

Gender-based Differences in Labor Market Returns in Indian Manufacturing: Evidences from NSS Rounds

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This paper explores the gender-based differences in labor market returns in Indian manufacturing sector during 2004/05 – 2011/12 and finds that the female to male wage ratio improved significantly for the blue-collar workers majorly in rural areas. The reason had been a major sectoral change among female blue-collar workers in rural areas. A sharp increase in the share of employment in wearing apparels industries and a decline in the share of tobacco industries led to a high rise in share of workers in regular monthly salary system and a decline in share of workers in piece-rate payment system among rural female blue-collar workers. Methodologies used here are Neumark decomposition analysis, Logit and Ordered Logit regressions.

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Introduction

This paper addresses three questions regarding gender-based differences in labor market outcomes in Indian manufacturing sector during 2004-05 to 2011-12. The first is: how the gender wage gap has moved during the period in the sector and what are the factors behind such changes? The second question is: whether the change in gender wage gap differs among different enterprises and if it does what are the factors behind it? The third question is: how the job security conditions change in different occupations for male and female workers over the time period and what are the factors behind such changes?

The focus is on the wage earners in Indian Manufacturing sector. The time period considered here is from 2004-05 to 2011-12. The database of the analysis has been the employment and unemployment surveys of National Sample Survey rounds. Descriptive statistics, Logit regression and Neumark decomposition analysis are the methodologies used here to address the questions.

We divided the workers in Indian manufacturing sector into three main groups. The first group includes senior officials, managers, professionals and technicians who are usually workers with high education levels and relatively higher wages. They are described here as white-collar workers. The second group includes clerks, sales and service workers, who usually have education levels lower than those of white-collar workers as well as lower average wage levels. They are described as pink-collar workers. The third group consists of blue-collar workers: craftsmen, machine operators and those engaged in what are classified as “elementary occupations”, which receive, on average, lower wages than pink-collar workers and usually have very low levels of or no formal education.

The enterprises are divided into three groups according to their ownership patterns. Group 1 consists of household-managed enterprises, partnership firms, co-operative societies. Group 2 are the public sector enterprises and group 3 comprises the private/public limited companies.

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Our analysis reveals that the female to male wage ratio improved sharply for blue-collar workers and more sharply in rural areas. The improvement took place due to high increase in the share of female blue-collar workers in regular

monthly salary system where average earnings were higher and reduction in the share in piece-rate payment system where average earnings were lower. The change took place mainly due to the sectoral changes taking place among rural female blue-collar workers. There occurred a significant rise in the share of employment in wearing apparel industry and a sharp fall in the share of tobacco industries among rural female blue-collar workers. The share of pink-collar occupations also increased among female workers in manufacturing industries.

Another important finding is that the female to male wage ratio improved tremendously in public/private limited companies. The responsible factors had been a rise in the share of white-collar and pink-collar occupations among female workers and high rise in the share of female blue-collar workers in regular monthly salary system in those enterprises. At the same time there was a decline in the share of female workers in these enterprises.

Another important finding is the decline in the share of workers with written job contract among female pink-collar workers whereas the situation stayed the same for male workers. The reason had been the casualization of female pink-collar workers in which house-keeping and restaurant service workers had a major share.

Theoretical Framework

The neo-classical or human capital model explains gender wage gap in terms

of differences in education, experience level and constraints which include family responsibilities, preference for work environment etc. According to the tenet, workers' preference for a job and also employers' preference for a worker get influenced by these characteristics of workers. But the theory failed to explain the existence of large gender wage gap. So the neo-classicals developed complementary theories. To explain the existing discrimination, Gary S. Becker came out with his theory that employers had a taste for discrimination against workers based on their age, gender, race, disability etc. But he also argued that as competition would grow in an economy, the discriminatory behavior of the employers would make them uncompetitive compared to the non-discriminatory employers. Thus, to survive in a competitive economy, the discriminatory employers would change their attitude (Anker, 1997). Two conditions had to be fulfilled for that result. The first condition was that the number of discriminatory employers should not be too large and the second condition was that the supply of discriminated workers should not be greater than the demand for those employees (Autor, 2003).

The early feminists of 1960s fought for equality in treatment as a legal right. This brand of feminism, often known as legal feminism, followed an equality-based strategy based on the assumption that there were no legally relevant differences between male and female workers. During that era women were excluded from several domains of work because of their biological differences with men workers.

They were more confined to family sphere. After following those equality-based strategies for few decades, one lesson was taught that ensuring mere access to these domains where the institutions were designed keeping men in mind wasn't sufficient to bring equality in true sense. So few feminists argued that along with the equality in access there had to be appreciation of the biological differences between male and female workers. However the feminist got themselves divided over that sameness-difference debate. Some feminists argued that recognition of these differences would lead to the former ideology of separating spheres back. Others recognised that equality in treatment was creating obstacle to formulating solutions to the unique problems women workers faced. So the "post-egalitarian feminists" focused on justice and fairness going beyond equality in treatment and tried to push for the necessary affirmative actions from a feminist perspective after recognizing the differences between male and female workers (Fineman, 1995).

According to the gender theorists, the difference in labor market outcomes between male and female workers was mainly due to common stereotypes about female abilities.

According to the gender theorists, the difference in labor market outcomes between male and female workers was mainly due to common stereotypes about female abilities. The positive stereotypes consisted of caring nature, skill and experience in household related work, more

honesty and attractive physical appearance. The negative stereotypes consisted of disinclination to supervise, lesser physical strength, lesser ability in science, lesser willingness to travel and lesser willingness to face physical danger and to use physical force. The positive stereotypes like the caring nature and attractive physical appearance were supposed to result in higher representation of female workers in sales and service workers and the negative stereotypes like less ability to supervise and less ability in science were supposed to result in lower share of female workers in white-collar workers' group (Anker, 1997). Apart from being itself a manifestation of gender-based discrimination, occupational segregation strengthened gender wage gap in a work organization in other ways. Higher representation of female workers in managerial and supervisory positions in a work organization often tended to influence the reward distribution between male and female workers by influencing the policies relevant for gender bias there. Also female workers seemed to benefit more from sex-differentiated networks in a work organization where male members didn't dominate the managerial and supervisory positions (Hultin & Szulkin, 2003).

Also provision of marketed alternatives to family care could provide more freedom to women irrespective of their interests and talents. Research had shown that women worked equal number of hours providing goods and services in households or even more in households with children as men did in paid work. Although love had often been behind the

family care, compulsion of women workers to do the unpaid family work couldn't be ignored. Women lacked a viable alternative to being a homemaker for self-support due to labor market barriers (Folbre & Nelson, 2000).

Another form of gender bias taking place in labor market was through industry effects. The industry effect in gender wage gap got manifested through two channels- one was the difference in returns between male and female members in different industries and another was differential distribution of male and female members among different industries i.e industrial segregation (Fields & Wolff, 1995).

According to both gender theories and neo-classical theories, due to the family responsibilities and child care responsibilities women workers preferred jobs with flexibility regarding working hours and easy entry-exit options which again could result in differences in labor market returns between male and female workers (Anker, 1997).

In setting the objectives to empower women in the society, the capability approach had been often found to be superior to the resource-based approach or the preference-based approach. The problem with resource-based approach was that economic prosperity first of all didn't tell about the distributional aspects between male and female members in a society. Secondly, for example, the same level of educational attainment for female members as male members would need more resources than male members as

they face obstacles from the traditional hierarchy. The problem with preference-based approach was that female and male preferences were often shaped by the norms of a patriarchal society and that tended to reinforce the already existing inequality. The capability approach overcame these drawbacks by setting the ability to do as the goal rather than emphasizing on functioning, preference or satisfaction. Another criticism for different frameworks for justice, equality which crossed cultural boundaries had been the inappropriateness of introducing a set of cross cultural objectives to bring equality between male and females where the cultures already had different normative categories. The superiority of capability approach in dealing with these criticisms was that that approach didn't set goals on preference or satisfaction of individuals rather it focused on what the individuals were capable to do. The capabilities could be divided into three categories. The first category consisted of the basic capabilities which were needed to flourish the more advanced capabilities. The second category of capabilities consisted of the internal capabilities which included states of the person being sufficient for performing the requisite functioning. The third category of capabilities was the combined capabilities which indicated the internal capabilities being combined with the proper external conditions to perform the functioning (Nussbaum, 1999).

Background

Using NSS rounds for the two states of Tamil Nadu and Madhya Pradesh, a

study found that labor force participation rate was strikingly higher for male workers compared to female workers in both the states, although both male and female labor force participation rates were higher in Tamil Nadu as compared to Madhya Pradesh. Among employed persons, the share of salaried employment (which includes both regular and casual workers) was higher among male workers than among female workers. And among salaried workers, the share of regular workers was higher among male workers than among female workers. Higher values of land and home-stead owned tended to decrease the possibility of joining in salaried employment for both male and female workers. Education and salaried employment were found to be in a U-shaped relationship. In salaried employment, around 88% and 75% of the wage gap between male and female members were found to be discriminatory in Madhya Pradesh and Tamil Nadu respectively (Kingdon & Unni, 2001).

In rural areas, gender wage gap was found to rise over 1983 to 1999. Gender wage gap was found to decline with rise in education level.

Another study using NSS rounds found that almost two-thirds of the gender wage gap was explained and almost one-quarter of that gap was due to differences in industrial affiliation. Gender wage gap was found to be higher among regular employees compared to casual employees. But gender wage gap among

casual employees was found to be rising over 1983 to 1999. In rural areas, gender wage gap was found to rise over 1983 to 1999. Gender wage gap was found to decline with rise in education level (Reilly & Dutta, 2005).

Gender wage gap was found to decline with rise in education level.

Another research work based on a nationally representative survey of 7500 rural villages with about 30000 individuals aged 14 or above in 240 Indian villages in 12 states by NCAER in 1999, looked into gender wage discrimination in the rural informal labor market in India. Female workers were found to earn 28% less as casual workers in agriculture and 35% less as casual workers in non-agricultural sector in rural India. Most of the wage gap was found to be discriminatory in nature in rural informal sector. The agricultural sector was found to be more discriminatory than the non-agricultural sector. Discrimination was found to be higher in rich villages compared to poor villages. The study came out with the conclusion that the higher economic development would not be able to reduce discrimination as predicted theoretically and as the workers would move out of the agricultural sector, the discrimination faced by female workers would decline (Deininger, Jin, & Nagarajan, 2013). In the present study we are examining the gender wage gap in manufacturing sector. The focus in explaining the gender wage gap had been majorly on the industry effect and occupational shares.

Database

The database has been the employment and unemployment surveys of 61st and 68th NSS rounds. The analysis has been based on manufacturing sector industries only. The industrial classification in 61st round (2004-05) has been done on the basis of 1998-NIC code. At two digit level, the manufacturing industries are coded from 15 to 37 according to 1998-NIC code. In 68th round (2011-12) the industrial classification has been done according to 2008-NIC codes and the manufacturing sector industries are coded from 10 to 33. We confined the study to the wage earners only and the analysis has been done taking into account only the usual principal status activity of workers which shows the main employment status of a person during the reference period of last 365 days.

The definition of formal sector as mentioned in the Factories Act, 1948 has been followed here. The enterprises with at least 10 or more workers with use of electricity for production purpose or at least 20 or more workers without use of electricity for production purpose comprises the formal sector. All other enterprises are considered to be in informal sector.

Methodologies

Descriptive statistics, Neumark decomposition analysis, Logit regression and ordered Logit regression are the methodologies used here.

Neumark Decomposition Analysis: Neumark decomposition analysis is basically an advancement based on Oaxaca-Blinder decomposition technique. Oaxaca-Blinder technique is a counterfactual decomposition technique used to study mean outcome differences between groups and is based on linear regression models. The decomposition technique divides mean wage gap of two groups of workers into an explained part and unexplained part. The explained part is the difference in mean wage due to differences in characteristics related to productivity of workers. The unexplained part is treated as discrimination. One shortcoming of the analysis is that the unexplained part also includes difference in mean wage gap explained by unobserved characteristics and thus tends to often overestimate discrimination.

Let us suppose that there are two groups A and B and the outcome variable is wage. The mean difference in wage between the groups is noted here by $W = E(A) - E(B)$. Let us suppose that the set of predictors are skill levels and experience levels which are denoted by vector X and the linear regression model is:

$$W_i = X_i\beta_i + \varepsilon_i \text{ where } i \in (A, B) \text{ and } E(\varepsilon_i) = 0.$$

$$W = E(X_a)\beta_a - E(X_b)\beta_b, \dots (1)$$

Now if we assume that group B is paid according to the wage structure of group A, then the hypothetical earning function of group B would be

$$W_b = E(X_b)\beta_a, \dots (2)$$

(1) can be rearranged as

$$W = \{E(X_a)\beta_a - E(X_b)\beta_a\} + \{E(X_b)\beta_a - E(X_b)\beta_b\}$$

$$= \beta_a \{E(X_a) - E(X_b)\} + E(X_b) \{\beta_a - \beta_b\}$$

The first part here shows the wage difference which arises if group B is also paid according to the wage structure of group A and this is called endowment effect which happens because of difference in productivity characteristics between the two groups. The second part arises due to the difference in wage structure between the two groups. This is the discriminatory part of the wage differential.

If we assume here that β^* is a non-discriminatory coefficient structure derived from the pooled coefficient structure where $\beta^* = \Omega\beta_a + (1-\Omega)\beta_b$ where $\Omega = (X'X)^{-1}(X'_aX_b)$ then eq(1) can be arranged as

$$W = \{E(X_a) - E(X_b)\}'\beta^* + \{E(X_a)'(\beta_a - \beta^*) + E(X_b)'(\beta^* - \beta_b)\}$$

Here the first part of the equation i.e. $\{E(X_a) - E(X_b)\}'\beta^*$ is the difference in outcome variable wage which can be explained by differences in predictors. This is the explained part of the difference in outcome variable between the two groups. Now the second part arises because of differences in coefficients of the predictors, i.e. the difference in returns to endowments. The first component of the second part is due to overpayment made to group A and the second component accounts for the underpayment to group B. However the second part also includes the difference in outcome variable arising for difference in unobserved predictors as

already mentioned above. This second part is called the discrimination here. This decomposition is called Neumark decomposition method.

Logit Regression: In a Logit regression, the dependent variable is a dichotomous one which takes two values either zero or one. The purpose of logistic regression is to predict the probability of the dependent variable taking value 1 given the values of the independent variables Xs. The probability that the dependent variable takes the value of 1 is denoted by p and thus the probability of the dependent variable taking the value 0 is (1-p). $p/(1-p)$ is called as the odds and the logarithm of the odds is called the log-odds or the logit. If the logit depends on X variables linearly then the logit regression can be written as

$\log \frac{p}{(1-p)} = \alpha + \beta'x$ where x represents the vector of covariates and β' represents the vector of coefficients. In predicting the vector of coefficients maximum likelihood method has been followed in logit regression.

Marginal effects are calculated for the categorical independent variable gender. Marginal effects for the categorical variables show change in predicted probability of the dependent variable taking the value of one for discrete changes in value of the independent variable.

Ordered Logit Regression: Here there are three outcomes for the dependent variable: the first is being into blue-collar occupations, the second is being into pink-collar occupations and

the third is being into white-collar occupations. Let us suppose that p_1 is the probability of the base outcome i.e outcome 1, p_2 is the probability of next higher outcome i.e outcome 2 and p_3 is the probability of the highest outcome i.e outcome 3.

The ordered logit model takes the form:

$\text{logit}(\theta_1) = \log \frac{p_1}{(1-p_1)} = \alpha + \beta'x$ where the base category is compared to the pooled category of other two categories of level 1 and level 2

$\text{logit}(\theta_2) = \log \frac{p_1+p_2}{1-p_1-p_2} = \alpha + \beta'x$ where the pooled category of the base category and level 1 is compared to the category of level 2

As the number of equations ordered logit model estimates will be the number of categories minus one, two equations will be estimated here. This is because the last category won't have an odds ratio as the sum of the probabilities of all the categories including the last category will be equal to one.

But ordered logit model estimates only one set of coefficients for the independent variables based on the parallel regression assumption which assumes that the coefficients won't differ significantly if the equations are estimated separately.

Marginal effects are calculated for the categorical independent variable gender.

Variables

In Neumark decomposition analysis, the logarithm of wage level has been the dependent variable and education dummies, age and age-square have been the independent variables. General education level 1 stands for illiterates and literates without formal schooling. General education level 2 stands for below primary, primary and middle school level of education. General education level 3 stands for the secondary, higher-secondary and diploma courses and level 4 stands for graduate, post-graduate and above level of education.

In the first logit regression the dependent variable has been the dummy of being into regular monthly salary system or other systems. The independent variables had been the dummies of education levels, age and age-square as proxies for experience levels and gender dummy.

In the second logit regression the dependent variable has been the dummy of being into group1 enterprises or being into group3 enterprises. As the share of group2 enterprises was very small, we majorly focused on these two types of enterprises. Again the independent variables had been the dummies of education levels, age and age-square as proxies for experience levels and gender dummy.

In ordered logit the dependent variable has been the dummy of being into white-collar occupations or pink-collar occupations or blue-collar occupations. Again the independent variables had been the dummies of education levels, age and age-square as proxies for experience levels and gender dummy.

Findings & Analysis

The analysis has been done on the wage-earners (which include regular and casual workers) in manufacturing sector in India. Wage-earners comprise 30% and 33% of female workers in India in the manufacturing sector in 2004-05 and 2011-12 respectively (Appendix 1). For male workers wage-earners comprise 57% and 61% of all workers in manufacturing sector in 2004-05 and 2011-12 respectively (Appendix 2). Thus workers in this analysis refer to wage-earners who include regular and casual workers only.

Average female wage level as a percentage of average male wage level for all the workers together increased moderately from 2004-05 to 2011-12.

Average female wage level as a percentage of average male wage level for all the workers together increased moderately from 2004-05 to 2011-12. Occupation-wise the situation differs. There occurred a marginal decline and moderate decline in that percentage for white-collar and pink-collar workers respectively. The percentage rose up significantly for blue-collar workers (Table 1). The results of Neumark decomposition analysis show that raw wage gap in logarithmic scale between male and female white-collar and pink-collar workers rose up over the period. There happened a significant rise in wage gap due to difference in productivity and a moderate rise in discrimination. But the wage gap due to discrimination had been much

higher than the wage gap due to productivity difference at both the points of time (Table 2). For blue-collar workers, the raw wage gap between male and female workers in logarithmic scale decreased significantly and the decline in wage gap happened mainly due to decline in wage gap due to discrimination. But the discrimination part of the wage gap has been much higher than the part explained by productivity difference at both the points

of time and the discrimination part as a share of total wage gap stayed the same over the time period (Table 3). However, here mainly we examined the factors behind the change in wage gap between the male and female blue-collar workers as blue-collar workers consisted of the major share of workforce in manufacturing sector and also the overall wage trend got influenced by that of blue-collar workers.

Table 1 Mean Female Wage as a Percentage of Male Wage Over Time

	For all the workers together	White-collar occupations	Pink-collar occupations	Blue-collar occupations
2004-05	44	64	81	46
2011-12	49	62	77	54

Table 2 Results of Neumark Decomposition Analysis for White-collar & Pink-collar Occupations

	Raw wage gap in logarithmic scale	Due to difference in productivity	Due to discrimination
2004-05	0.41	0.08 (19%)	0.33 (81%)

Table 3 Results of Neumark Decomposition Analysis for Blue-collar Occupations

	Raw wage gap in logarithmic scale	Due to difference in productivity	Due to discrimination
2004-05	0.79	0.2 (25.3%)	0.6 (72.7%)
2011-12	0.61	0.15 (25.4%)	0.46 (72.6%)

Female wage as a percentage of male wage increased more in rural areas than in urban areas.

Female wage as a percentage of male wage increased more in rural areas than in urban areas from 2004-05 to 2011-12 (Table 4). The reason behind the sharp rise in female to male wage in rural areas had been the significant increase

in share of female blue-collar workers in regular salary payment system (Table 5) as the mean wage level had been much higher in regular monthly salary system compared to other payment systems (Table 6). Again the reason behind this rise in share in regular monthly salary system had been the shifts in sectoral shares among the female blue-collar workers in rural area. The major sectoral changes have been the sharp decline in

the share of tobacco industries¹ and sharp rise in share of wearing apparels industries (Table 7). The sectoral change had resulted in reduction in share of female blue-collar workers in piece rate payment system and increased their share in regular monthly salary system as the major employment happens in tobacco industries as piece-rate earners and in wearing apparel industries as regular monthly salary earners (Table 8). The logit regression results also confirmed that there

occurred an increased probability of being into regular monthly salary system among female blue-collar workers compared to their male counterparts in 2011-12 (Table 9). The majority of female blue-collar workers in tobacco industries tended to work from their own dwellings whereas in the case of wearing apparel industries, the workers mainly worked in employer's enterprises (Table 10 & Table 11). Thus the sectoral change resulted in an increase in the share of for-

Table 4 Mean Female Wage as a Percentage of Mean Male Wage for Blue-collar Workers in Rural & Urban Areas (in rupees)

	Rural areas	Urban areas
2004-05	50	47
2011-12	59	51

Table 5 Share of Workers Regular Monthly Salary System among Blue-collar Workers in Rural & Urban Areas (%)

	Rural areas	Urban areas
2004-05	14	46
2011-12	33	44

Table 6 Average Wage Levels in Different Payment Systems Over Time (in rupees)

Methods of payment	Average wage level 2004-05	Average wage level 2011-12
Regular monthly salary	131.74	171.21
Regular weekly salary	51.78	74.39
Regular daily salary	58.32	91.48
Piece-rate payment	57.87	74.98
Others	64.94	83.99

¹ This sectoral shift occurred only among the rural female wage earners which excludes the own account workers and unpaid family workers. If the own account workers and unpaid family workers are included the share of tobacco industries stayed almost the same around 27% among rural female workers from 2004-05 to 2011-12.

mal sector employment among rural female blue-collar workers from 2004-05 to 2011-12 (Table 12).

There occurred an increase in the share of pink-collar occupations and a moderate decline in the share of blue-collar occupations among female workers whereas in the case of male workers

Table 7 Sectoral Shares among Female Blue-collar Workers Over Time (%)

Food products industries	
2004-05	13
2011-12	14
Tobacco products industries	
2004-05	19
2011-12	6
Textile products industries	
2004-05	19
2011-12	21
Wearing apparels industries	
2004-05	9
2011-12	18
Chemicals industries	
2004-05	10
2011-12	4
Non-metallic mineral products industries	
2004-05	14
2011-12	14

Table 8 Share of Regular Monthly Salary Earners and Piece-rate Payment Workers in Tobacco and Wearing Apparel Industries (%)

	Share of regular monthly salary earners in tobacco industries	Share of piece rate payment earners in tobacco industries	Share of regular monthly salary earners in wearing apparel industries	Share of piece rate payment earners in wearing apparel industries
2004-05	52	11	55	19
2011-12	47	17	48	21

Table 9 Logit Results for Getting Employed into Regular Monthly Salary System for Blue-collar Workers

	Male	Female
2004-05	0.47	0.2
2011-12	0.54	0.44

Table 10 Share of Rural Female Blue-collar Workers Working in Own Dwellings (%)

	Tobacco industries	Wearing apparel industries
2004-05	68	17
2011-12	92	9

Table 11 Share of Rural Female Blue-collar Workers Working in Employer's Enterprises (%)

	Tobacco industries	Wearing apparel industries
2004-05	21	55
2011-12	0.6	59

Table 12 Share of Formal Sector Employment among Rural Female Blue-collar Workers (%)

Share of formal sector employment	
2004-05	41
2011-12	52

there occurred an increase in the share of white-collar occupations and decline in the share of pink-collar occupations (Table 13). The ordered logit results also

There occurred an increase in the share of pink-collar occupations and a moderate decline in the share of blue-collar occupations among female workers.

confirmed that there happened a relative increase in the probability of female workers for getting into pink-collar occupations compared to male workers (Table 14).

Table 13 Share of Employment in Different Occupations for Male & Female Workers (%)

	Share of male workers 2004-05	Share of female workers 2004-05	Share of male workers 2011-12	Share of female workers 2011-12
White-collar workers	5	2	10	3
Pink-collar workers	10	5	5	8
Blue-collar workers	84	93	85	89

Table 14 Ordered Logit Results for Being into Pink-collar Occupations for Male & Female Workers

	Male workers	Female workers
2004-05	0.075	0.053
2011-12	0.042	0.048

Enterprise-type wise Situation

Female wage to male wage ratio improved moderately in group1 enterprises and improved significantly in group 3 enterprises (Table 15). In group 3 enterprises, the wage ratio improved significantly for blue-collar occupations, marginally for pink-collar occu-

Female wage to male wage ratio improved moderately in group1 enterprises and improved significantly in group 3 enterprises.

pations and declined significantly for white-collar occupations. However due to the high share of blue-collar workers, the wage trend got majorly influenced by the wage trend of blue-collar workers (Table 16). The reason behind the increase in female wage to male wage ratio among blue-collar workers in group 3 enterprises had been the much higher increase in the share of regular monthly salary earners among female blue-collar workers (Table 17). Another reason behind the overall increase in female wage to male wage ratio in group 3 enterprises had been a significant relative increase in the share

of white-collar and pink-collar occupations for female workers compared to their male counterparts (Table 18). Although the relative wage position improved for female workers in group 3 enterprises, employment share of group 3 enterprises among female blue-collar workers declined significantly

whereas the share increased among the male blue-collar workers (Table 19). The logit results also confirmed that the probability of female workers for being into group 3 enterprises decreased over time whereas the probability increased for male workers (Table 20).

Table 15 Female Wage to Male Wage Ratio in Different Enterprises Over Time

	2004-05	2011-12
Group1 enterprises	0.53	0.56
Group2 enterprises	0.46	0.28
Group3 enterprises	0.38	0.56

Table 16 Female Wage to Male Wage Ratio in Different Occupations in Group 3 Enterprises

	White-collar occupations	Pink-collar occupations	Blue-collar occupations
2004-05	0.73	0.87	0.36
2011-12	0.61	0.89	0.54

Table 17 Share of Workers in Regular Monthly Salary System among Blue-collar Workers in Different Enterprises (%)

Group	Year	Male share	Female share
Group 1 enterprises	2004-05	43	23
	2011-12	46	29
Group 2 enterprises	2004-05	87	37
	2011-12	92	66
Group 3 enterprises	2004-05	82	45
	2011-12	86	75

Change in Job Security

The share of workers without any written job contract increased sharply among both female white-collar workers and female pink-collar workers from 2004-05 to 2011-12 whereas the share stayed the same among male white-collar and pink-collar workers.

The share increased marginally among both male and female blue-collar workers (Table 21). As the share of white-collar occupations had been a meager 2%, we focused on female pink-collar workers to look into what went behind the change in job security conditions among them. It was found that there occurred a significant increase in the

Table 18 Share of Different Occupations for Male and Female Workers in Group 3 Enterprises (%)

White-collar occupations	Male workers	Female workers
2004-05	13	5
2011-12	19	13
Pink-collar occupations		
2004-05	16	8
2011-12	7	15
Blue-collar occupations		
2004-05	72	87
2011-12	74	73

Table 19 Share of Employment in Group 3 Enterprises among Male and Female Blue-collar Workers (%)

Year	Male	Female
2004-05	20	20
2011-12	28	18

Table 20 Logit Results for Blue-collar Workers in Group 3 Enterprises

Year	Male	Female
2004-05	0.19	0.27
2011-12	0.22	0.2

share of casual workers among the female pink-collar workers whereas the share declined marginally among male pink-collar workers (Table 22). Among the female casual workers it was found that around 73% workers were house-keeping and restaurant service workers in 2011-12 (Table 23).

There occurred a significant increase in the share of casual workers among the female pink-collar workers whereas the share declined marginally among male pink-collar workers.

Conclusion

Unlike the prediction of Becker's taste-based discrimination theory, the gender-based wage discrimination stayed quite high in both 2004-05 and 2011-12, even after 15 years of adopting LPG (liberalization, privatization and globalization) model of growth as a government declared policy which means endorsing the competitive forces in the economy.

The sectoral change among rural female blue-collar workers resulting in more and more of them coming under regular monthly salary system (where the

Table 21 Share of Workers without any Written Job Contract among Male and Female Workers in Different Occupations (%)

	Male	Female
White-collar workers		
2004-05	40	24
2011-12	43	63
Pink-collar workers		
2004-05	61	55
2011-12	61	84
Blue-collar workers		
2004-05	86	90
2011-12	89	92

Table 22 Share of Casual Workers among Female Pink-collar Workers (in percentage terms)

Year	Male	Female
2004-05	7%	2%
2011-12	5%	20%

Table 23 Share of Different Occupations among the Female Pink-collar Casual Workers (%)

2004-05	Clerks general (14)	Office attendants (12)	Building care-takers (42)
2011-12	Other office clerks (18)	House-keeping and restaurant service workers (73)	

workers have to work in their employers' enterprises) and decline in the share of piece-rate earners (who generally work from their home) indicate towards more labor market commitment and willingness to work in more inflexible work environment among them. This is a positive development.

Although the relative wage position improved in public/private limited companies, the share of employment in those enterprises among female workers declined over time. Ensuring increased employment of female workers in these enterprises would be a positive development in reducing the gender pay gap.

Acknowledgements

The author gratefully acknowledges the useful comments by her supervisor Prof. Jayati Ghosh, Jawaharlal Nehru University while writing the paper.

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Appendix 1 Share of Workers According to Different Activity Status among Female Workers (%)

Year	Own account workers and unpaid family workers	Wage earners
2004-05	70	30
2011-12	67	33

Appendix 2 Share of Workers According to Different Activity Status among Female Workers (%)

Year	Own account workers and unpaid family workers	Wage earners
2004-05	43	57
2011-12	39	61

Appendix 3 Values of Chi-square Statistics in Logit Regressions

Logit regression 1: dependent variable- being into regular salary system or other systems

Independent variables- education dummies, age, age-square, gender dummy

Logit regression 2: dependent variable- being into group1 enterprises or group 3 enterprises

Independent variables- education dummies, age, age-square, gender dummy for blue-collar workers only

Ordered logit regression 1: dependent variable- being into group1 enterprises or group3 enterprises

Independent variables- education dummies, age, age-square, gender dummy

Year	Chi-square in logit regression 1	Chi-square in logit regression 2	Chi-square in ordered logit regression
2004-05	2824924.17	776551.59	4725540.66
2011-12	3438603.57	1302845.46	7370270.49