

Contribution of Education in the Changing Female Wage Structure in the Last Three Decades in India

Abstract

Post economic liberalization in 1991 India has witnessed fast economic growth. And, in last few decades female participation in formal wage employment has increased substantially. However, female being most vulnerable group in labour markets they are being paid less than their male counterparts in India. Education is one of the important endowments which increases wage bargaining power. Present study assesses the contribution of improvement in women's education on their wage growth in India over the last three decades 1983-2011. We used two rounds of NSSO (National Sample Survey Organization) – 38th (1983-84) and 68th (2011-12) data on Employment and Unemployment. Wage has been convert constant price. Bivariate analysis reveal that female wage has increased during 1983-2011. Graduate and above educated females have higher mean wage as compared to illiterate ones. Further, female's participation in primary sector has declined whereas theirs' participation has increased in business and service sector. Oaxaca-Blinder decomposition shows that female's education significantly contributes 11% to the total increment in wages during 1983-2011. Machado-Mata Decomposition (MM) shows that contribution of socio-economic distribution of female worker increases at the higher wage distribution, whereas, the contribution of socio-economic characteristics declines. The findings reveal that given household's socio-economic characteristics female education contributed significantly in their wage growth in last three decades. Female education not

Keywords: Women economic status, Wage structure, Empowerment, NSSO, Quintiles, Decomposition, India.

Introduction

The economic well-being of women is often used as an indicator of the overall advancement of a society. In the World Bank report on Gender and Poverty in India of 1991, principal author Lynn Bennett announced – women must be seen as economic actors - actors with a particularly important role to play in efforts to reduce poverty (World Bank, 1991).

That said, there is a direct relationship between economic development and women's empowerment defined as improving the ability of women to access the constituents of development—in particular, health, education, earning opportunities, rights, and political participation. On the one hand development can boost improvement in women's status whereas, on the other hand discrimination against women can hinder development. In its report, "Engendering Development," the World Bank (2001) called for policies to address gender imbalance in "rights, resources, and voice," and recommended specific measures for women empowerment (World Bank, 2001). A substantial number of studies have investigated these issues and found clear evidence of a correlation between mothers' education and earnings, and society's welfare, particularly child welfare and health.

Traditionally, women were the keepers of the family and were mostly engaged in household chores or unpaid work. In more recent times, we've seen a surge in women's economic status. Today, women throughout the world are engaged in economically productive work and earn incomes. However, in the developing countries they work primarily in agriculture or informal sector but their participation in formal wage employment is also increasing. Their earnings however are generally lower than their male counterparts (Bernstein, 1999; Press, 2000).

Having said that, the studies on wage structure are as old as the economics profession itself. Many quantitative studies have tried to examine differences and changes in wages by occupation or industry (Cuflen, 1956; Douglas, 1930). Researchers have also studied gender differential in pay gaps. Enormous literature could be found on gender wage differential around the world. Studies reveal gender gaps in earnings in, for example, North East rural Ghana, rural Benin, Costa Rica, and Egypt (Avirgan, Bivens, & Gammage, 2005; Chen, 2008; Whitehead,

2009). A study on Latin America states that in 1998 women's earnings in the informal economy were about 53 per cent of men's (Barrientos, 2002).

In Indian scenario there are few important studies on gender wage discrimination. Reilly and Dutta (1996) find that the mean wage differential between men and women was relatively stable in the 1980s and the 1990s (Reilly & Dutta, 2005). A study on urban labor markets reveals that the gross raw wage differential between men and women declined over time, in both the regular and casual labor markets (Madheswaran & Khasnobis, 2007). However, the existing literature, based on data from 1983 to 1999, points out that the economic growth in India has been associated with rising wage inequality.

Unequal opportunities between women and men continue to restrict women's ability to lift themselves from poverty and improve their lives. Women make enormous contributions to economies, whether in businesses, on farms, as entrepreneurs or employees, or by doing unpaid care work at home. They have the potential to change their own economic status, as well as that of the communities and countries in which they live (reference).

The past three decades have witnessed a steadily increasing awareness of the need to empower women to increase social, economic and political equity. Earlier policies reflected more emphasis on investments in women's reproductive rather than their productive roles. In recent years development policies and program have started to view women as integral part of economic development. Although six decades of development (1950-2010) in India have yielded important benefits to women, significant gender gaps still remain. Life expectancy, School enrollment ratio, has improved over time but women are still trailing behind men in these indicators. The same is true for economic status of women too. Women are crowded into lower paying jobs; consequently there is widely observable gender gap in wage distribution (Macpherson & Hirsch, 1995).

After economic liberalization in 1991, India became one of the fastest growing economies. However this economic growth in the past two decades has been associated with rising wage inequality (Azam, 2012). It has come to notice that the main beneficiaries of the rapid growth are those at top level of income distribution (Cain, Hasan, Magsombol, & Tandon, 2010). While

there are several papers that deal with gender wage inequality, studies solely focusing on female wage structures are scarce in India. As women have long been identified as one of the most vulnerable groups in the labor markets, understanding the dynamics of the female wage structure will help policy makers to design more effective social and economic policies.

Given this context, education has always been considered as one of the important simulators of economic growth (Mincer, 1974; Ozturk, 2001). It is important to note here that the returns to tertiary education have increased in India. But, according to a study conducted in 2007, differences in education played an important role in explaining the wage differential for regular workers (Madheswaran & Khasnobis, 2007). However, in the recent few years there have been drastic improvements in educational attainment of women in India for example - women's literacy rate has increased from 22% in 1971 to 65% in 2011 (still, they are trailing behind men . in this indicator). Hence it will be of great help to see the effect of improvements in women's educational status on their wage structure.

In this paper, therefore, we examine changes in the wage structure of Indian females across the entire wage distribution over the past three decades (1983–2011). We investigate the earning function at two points in time (1983 and 2004) using quantile regressions to assess whether the entire earnings distribution is affected uniformly by human capital variables, demographic characteristics and industry affiliations.

Data and Methods

Data

For the analysis, this paper uses data from the Employment and Unemployment Schedule, administered by the National Sample Survey Organization (NSSO), Government of India. Information from 38th and 63rd rounds which were conducted in 1983 and 2011, respectively, is drawn. The data constitutes a repeated cross section and contains information on household size and composition, social group, religion, monthly consumption, landholdings, demographic variables (age, gender, marital status), educational participation and attainment, along with a detailed employment section on principal and subsidiary activities (industry, occupation, and

wages earned). The sample is drawn based on a stratified random sampling procedure and all the analysis is done using survey weights. The sample is restricted to females aged 15-64 years who either were employed or willing to work at the time of the survey. All the analysis has been done using STATA12 software.

Variables

Our dependent variable is natural log of wage earned by females in current week (the week preceding the survey). The covariates include age (15-64), education (Illiterate, primary, secondary, Graduate and above), technical education (yes, no), wealth index, gender of household head, education of household head (categories?) , sector (Rural, Urban), marital status (Single, Married, Divorced/separated), caste (categories?), religion (categories), type of industry, etc. Type of industry is coded as per NIC-1970 for 38th round and NIC-2008 rules for 68th round in 11 categories. It is recoded into four broad categories (1) Primary sector (Agriculture & mining) (2) Secondary sector (Manufacture/Construction) (3) Business and (4) Service sector (Administrative and public services) to balance the sample size in each category as women participation is very low in a few economic activities.

Methods

Linear regression gives us an idea of the effect of covariates on mean of wage distribution. However in case of wage distribution where chances of heterogeneity are very likely; linear regression may not be alone enough to explain the impact of covariates along the wage distribution. In this regard, quantile regression as introduced by Koenker and Bassett (1978) help us to understand within and between groups changes in female wages, as well as how returns to covariates that affect wages, change across quantiles (Koenker & Gilbert Bassett, 1978). Hence in addition to estimating the standard OLS wage equations, quantile regressions are also used in this paper.

Since, the Blinder-Oaxaca decomposition (B-O) which has been used in several studies on wage discrimination is also based on mean wage distribution; focus has recently shifted to assess the degree of discrimination across the entire wage distribution. That said, Machado and Mata

(2005) proposed a quantile based decomposition technique named Machado-Mata Decomposition (MM) (Machado & Mata, 2005). The advantage of MM decomposition is that it accounts for heteroskedasticity. The MM (2005) decomposition is well suited to depict heterogeneous characteristic and coefficient effects across the entire distribution (Azam, 2012). In this study therefore, apart from the standard B-O decomposition, the MM technique is applied to decompose the wage gaps across different quantiles.

Results

Table 1 represents distribution of socioeconomic and demographic characteristics in the sample which includes females aged 15-64 years in both the rounds of NSSO namely 38th and 68th. Majority of families have male household heads, only 9% families in 38th round have a female household head which slightly increased to 11% in 68th round. Caste and religion wise distribution of females is almost same in both the rounds. About 9% of the females were from ST category in both rounds. In 38th round 79% females were from rural sector and 21% from urban sector. In 68th round 71% were from rural areas and 29% from urban areas. Female's education has improved over time, illiteracy among females has reduced from 74% (38th) to 71% (68th). In comparison to only 1% females who attended higher education in 1983 approximately 7% females attended higher education in 2011. Attainment of technical education among females have also increased from meager .7% to 1%. Female's participation in primary sector has decreased during 1983-2011. As compared to 80% in 1983 only 60% females were engaged in primary sector jobs in 2011. Their involvement in business and service sector has approximately doubled during 1983-2011.

Fig. 1 plots the kernel estimate of the wage density for both the rounds of survey. The whole distribution has shifted to right during 1983-2011. The mean has also changed and shifted towards right indicating increase in female wages over past three decades. By comparing 1983 and 2011 curves we can say that there are evident changes in levels of female wages however pattern of wage distribution remains same. There is not much change in dispersion of wage distribution.

Table 2 represents mean wage earned by females in both the rounds and broad measures of increment in wages (ratio of wages in 2011 to 1983). Females with female head of the household has higher mean wage than those with male household heads in both the rounds. It can also be seen in the analysis that lower the family size higher the mean wage. In 38th round females who have 1-2 members in their household earned averagely 185 rupees however those who have more than 6 members earned 178 rupees. In 68th round females mean wage increased in all the categories. Rural females has low mean wage than urban females in both the rounds. Highly educated females have higher mean wage as compared to illiterate in both the rounds. Mean wage for urban females have increased approximately 4 times during 1983-2011 where as the increase for rural females was only 3 times. Also the ANOVA results show that difference in rural urban mean wages was significant in both the rounds. The increment in female wages has been maximum for highly educated females it has increased almost 3 times. Industry wise females engaged in business activities witnessed increase of 4 times in their mean wages. Lowest increase was witnessed by females working in primary sector.

Table 3 & 4 shows results of mean and quantile regression in 1983 and 2011, respectively. It can be seen that OLS coefficients for variables such as Household size, education of household head, female education, quintile index and type of industry are significant in both the round. Technical education did not have significant effect in 38th round but showed significant positive relationship in 68th round. The findings show that in both the rounds mean wage increased with increasing age, education and quintile index. Female household head has advantage over male household head in earnings. Sex of head of the household has significant effect on female wage across all quantiles except 90th quantile in 2011. Head of the household's education and household size has also significant relationship with female's wage. Female's education has significant positive impact on female wages and the impact increases with increasing quantiles of the wage distribution in both the rounds. The effect of tertiary education levels, such as graduation and above, increases with increasing quintiles of wage distribution in 38th round, while the impact of this covariate decreases with increasing quantiles in 68th round. Technical education has more or less same effect on wage rate across all quintiles. The wage rate of

primary sector workers is lower than secondary or service sector workers. The effect of secondary or service sector on wage rate increases with increasing quintile in both the rounds.

Table 5& 6. Shows the contribution of selected characteristics effect in explaining the increase in female wages during past three decades. The Oaxaca-Blinder decomposition shows that raw changes in natural log of female wages between 38th and 68th round is 1.53. Of this difference 0.6 is due to selected characteristics which means 36% of the difference is explained by selected characteristics. Among the selected characteristics the major predictors in increment of female wages are female's education, education of the head of the household, type of industry and quintile index. Female's education significantly contributes 29% to the increment in wages. Type of industry in which the female works account for 11% of the total difference in wages.

The O-B decomposition is limited to decomposing the mean gender wage gap. The MM decomposition based on quantile regression considers the entire wage distribution. The MM decomposition captures the heterogeneity in the covariate and the coefficient effects which are larger at lower and higher quantiles (Figure 2). Change in both the covariates and the coefficients contributes to the changes in real wages and their effect is statistically significant at all quantiles. It can be seen that the difference in wages during 1983-2011 increases sharply in upper quintiles. The effect of coefficients decreases with increasing quintiles whereas the effect of characteristics increases with increasing quintiles. In lower quintiles coefficient effect is more than characteristic effect but as the quintile increases characteristic effect exceeds coefficient effect. Table 7 reveals that the difference in mean wages vary across all the quintiles however the variation is not very strong and ranges from difference of 1.30 in 6th quintile to 1.41 in 1st quintile. The estimated quantile regression coefficients already provide first hints on these relatively small variations across the quantiles of the wage distribution. The changes in wage slightly decrease with increasing quantiles of the wage distributions.

Discussion:

Enhancing female's economic status is critical for any country's development. Despite the fact that women represent almost 50% of the Indian population (Census, 2011), this study shows

that their representation in post primary education, technical education, wage employment, participation in business and service sector is limited. The analysis above reveals that although women's participation in economic activities has increased over past three decades their participation rates in business and service sector is still low. Moreover very few women attain technical education which contributes to limited knowledge among women to excel in more lucrative sectors such as manufacturing and highly profitable entrepreneurship programmes.

The mean female wage has increased over time but the dispersion remains unchanged which means there has not been any change in distribution of female wages, those who were earning less in 1983 remained same in 2011. On the whole it can be said that some of the policies that have been put in place by government have yielded positive impact in increasing women participation in higher education levels. However, more needs to be done in most sectors including technical education, economic empowerment, access to financial services etc.

Education plays vital role in women's economic empowerment. It's revealed in this paper that education alone contributed 30% of increment in female wages. And hence more emphasis should be on educating girls and women. Quintile index and type of industry are other important simulators of female wage changes. This study presents a profile of female wage structure in India. It provides relevant data and information that can influence design and implementation of gender related policies. Improving women's economic status not only benefits women alone, but also men, children, poor and rich as well.

Table 1. Distribution of female workers aged 15-64

| | 38th round (142694) | 68th round (127905) |
|-----------------------|--|---------------------------------------|
| Head sex | | |
| Male | 90.73 | 88.74 |
| Female | 9.27 | 11.26 |
| Head Education | | |
| illiterate | 55.86 | 34.57 |
| primary | 25.38 | 24.66 |
| secondary | 16.10 | 31.67 |
| grad & above | 2.66 | 9.10 |
| Hhsize | | |
| 1-2 Members | 7.60 | 8.76 |
| 3-4 member | 23.58 | 35.85 |
| 5-6 members | 31.04 | 33.35 |
| more members | 37.78 | 22.03 |
| Age group | | |
| 15-24 | 31.75 | 19.44 |
| 25-34 | 26.79 | 28.59 |
| 35-44 | 19.24 | 25.03 |
| 45-54 | 14.41 | 16.29 |
| 55-64 | 7.81 | 10.65 |
| Residence | | |
| Rural | 78.53 | 71.02 |
| Urban | 21.47 | 28.98 |
| Marital status | | |
| Single | 10.23 | 9.14 |
| Married | 79.91 | 83.62 |
| Divorced/separated | 9.86 | 7.24 |
| Education | | |
| Illiterate | 73.78 | 41.49 |
| primary | 15.24 | 21.78 |
| secondary | 9.64 | 29.51 |
| grad & above | 1.34 | 7.22 |
| Religion | | |
| Hindu | 84.32 | 81.84 |
| Muslim | 10.36 | 13.19 |
| Other | 5.32 | 4.97 |
| Caste | | |
| ST | 8.96 | 8.80 |
| SC | 17.10 | 18.68 |
| Other | 73.94 | 72.52 |
| Tech education | | |
| No | 99.31 | 98.70 |
| Yes | 0.69 | 1.30 |
| Industry | | |
| Primary | 79.78 | 59.95 |
| Secondary | 8.68 | 18.30 |
| Business | 3.21 | 5.23 |
| Services | 8.33 | 16.53 |
| Quintile | | |

| | | |
|---------|-------|-------|
| Poorest | 20.84 | 20.30 |
| Poorer | 21.17 | 20.03 |
| Middle | 21.06 | 20.17 |
| Richer | 20.01 | 20.08 |
| Richest | 16.92 | 19.42 |

Figure 1. Kernel density of log real wage

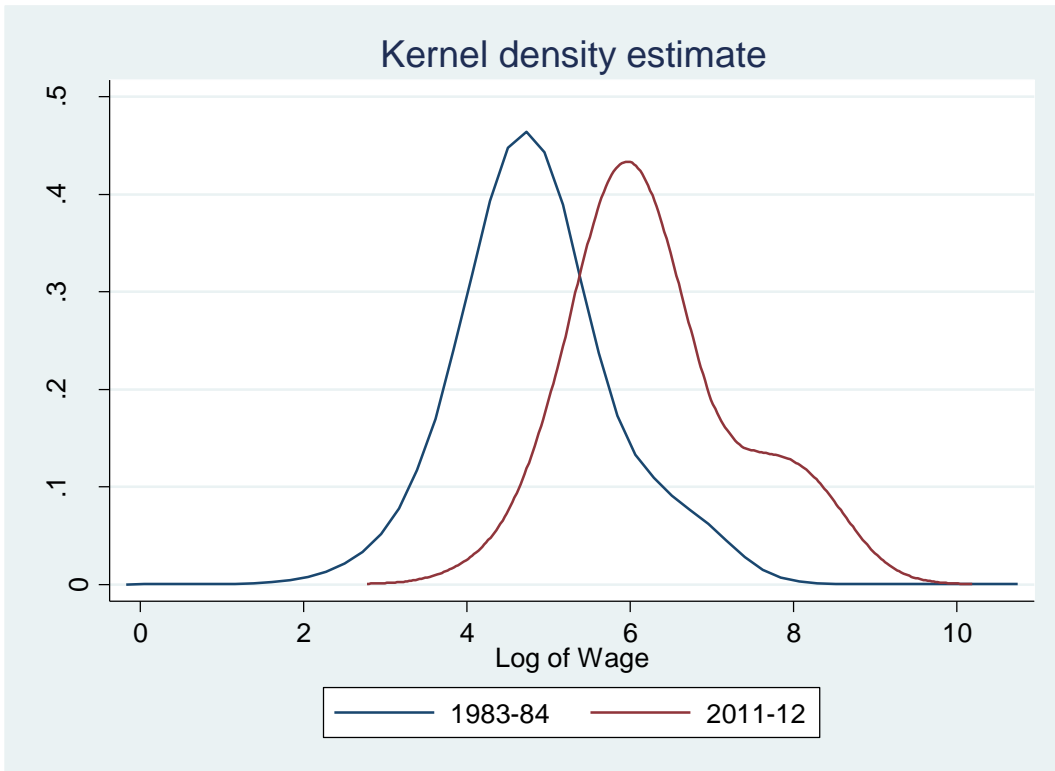


Table 2. Descriptive statistics of female wage structure

| | mean wage | | Ratio of wages in 1983-2011 | p value for ANOVA test | |
|-----------------------|-----------|---------|--------------------------------|------------------------|------|
| | 38th | 68th | | 38th | 68th |
| Head sex | | | | | |
| Male | 175.79 | 685.72 | 3.90 | 0.05 | 0.00 |
| Female | 204.86 | 721.76 | 3.52 | | |
| Head Education | | | | | |
| illiterate | 143.00 | 388.74 | 2.72 | | |
| primary | 155.19 | 439.68 | 2.83 | | |
| secondary | 397.22 | 761.40 | 1.92 | 0.00 | 0.00 |
| grad & above | 754.40 | 2627.89 | 3.48 | | |
| Hhsize | | | | | |
| 1-2 Members | 184.67 | 754.71 | 4.09 | | |
| 3-4 member | 173.01 | 742.86 | 4.29 | 0.85 | 0.00 |
| 5-6 members | 188.68 | 638.20 | 3.38 | | |
| more members | 177.92 | 600.60 | 3.38 | | |
| Age group | | | | | |
| 15-24 | 153.36 | 546.89 | 3.57 | | |
| 25-34 | 204.39 | 742.39 | 3.63 | | |
| 35-44 | 186.19 | 680.49 | 3.65 | 0.00 | 0.00 |
| 45-54 | 190.38 | 839.28 | 4.41 | | |
| 55-64 | 155.83 | 549.39 | 3.53 | | |
| Residence | | | | | |
| Rural | 145.60 | 442.98 | 3.04 | | |
| Urban | 338.5379 | 1342.73 | 3.97 | 0.00 | 0.00 |
| Marital status | | | | | |
| Single | 198.02 | 865.26 | 4.37 | | |
| Married | 180.91 | 689.49 | 3.81 | 0.01 | |
| Divorced/seperated | 167.48 | 583.37 | 3.48 | | |
| Education | | | | | |
| illiterate | 142.12 | 363.32 | 2.56 | | |
| primary | 165.83 | 407.29 | 2.46 | | |
| secondary | 495.67 | 645.84 | 1.30 | 0.00 | 0.00 |
| grad & above | 823.33 | 2351.66 | 2.86 | | |
| Religion | | | | | |
| Hindu | 172.99 | 677.46 | 3.92 | | |
| Muslim | 205.94 | 570.07 | 2.77 | 0.00 | 0.00 |
| Other | 270.68 | 1085.46 | 4.01 | | |
| Caste | | | | | |
| ST | 147.19 | 456.63 | 3.10 | | |
| SC | 146.71 | 484.77 | 3.30 | 0.00 | 0.00 |
| Other | 205.10 | 837.17 | 4.08 | | |
| Tech education | | | | | |
| No | 169.90 | 614.25 | 3.62 | | |
| Yes | 701.41 | 2691.62 | 3.84 | 0.00 | 0.00 |
| Industry | | | | | |
| Primary | 130.11 | 357.68 | 2.75 | | |
| Secondary | 162.51 | 539.41 | 3.32 | 0.00 | 0.00 |
| Business | 398.42 | 1622.37 | 4.07 | | |
| Services | 383.23 | 1417.91 | 3.70 | | |
| Quintile | | | | | |
| Poorest | 121.08 | 322.20 | 2.66 | | |
| Poorer | 142.82 | 379.13 | 2.65 | | |
| Middle | 157.16 | 427.03 | 2.72 | 0.00 | 0.00 |

| | | | |
|---------|--------|---------|------|
| Richer | 208.68 | 558.00 | 2.67 |
| Richest | 415.82 | 1819.79 | 4.38 |

Table 3. Linear and quantile regression coefficient of natural log of wage of the female workers, 1983-84, India.

| <i>Characteristics</i> | 38th round (1983-84) | | | | | |
|------------------------------|-----------------------------|-------------------|-------------------|---------------|-------------------|-------------------|
| | Mean regression | Quantile10 | Quantile25 | Median | Quantile75 | Quantile90 |
| <i>Head sex</i> | | | | | | |
| Male | | | | | | |
| Female | 0.07(0.05) | -0.02(0.05) | 0.01(0.03) | 0.04(0.02) | 0.05*(0.02) | 0.08*(0.03) |
| <i>Head Education</i> | | | | | | |
| Illiterate | | | | | | |
| primary | -0.01(0.02) | 0.01(0.04) | -0.02(0.02) | -0.02(0.02) | -0.03(0.02) | 0(0.02) |
| secondary | 0.26*(0.03) | 0.35*(0.06) | 0.28*(0.04) | 0.21*(0.03) | 0.17*(0.02) | 0.15*(0.03) |
| grad & above | 0.41*(0.04) | 0.61*(0.09) | 0.46*(0.05) | 0.29*(0.04) | 0.26*(0.04) | 0.31*(0.05) |
| <i>Hhsize</i> | | | | | | |
| 1-2 Members | | | | | | |
| 3-4 member | 0.18*(0.02) | 0.23*(0.05) | 0.21*(0.03) | 0.17*(0.02) | 0.13*(0.02) | 0.08*(0.03) |
| 5-6 members | 0.29*(0.03) | 0.36*(0.07) | 0.31*(0.04) | 0.26*(0.03) | 0.23*(0.03) | 0.18*(0.04) |
| more members | 0.52*(0.05) | 0.8*(0.12) | 0.59*(0.07) | 0.46*(0.05) | 0.37*(0.05) | 0.28*(0.07) |
| <i>Age group</i> | | | | | | |
| 15-24 | | | | | | |
| 25-34 | 0.07*(0.02) | 0.06(0.03) | 0.05*(0.02) | 0.03(0.02) | 0.08*(0.02) | 0.1*(0.02) |
| 35-44 | 0.11*(0.02) | 0.06(0.04) | 0.1*(0.02) | 0.08*(0.02) | 0.11*(0.02) | 0.09*(0.02) |
| 45-54 | 0.16*(0.02) | 0.19*(0.05) | 0.16*(0.03) | 0.09*(0.02) | 0.13*(0.02) | 0.16*(0.03) |
| 55-64 | 0.12*(0.04) | 0.12(0.08) | 0.16*(0.05) | 0.1*(0.03) | 0.11*(0.03) | 0.07(0.04) |
| <i>Residence</i> | | | | | | |
| Rural | | | | | | |
| Urban | -0.06(0.03) | -0.26*(0.07) | -0.16*(0.04) | -0.07*(0.03) | 0.02(0.03) | 0.15*(0.04) |
| <i>Marital status</i> | | | | | | |
| Single | | | | | | |
| Married | 0.06*(0.02) | 0.05(0.04) | 0.08*(0.02) | 0.07*(0.02) | 0.03(0.02) | 0.02(0.03) |
| Divorced/separated | 0.02(0.02) | 0.03(0.05) | -0.01(0.03) | 0.02(0.02) | 0.02(0.02) | 0.06*(0.03) |
| <i>Education</i> | | | | | | |
| Illiterate | | | | | | |
| primary | 0.08*(0.02) | 0(0.04) | 0.07*(0.03) | 0.06*(0.02) | 0.11*(0.02) | 0.16*(0.03) |
| secondary | 0.59*(0.03) | 0.22*(0.08) | 0.59*(0.04) | 0.86*(0.03) | 0.8*(0.03) | 0.7*(0.04) |
| grad & above | 0.66*(0.06) | 0.36*(0.14) | 0.72*(0.08) | 0.91*(0.06) | 0.9*(0.06) | 0.84*(0.08) |
| <i>Religion</i> | | | | | | |
| Hindu | | | | | | |
| Muslim | -0.02(0.02) | -0.14*(0.05) | -0.1*(0.03) | -0.01(0.02) | 0.06*(0.02) | 0.05(0.03) |
| Other | 0.08*(0.02) | -0.02(0.05) | 0.03(0.03) | 0.05*(0.02) | 0.13*(0.02) | 0.12*(0.03) |
| <i>Caste</i> | | | | | | |
| ST | | | | | | |
| SC | -0.33*(0.04) | -0.66*(0.09) | -0.44*(0.05) | -0.27*(0.04) | -0.14*(0.04) | -0.05(0.05) |
| Other | -0.14*(0.02) | -0.22*(0.04) | -0.17*(0.02) | -0.13*(0.02) | -0.09*(0.02) | -0.04*(0.02) |
| <i>Tech education</i> | | | | | | |
| No | | | | | | |
| Yes | 0.07(0.05) | 0.08(0.1) | 0.23*(0.06) | 0.04(0.05) | 0.02(0.04) | 0.06(0.06) |
| <i>Industry</i> | | | | | | |
| Primary | | | | | | |

| | | | | | | |
|-----------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Secondary | -0.14*(0.03) | -0.14*(0.06) | -0.16*(0.03) | -0.13*(0.03) | -0.11*(0.02) | -0.08*(0.03) |
| Business | 0.81*(0.09) | 1.09*(0.19) | 0.88*(0.12) | 0.71*(0.08) | 0.67*(0.08) | 0.56*(0.11) |
| Services | -0.33*(0.08) | -0.89*(0.19) | -0.51*(0.11) | -0.23*(0.08) | -0.05(0.08) | 0.09(0.11) |
| Quintile | | | | | | |
| 1st | | | | | | |
| 2nd | 0.22*(0.02) | 0.3*(0.04) | 0.26*(0.03) | 0.21*(0.02) | 0.17*(0.02) | 0.19*(0.03) |
| 3rd | 0.39*(0.03) | 0.51*(0.07) | 0.4*(0.04) | 0.36*(0.03) | 0.31*(0.03) | 0.36*(0.04) |
| 4th | 0.62*(0.04) | 0.77*(0.1) | 0.65*(0.06) | 0.57*(0.04) | 0.51*(0.04) | 0.57*(0.06) |
| 5th | 0.84*(0.05) | 1*(0.11) | 0.89*(0.07) | 0.78*(0.05) | 0.7*(0.05) | 0.68*(0.07) |

Table 4. Linear and quantile regression coefficient of natural log of wage of the female workers, 2011-12

| <i>Characteristics</i> | 68th round (2011-12) | | | | | |
|------------------------|----------------------|-------------|-------------|-------------|--------------|--------------|
| | Mean regression | Quantile10 | Quantile25 | Median | Quantile75 | Quantile90 |
| Head sex | | | | | | |
| Male | | | | | | |
| Female | 0.08*(0.02) | 0.09*(0.04) | 0.08*(0.03) | 0.08*(0.02) | 0.04*(0.02) | 0.04(0.02) |
| Head Education | | | | | | |
| Illiterate | | | | | | |
| primary | 0.05*(0.02) | 0(0.04) | 0.04(0.03) | 0.04(0.02) | 0.06*(0.02) | 0.05*(0.02) |
| secondary | 0.15*(0.02) | 0.11*(0.04) | 0.13*(0.03) | 0.13*(0.03) | 0.18*(0.02) | 0.17*(0.03) |
| grad & above | 0.52*(0.03) | 0.43*(0.05) | 0.56*(0.04) | 0.61*(0.04) | 0.52*(0.03) | 0.47*(0.04) |
| Hhsiz | | | | | | |
| 1-2 Members | | | | | | |
| 3-4 member | 0.19*(0.02) | 0.13*(0.04) | 0.17*(0.03) | 0.17*(0.03) | 0.23*(0.02) | 0.2*(0.03) |
| 5-6 members | 0.4*(0.03) | 0.33*(0.05) | 0.34*(0.04) | 0.36*(0.03) | 0.46*(0.03) | 0.45*(0.04) |
| more members | 0.62*(0.04) | 0.5*(0.07) | 0.52*(0.05) | 0.57*(0.05) | 0.73*(0.04) | 0.69*(0.05) |
| Age group | | | | | | |
| 15-24 | | | | | | |
| 25-34 | 0.11*(0.02) | 0.14*(0.04) | 0.09*(0.03) | 0.06*(0.03) | 0.1*(0.02) | 0.13*(0.03) |
| 35-44 | 0.25*(0.02) | 0.25*(0.04) | 0.19*(0.03) | 0.2*(0.03) | 0.24*(0.02) | 0.26*(0.03) |
| 45-54 | 0.43*(0.03) | 0.45*(0.05) | 0.34*(0.03) | 0.33*(0.03) | 0.39*(0.03) | 0.4*(0.03) |
| 55-64 | 0.49*(0.03) | 0.38*(0.06) | 0.34*(0.05) | 0.37*(0.04) | 0.51*(0.04) | 0.59*(0.05) |
| Residence | | | | | | |
| Rural | | | | | | |
| Urban | 0(0.02) | 0.02(0.03) | 0.02(0.02) | -0.01(0.02) | -0.06*(0.02) | -0.07*(0.02) |
| Marital status | | | | | | |
| Single | | | | | | |
| Married | 0.14*(0.02) | 0.1*(0.04) | 0.17*(0.03) | 0.18*(0.03) | 0.14*(0.02) | 0.12*(0.03) |
| Divorced/seperated | 0.09*(0.03) | 0.02(0.05) | 0.1*(0.04) | 0.09*(0.03) | 0.09*(0.03) | 0.11*(0.04) |
| Education | | | | | | |

| | | | | | | |
|-----------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| illiterate | | | | | | |
| primary | 0.1*(0.02) | 0.09*(0.04) | 0.08*(0.03) | 0.08*(0.02) | 0.1*(0.02) | 0.11*(0.03) |
| secondary | 0.42*(0.02) | 0.31*(0.04) | 0.29*(0.03) | 0.33*(0.03) | 0.43*(0.02) | 0.46*(0.03) |
| grad & above | 0.61*(0.04) | 0.56*(0.07) | 0.56*(0.05) | 0.67*(0.05) | 0.56*(0.04) | 0.46*(0.05) |
| Religion | | | | | | |
| Hindu | | | | | | |
| Muslim | 0.03(0.02) | -0.09*(0.04) | 0(0.03) | 0.05(0.03) | 0.11*(0.02) | 0.07*(0.03) |
| Other | 0.26*(0.02) | 0.21*(0.04) | 0.24*(0.03) | 0.27*(0.03) | 0.31*(0.02) | 0.26*(0.03) |
| Caste | | | | | | |
| ST | | | | | | |
| SC | -0.43*(0.03) | -0.36*(0.06) | -0.35*(0.04) | -0.39*(0.04) | -0.46*(0.03) | -0.45*(0.04) |
| Other | -0.18*(0.02) | -0.13*(0.03) | -0.13*(0.02) | -0.15*(0.02) | -0.18*(0.02) | -0.14*(0.02) |
| Tech education | | | | | | |
| No | | | | | | |
| Yes | 0.1*(0.03) | 0.1*(0.05) | 0.11*(0.04) | 0.04(0.03) | 0.07*(0.03) | 0.14*(0.04) |
| Industry | | | | | | |
| Primary | | | | | | |
| Secondary | -0.13*(0.03) | -0.09(0.06) | -0.09*(0.04) | -0.12*(0.04) | -0.16*(0.03) | -0.09*(0.04) |
| Business | 0.39*(0.04) | 0.31*(0.07) | 0.29*(0.05) | 0.35*(0.05) | 0.49*(0.04) | 0.69*(0.05) |
| Services | -0.95*(0.09) | -1*(0.16) | -0.99*(0.12) | -0.96*(0.11) | -0.96*(0.09) | -0.63*(0.12) |
| Quintile | | | | | | |
| 1st | | | | | | |
| 2nd | 0.19*(0.02) | 0.15*(0.04) | 0.19*(0.03) | 0.18*(0.03) | 0.22*(0.02) | 0.21*(0.03) |
| 3rd | 0.32*(0.02) | 0.25*(0.04) | 0.29*(0.03) | 0.3*(0.03) | 0.34*(0.02) | 0.39*(0.03) |
| 4th | 0.54*(0.03) | 0.43*(0.05) | 0.46*(0.04) | 0.51*(0.04) | 0.62*(0.03) | 0.65*(0.04) |
| 5th | 0.96*(0.03) | 0.77*(0.06) | 0.84*(0.04) | 0.9*(0.04) | 1.1*(0.03) | 1.06*(0.04) |

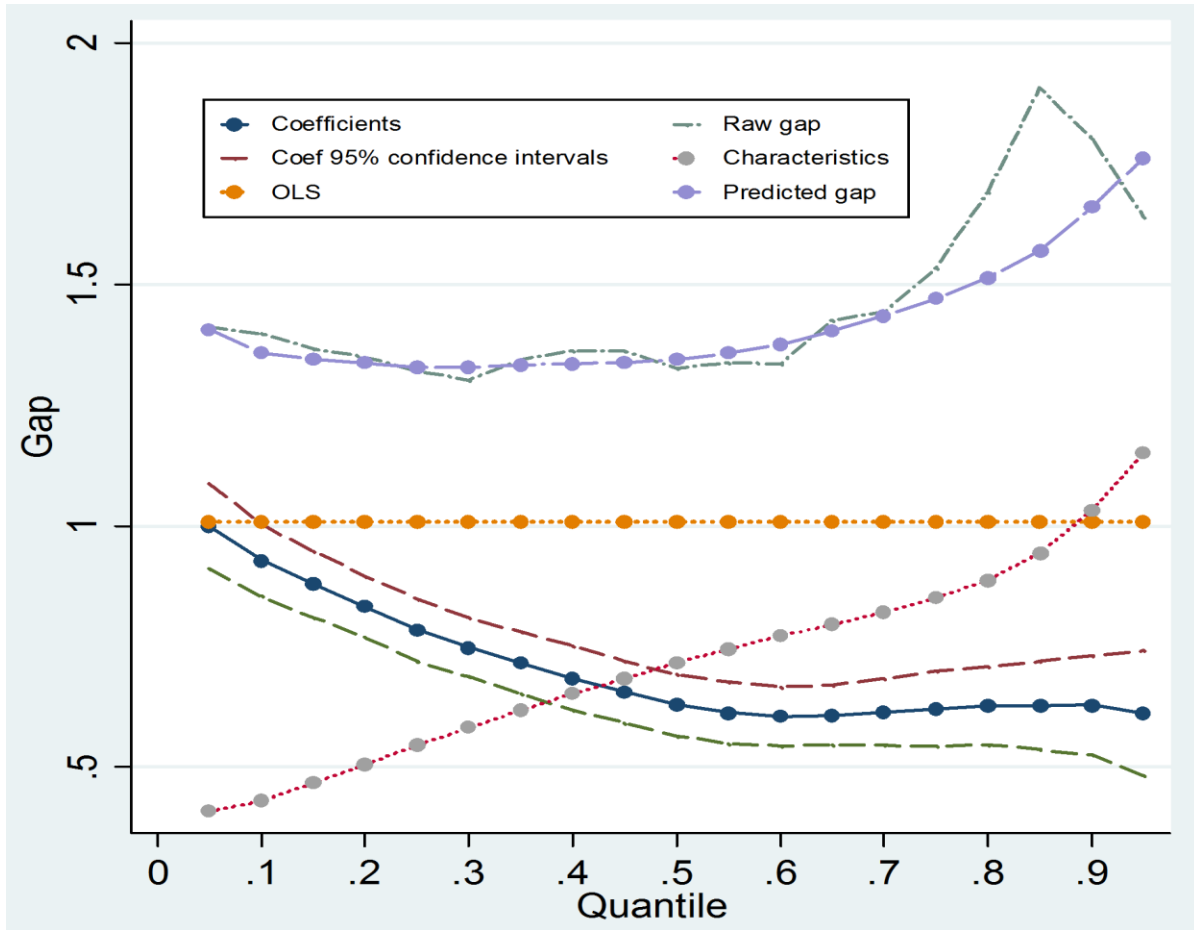
Table 6: Percentage contribution of socio-demographic determinants to increase in female wages (log),1983-2011, India.

| | Net distribution | Percentage contribution of total explained increase in wage | Percentage contribution of total increase in wage |
|-------------------------|-------------------------|--|--|
| Head sex | 0.04 | -7.23* | -2.61* |
| Head education | -0.191 | 34.38* | 12.48* |
| HH size | 0.091 | -16.31* | -5.95* |
| Age group | -0.004 | 0.65 | 0.26 |
| Residence | -0.002 | 0.42 | 0.13 |
| Religion | -0.008 | 1.42* | 0.52* |
| Caste | -0.014 | 2.48* | 0.92* |
| Marital status | 0.002 | -0.34* | -0.13* |
| education | -0.161 | 29.06* | 10.52* |
| Tech Education | 0.025 | -4.45* | -1.63* |
| Industry | -0.063 | 11.44* | 4.12* |
| Quintile | -0.202 | 36.14* | 13.20* |
| Total Difference | -1.53 | | |
| Explained | -0.56 | 36.6* | |
| Unexplained | -0.98 | 64.1* | |

Table 7. Results of MM decomposition of changes in wages during 1983-2011, India

| Quintile | Actual difference | Characteristics | SE | Coefficient | SE | Percent Contribution |
|-----------------|--------------------------|------------------------|-----------|--------------------|-----------|-----------------------------|
| 1 | 1.41 | 0.41 | 0.04 | 1.00 | 0.05 | 28.86 |
| 2 | 1.40 | 0.43 | 0.03 | 0.93 | 0.04 | 30.74 |
| 3 | 1.37 | 0.47 | 0.03 | 0.88 | 0.04 | 34.13 |
| 4 | 1.35 | 0.50 | 0.03 | 0.83 | 0.03 | 37.39 |
| 5 | 1.32 | 0.54 | 0.03 | 0.78 | 0.03 | 41.26 |
| 6 | 1.30 | 0.58 | 0.02 | 0.75 | 0.03 | 44.61 |
| 7 | 1.34 | 0.62 | 0.03 | 0.72 | 0.03 | 45.96 |
| 8 | 1.36 | 0.65 | 0.03 | 0.68 | 0.03 | 47.84 |
| 9 | 1.36 | 0.68 | 0.03 | 0.66 | 0.03 | 50.13 |
| 10 | 1.33 | 0.72 | 0.03 | 0.63 | 0.03 | 53.95 |

Figure 2. MM Decomposition of difference in Female wages during 1983-2011, India.



References:

- Avirgan, T., Bivens, L. J., & Gammage, S. (2005). *Good jobs, bad jobs, no jobs. Labour markets and informal work in Egypt, El Salvador, India, Russia and South Africa*. Washington: Economic Policy Institute.
- Azam, M. (2012). Changes in Wage Structure in Urban India, 1983–2004: A Quantile Regression Decomposition. *World Development*, 40(6), 1135–1150.
- Bank, W. (1991). *Gender and poverty in India*. Washington, D.C.: World Bank.
- Bank, W. (2001). *Engendering development: Through gender equality in rights, resources, and voice*. Washington, D.C: World Bank.
- Barrientos, A. (2002). *Women, Informal Employment, and Social Protection in Latin America*, IDPM, Discussion Paper Series, Paper no. 66. University of Manchester.
- Bernstein, J. (1999). Demand Shifts and Low-Wage Workers. *Eastern Economic Journal*, 25(2), 191-208.
- Cain, J. S., Hasan, R., Magsombol, R., & Tandon, A. (2010). Accounting for inequality in India: Evidence from household expenditures. *World Development*, 38(3), 282–297.
- Chen, M. (2008). Informality and Social Protection; Theories and Realities. *IDS Bulletin*, 39(2), 18-27.
- Cuflen, D. E. (1956). The inter-industry wage structure, 1899-1950. *American Economic Review*, 46, 353-369.
- Douglas, P. H. (1930). *Real wages in the United States, 1890-1926* (Houghton Mifflin, Boston, MA).
- Koenker, R., & Gilbert Bassett, J. (1978). Regression Quantiles *Econometrica*, 46(1), 33-50.
- Machado, J. E. A. F., & Mata, J. E. (2005). Counterfactual Decomposition Of Changes In Wage Distributions Using Quantile Regression. *JOURNAL OF APPLIED ECONOMETRICS*, 20, 445–465.
- Macpherson, D. A., & Hirsch, B. T. (1995). Wages and Gender Composition: Why do Women's Jobs Pay Less? *Journal of Labor Economics*, 13(3), 426-471.
- Madheswaran, S., & Khasnabis, B. G. (2007). "Gender Discrimination in the Labour Market: Evidence from the NSS", WIDER research project on "Gender wage Gap and its Impact on poverty: Evidence from India".
- Mincer, J. (1974). *Schooling, Earnings and Experience*. New York: Columbia University Press.
- Ozturk, I. (2001). The role of education in economic development: a theoretical perspective *Journal of Rural Development and Administration*, 33(1), 39-47.
- Press, U. I. (2000). *The Low Wage Labor Market: Challenges and Opportunities for Economic Self-Sufficiency*. Washington, D.C.: Urban Institute Press.
- Reilly, B., & Dutta, P. V. (2005). "The Gender Pay Gap and Trade Liberalization: Evidence for India", *Poverty Research Unit at Sussex working paper*, 3.
- Whitehead, A. (2009). "The Gendered Impacts of Liberalization Policies on African Agricultural Economies and Rural Livelihoods," in S. Razavi (ed.), *The Gendered Impacts of Liberalization: Towards 'Embedded' Liberalism?* London: Routledge.