The Glass Ceiling for Women: An Empirical Investigation

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Background:

The term labour market discrimination can be defined as the adverse treatment in hiring and treatment of job, based on characteristics of individuals such as race, gender, age, religion, occupation and qualifications. Labour market discrimination may also affect women's wages and occupations. The disparity in wages unfavourable to women generally arises from their not investing to acquire skills required to compete with men. The notion that they may not be able to reap the benefits of such investment (for example education) forecloses any consideration to make large investments. As women are excluded from certain "male" jobs, the "female" occupations witness a concentration of their labour & excess supply. This excess supply of labour has the effect of depressing the wages of those who are productive in those occupations. The human capital model of this disparity suggests that if the returns for the experienced workers are higher irrespective of their gender, since women lack experience, the gender gap in pay will be larger &

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unfavourable to women. Even small initial discriminatory differences in wages may cumulate to large ones as men & women make decisions about human capital investments & time allocations in the market & the home on the basis of these wage differentials (Blau and Kahn, 2000).

The human capital approach to the gender disparity, however, is not the only approach available. This paper compares and contrasts the two diverse approaches to understand the issues related to human capital formation in women. These approaches are the patriarchal approach and the human capital approach. The patriarchy approach highlights the role of social structures and power relationships in society, while the human capital approach highlights the importance of differential human capital endowments in explaining differences in labour market earnings. The two approaches are not mutually opposed, though they emphasize different channels that produce differences in labour market earnings. For example, lower earnings because of lower human capital investment in women as a result of social attitudes are entirely compatible with the human capital approach. How does one then distinguish the two approaches in an empirical study? This paper makes an attempt to do so. In this paper we attempt to analyse the labour market discrimination by controlling for variables such as gender, age, experience, number of children, and education in the regressions.

The existing literature available speaks of how initially, as women are engaged in the household work most of the time, are left with hardly any time to acquire the requisite skills (education and training) for employment outside. From childhood to adulthood women are hardly given any time or opportunity to sharpen their skills for work outside the household. Under such circumstances, women who enter the labour market experience insecurity and a feeling of inferiority. (Ester Boserup (1970), Nirmala Banerjee (2001)). In addition, even if education is imparted to the girls it is often of inferior quality, as parents do not expect their daughters to be able to make an economic contribution to the family (Meera Kosambi (2001); K. Subbarao *et al* (1994); L.H. Summers (1992)). When girls are uneducated, their labour has little

economic worth outside the home. Claudia Goldin (1995) discusses how when the wage rate improves, women experience an income effect that contracts their labour supply because of introduction of new technology or expansion of the market, owing to lack of education and skill. Whenever any technological changes takes place, men generally leave such unskilled jobs for women and opt for skilled jobs, which are better paying, as men are more organized than woman (Claudia Goldin (1995)). Rosenzweig and Schultz (1982) discuss how education plays a decisive role in determining the employment rate for women (Rosenzweig and Schultz (1982)). Paul Schultz (1988) explains how education is a prerequisite for effective economic participation. For young and married women there is a partial positive relation between amount of education and hours of market work ((Paul Schultz (1988)). C. U. Thresia(2004) deals with a similar study on gender discrimination with regards the limitations on working women with young children in agriculture in the State of Kerala (C.U. Thresia (2004)). Studies conducted by J. M. Stycos and R. H. Weller(1967) as well as the United Nations (1985) found that only as the female working role advances incompatibility with the role of wife and that of mother does the relation between fertility and employment appear. (J. M. Stycos and R. H. Weller (1967); Population Studies, United Nations (1985)).

The question we ask in this paper is the following:

Do women systematically earn less than men once other determinants of earnings, viz, the human capital endowments are taken into account?

In Section I of this paper we discuss the data undertaken for this study. Section II discusses the empirical results achieved through its analysis and Section III discusses the conclusion of this paper.

Section I:

The issue of earnings being determined not according to human capital endowment alone but on the basis of gender is a serious concern for gender equality and social justice. Hence we carried out a regression to see if women are discriminated against in spite of possessing human capital endowments. In the regression comparison is made with their spouses to see if discrimination persists. We have used a dummy variable model for this regression.

The primary data used in this regression comprises of a sample size of 200 married working women within Mumbai from different spheres of work and with varying qualifications. Detailed data were collected for them as well as their spouses related to employment, income, age and educational qualifications. Especially with regards to women additional data such as number of years of experience, break in service, whether promotion prospects were available for them in their respective employment were collected. The sample comprises of women from the Private Sector (Manufacturing), Private Sector (Service), Travel and Tourism Sector, Banking and Insurance Sector, Self-Employed, Teaching, Health Sector, Lawyers and Chartered Accountants. Private Sector (Service) refers to small, medium and large enterprises which include pharmaceuticals, InfoTech companies, Media and trading companies. Banking and Insurance, Travel and Tourism, Health Sector and teaching consisted of both private sectors as well public sector, though they were not clubbed together with the private sector services.

The various sectors and professions in which the women in the sample were employed are described in Table 1. More women in the sample belonged to the Private Sector (manufacturing), Banking Sector, and Health Sector or were self-employed. Few of them were Chartered Accountants (which in India is a predominantly masculine profession).

Table 1: **Various Areas of Women's Employment**

Fields of Work	**Total**
Private Sector --- Service Sector	10
Private Sector ---Manufacturing	29

Travel and Tourism Sector	20
Banking	27
Insurance	21
Teaching	20
Health Sector	26
Lawyers	13
Chartered Accountants	04
Self-employed	30
	200

Table 2: **Women's education corresponding to men's education**

	Women's Education						
Spouse's Education	PhD	PG	UG	HSC	SSC	Technical Education	Total
PhD	2	2	0	0	0	4	4
PG	6	29	26	0	0	22	61
UG	1	22	91	5	1	21	120
HSC	0	0	1	2	2	33	5
SSC	0	0	0	2	8	16	10
Technical Education*	9	53	37	2	1	22	102
Total	9	53	118	9	11	96	200

Where
PhD stands for the individual possessing Doctoral Degree
PG stands for the individual possessing Post-Graduation Degree
UG stands for the individual possessing Graduation Degree
HSC stands for the individual possessing Higher Secondary Education
SSC stands for the individual possessing Secondary Education

Technical education is defined by us as one which would professionally help an individual in the employment sphere. For example, a graduate with a diploma in Travel and Tourism is technically qualified to work

in the Travel and Tourism Sector. Hence it is an additional qualification to the regular education (and is not taken into account while adding to the total for either women's education or their spouse's education) acquired by any individual from primary education to doctoral education. The qualification of their spouse's education to woman's education is shown in Table 2. This data reveals that women who have higher education have spouses with similar educational qualification; or rather men with higher qualifications prefer women with educational qualifications similar to theirs.

Table 3: **Average Salary of the Women and their Spouses (per annum)**

	Number of Women	Number of Men	Average Salary Of Women	Average Salary of their Spouse's
Full – Time	192	200	301895	318105
Part – Time	8	0	89977	0
	200	200	195936	318945

From Table 3 it is can be seen that women's average per annum salary (Rs. 1,95,936) is less than that of men's (Rs. 3,18,945). The eight women who worked part-time earned an average salary of Rs. 89977 per annum. This could be primarily because of activities like child rearing, house-keeping etc which are considered women's responsibility.

Table 4: **Number of Children**

Number of	Women

Children	
No Child	4
One Child	113
Two children	81
Three children	2

From Table 4, 113 women had only one child, 81 women had two children, two women had three children and four women had no children. As majority of the women from the sample had only one child it indicates their preference to reduce child-rearing activities and devote more time towards productive work activity.

Table 5: **Break in Service and Total Experience**

	Number of Women
Break in Service	39
Experience: Less than 10 years	53
Experience: Less than 20 years but more than or equal to 10 years	95
Experience: Less than 30 years but more than or equal to 20 years	46
Experience: More than or equal to 30 years	6

From Table 5, it is evident than only 39 women from the sample of 200 had break in service. Similarly, most women (95 women from the sample) had experience of more than or e 10 years but less than 20 years.

Certain reservations have to be allowed with respect to the data. First of these limitations may be the sample size itself, which is rather undersized for

exact results. Generally, detailed questions on family especially regarding income details evoke responses that are approximate rather than exact. However, the relative appraisals about income tend to be accurate if not in actual terms.

Using this primary data, we proceed with our first analysis under study. The variables used in this analysis are education, age and income. The variable education is divided into six different categories: primary (d_1), secondary (d_2), higher secondary (d_3), graduation (d_4), post-graduation (d_5) and technical education (d_6). We use dummy variables for each of the educational category. That is, if the woman possesses technical education then the variable is assigned the value 1 or else 0. This is carried out for the remaining of the five educational categories. Similarly the variable sex is also taken as a dummy variable. Women have been assigned the value 1, while men have been assigned the value 0.

Table 6: **Averages of Age, Education and Income**

Sex	Age	PhD (d1)	Post-Graduation (d2)	Graduation (d3)	Higher Secondary Education (d4)	Secondary Education (d5)	Technical Education (d6)	Income
Female	41.214	9	53	118	9	11	96	195936.318
Male	44.930	4	61	120	5	10	102	318105.458

From table 6, the mean Age of 200 Women in the primary data is 41.21 years whereas that of men is 44.93 years. Majority of the men (120) & women (118) were graduates. In all the six categories of education women relatively had similar educational qualification to men. But in spite of their educational

qualifications being similar to men their earnings differed from that of men. While men earned Rs. 3,19,625 per annum on an average, women earned only Rs. 1,96,915 per annum for similar educational qualifications.

The purpose of this particular study is to find whether, once account is taken of other factors that determine earnings differences, the sex of the worker, i.e., whether the worker is a male or a female continues to influence earnings. In the given regression Earnings (ERN_i) is considered as the dependent variable while age of the individual (AGE_i), sex of the individual (SEX_i), their respective educational levels were considered as the independent variables. The educational categories were further divided into six different categories: Individuals possessing Doctoral Degree (PHD_i), Post-graduation Degree (PG_i), Graduation Degree (UG_i), Higher Secondary Education (HSC_i), Secondary School Education (SSC_i), and Technical Education ($TECHED_i$). The equation can be written as follows:

$$ERN_i = \alpha + \beta_1 SEX_i + \beta_2 AGE_i + \beta_3 PHD_i + \beta_4 PG_i + \beta_5 UG_i + \beta_6 HSC_i + \beta_7 SSC_i + \beta_8 TECHED_i$$

where

ERN_i = Earnings of the ith individual

SEX_i = Sex of the ith individual

AGE_i = Age of the ith individual

PHD_i = ith individual possessing Doctoral Degree

PG_i = ith individual possessing Post-Graduation Degree

UG_i = ith individual possessing Graduation Degree

HSC_i = ith individual possessing Higher Secondary Education

SSC_i = ith individual possessing Secondary Education

$TECHED_i$ = ith individual possessing Technical Education

And α, β's, are the intercept estimate and coefficient estimates of the variables, respectively.

From the literature, we expect women with primary education to have lesser earnings and few of the women to have employment. This would also indicate that women having less education have been deprived of sharpening their skills and education. On the other hand if more of the women are found to be employed, then it would signify that especially in urban areas like Mumbai the cost of living being higher forces women with less education to enter the labour force. We also expect women with higher educational qualification to earn on par with men as human capital endowment determines earnings.

If there is labour market discrimination against women once all the other determinants are taken care of, we would expect the dummy coefficient for sex to be significant and negative. This would indicate the existence of the so called "glass ceiling". This would signify that women are discriminated in the labour market, which is not justified by their human endowments.

Age is another possible determinant of labour market earnings, as it is closely related to labour market experience. Older individuals are expected to earn more because they have accumulated greater skills.

Section II: **Results of the Analysis**

After running the regression on the given data, the estimated equation is written as follows:

Equation 1:

$$ERN_i = \underset{(4.344^{***})}{272570} - \underset{(-7.163^{***})}{120350}\ SEX_i - \underset{(-0.4749)}{494.87}\ AGE_i +$$

$$\underset{(0.7287)}{38706}\ PHD_i + \underset{(2.439^{**})}{110420}\ PG_i + \underset{(0.1747)}{7478.6}\ UG_i -$$

$$\underset{(-0.3454)}{21171}\ HSC_i - \underset{(-1.822^{*})}{80709}\ SSC_i + \underset{(4.893^{***})}{68220}\ TECHED_i$$

Note: Figures in the parentheses are the *T*-ratios

:**significant at 10%, **significant at 5% and ***significant at 1%.*

: *F*-ratio: 17.102 significant at 1%

: Adjusted *R*-square: 0.2454

The signs of the variables Doctoral education, Post-Graduate education, Graduation, Technical education indicate a positive relation with Earnings unlike the variables Sex of the individual, Higher secondary education, and Secondary education which have an inverse relation with Earnings of an individual. The adjusted *R*-square is 0.2454. However, the *F*-value which equals 17.102 is significant at 1%. From the regression, it can be seen that the coefficient of sex is negative and statistically significant. Hence, being a woman is associated with a labour market disadvantage. Being a woman reduces earnings by 1, 20,350 Rs. annually on an average.

Technical education (significant at 1%) is responsible for an increase in earnings amongst individuals. Individuals possessing post-graduation also earn more than others. While mere secondary education is responsible for low earnings amongst individuals. Further the results are significant as *F*-value equals 17.102.

We decided to include the variable Break in service (BRKi) for women in the regression Section which could also be responsible for differences in

earnings, as women especially could have to take a break from their employment owing to marriage, child-bearing and child-rearing activities.

The following is the estimated regression after including the variable break in service:

Equation 2:

$$ERN_i = \underset{(4.329^{***})}{274670} - \underset{(-7.072^{***})}{120350}\, SEX_i - \underset{(-0.5068)}{494.87}\, AGE_i + \underset{(0.7243)}{38706}\, PHD_i + \underset{(2.420^{**})}{110420}\, PG_i + \underset{(0.1675)}{7478.6}\, UG_i - \underset{(-0.3445)}{21171}\, HSC_i - \underset{(-1.830^{*})}{80709}\, SSC_i + \underset{(4.897^{***})}{68220}\, TECHED_i + \underset{(0.3489)}{2443.9}\, BRK_i$$

Note: Figures in the parentheses are the *T*-ratios

:**significant at 10%, **significant at 5% and ***significant at 1%.*

: *F*-ratio: 15.173 significant at 1%

: Adjusted *R*-square: 0.2436

From the above equation it can be seen that the inclusion of the variable Break in Service did not make any difference to the existing regression results, nor was the variable significant. The variables which are significant remain unchanged; that is, sex of an individual, technical education, post graduate education, and secondary education. The variables Sex and Technical Education continue to be significant at 1%. This implies that women continue to be the variable, which brings about a difference in the earnings between individuals. The results are significant as *F*-value equals 15.173 while adjusted *R*-square was 0.2436.

It is possible that women being primary care providers, the number of children adversely affects the ability of a woman to earn better wages.

The following is the estimated regression after including the variable number of children:

Equation 3:

$$ERN_i = \underset{(4.329^{***})}{274670} - \underset{(-7.072^{***})}{120350}\, SEX_i - \underset{(-0.5068)}{494.87}\, AGE_i + \underset{(0.7243)}{38706}\, PHD_i + \underset{(2.420^{**})}{110420}\, PG_i + \underset{(0.1675)}{7478.6}\, UG_i - \underset{(-0.3445)}{21171}\, HSC_i - \underset{(-1.830^{*})}{80709}\, SSC_i + \underset{(4.897^{***})}{68220}\, TECHED_i + \underset{(0.3489)}{2443.9}\, BRK_i - \underset{(-0.1346)}{2655.6}\, CHD_i$$

Note: Figures in the parentheses are the T-ratios

:**significant at 10%, **significant at 5% and ***significant at 1%.*

: F-ratio: 13.622 significant at 1%

: Adjusted R-square: 0.2417

The variables which are significant continue to remain unchanged; that is, sex of an individual, technical education, post graduate education, and secondary education. The variables Sex and Technical Education continue to be significant at 1%. The variable Number of Children is negatively associated with Earnings but does not have any significant effect on Earnings. The results are significant as F-value equals 13.622 while adjusted R-square was 0.2417.

Since the Number of years of Experience (EXPi) could give individual higher earnings we decide to include it in the existing regression Section.

Equation 4:

$$ERN_i = \underset{(4.329^{***})}{274670} - \underset{(-7.072^{***})}{120350}\, SEX_i - \underset{(-0.5068)}{494.87}\, AGE_i + \underset{(0.7243)}{38706}\, PHD_i$$
$$+ \underset{(2.420^{**})}{110420}\, PG_i + \underset{(0.1675)}{7478.6}\, UG_i - \underset{(-0.3445)}{21171}\, HSC_i - \underset{(-1.830^{*})}{80709}\, SSC_i$$
$$+ \underset{(4.897^{***})}{68220}\, TECHED_i + \underset{(0.3489)}{2443.9}\, BRK_i - \underset{(-0.1346)}{2655.6}\, CHD_i$$
$$+ \underset{(2.665^{***})}{4670.3}\, EXP$$

Note: Figures in the parentheses are the *T*-ratios

:**significant at 10%, **significant at 5% and ***significant at 1%.*

: *F*-ratio: 12.992 significant at 1%

: Adjusted *R*-square: 0.2499

The variables which are significant remain unchanged; that is, sex of an individual, technical education, post graduate education, and secondary education. The variables Sex and Technical Education continue to be significant at 1%. The variable Number of years of experience is positively associated with earnings and is significant (at 1%) enough to bring about a difference in the given regression Section. The results are significant as *F*-value equals 12.992 while adjusted *R*-square was 0.2499.

Section III: **Conclusion**

Hence we conclude from the above empirical exercise that being woman matters, over and above the differences that would be caused by differences in human capital endowments. There surely appears a "glass ceiling" with regards women in the labour market. Also in spite of having greater human capital endowments as well as experience they are differentiated

against men in the labour market with the same level of education and experience.

In this paper, the empirical exercise was attempted to check whether gender matters over and above its manifestation through systematic human capital differences? We find that in the empirical exercise, the answer is yes. Gender does matter, in addition and over and above the differences that are caused by human capital variables. The following influences are inevitable. First, women are less likely to be educated & therefore likely to earn less. Second, they are likely to earn less even in white collared jobs in the cities. Third, in spite of parity in qualifications & experience women earn less than men. Thus it is obvious that an explanation of this difference based on the human capital models is incomplete & inadequate. The analysis must include gender.

However, our empirical study also shows gender discrimination among adult educated women in a large metropolis like Mumbai where traditional attitudes are supposed to be less apparent. Thus, gender discrimination and patriarchy should be considered as independent determinants of economic outcomes over and above the usual economic variables. This in itself is a significant challenge to neo-classical economic theory which works on the assumption of a homo economics, without being bothered about whether that homo-economics is a man or woman. This is fine if gender differences are merely articulated through variables that economists are used to handling; for example the labour market variables. On the other hand, our results suggest that gender needs to be included much more directly, in addition to its effects through the usual variables.

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