INDIAN LABOUR MARKET AND POSITION OF WOMEN: GENDER PAY GAP IN THE INDIAN FORMAL SECTOR

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Abstract

Gender diversity and its consequences in relation to work and economy are much discussed topics in India today. Women constitute almost half the population of India (48%) (Census India, 2011) and thus half of its potential labour force. But the LFPR of women in India has been constantly declining and stands at merely 28.6% for 2014 (The World Bank, 2016). This implies that half of the potential talent base in India is under-utilized (Zahidi & Ibarra, 2010). Though the Indian Government has taken various measures to prevent discrimination against women workers, there still exists a wide gender pay gap in India and in fact no country has been able to close the gender pay gap completely (Tijdens and Klaveren, 2012). The issue of wage inequality is also central to United Nations' SDGs, "*decent work for all women and men, and lower inequality, as among the key objectives of a new universal policy*", which highlight the importance of measuring and devising a mechanism to reduce the pay gap (ILO, 2016).

This paper quantifies the magnitude of gender-based disparities that women face in the organized sector of the Indian Labour Market, offers possible explanations for the same and tracks changes over time. Using the WageIndicator (Paycheck.in) continuous and voluntary web salary survey dataset and OLS regression analysis (Blau and Kahn, 2016), the paper identifies the key drivers, trends and reasons of the gender pay gap in the Indian labour market. Key findings include that gender pay gap increases with age, education and skill, occupational status and is significantly higher for married women than single women.

To survive in an ever-changing world, in terms of political, economic, social, technological, environmental and legal aspects is the challenge of each passing day. Moreover, to be able to subsist in a dynamic environment, there is a need for a new mind-set that can discard old prejudices and inertia, and accept new ideas and solutions (Hausmann, Tyson, & Zahidi, 2011). The paper explores and expands on the different approaches used by various organizations to counter the gender pay gap. We conclude by providing several concrete and innovative policy recommendations on how to enable Indian women and men to overcome gendered barriers in the labour market.

Keywords: Gender, India, Labour Market, Pay Gap, Women

Indian Labour Market and Position of Women:
Gender Pay Gap in the Indian Formal Sector

1. Introduction

To survive in an ever-changing world, in terms of political, economic, social, technological, environmental and legal environment is the challenge of each passing day. Also, to be able to subsist in dynamic environment, there is a need for a new mind-set that can discard old preconceptions and inertia to problems faced by women in the labour market, and accept new mind-sets towards the solutions (Hausmann, et al., 2011).

In today's world, where men and women work together in almost all fields; the concern of fair and equal treatment is of utmost importance. Gender inequality at work place is one of the issues that has often been raised and debated. Women constitute almost half the population of India (48%) (Census India, 2011) and thus half of its potential labour force. But the LFPR of women in India has been constantly declining since 1991 (36%), and is only 28.6% for 2014 (The World Bank, 2016). This implies that half of the potential talent base in India is under-utilized (Zahidi & Ibarra, 2010). Though the government of India has announced numerous laws to disallow disparities or discrimination against women at work, Gender Pay Gap (GPG) still exists[1]. It would be worth mentioning here that most of these government interventions were instituted decades before economic reforms, and not much has changed with respect to the status of women in Indian society and the labour market structure. In most Indian work places, the so-called '*glass ceiling*' is not completely broken yet. There are many facets of gender inequality, and in the current setup, it is '*professional inequality*' that persistently acts as an impediment for women's progression at the workplace. Professional inequality, as explained by Amartya Sen in one of his lectures, refers to *"discrimination in terms of employment, remuneration, promotion at work and even occupation",* (Sen, 2001).

2. GPG: Theoretical Overview

The GPG measures the earning differences between women and men in paid employment in the labour market. "*It is one of the many indicators of gender inequality in a country that emerge on examining the labour market participation in terms of gender*" (Education International, 2011). The GPG exists in almost all countries and no country has been able to close this gap completely (Tijdens & Klaveren, 2012). Various theories have been advanced to provide an explanation for this gap from an economic perspective. Majority of them discuss either the human capital model (supply-side factor) that emphases on gender differences in skills, particularly education and experience, or labour market discrimination (demand-side factor) i.e., prejudiced treatment of equally qualified male and female workers.

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[1] Refer to Exhibit 1 and Exhibit 2 in Annexure 12.1

One of the earliest works on labour market discrimination and its effects on pay has been done by Edgeworth in 1922. He stresses that women will be paid lower than men because of multiple reasons such as men are better organised than women (Marshall), hiring women is risky and costly for certain jobs (Fawcett), there is pressure from trade unions and as a result women are crowded in certain types of jobs, often women are not given opportunities to learn, some occupations are not chosen by women themselves, women are liable to leave the job because they might get married, women are less useful in case of emergencies, men being the principal breadwinner should be paid higher wages, and so on. The "*equality of utility to the employer as tested by the pecuniary value of the result, and equality of disutility to the employee as tested by his freedom to choose his employment*" (Edgeworth, 1922). Bronfenbrenner also brings out the issue of wage-fixing activity, where the employer discriminates when hiring, in terms of quantity and in payment, in terms of price or both (Bronfenbrenner, 1939). In fact, it is stressed by economists that labour market discrimination is often used as an instrument of divide and rule strategy by employers (Syzmanski, 1977).

The initial and the most dominant rationale of gender discrimination is given by human capital theorists Becker (1962) and Mincer (1962). Human capital theory of wage determination suggests that the observed gender wage differential is explained by the productivity differences between men and women. Gender discrimination arises when the wage difference occurs between equally productive female and male workers (taste for discrimination). Due to this gendered division of labour, women are less likely to invest in formal education compared to men, which will translate in lower salary. Thus, the human capital model explains the relationship between the demographic characteristics of the workers and the gender wage gap. Furthermore, Becker's (1971) discrimination theory and Mincer and Polachek's (1974) human capital theory attributes the gender wage gap to the endowment variations in individual characteristics. On the other hand, Bergman's (1974) crowding model explains that the employer's rational decision to hire a woman in the occupation is discriminatory, when the employer uses gender as the variable in the hiring process. Roemer (1979) suggests that if men can manage to penalize the authority that violates the concord against hiring women, then the gender discrimination will be reduced. However, in Indian labour markets the existence of such massive coordinated efforts for fighting gender discrimination is not currently plausible.

3. Literature Review

Some empirical studies conducted in India support the fact that there are human capital differences and existence of labour market discrimination (Madheswaran & Khasnobis, 2007). The typical model used by economists to analyse the GPG and its sources involves statistical decomposition of the total wage gap into two categories generally called explained or endowment, and unexplained or treatment components. The endowment effect explains that the wage gap is owing to differences in skills while

the unexplained or treatment effect postulates that wage differences arise owing to unequal gender treatment with otherwise equally productive workers. The results of all such studies indicate that a significant GPG does exist in India and discrimination revealed by the treatment effect is more prominent as compared to the endowment effect (Jann, 2008). Almost two-thirds (63.5%) of the GPG can be accounted for by discrimination, which is least at the beginning of one's career but widens with experience. More experienced women face higher inequality in pay (Duraisamy & Duraisamy, 1998). The human capital theory argues that women deliberately choose lower paying jobs, but an empirical study suggests that the greater part of the female earnings disadvantage lies in their poor wage position owing to wage discrimination and not in their occupational distribution (Madheswaran & Lakshmanasamy, 1996).

Majority of the empirical studies in India on GPG are based on data from different rounds of National Sample Survey Organisation (NSSO)[2] and using standard OLS regression. Gupta's paper tries to estimate the GPG using NSSO data and finds that GPG has declined over the years, from 58.9% (1999-2000) to 52.1% (2009-2010). Agarwal's study has examined GPGs for urban and rural population (33% and 19% respectively) using Oaxaca-Blinder decomposition method with NSSO data and asserts that pay gaps are because of labour market discrimination, but caste based discrimination is mostly because of endowment differences (Agrawal, 2013). Bhattacharjee et al., studied the evolution of GPGs in India for the time-period of 1983 to 2010 using NSSO and OLS regressions with variables like age, caste, place of residence, etc. Their results suggest that GPGs have narrowed over years, but are still high for illiterates and people with higher secondary education. The GPGs are also high for white collared jobs as compared to blue collared jobs, whereas the GPGs in the agricultural sector have not changed much over the years (Bhattacharjee, et al., 2015).

Some GPG studies have tried to study the effect of caste and religion on wages. Sengupta and Das have tried to estimate the GPG for women across various social and religious groups using the NSSO data with a Mincerian wage regression model. Their study shows that GPG has declined over the years (1993-94 to 2009-10). But the GPG is more amongst Muslim women than Hindu women and the GPG is less for ST[3] than SC women for the same time-period (Sengupta & Das, 2014).

Chakraborty has used similar methodology along with NSSO data, and has comparable results for religion and caste, but adds that education does not add much to the wages for women (Chakraborty, 2016).

A few others have tried to study the effect of geographical location and rainfall on GPG, again all using NSSO data. Mohanty, et al., have computed the state-level GPG for the salaried class in India using 2013 NSSO data. They found state-level variations in the GPG which were affected, majorly by the decision-making power of women (with respect to their own health, participation in major household decisions, big household purchases, etc.), to some extent by their labour supply decisions, but not much by skill level, education, health, etc. (Mohanty, et al., 2014). Mahajan and Ramaswami's study also uses NSSO data and formally tests the Boserup hypothesis. They emphasize that women have less opportunities in the non-farm sector and focuses on difference in wage rates of men and women because of geographical location, which can explain 55% of the GPG between northern and southern India (Mahajan & Ramaswami, 2017). Mahajan's study on rainfall shocks and GPG, again using NSSO data, confirms that female wages are vulnerable to rainfall shocks than male wages, but are less responsive to rainfall shocks with high literacy rates (Mahajan, 2017).

Others have tried to find the effect of trade liberalisation on GPGs. Reilly and Datta have tried to find some empirical evidence on the relationship between trade and GPG using NSSO data and Horrace and Oaxaca regression method. They have found that GPG decreases with an increase in the level of education, but have very little evidence of trade liberalisation measures affecting the GPG (Reilly & Dutta, 2005). Paul and Paul have tried to compute the effect of trade exposure on gender pay in India using the NSSO data and Oaxaca-Blinder method. They find that wage gap has decreased over the years for India as whole, but has increased for rural India while it has registered a fall for urban India with a significant impact of trade liberalisation (Paul & Paul, 2013).

There a few studies which have not used NSSO data to compute GPG in India. Agarwal and Vanneman have used the Indian Human Development Survey and the matching comparison method to find evidence of gender based pay gaps. They find that GPG declines with increase in the level of education, but the GPG is higher in the rural area compared to the urban area with strong evidence for labour market discrimination (Agrawal & Vanneman, 2014). Agarwal et al. have used data from Ministry of Labour and Occupational Surveys and focus on only on a few major industry groups and have found that wage discrimination based on gender is not very significant but occupational segregation is quite significant (Agrawal, et al., 2014). Solanki and Zankharia have found a GPG of Rs. 26 for migrant unskilled construction workers in Surat for the year 2013. Their study is based on stratified random sampling of 200 workers (Solanki & Zankharia, 2014). Gangopadhayay's theoretical model predicts that with technological progress women will start entering the non-

traditional professions, and GPGs will subsequently reduce but will result in an increase in sexual assaults (Gangopadhyay, 2015).

The Global Wage Report 2016-17 published by ILO has raised alarms with the revelation that the GPG in India, which stands at 30%, is one of the highest in the world (ILO, 2016). According to a report published by Korn Ferry Hay Group, women in India earn 18.8% less than men essentially because of less representation in top management roles (Hay Group, 2016). According to a report published by Accenture based on a global survey, women in India earn 67% less than men and have estimated that it will take more than 100 years to close the gap (Accenture, 2017).

Most GPG studies in India are limited to time, area of coverage, inter-industry comparison, etc. Majority of the studies concentrate on limited parameters and fail to provide a holistic picture. Very few studies have been able to provide a Pan India analysis, and most of them use NSSO data. This paper reinforces the conclusions of an earlier study by Varkkey and Korde (2013) along with an updated dataset till 2016 and uses OLS regression analysis to support the results (Varkkey & Korde, 2013)[4].

4. Possible reasons for the GPG in Indian Formal Sector:

The literature show that GPG exists in India, although the Constitution of India does not allow for any discrimination in the labour market[5]. Though the number of educated women entering the labour market has been on the rise in the past decade, the LFPRs for women have registered a fall. Our study is broadly in line with other studies, and its results reinforce our earlier study (Varkkey, et al., 2012). Some reasons for the existence of GPG in India are mentioned below:

- *Direct labour market discrimination:* people with same skill, education and work experience are treated differently only because of gender, i.e., they are paid different wages for the same work and/or there are different job requirements for the same pay level.
- *Occupational segregation:* women are mostly preferred for low paying jobs like secretaries, teachers, nurses, etc., and even within these jobs they are paid less than their male counterparts (IWPR 2009).
- *Undervaluation of women's work:* it is assumed that a woman's primary responsibility is that of unpaid care work (e.g., family care work), and it therefore seems natural to provide women with similar employment opportunites in the labour market (UNIFEM, 2005). Women in India contribute three times more than men to unpaid care work (ILO, 2016).

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[4] An earlier version of this paper by same the authors (Biju Varkkey and Rupa Korde) has been uploaded as a working paper on the WageIndicator Foundation website (www.wageindicator.org) for comments and feedback. Paycheck India project (www.paycheck.in), a research initiative an Indian Institute of Management, Ahmedabad, is a part of WageIndicator Foundation. Full details are available at http://www.wageindicator.org/main/Wageindicatorfoundation/publications/2013/gender-pay-gap-in-the-formal-sector-in-india-2006-2013
[5] Refer to Exhibit 1 and Exhibit 2 in Annexure 12.1

- *The selection effect:* women are often not given the choice of certain types of employment (occupation), but in most cases, it is employers who favour men workers over women workers. (Pertersen & Snartland, 2004).

- *Bargaining Power:* lack of bargaining power in the labour market, because of gendered division of work, and hence women are forced to take up low paying jobs.

- *Entry barriers:* women are also faced with entry barriers to the labour market, which affects their income growth and promotion prospects.

- *Requirements and duties of parenthood:* it may lead to gender bias in employment and as a result occurrence of GPG. With motherhood duties, women often prefer to take up part-time jobs or even consider a career break.

- *Return to labour market after career break:* women are often offered lower wages compared to their male colleagues and there is no guarantee of an equivalent position in the organization after their maternity leave (World Bank, 2016).

- *Women with no children:* women belonging to this category are not the first choice of the employers, since they are looked at as potential mothers (Goldberg & Hill, 2007).

- *Unmarried women:* often are refused job prospects because the chances of them quitting jobs on account of their marriage and wanting to relocate with spouse or may even take time off for marriage ceremonies are higher compared to men.

- *Social Fabric:* unfavourable social interactions on the job can lead to decreased efficiency at work. In Indian society, some male workers may become disgruntled when obligated to work with or take orders from women. Therefore, in the interests of productivity and profits, employers may decide to segregate men employees and women employees on the job.

- *Preconceived notions about women's productivity:* women are often not the first choice for promotion to higher positions in the occupational hierarchy, since they are thought to be less productive. This may result in most women crowding at the lower end of the occupational hierarchy[6].

All these factors and many more tend to increase the GPG (Education International, 2011).

5. **Hypothesis**

- There exists a gender pay gap in the Indian organised labour sector.
- Gender has a significant relationship with the gross hourly wage for every individual, controlling for other factors such as years of experience, marital status, industry and level of education.

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[6] Bergmann's crowding model (1974).

6. Data

This research paper uses data collected from the continuous and voluntary Paycheck India web survey (www.paycheck.in) that is posted in English and Hindi. The questionnaire is uploaded on the website and the survey is answered through a process of non-controlled self-selection, whereby some individuals complete the questionnaire others don't[7]. *"The survey has detailed questions about earnings, benefits, working conditions and employment contracts, as well as questions about education, occupation, industry and household characteristics"* (Tijdens, Zijl, Klaveren, & Steinmetz, 2010), (Guzi & Pedraza, 2013)[8].

In 2000, the WageIndicator project (www.wageindicator.org) started as a paper-pencil survey for establishing a website with salary information for women's occupation in Netherlands. By 2015, it developed into an online data collection tool hosted in over 80 national websites with job-related content, labour law and minimum wage information, collective bargaining agreements, public sector wages, and a free and crowd-pulling salary checker presenting average wages for occupations. World-renowned universities, trade unions and employer's organization assist the WageIndicator project.[9]

The primary data for this report is based on a voluntary online salary survey conducted by Paycheck India[10]. After cleaning the data for outliers and missing data, of the online responses obtained through the survey, 20,701 were males and 4,150 were females over 9 years spread across India. Respondents came from different age groups, varied industries, and various hierarchical positions in their respective occupations. The year-wise gender distribution of the overall respondents during the period of survey shows that the ratio of male to female respondents has been 5:1 on an average. Literature shows that the effect of gender may vary based on various factors. Keeping these in mind, we have decided to focus on the organized labour sector only and attempted to understand the effect of changes in gross hourly wage rates. The data is cross sectional and all variables have been taken in absolute values.

Being an online volunteer survey, the dataset is biased towards those people who have access to the Internet and are inclined to complete the questionnaire. Because of this limitation, the dataset captures responses from the organized sector in India.

Table 1 gives us a broad overview of the dataset and shows the demographic and occupational profile of the respondents. It clearly shows that the minimum gross hourly wage in our dataset is Rs. 40.03

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[7] This section "Survey Design and Data Collection" is same for all the papers that used Paycheck.in Salary data. This section describes the methodology of survey and data collection from http://www.paycheck.in/main/career-tips/research-publication

[8] *"Detailed information about WageIndicator project, the web survey, the questionnaire and a description of variables can be found on Wage Indicator website"*

[9] The above paragraphs are standard explanation in all wage indicator and paycheck publications.

[10] For more information about Paycheck India please visit http://www.paycheck.in/main/about-us

and the maximum is Rs. 15011.55 per hour. The mean wage is Rs. 718.85 per hour. The age variable is set between 18 years and 60 years only, as this is the working age in India. The mean age is 31.53 years and mean of years of work experience is 8.53 years.

7. **Analysis of Gender Pay Gap in India – Median Hourly Wage**

The GPG is computed according to the formula:

$$\text{Pay Gap} = \frac{\textit{Median wage}_{\textit{female}} - \textit{Median wage}_{\textit{male}}}{\textit{Median wage}_{\textit{male}}} * 100\%$$

It can be interpreted as the percentage difference between female and male median wages (CELSI, 2012)[11]. During the data analysis only those variables were considered where there were sufficient numbers of female observations.

7.1. *GPG in India (2008 – 2016)*: To analyze the pay differentials between males and females, and to know the parity between the salaries of both the genders, year-wise data were analyzed as seen in Table 2. The results showed an astonishing gap of 67.27% before 2009 (females earned less than males). Though this gap has been constantly shrinking since 2010, the gap continues to be at a disturbing rate of 36.12% in 2016. These figures point to the fact that unless there is drastic action taken by the government, achieving pay equality as a matter of normal progression appears to be a distant dream.

7.2. **GPG across Indian States:** The Indian Union is made up of 29 states and 7 union territories. The states enjoy political and administrative freedom while working within the framework of the constitution. Nonetheless, there are huge differences between the states in terms of social, cultural and economic setup. Analysis of Paycheck data clearly shows that the GPG varies across Indian states[12] as seen in table 3. For the purpose of our analysis, the Indian Union has been divided into six zones – North (Himalayan), East, West, South[13], Central (the Plains) and North-East[14] as seen in Table 4.

Reasons:

- Difference in gender sensitivity perceptions
- Prevalence of different customs across different states
- Variations in LFPR rates in different states (CSO, 2006)

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[11] The formula used here for computation of GPG is used in various reports published by WageIndicator Foundation, Amsterdam (www.wageindicator.org).
[12] Only those states are considered for this analysis, which has sufficient number of female observations.
[13] For this paper, Telangana and Andhra Pradesh are considered as one State.
[14] In the light of the vision of Jawaharlal Nehru (first Prime Minister of India), five Zonal Councils were set up vide Part-III of the States Re-Organisation Act, 1956 (Ministry of Home Affaris, 2010).

- Cultural restrictions with respect to women participating in labour market (Dreze & Sen, 1995), (Dunlop & Velkoff, 1999), (Nihila, 1999)

7.3. GPG with respect to age: Generally, with increase in age, one would expect to see an increase in pay, and GPG to narrow down. But the Indian socio-economic structure does not guarantee same wages for workers of similar age, especially men and women. Table 5 shows GPG with respect to age.

Reasons:

- *Relatively low GPG for age group below 30 years[15]:* proportion unmarried women higher (possible explanation also seen in GPG with respect to marital status).
- *Relatively high GPG for age group 30-50 years[16]:* women take up multiples roles, try and balance family and work, take career breaks, etc.
- Greater the number and duration of career break(s), lower bargaining power in the labour market.
- *Positive GPG for age group above 50 years:* only those women, who have a need to work or want to work, may engage themselves in the labour market and thus have higher bargaining power.

7.4. GPG with respect to educational qualification: An analysis of the GPG with respect to educational qualifications is shown in Table 6. It is seen that women attaining higher educational qualifications, stand a higher chance of facing discrimination as in the case of four and five year degrees and masters' degrees. Women are generally preferred for low paying jobs, which require lower educational qualifications, and thus women earn about 50% more than men for such jobs.

Reasons:

- *Human capital discrimination:* women have less access to productivity increasing opportunities such as formal schooling or on-the-job training[17] (World Bank, 2012), when compared to men.
- *Pre-market discrimination:* often women, especially in India, (UNICEF, 2003) can obtain just basic education[18] (that too with a lot of difficulty, given that the female literacy rate in

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[15]In most cases, unmarried women are in age group of below 30years.
[16]Career breaks because of child bearing and child rearing.
[17]Some women face pre-market discrimination and are not able to continue their education further. In India, it is usually a custom for parents decide the future for their daughters. The average age of marriage in India is 18.3 (UNICEF, 2001) (though it has been increasing over the years with social and cultural reforms). Parents even decide about the groom and time of marriage in India. This results in an abrupt end to further education for most women in India. In other cases, people anticipate post-market discrimination and choose not to invest further in education especially for women.
[18]In India, education equivalent to Plus 2 is considered as very basic education whereas post-graduate programmes are considered as higher education. Higher education attainment means advanced knowledge and skills, which enables individuals to earn higher wages in the labour market.

India is merely 65.46%) (National Comission on Population, 2013). Additionally, women typically only have access to education of an inferior quality as compared to men[19].

7.5. GPG with respect to Industry: The jobs taken up men and women are often different, whether they are across sectors, industries, occupations, types of jobs, or types of firms. In India, all industries (except agriculture) face a GPG crisis as seen in Table 7.

Reasons:

- *Gender segregation:* women not only in India but across the globe seem to be concentrated in low paying and low productivity jobs (World Bank, 2012).

7.6. GPG with respect to work experience: Human capital can be gained not only by investing in education but also through work experience. It is expected that over a period, people with the same amount of work experience should be paid similar salaries. This also assumes that education/skill levels are congruent. The analysis shows a rather unexpected trend, as depicted in Table 8.

7.7. GPG with respect to marital status: Marital status also determines the amount of wages paid to an individual, especially to women as seen in Table 9. GPG is higher for married women than unmarried women.

Reasons:

- *Elasticity of labour supply curve*: women tend to have less elastic labour supply curve, and hence are paid lower wages[20].
- *Mobility*: women generally have less geographical and occupational mobility[21].
- *Occupational segregation*: women do not have access to a wide range of occupations and jobs as men.
- *Responsiveness to wage change*: women do not change jobs as quickly as men because of increase in wages.
- *Unionization:* women have a lower tendency to join unions and have lesser bargaining power[22].

7.8. GPG with respect to skill level: It is evident from Table 10 that the GPG is high for unskilled jobs and skilled jobs, it widens further for highly skilled jobs.

Reasons:

- *Level of skill*: women are not preferred for skilled or high skilled jobs.

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[19]In India, due to social factors there is a preference for a male child and hence, more care is taken of the male child.
[20] It should be noted that in this model, the employer need not be prejudiced towards hiring male employees.
[21] For example, if a woman's husband has a job in a particular locality, she may be unwilling to accept a job in another locality.
[22] The significance of this is that union reduces monopsonistic employer's ability to exploit workers.

- *Association between level of skill and jobs*: women are mostly crowded in lower paying jobs, since they are offered only low skill jobs.
- *Disadvantaged group*: It is also easy to pay less to a disadvantaged group or less preferred group (Milgrom & Oster, 1987).

The above GPG mentioned till now is in terms of percentage. To get a better understanding we also calculate the pay gap in absolute values by regression analysis.

8. Methodology

For analysis, an OLS regression model is used commonly (for the benefit of coefficient interpretation), as it will further highlight the variables which are significant and tell us how it impacts hourly wages (Blau & Beller, 1988). Literature suggests that *"treating the aggregated answers as continuous variables leads to the same conclusions. The results from the analysis cannot be interpreted in a causal way because these data sets do not follow the same individuals each year, and therefore the analysis does not correct for unobserved individual effects"* (Guzi & García, 2015). All variables are taken as absolute values. While the aim is to find the effect of gender on the gross hourly wage rate, all other variables will be controlled for in the analysis.

8.1. Variables

8.1.1. Dependent Variable

wagegrhr – gross hourly wage variable is the dependent variable for our research. In the 'paycheck' survey individuals were asked to enter their wage per hour not accounting for the tax they pay on it.

8.1.2. Independent Variables

- *gender* – the variable is binary. 0 is male and 1 is female. As stated in the hypothesis, it is expected that with an increase in the value of gender; i.e. if the value changes from 0 to 1 there will be a decrease in the wage. Thus, in regression analysis if the coefficient is negative then it would signify that the GPG exists and men are paid higher than women.
- *educat1* – signifies education qualification. There are 12 options an individual can pick from thus it is a categorical variable. The options are as follows: no education, below 10 (10th grade or lower), plus 2 (12th grade/ high school), 3-year degree (B.A., B.B.A., B.Com., etc.), 4/5-year degree (B.Tech., B.Arch., L.L.B., etc.), C.A./C.S. (Chartered Accountant/ Company Secretary), masters (M.Sc., M.Tech., etc.), advanced diploma, I.T.I. (Industrial Training Institute degree), Ph.D., post doctorate and others. Dummy variables were generated for all the aforementioned categories for the purpose of analysis. This is done to analyse the effect of individual categories

on the hourly wage for an individual. Ideally there should not be any pay gap as the education qualification rises.

- *age* – it is expected that with an increase in age, wages rise. This variable is a continuous variable. The working age in India is 18 years and retirement age is 60.

- *tenuexpe* – indicates years of experience. Logically, with an increase in work experience, wage is expected to rise. As one gathers more knowledge about the industry, he or she will be able to earn higher. Years of experience is a continuous variable.

- *nace2001* – denotes type of industry. The organised labour sector is divided into 20 categories in the 'Paycheck' survey. Every individual has the following options to choose from: Agriculture, Mining, Manufacturing, Power, Water/Waste Management, Construction, Wholesale/Retail, Logistics, Hospitality, IT, Finance, Real Estate, Technical, Administrative, Defence, Education, Social Work, Entertainment and Others. Dummy variables were generated for all the mentioned categories for analysis. This is done to analyse the effect of individual categories on the hourly wage for an individual in each of the industry, as all industries have different characteristics and will lead to a varied pay gap.

- *married* – this variable denotes whether one is married or not and is binary. If the individual is married then it records as 1 else 0. Generally, it is expected that married men and women will earn a higher wage as they will be more stable and certain about their future.

8.2. Description

Step 1 Two sample t-test: A basic two sample t-test was done to find the difference if any between the two gender groups in their wages.

Step 2 OLS: An ordinary least squares form of linear regression model would give us an estimate and a level of significance of each of the variables considered and hypothesized. Thus, regression was carried out, keeping note of multi-collinearity in the model.

Step 3 Variance inflation factor: Once the regression model is run, it is important to test it for variance inflation factor. The variance inflation factor provides us with a clearer representation of the model. It indicates how much the coefficients of the predictor variable are inflated compared to the same when the model is non-linear; giving an insight to collinearity in the model.

Step 4 Cross tabulation: Finally, cross tabulations are prepared by running various regression equations with multiple combinations of education qualifications and type of industry. This provides us a holistic picture of the absolute difference and a combination of differences across the organised Indian labour market.

It is important for us to realise that this empirical research focuses on two different parts of GPG. The former provides us with the percentage difference in the median wages with respect to variables

chosen in the analysis. The latter concentrates on the absolute difference between the wages of men and women. This helps us realise the magnitude of the gap whereas the former helps us to identify the gaps more clearly.

8.3. Regression Model

We have used multiple models across the paper:

Model 1: For OLS regression (Blau & Kahn, 2003)**:**

$$wagegrhr = \alpha + \beta_1 gender + \beta_2 age + \beta_3 tenuexpe + \beta_4 married$$
$$+ \beta_5(educat1\ variable\ list) + \beta_6(nace2001\ variable\ list)$$

Model 2: For Cross-tab for absolute gender pay gap:

$$wagegrhr = \alpha + \beta_1 gender + \beta_2 tenuexpe + \beta_3(educat1\ variable\ list)$$
$$+ \beta_4(nace2001\ variable\ list)$$

The educat1 and nace2001 variable list was run for all levels of education and industries.

8.4. Results and Discussion

Results from the two-sample t-test confirm that there exists a pay gap when it comes to gender. We see that the difference in means is Rs. 151.80, which also represents the absolute difference in gross hourly wage rate in table 11, amounting to ~Rs. 31,208 per month[23]. Evidently the GPG is vast and demands further analysis.

OLS regression is presented in table 12. It is evident that there exists a GPG. Accounting for all the controlling variables mentioned earlier we see that the gender coefficient is -91.98 in table 3, suggesting that in the organised labour sector women are paid ~Rs 19,132 per month[24] (Rs. 91.98 per hour) less than men. Age does not play a major role in gender wage gap as the coefficient is close to 0. Years of work experience and marriage are highly significant as the variables have a p-value of < 0.0005. We see that with an increase in work experience the pay does increases. However, when it comes to marriage in the Indian context, women who are not married are not paid well as their future is uncertain, in keeping with the general labour market convention.

Regression analysis also gives us wages earned per hour for particular industry and level of education qualification. We see that most of the lower education qualifications such as no education, below 10, plus 2 and 3 year degrees are associated with a lower hourly wage. This is expected as by applying simple logic one can say that if an individual is not educated the wages earned will be lower,

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[23] It is influenced by sample characteristics, for the high paying managerial occupations/jobs. For lower levels, monthly salary will be lower than that. Which are a part of the survey. Law of averages. But there exists a gap.
[24] Calculation: Rs. 91.98 per hour * 8 hours per day * 26 days per month = ~ Rs. 19,132

irrespective of gender. Similarly, a different interpretation can be chalked out based on industries. To understand the effects of educational qualification and industry specific pay gaps a further regression study is done below.

For further check, a variance inflation factor (VIF) is calculated for every single variable used in the regression model. Table 13 below shows the VIF for each variable. Results indicate that the model is a relatively good fit with VIF for almost all variables being less than 10. Only 5 variables which are master, deg45y, deg3y, it, manufact have a high variance inflation factor suggesting that the regression coefficients might be inflated and the predictor variables are not linearly related.

After a collinearity check we can drop the age variable as we see collinearity existing with years of work experience. Graph 1 expresses the mentioned relationship. The collinearity value is ~0.89 between age and years for work experience.

As mentioned earlier a cross-tab is prepared by the multiple regression model as represented in table 14. There exists a GPG even with the same educational qualification and working in the same industry:

- In the agricultural sector, men earn more than women. Even after a 4/5-year degree women earn Rs. 411.50 less than men per hour.
- Mining, manufacturing, power and water/waste management have a similar outcome to that of agriculture; men have been earning more than women throughout.
- Sectors like construction have a gap of Rs. 472.40 even after a masters' degree.
- Parallel comparisons can be made with educational qualifications. If one looks at the column of masters or advanced diploma in Table 14, we realise that men still earn more than women.
  There are some positives for women when it comes to the GPG:
- There are pockets created where women are earning more than men. However, this is a very marginal amount when compared to the pay gap in favour of men.
- In sectors like social work, administrative jobs and technical services, women have a higher wage per hour than men. Though not consistent but after an advanced diploma women receive Rs. 114.60 per hour more than men in administrative jobs.

Crowding down effect is observed, where women are increasingly moving out of front-end and customer interface jobs to back-end jobs. Gender stereotyping has led to women being concentrated in certain industries and they are not preferred for highly skilled jobs, making the glass ceiling even harder.

8.5. Limitations and future prospects

Omitted variables play a vital role in such analyses. As mentioned earlier, some variables were removed from our models as they did not fit well in the regression equation. An omitted variable bias exists which surely affects the model. Some variables are mentioned below which could have been added to the model if available (variables mentioned under socio-economic factors).

Moreover, our analysis is based on national level data. Such an investigation would be substantially more accurate and strong with the usage of individual level data, as that would clearly display what causes these individuals to have a pay gap due to gender. National level analysis is a much wider and broader aspect to look at. Interstate differences themselves are high, with each having varied characteristics for jobs and dominating industries.

Further, more socio-economic household factors can be accounted for in further studies if this information for the individuals were present. Information like total household income, parental education, number of children, etc. would surely better the model.

Multicollinearity is faced as certain predictor variables in OLS regression model are highly correlated and thus must be removed from the model completely. It is assumed that the cause and effect relationship between the variables remains unchanged.

Another very important point to be reflected upon in the research is that the data are censored. The data are highly skewed due to the nature of wage itself. As we consider higher wages, the number of observations for that bracket starts reducing. The kernel density graph clearly depicts the same as seen in Graph 2.

Therefore, we need to find a better model that fits the same. Censored modelling will be done in the near future. Also, there is a selection bias which interferes with our research. A Heckman selection model will be run to help us eliminate the selection bias. Though the aim of the paper is not to decompose the model for finding how wage is predicted, we plan to run the Blinder-Oaxaca decomposition which will help us explain the difference in means of the dependent variable with respect to the model components.

9. Innovative ways to close the gap and Policy Recommendations

We know that GPG exists in every part of the world, and India is no exception. When we delve deeper in the literature, we find that no single country has been able to close down the GPG entirely, but most them are attempting to narrow the gap as far as possible (Tijdens & Klaveren, 2012). But this cannot happen without simultaneous interventions at various levels. Thus, we have provided concrete and

innovative policy recommendations to enable Indian women and men to overcome gendered barriers in the labour market (Matejczyk, n.d.; Lam, 2016; and Holmes & Corley, 2017).

9.1. Government Level:

- Watch the GPG on continuous basis and intervene proactively, rather than reactively. A robust system for continuously monitoring wage levels and computing the gaps may be set up by the government.

- The government should officially publish GPG data, which will increase the awareness and mechanisms to reduce the gaps.

- India has one of the most progressive HR policies which are women friendly, in terms of 6-month maternity leave for all organizations and 2 years' child care leave for women in government jobs. Such policies have influenced the private sector also, with more and more firms introducing more liberal benefits for women.

- The government should strengthen compliance to equality, and since it is illegal for any organization to pay men more than women for the same job under Equal Remuneration Act, 1976. The scope of Equal Remuneration Act, 1976 should be enhanced to cover all the levels of employment.

- Revisit the Equal Remuneration Act, 1976. Understand the reasons why it is not working and create a reporting mechanism.

- As a step to improve gender representation, the Companies Act 2013 has made it mandatory to include at least one female member on the board of directors for publicly listed companies in India. But the representation of women board members is still only 11.2% for Indian firms, suggesting that India's performance is still far below average. Many firms face challenges in finding suitable women talent

- Under the Factories Act, the crèche (child care facility) rule is currently applicable based on number of women employed. We suggest that it should be gender neutral. Keeping in view the social realities, men also bring their kids to work in many cases, where both parents are working.

9.2. Organizational Level:

- Mechanisms which encourage transparency in salary reporting across all levels and tackle discrepancies in the same should be introduced.

- Organizations also must critically examine GPG and strive that it does not exist at any level.

- Organizations need to approach recruitment and promotion with more sensitivity, and move away from gender stereotypes (Comment made by Satya Nadella, Microsoft CEO, during a visit to India "*women should trust karma instead of asking for pay raises*". Later, he and the company apologised for the comments, (Chowdhry, 2014))

- Very few women are promoted to higher levels in organizations, who then become 'poster girls' for the organisation instead of addressing the issue of inequality. Rather a policy of proportionate

employment and opportunity needs to be implemented. A meaningful progression plan for the employees should be in place to build culture and career paths.

- Focused programs for women development and empowerment (Cummins India Ltd. encouraging women to take up engineering jobs and GE's Balancing the Equation Campaign).

- Work design should offer workplace flexibility along with client site flexible work arrangements, subject to suitability to the firmThe work environment should be made less intimidating for women in traditionally male dominated professions like finance, executive management, engineering, etc.

- Organizations should promote a diverse and more inclusive environment by engaging women in both senior and leadership roles. Organizations should create a culture which can acknowledge all employees, preserve individuality and animate networking and life-long earnings.

- Across all sectors, women, both mother-to-be and mothers, can be given better maternity leave policy arrangements, flexible working hours and if not free, at least affordable child care. Women need not bear the 'motherhood penalty' by taking time off, reducing work hours or quitting their job to take care of their children.

9.3. Academic Level:

- Expanding and encouraging efforts for pay data collection and reporting (Paycheck India and WageIndicator.org are examples) and research with the aim to create more transparency in the labour market, along with regular gender audits.

- Programs to sponsor women's education and provide them with unbiased training should be encouraged.

- Second opportunity programs, especially for women who join the workforce after a career break, need to be encouraged (Tata's Second Career Internship Program).

- Formal mentorship programs for women can be created in organisations.

- Universities/colleges can take lead in creating formal support networks for women, which can give them access to crucial information regarding jobs and promotions.

- Academic policies to encourage women to take up careers in STEM, and other major profitable areas.

9.4. Individual Level:

- Women need to show openness to risk taking and venture into non-traditional occupations and roles.

- Women should be willing to take chances with their second opportunities, and not shy away from different job options available in the labour market. There are several programs (Tata's Second Career Internship Program) and agencies (AVTAR Career Creators) which help women to achieve meaningful second careers, but they need to work hard to become more aware and use opportunities

- Women should also be willing to take more responsibilities at an individual level or even while making conscious job choices.

9.5. Society Level:

- The society needs to change its mind-set and be open towards women working in industries which are traditionally not women oriented (STEM).

- Family responsibility and unpaid care should be promoted as joint responsibility of couples rather than imposing the entire burden on women, a movement of non-market jobs to market jobs must be created for women.

- Encourage women to take up jobs that pay more and with higher growth prospects.

- Encourage women to take up full-time jobs instead of part-time jobs and enhance their earnings.

- Women are not looked at as good negotiators, and thus it results in widening the GPG. This perception needs to change and for that, women need to proactively seek information, learn and engage in negotiation, rather than accepting what is given or even underselling themselves.

- Tt is falsely assumed that mothers might not be as good at their jobs, as they were before their pregnancy and thus, will not work as hard as men and thus, should not expect employment or promotions. However, the assumption is not data based – but a continued rhetoric, supported by anecdots or partial information. Conclusions based on emperical study about productivity gaps, and if it exists, the reasons for the same can help to arrive at a realistic picture.

10. Conclusion

Although disheartening, GPG does exist in India. Paycheck data and its analysis have given us insights to show that the gap exists with two effects. One being positive that clearly indicates the GPG to be narrowing but still high and requiring immediate policy interventions. The other being, gender stereotyping, where women are traditionally offered only certain types of jobs. More women choose soft specializations in human resource roles and administration, because they are more female friendly. Even the organizations that are trying to improve women ratio in the workplace, are hiring women for backend jobs. This can be termed as blatant discrimination. The side effects of such a policy can only be addressed by transparency and education. Since this gap is neither good for gender equality nor for women empowerment.

Looking at the GPG figures in India, unless there are focused policy-level interventions, achieving equality in pay as a matter of normal progression seems to be a distant dream. The Constitution of India does promise equality in all aspects to its citizens, irrespective of any characteristic. But there still exist vast differences in socio-economic aspects, which imply a direct violation of basic rights, especially when it comes to not giving equal opportunity and equal pay to women who choose to work in the organized sector. By denying equality to women, the nation is not harnessing the potential

of its labour force to the fullest. At the same time, it should also be noted that policy interventions should focus on programs that encourage and support women to make their mark in the world of work.

Apart from constitutional provisions, there have been administrative actions initiated in that direction. For example, the government has tried to set norms that would limit discrimination of employees through the Sixth Pay Commission (Ministry of Finance, 2008). With a continuously growing private sector (Economic Survey, 2013) in India, firms will have to formulate their policies such that the gap-induced limitations do not contaminate the labour market.

Despite the efforts of the government, over time, the GPG has become institutionalized, a matter of grave concern. But the time has come now that we should focus on trying to reduce its impact on society. If these issues are not contained as a matter of urgency, then the problem of the GPG is likely to be further aggravated. Thus, policy-level interventions will have to be complemented with changes in socio-cultural factors as well.

"*Business, Government, International organizations and Academia all have an important role to play in closing the gender pay gap. Collaboration among these organizations is key to providing the right opportunities, environments and role models to lead the way for change*" (Accenture, 2017). These gaps can only be addressed if the results are made a part of the official reporting by NSSO. This in turn would help in tracking the problem and designing policies to fill up the gaps. Diversity and equity is required both, at an organizational and individual level along with acceptance. There are positive trends, but much more needs to be done.

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Annexure

11.1. Exhibits

Exhibit 1: Articles of the Constitution of India

Article	Description
Article 14	Men and women to have equal rights and opportunities in the political, economic and social spheres.
Article 15(1)	Prohibits discrimination against any citizen on the grounds of religion, race, caste, sex etc.
Article 15(3)	Special provision enabling the State to make affirmative discriminations in favour of women.
Article 16	Equality of opportunities in matter of public appointments for all citizens.
Article 39(a)	The State shall direct its policy towards securing the right to means of livelihood for all citizens, men and women, equally.
Article 39(d)	Equal pay for equal work for both men and women.
Article 42	The State to make provision for ensuring just and humane conditions of work and maternity relief.
Article51(A)(e)	To renounce practices derogatory to the dignity of women.

Source: Report of the Working Group on Empowerment for Women for the XI Plan, Ministry of Women and Child Development, Government of India (Planning Commission, 2006).

Exhibit 2: Acts passed by the Government of India for the Labour Market

Workmen's Compensation Act, 1923 This Act was aimed at providing financial protection to the workman & his/her dependents in case of accidental injury by means of payment of compensation by a certain class of employers. Due to the difference in bargaining power, there are chances that the woman may be subject to exploitation.
Minimum Wages Act, 1948 In accordance with Article 39 of the Constitution, this Act was passed to provide for a statutory fixation of minimum wages, since workers are poorly organized and have less bargaining power. It provides for fixation of minimum wages by the government for employment and provides for machinery for fixing and revision of minimum wages.
Factories Act, 1948 This Act was introduced to regulate the condition of labourers employed in factories. However a number of provisions relating to safety, health & welfare of the workers are generally found to be inadequate in view of the large and growing industrial activities.
Contract Labour (Regulation and Abolition) Act, 1970 This Act provides for the separate provision for utilities and fixed working hours for women.
Equal Remuneration Act, 1976 This Act provides for equal pay to men and women for equal work. Article 42 of the Constitution states that the State shall make provisions for securing just and humane conditions of work and provide for maternity relief. This act was enacted keeping in mind the unequal physical & sociological burden a woman faces at the time of child bearing and rearing.

Source: Planning Commission, 2006

11.2. Tables

Table 1: Descriptive Statistics

Demographic Profile		
Variable	Minimum	Maximum
gender	Male = 20701	Female = 4150
age	18	60
married	Currently Not Married = 9880	Currently Married = 14971
Occupational Profile		
Variable	Minimum	Maximum
wagegrhr (Mean = Rs. 718.85)	Rs. 40.03	Rs. 15011.55
educat1	11 categories (mentioned in the variable description)	
Tenuexp (in years)	0	42
nace2001	20 categories (mentioned in the variable description)	

Table 2: Year-wise GPG Analysis

Year	Male		Female		% difference in salary of females from males
	Median Salary (per hour in Rs.)	Count	Median Salary (per hour in Rs.)	Count	
2008	282.35	2341	205.29	427	-37.54
2009	241.44	1902	144.34	306	-67.27
2010	240.57	4474	159.17	832	-51.14
2011	204.07	4441	138.57	881	-47.27
2012	181.13	2264	122.70	516	-47.62
2013	251.89	2401	168.40	357	-49.58
2014	279.06	1349	187.43	378	-48.88
2015	219.20	1162	164.23	349	-33.47
2016	200.02	367	146.94	104	-36.12

Table 3: State wise GPG Analysis

State	Male Median Salary (gross hourly wage in Rs.)	Female Median Salary (gross hourly wage in Rs.)	% difference in salary of females from males
Andhra Pradesh	225.28	153.96	-46.32
Arunachal Pradesh	173.21	115.47	-50.00
Bihar	173.21	1176.15	85.27
Chandigarh	181.99	96.72	-88.16
Chhattisgarh	123.72	106.42	-16.26
Delhi	236.08	166.73	-41.60
Goa	155.87	150.71	-3.42
Gujarat	151.77	95.27	-59.31
Haryana	300.23	200.92	-49.43
Himachal Pradesh	144.34	84.49	-70.83
Jammu & Kashmir	213.84	92.72	-130.63
Jharkhand	177.93	125.26	-42.04
Karnataka	334.87	205.29	-63.13
Kerala	179.35	124.57	-43.97
Madhya Pradesh	146.41	124.65	-17.46
Maharashtra	246.34	163.02	-51.11
Orissa	173.31	139.53	-24.21
Pondicherry	230.95	77.56	-197.76
Sikkim	178.98	179.88	0.50
Tamil Nadu	209.38	148.19	-41.29
Uttarakhand	97.19	72.39	-34.27
Uttar Pradesh	168.33	144.34	-16.62
West Bengal	170.32	120.28	-41.61

Table 4: Region wise GPG Analysis

Region	Male		Female		% difference in salary of females from males
	Count	Median Salary (gross hourly wage in Rs.)	Count	Median Salary (gross hourly wage in Rs.)	
Southern India	6952	259.82	1338	173.55	-49.71
North-Eastern India	310	125.37	110	70.42	-78.03
The Plains	4980	210.95	759	144.34	-46.15
Eastern India	1284	167.71	279	125.70	-33.42
Western India	6914	218.32	1622	145.17	-50.38
Himalayan North	261	134.72	42	78.52	-71.57

Table 5: Age-wise GPG Analysis

Age Group	Male Median Salary (per hour in Rs.)	Female Median Salary (per hour in Rs.)	GPG (in %)
Less than equal to 25	116.00	178.17	34.89
Greater than 25 Less than equal to 30	207.80	156.69	-32.62
Greater than 30 Less than equal to 35	299.86	201.86	-48.55
Greater than 35 Less than equal to 40	328.29	240.72	-36.38
Greater than 40 Less than equal to 45	305.97	228.44	-33.94
Greater than 45 Less than equal to 50	325.47	220.48	-47.62
Greater than 50	337.66	368.02	8.25

Table 6: Educational Qualification GPG Analysis

Highest Level of Education	Male		Female		% difference in salary of females from males
	Median Salary (per hour in Rs.)	Count	Median Salary (per hour in Rs.)	Count	
No formal education	91.42	63	80.83	11	-13.10
Below 10th standard	107.99	106	245.87	12	56.08
Plus 2 or equivalent	97.60	627	90.45	67	-7.90
Three-year degree (B.com., B.B.A., B.Sc., B.A. etc.)	143.30	4286	120.34	858	-19.08
CA/CS/ICWA or equivalent	415.70	595	242.17	106	-71.66
Four/five years' degree (B.E., M.B.B.S, B.Arch., B.Pharm., L.L.B, etc.)	317.55	5734	227.82	623	-39.39
Masters (arts, science, engineering, commerce, MBA/equivalent)	256.61	7808	147.23	2201	-74.29
Advanced certificate/diplomas	178.02	898	168.83	187	-5.45
ITI/other certificates	93.82	235	262.70	12	64.29
PhD or equivalent	384.91	160	235.76	46	-63.27
Post-Doctoral	415.70	58	375.39	7	-10.74
Other education	155.89	131	151.00	20	-3.24

Table 7: Industry-wise GPG Analysis

Industry	Male		Female		% difference in salary of females from males
	Median Salary (per hour in Rs.)	Count	Median Salary (per hour in Rs.)	Count	
Agriculture, forestry and fishing	140.01	168	175.21	32	20.09
Mining and quarrying	276.04	131	243.78	25	-13.23
Manufacturing	202.17	4585	121.25	675	-66.74
Electricity, gas, steam and air conditioning supply	253.49	228	176.80	24	-43.37
Water supply; sewerage, waste management and remediation activities	198.11	74	149.30	14	-32.69
Construction	193.42	1144	122.99	174	-57.26
Wholesale and retail trade; repair of motor vehicles and motorcycles	164.76	933	141.13	185	-16.74
Transportation and storage	178.98	537	147.81	93	-21.09
Accommodation and food service activities	134.72	333	119.67	106	-12.57
Information and communication	330.67	5023	208.95	889	-58.25
Financial and insurance activities	285.29	2522	233.89	463	-21.97
Real estate activities	207.37	229	124.43	60	-66.65
Professional, scientific and technical activities	230.95	2370	150.62	605	-53.33
Administrative and support service activities	155.66	698	131.22	173	-18.62
Public administration and defence; compulsory social security	165.43	115	167.94	28	1.50
Education	161.02	683	132.58	299	-21.45
Human health and social work activities	169.74	544	118.96	184	-42.68
Arts, entertainment and recreation	243.69	152	125.86	40	-93.62
Other service activities	142.02	202	106.24	67	-33.68
Activities of households as employers	106.20	30	86.28	14	-23.09

Table 8: Work Experience GPG Analysis

Work Experience	Male Median Salary (per hour in Rs.)	Female Median Salary (per hour in Rs.)	% difference in salary of females from males
Less than equal to 5	154.87	120.05	-29.01
Greater than 5 Less than equal to 10	277.86	186.70	-48.83
Greater than 10 Less than equal to 15	333.26	246.30	-35.31
Greater than 15 Less than equal to 20	335.77	222.65	-50.81
Greater than 20 Less than equal to 25	311.81	258.10	-20.81
Greater than 25 Less than equal to 30	288.89	270.90	-6.64

Table 9: Marital Status GPG Analysis

Marital Status	Male		Female		% difference in salary of females from males
	Median Salary (per hour in Rs.)	Count	Median Salary (per hour in Rs.)	Count	
Not Married	173.21	7901	128.30	1982	-35.00
Married	278.58	12800	183.71	2168	-51.64

Table 10: Skill Level: GPG Analysis

		Gender				% difference in salary of females from males
		Male		Female		
		Gross HOURLY wage in nat. currency		Gross HOURLY wage in nat. currency		
		Median	Count	Median	Count	
ISCO 2008 skill levels 1 - 4	Unskilled	114.34	790	76.42	276	-49.63
	Semi-skilled	106.59	1968	92.38	387	-15.38
	Skilled	240.57	6949	168.40	1290	-42.86
	Highly skilled	259.82	10994	166.79	2192	-55.77

Table 11: Two sample t-test

```
   Group |     Obs        Mean    Std. Err.    Std. Dev.    [95% Conf. Interval]

       0 |   20701    744.1982    9.120898       1312.3     726.3206    762.0759
       1 |    4150    592.4029    18.54912     1194.943     556.0367    628.7691

combined |   24851    718.8491     8.21265     1294.659     702.7519    734.9464

    diff |            151.7953    21.99888                  108.6762    194.9144

    diff = mean(0) - mean(1)                                    t =    6.9001
Ho: diff = 0                                  degrees of freedom =      24849

   Ha: diff < 0                 Ha: diff != 0                    Ha: diff > 0
 Pr(T < t) = 1.0000      Pr(|T| > |t|) = 0.0000          Pr(T > t) = 0.0000
```

Table 12: OLS *Regression*

Source	SS	df	MS			
Model	2.0686e+09	34	60841045.3			
Residual	3.9584e+10	24816	1595080.11			
Total	4.1652e+10	24850	1676140.99			

Number of obs = 24851
F(34, 24816) = 38.14
Prob > F = 0.0000
R-squared = 0.0497
Adj R-squared = 0.0484
Root MSE = 1263

wagegrhr	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
gender	-91.97661	21.95167	-4.19	0.000	-135.0032	-48.95002
age	-.1139315	2.85489	-0.04	0.968	-5.709686	5.481823
tenuexpe	14.4672	2.886051	5.01	0.000	8.810367	20.12403
married	130.8376	19.00417	6.88	0.000	93.58827	168.0869
noedu	-81.30866	179.3991	-0.45	0.650	-432.9415	270.3242
below10	-212.7308	155.3443	-1.37	0.171	-517.2149	91.75329
plus2	-221.2822	113.5809	-1.95	0.051	-443.9075	1.343195
deg3y	-62.68394	104.3611	-0.60	0.548	-267.2379	141.8701
cacs	343.7227	113.5065	3.03	0.002	121.2433	566.2021
deg45y	433.7759	104.2561	4.16	0.000	229.4277	638.1241
master	261.3677	103.7341	2.52	0.012	58.0427	464.6927
advdip	38.01549	109.7607	0.35	0.729	-177.122	253.153
iti	-170.4843	130.578	-1.31	0.192	-426.425	85.45648
phd	416.6053	136.4799	3.05	0.002	149.0966	684.1141
postdoc	630.6388	189.5229	3.33	0.001	259.1626	1002.115
agri	-38.75265	117.6227	-0.33	0.742	-269.3002	191.7949
mining	97.63541	126.9705	0.77	0.442	-151.2343	346.5051
manufact	20.19971	78.27859	0.26	0.796	-133.231	173.6304
power	129.1738	110.3545	1.17	0.242	-87.12758	345.4752
waterwastemgmt	-80.1236	154.7693	-0.52	0.605	-383.4807	223.2335
construct	-25.68768	83.87571	-0.31	0.759	-190.0891	138.7137
whsaleretail	58.52588	85.0912	0.69	0.492	-108.2579	225.3097
logistics	-9.461799	91.34272	-0.10	0.917	-188.499	169.5754
hospitality	-86.36961	97.3006	-0.89	0.375	-277.0846	104.3454
it	365.2112	78.10388	4.68	0.000	212.123	518.2995
finance	293.6857	79.69778	3.68	0.000	137.4733	449.8981
realestate	-36.42168	106.559	-0.34	0.733	-245.2837	172.4403
technical	192.0305	79.69972	2.41	0.016	35.8143	348.2467
admin	-4.401737	87.4428	-0.05	0.960	-175.7948	166.9914
defence	67.1311	130.2538	0.52	0.606	-188.1742	322.4364
edu	-66.02158	86.32492	-0.76	0.444	-235.2236	103.1804
socialwork	24.52186	89.65604	0.27	0.784	-151.2093	200.2531
household	-31.26416	209.441	-0.15	0.881	-441.7811	379.2528
entertainment	91.59569	118.8269	0.77	0.441	-141.3121	324.5034
_cons	178.4294	144.05	1.24	0.215	-103.9171	460.776

Table 13: VIF

Variable	VIF	1/VIF	Variable	VIF	1/VIF
master	40.36	0.024779	logistics	3.21	0.311348
deg45y	32.2	0.031055	iti	2.61	0.382546
deg3y	27.83	0.035929	hospitality	2.55	0.392442
it	17.28	0.05788	phd	2.35	0.425315
manufact	15.92	0.06282	realestate	2.03	0.493483
finance	10.46	0.095641	power	1.9	0.525083
technical	10.42	0.09597	below10	1.78	0.56283
advdip	7.83	0.127711	agri	1.71	0.584035
age	5.55	0.180059	entertainm~t	1.69	0.592953
cacs	5.49	0.181992	mining	1.56	0.642337
construct	5.49	0.182052	defence	1.51	0.661259
plus2	5.45	0.183536	noedu	1.49	0.671747
tenuexpe	5.38	0.185875	postdoc	1.44	0.695663
whsaleretail	4.84	0.206506	married	1.35	0.742029
edu	4.4	0.22716	waterwaste~t	1.32	0.7594
admin	4.02	0.248756	household	1.15	0.86725
socialwork	3.53	0.283068	gender	1.04	0.957528
			Mean VIF	**6.97**	

Table 14: Cross tab Analysis

Gender Pay Gap (Regress Wage with Gender and Work Experience)					
	Plus 2	3 Year Degree	4/5 Year Degree	Masters	Advance Diploma
Agriculture	-280.9	-74.0	-411.5		-35.0
Mining	-123.4				-347.3
Manufacturing	-13.5	-66.6		-289.9	-69.7
Power		-135.2	-448.1	-185.7	
Water/Waste Mgmt	-11.8		-391.2	-472.4	
Construction	-212.6	-6.0	-147.6	-288.4	-209.9
Wholesale/Retail	-166.5	76.0		-100.0	299.0
Logistics	-38.2	-194.9		-284.8	-130.5
Hospitality	-282.2	21.8		-17.9	-176.7
IT	-283.5	36.0	-84.6	-207.6	
Finance		-0.1		-127.3	
Real Estate		-261.7	18.1	-448.9	-247.6
Technical		-161.1	-184.7	-124.2	167.9
Administrative	-114.3		-183.2	35.4	114.6
Defence				-191.0	
Education	-368.7	-75.8	-595.4	-51.5	-232.8
Social Work	-50.9	57.9	-415.5	-72.4	
Entertainment	-273.1	-130.8	-581.9	-443.9	-397.5
Household			12.2	12.7	
Others	34.0		-571.1		

11.3. Graphs

Graph 1: Collinearity

Graph 2: Kernel Density