed diploma/ certificate course=1; 0 otherwise	0.0249938	0.1561073	0.0260665	0.1593348	0.0210829	0.1436661
Postgrad	if completed post graduation=1; 0 otherwise	0.0444341	0.2060592	0.041726	0.1999643	0.0543073	0.2266317
NCO_1	if belongs to NCO1=1; 0 otherwise	0.0385665	0.1925609	0.0360223	0.1863474	0.047842	0.2134398
NCO_2	if belongs to NCO2=1; 0 otherwise	0.0516018	0.2212234	0.0490263	0.215925	0.0609912	0.2393233
NCO_3	if belongs to NCO3=1; 0 otherwise	0.0508742	0.2197425	0.0498103	0.217555	0.0547528	0.2275058
NCO_4	if belongs to NCO4=1; 0 otherwise	0.042473	0.2016673	0.0458035	0.2090607	0.0303312	0.1715035
NCO_5	if belongs to NCO5=1; 0 otherwise	0.0733198	0.2606628	0.0772979	0.2670662	0.0588169	0.2352907
NCO_6	if belongs to NCO 6=1; 0 otherwise	0.0620961	0.2413319	0.055166	0.2283063	0.0873612	0.2823744
NCO_7	if belongs to NCO 7=1; 0 otherwise	0.1537292	0.3606918	0.1639031	0.3701913	0.116638	0.3210006
NCO_8	if belongs to NCO 8=1; 0 otherwise	0.0851012	0.2790344	0.0957285	0.2942215	0.0463571	0.2102652
NCO_9	if belongs to NCO 9=1; 0 otherwise	0.4390836	0.4962792	0.4241851	0.4942235	0.4933995	0.4999754
Public	if working in public sector=1; 0= private sector	0.1501514	0.3572225	0.1471631	0.3542719	0.1610458	0.3675871
Urban	if working in urban area=1; 0= rural area	0.366312	0.4817999	0.3782602	0.4849578	0.3227524	0.4675466

Regular	If regular worker=1; 0= casual worker	0.4558473	0.4980506	0.4680031	0.4989801	0.4115304	0.4921296
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Source: Author's own calculations based on NSS data 2011-12

Notes: the sample consists of individuals aged 15 - 65 in the nss (2011-12) 68th round. Standard deviations are not reported for dummy variables

Notes

1.Primary sector is represented by 'Section A' in the Broad Structure of NIC 2008, this sector includes: agriculture, forestry and fishing. Secondary sector and Tertiary are also mentioned under NIC 2008.

2.Classification of Occupations- dummy variable groups are: (for NCO1) if a person is occupied in Legislators, Senior Officials, Professionals and Associate Professionals then 1; otherwise=0. (for NCO2) If a person is occupied in/as Clerks, Service Workers, Shop and Market Sales Workers, Market Oriented Skilled Agri and Fishery Workers, Craft and Related Trade Workers, Plant and Machinery Operators and Assemblers then 1; otherwise=0. (for NCO3) if a person is occupied in/as Subsistence Agri and Fishery work, Elementary Occupations and Work not classified by occupations then 1; otherwise =0.

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