

**Gender Inequality in Labour Force Participation:
An empirical Investigation**

Labour Market Discrimination (J7, J15, J16, J42)

Muhammad Sabir

Principal Economist,
Social Policy and Development Centre (SPDC).
15 Maqbool Co-Operative Housing Society,
Block 7 & 8, Karachi 75350.
Tel: 021-111 113 113;
Email: (muhammadsabir@spdc.org.pk)
(muhammadsabir@hotmail.com)

Abstract

One of the main caveats of Pakistan's economic development history is the persistence gender inequality with respect to almost all socioeconomic indicators. One of the possible explanations of these gender gaps is discrimination in various socio-economic spheres including labour market. An attempt is made in this paper to investigate labour market discrimination in Pakistan by focusing on three aspects including labour force participation, access to paid jobs and inequality in occupation by applying a nested logit model. The results show that women are highly disadvantaged in labour market reflected through estimated probabilities in both years. This is attributed to multifaceted discriminatory factors that prevail in the society and not to less human capital among women as compared to men. It is hypothesized that once these discriminatory factors are eliminated from the society women labour force participation will increase in Pakistan.

Labour Market Discrimination (J7, J15, J16, J42)

1. Introduction

Economic growth and development of the nations largely depend on the quantity and quality of their labour force. In Pakistan, a sizeable segment of population is considered as out of labour force. For instance, the overall labour force participation rate remained roughly in the range of 49 percent to 53 percent during 1974-75 to 2012-13. This means that of the total population in 2012-13, aged 15 years and above, 53 percent is economically active or part of labour force whereas 47 percent is economically inactive or out of labour force. And more than 75 percent of the women population is considered as economically in-active. In addition, the labour market statistics show that a smaller proportion of women than men, age 15 years and above, are employed. The unemployment rate among women is higher than men. One of the possible explanations of this gender gap is gender discrimination in the labour market.

In this context, this paper aims to analyze the behaviour of female and male in labour force participation by empirically investigating the determinants of labour force participation, and access to paid job for both female and male. It also shed light on occupational gender inequalities. It is believed that these types of analyses help designing better policies to increase employment opportunities for both females and males. They also facilitate suggesting various practical measures that can be incorporated in gender sensitized employment policies that in turn could lead towards greater labour force participation.

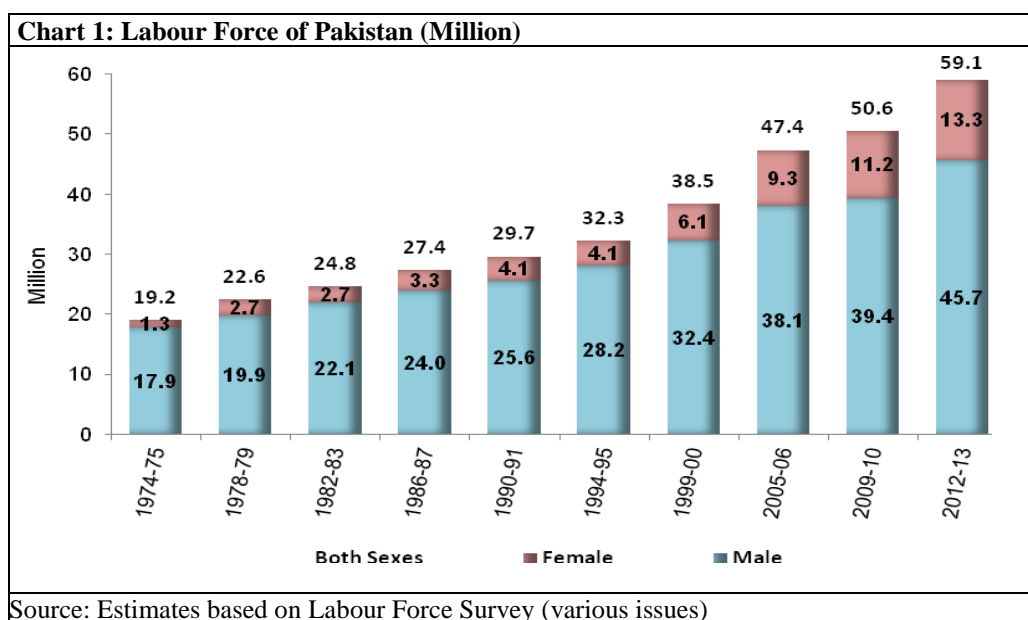
The rest of the paper is as follows: Section 2 presents the trend in labour force of Pakistan; Section 3 gives the both the theoretical and empirical review of literature on gender discrimination in the labour market; section 4 describes the empirical strategy employed in the paper; section 5 gives the estimated results and Section 7 concludes the paper by mentioning some relevant policy implications.

2. Trend in Labour Force

The section presents sex disaggregated trend in labour force of Pakistan for the period 1974-75 to 2012-13.

2.1 Magnitude of Labour Force

Total labour force of Pakistan, aged 15 years and above, constitutes 19.2 million in 1974-75 of which 1.3 million were women and 17.9 million were men. In 2012-13 it increased to 59.1 million of which 13.3 million were women and 45.7 million were men (Chart 1). This indicates that male labour force dominates over the female labour force. However, it is worth mentioning that in 1974-75 women labour force constitutes less than one-tenth of men labour force whereas in 2012-13 this proportion gone up to more than one-fourth.

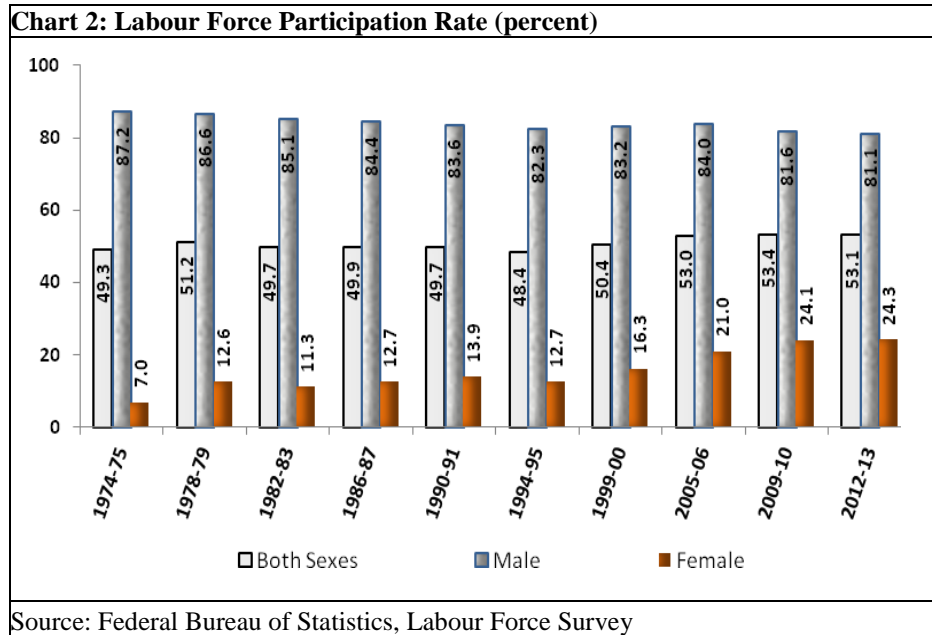


2.2 Labour Force Participation Rate

The refined labour force Participation rate (LFP) is the ratio of labour force (employed and unemployed but seeking work) to the population of respective age cohort. It is therefore, a key determinant of the currently active population or an indicator of the magnitude of the supply of labour in the economy and a crucial component of long term economic growth.¹ The LFP rate can be used as an essential tool in designing employment policies as well as of human resource development and training policies.

¹ The employed include those who are in paid employment as well as those who are unpaid family helpers.

In Pakistan, the overall LFP rate remained roughly in the range of 49 percent to 53 percent during 1974-75 to 2012-13. This means that of the total population in 2007-08, aged 15 years and above, 53.1 percent was economically active or part of labour force whereas 47.5 percent was economically inactive or out of labour force.

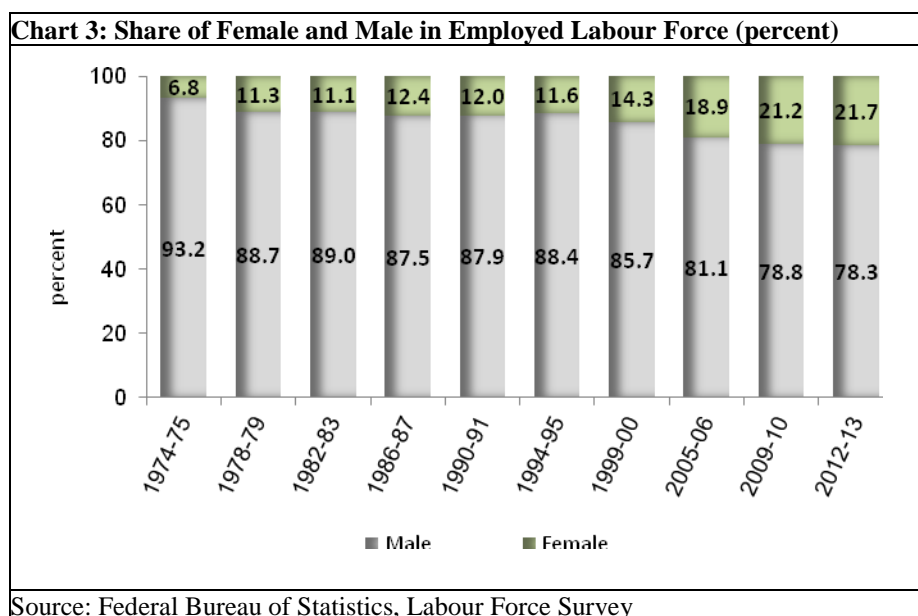


As for the LFP rate by gender, the participation rate of men declined from 87.2 percent in the 1974-75 to 83.6 percent in 1990-91 while remained more than 80 percent during the 1990s, in the 2000s and 2010s. As against, the LFP rate of women persistently rose from 7 percent in 1974-75 to 24.3 percent 2012-13. Apparently, this indicates that the overall gender gap in labour force participation rates has tended to reduce in Pakistan. However, it is still distressing that of the total female population 15 years and above only 24 percent is part of labour force compared to 81 percent of their male counterpart.

2.3 Employed Labour Force

Chart 3 gives the share of male and female in the employed labour force of Pakistan. According to this Chart, 93.2 percent of the total employed persons were male and only 6.8 percent were female in 1974-75. With time, the share of women in employed labour force has increased while

that of male has declined. In 2012-13, female constitute 21.7 percent and male constitute 78.3 percent of the total employed persons in Pakistan.



3. Gender Gaps in Labour Market: A Review of Literature

Gender discrimination in the labor market is a complex subject and theories explaining this discrimination can be classified into two broad categories: feminist theories largely directed towards the "Devaluation Hypothesis" and neo-classical human capital theories leading towards "The Specialized Human Capital Hypothesis".

3.1 Feminist Theories and the Devaluation Hypothesis

Feminist theories emphasize that women's disadvantaged position in the labor market is caused by, and is a reflection of patriarchy as well as the subordinate position of women in society and in the family. In other words, the role of gender stereotypes held by employers and societies at large affect differential occupational attainment of men and women. These theories predict that women gravitate towards occupations that are most consistent with their "female" characteristics e.g. caring, nurture (Anker 1998). Moreover, feminists argue that occupations classified as "female occupations" tend to receive substantially lower wages than male occupations. This wage penalty on female occupations is thought to be a form of sex discrimination. The

assignment of lower wages to occupations done mostly by women may also reflect a culture of discrimination against women's work. Feminists tend to believe that occupations with more female workers, on average, command lower wages than comparable occupations with more male participants. This theory is referred to as the Devaluation Hypothesis [Ruijter and Huffman (2003), Cohen and Huffman (2003), and Tam (1997)].

3.2 Neo-Classical Theories and the Specialized Human Capital Hypothesis

Emergence of non-competing groups in the labor market in the 1880s set the theme for occupational specialization while creating gender segmentation in the economic system. The Specialized Human Capital Hypothesis based on two basic ideas of human capital theory can be used to explain gender inequality in the market (Becker 1975). First, investment in any human capital is costly and thus has to be compensated to ensure its adequate supply. Just as employers have to compensate for workers' investments in general human capital is required for their work. They also have to compensate for workers' investments in specialized human capital. Second, the wage premium for specialized human capital depends on the supply and demand for that particular kind of specialized human capital. The supply and demand for a skill are contingent on a wide range of factors. The investment cost of a skill is often an important factor (Tam 1997).

3.3 Empirical Findings of Earlier Research

Tam (1997) examines the Devaluation and the Specialized Human Capital Hypotheses to explain the wage effects of occupational sex composition in the United State by using data of Population Survey. His findings entails that differences in the length of specialized training across occupations and industries, together with a few demographic and human capital attributes, were able to completely explain most of the sex composition effects among women and men and whites and blacks. The central results are difficult to reconcile with the Devaluation Hypothesis but are consistent with the Specialized Human Capital Hypothesis. However, the issue turns to access to education and training opportunities by women.

Semyonov and Frank (1998) in their analysis of data on 56 countries show that measures of nominal segregation are not equivalent to measures of hierarchical inequality. They further argue that occupational segregation should not be equated with occupational inequality. Findings are

illustrated by means of two summary indices - SEGR (nominal segregation) and ORDI (ordinal status inequality).

Manpower Research and Statistics Department, Singapore (2000) conducted a study of occupational segregation to determine the extent to which women and men are employed in different occupations and changed over time in Singapore. Moreover, they examined the degree to which women have entered traditionally "male" occupations and vice versa. They also discussed causes for occupation segregation and computed two summary statistics to highlight gender disaggregation i.e. the Index of Dissimilarity (ID) and the Marginal Matching (MM) Index.

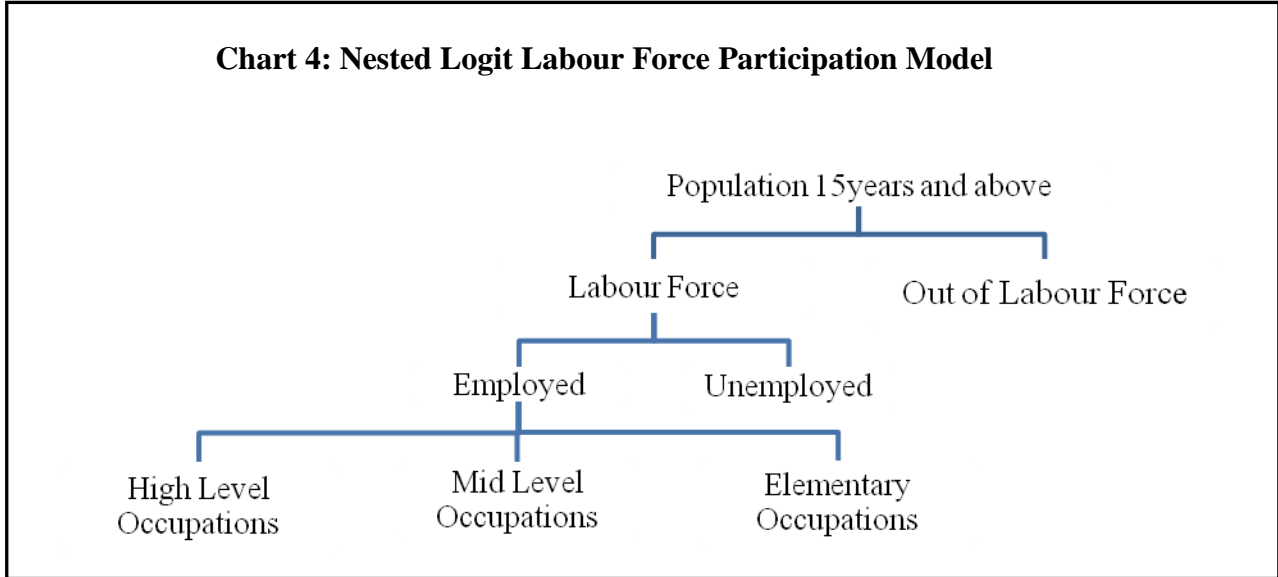
Blackburn, Brooks and Jarman (2005) discussed the effect of standardization on the measurement of segregation in 16 developed countries with different occupational sample sizes. They established an inverse relation between horizontal and vertical segregation illustrating that increases (decreases) in vertical segregation bring decreases (increases) in horizontal segregation.

Chzhen (2006) explores the role of labor market discrimination in determining occupational distributions of men and women in Europe. Using data from the eighth wave (2001) of the European Community Household Panel (ECHP), the paper documents the degree of occupational segregation in a sample of three Western European countries with different occupational sex segregation regimes namely Denmark, Germany and the United Kingdom (UK). The result shows that labor market discrimination appears to play the largest role in Germany, though the overall degree of discrimination does not vary substantially across the three countries.

4. Empirical Strategy

The empirical strategy adopted in this study consists of estimating a nested logit model of labour market participation. In this model, the labour market outcomes can be divided into a three-level possibility framework. The first level consists of the possibilities of whether or not a person is part of the labour force. The second level is a possibility of employed and unemployed for those

who decide to participate in labour market and leaves the non-participants as they are. The third level possibilities distinguish between high level, mid level and elementary occupations for those who are employed leaving the other branches unchanged (see Chart 4).



The computation of above mentioned possibility framework requires the following three distinct steps. In the first step a logit model for labour force participation is estimated by using a dichotomous variable having value 1 for either employed or unemployed and zero for all others. In the second step, another logit model for employed is estimated by using a dichotomous variable having value 1 for employed and zero for unemployed. Finally, a multi-logit model for occupational choices is estimated by using a variable having value zero for elementary occupation, 1 for mid level occupations and 2 high level occupations. This three step estimation is applied separately for all male and female aged 15 years and above in both 1996-97 and 2007-08. Heckman procedure is used to avoid selectivity bias.

In line with economic theory, a set of explanatory variables are used in the estimation of above mentioned empirical framework. These include a set of educational dummies indication various highest level of educational attainments. It also includes demographic variables like age and square of age, marital status and family size together with regional dummies. In order to get an

idea of reservation wage family income is also included in the analysis (complete list of variable is available in appendix).

Respective Labor Force Surveys for 1996-97 and 2007-08 are employed for our analysis. These surveys provide a narrative of more than a decade. The survey collects comprehensive information on various activities of workers. The information about employment status and distribution of employed labour force by occupation categories, gender and regions is particularly important for this study. A comparison of LFS with other data sources shows the superiority of LFS because of greater internal and external consistencies [Zeeuw (1996)]. For the purpose of our analysis we restrict our sample to persons of 15 to 65 years of age in both years.

5. Estimated Results

This section presents the results of the estimated three step nested logit framework discussed in empirical strategy. These logit equations were regressed on a set of independent variables like age (a proxy for experience), education level, household size, marital status, urban etc by using micro-datasets of Labour Force Survey (LFS) 2006-07 and 1996-97. Based on these estimated equations, three sets of probabilities including labour force participation, employment and occupational categories were estimated each with respect to education levels by gender. Almost all variables included in the analysis are statically significant and have expected signs.

The aim of estimation of three step nested logit framework is to compute the probabilities of various outcome with respect to educational attainment, therefore, the regression estimates, using the logit and multi-logit modes, are provided in the Appendix.

5.1 Probabilities of Labour Force Participation

Table 1 shows the resulting probabilities of LFP and Not Economically Active (NEA) women and men (15 years and above) with respect to level of education for 2007-08. These probabilities show three patterns: (1) probabilities of LFP are increasing with the level of education in women and U-shaped (decreasing till intermediate and then increasing) in men, (2) technical education plays a vital role in LFP, reflected through higher probabilities both in male and female, and (3)

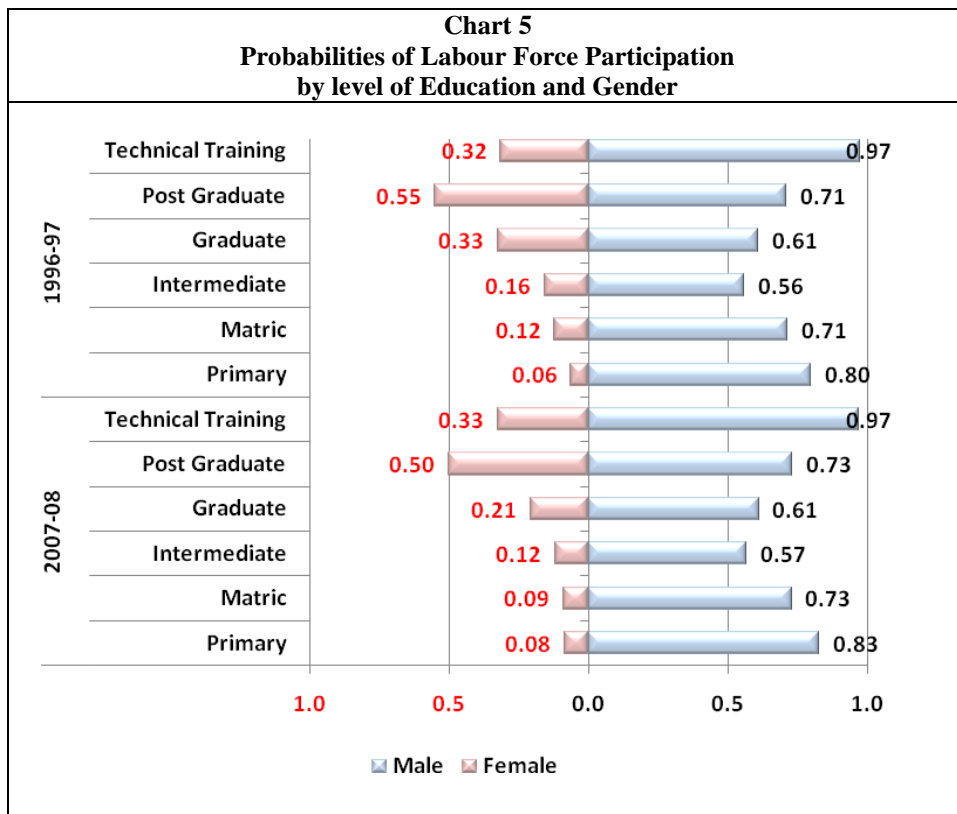
there are significant differences in probabilities among men and women with same level of education.

Table 1				
Probabilities of Labour Force Participation				
by Level of Education and Gender				
based on Logit Regression - 2007-08				
Level of Education	Female Sample		Male Sample	
	LFP	NEA	LFP	NEA
Primary	0.0849	0.9151	0.8280	0.1720
Matric	0.0901	0.9099	0.7289	0.2711
Intermediate	0.1183	0.8817	0.5667	0.4333
Graduate	0.2082	0.7918	0.6110	0.3890
Post Graduate	0.5022	0.4978	0.7312	0.2688
Technical Training	0.3257	0.6743	0.9686	0.0314

It is more likely that a woman with primary education would be NEA as compared to a woman with graduate or post graduate levels of education (see table 1). For instance, in the case of a woman having only primary education, the chances of being NEA is more than 90 percent. For women with postgraduate degrees however it declines to around 50 percent. This is indicative that investing in female education has a positive impact on labour force participation. This trend is not pronounced in men as in women. In men, probability of labour force participation is 0.82 at primary level, which is relatively higher and then it declined to 0.57 at intermediate and then subsequently increased to 0.73 at post graduate level. This trend shows that primary, matric and post graduate are terminal education levels where large number of men dropout from education and join labour force, while intermediate and graduate level of educations are not terminal level where a sizeable portion of educated men prefer to continue their education. Moreover, the probability of a woman or man with technical training being part of the labour force holds more significance than the probability of education levels in both men and women. For example, the probability of a woman with technical education being a part of the labour force is almost one-third, while for males it is more than 95 percent. This is greater than the rest of the education categories combined except post graduation in case of women. Finally, the probability of a man being part of the labour force as compared to a woman with same level of education is higher in all education levels. In case of women with only primary education, the chances of being NEA is

more than 91 percent, while for men with only primary education the chances of being NEA is slightly more than 17 percent.

Chart 5 presents a comparative picture of probabilities of labour force participation in 1996-97 and 2007-08. It is interesting to note that probabilities of labour force participation have declined among women in most of the educational categories except primary and technical education. The highest decline occurred among women with a graduate level education from a probability of 33 percent in 1996-97 to only 21 percent in 2007-08. In case of males, the probabilities of labour force participation either increased or remain same in all educational categories.



5.2 Probabilities of Access to Paid Jobs

Table 2 gives the gender disaggregated probabilities of being employed and unemployed with respect to level of education in 2007-08. These probabilities reveal two important messages: (1) the probabilities for being employed are higher for men as compared to women at every level of education, (2) unemployment in female increased with increasing levels of education, while there

is no clear pattern in males with respect to level of education. Moreover, probability of being employed increased in males and decreased in female with graduate, post graduate and technical education.

Level of Education	Female Sample		Male Sample	
	Employed	Unemployed	Employed	Unemployed
Primary	0.9409	0.0591	0.9714	0.0286
Matric	0.8976	0.1024	0.9581	0.0419
Intermediate	0.9009	0.0991	0.9526	0.0474
Graduate	0.8504	0.1496	0.9600	0.0400
Post Graduate	0.7372	0.2628	0.9478	0.0522
Technical Training	0.8999	0.1001	0.9744	0.0256

Now, the question is why chances of being unemployed for women significantly increased and marginally decreased for men after they had passed their intermediate level of education? Or why the gap between probabilities of being employed between men and women widen at post-graduate and professional levels of education?

There are three possible explanations: (1) vertical segmentation in labour market, (2) different reservation wages for men and women, and (3) residual jobs for women.

The argument of vertical segmentation in labour market explains that men and women are working in different occupations, which require different level of education attainment and skills. It can be said from the pattern of probabilities that labour market in Pakistan creates greater job opportunities for women in elementary occupations, which require low skills and less education while greater job opportunities for men in high skill occupations, which require higher level of education. As a consequence, there are higher probabilities of getting job for men with graduate or post graduate level of education as compared to women with same level of education.

The reservation wage argument explains that women with graduate and post graduate level of education might have higher reservation wage – the lowest wage rate at which a worker would be willing to accept a particular type of job – as compared to men with same level of education.

This argument is based on the assumption that women's reservation wage depends on her marital status and family earnings. This implies that reservation wage of a woman belonging from a family having low income would be low as compared to the reservation wages of a woman belonging from a family having high income. Moreover, if husband is getting a higher wage than the reservation wage of wife would be higher as compared to other women with same level of education. In order to test this hypothesis a proxy of family/husband income (total salary income – female earnings) was used in logit model. The result showed a positive sign and significant coefficient indicating that the null hypotheses of higher reservation wage cannot be rejected based on estimates of logit model of employment.

The residual job argument explains that in the presence of discrimination in labour market, women are restricted to low paid jobs while men enjoy high paid jobs. Since the high paid jobs require higher level of education therefore, probability of a man with higher level of education would be greater than women with same level of education.

Table 3 provides a comparative picture of probabilities of being employed in 1996-97 and 2007-08. It is interesting to note that probabilities of being employed have increased considerably in 2007-08 as compared to 1996-97 for women in all educational categories. The highest increase occurred among women with technical education (32 percent increase in probability of being employed). In the case of males, the probability of being employed increased only little in all educational categories.

This increase in probabilities is indicative of a high growth in GDP, on average over 7 percent during 2003-04 to 2006-07, that created higher employment opportunities for both men and women in 2007-08 compared to that in 1996-97. Since the unemployment rate of educated women is higher than men, this higher GDP growth created greater opportunities for educated women or women having technical education.

Table 3						
Changes in Probabilities of being employed between 1996-97 and 2007-08						
Level of Education	Female Sample			Male Sample		
	2007-08	1996-97	Difference	2007-08	1996-97	Difference
Primary	0.9409	0.8441	0.0968	0.9714	0.9617	0.0097
Matric	0.8976	0.6458	0.2518	0.9581	0.9294	0.0287
Intermediate	0.9009	0.7141	0.1868	0.9526	0.9245	0.0281
Graduate	0.8504	0.6301	0.2203	0.9600	0.9318	0.0282
Post Graduate	0.7372	0.4845	0.2527	0.9478	0.9079	0.0399
Technical Training	0.8999	0.5769	0.3230	0.9744	0.9742	0.0002

5.3 Probabilities of Occupational Gender Inequalities

Table 4 shows the computed probabilities for women and men by three broad categories of occupations, namely elementary, mid-level and high level occupations and with their associated levels of education in 2007-08. The probabilities that women work in elementary jobs are high in educational levels below graduate. In contrast, probabilities of being in a mid-level occupation are high for males with education level intermediate or higher. The probability that a man would be in a high-level occupation is higher than a woman with the same level of education at all levels. These probabilities vary among men and women depending on their levels of education, for instance, chances of women working in high-level occupations increase with levels of education and are highest among women with post graduate degrees and professional education. This pattern of probabilities confirms the hypothesis of vertical gender segmentation in labour market as men are largely employed in high level occupations while women were largely concentrated in elementary and mid level occupations.

Table 4				
Probabilities of Occupational Categories by Level of Education and Gender based on Multi-Logit Regression - 2007-08				
Level of Education	Elementary Occupations	Mid-Level	High-Level	Sum
For Female Sample				
Primary	0.4777	0.4211	0.1012	1.0000
Matric	0.1115	0.7978	0.0907	1.0000
Intermediate	0.0534	0.8384	0.1082	1.0000
Graduate	0.0530	0.7860	0.1610	1.0000
Post Graduate & Professional	0.0659	0.5951	0.3390	1.0000
Technical Training	0.3609	0.6188	0.0203	1.0000
For Male Sample				
Primary	0.3001	0.4253	0.2746	1.0000
Matric	0.1823	0.4833	0.3344	1.0000
Intermediate	0.1061	0.5307	0.3632	1.0000
Graduate	0.0531	0.4137	0.5332	1.0000
Post Graduate & Professional	0.0334	0.2151	0.7515	1.0000
Technical Training	0.0804	0.8183	0.1013	1.0000
Difference (Female - Male)				
Primary	0.1776	-0.0042	-0.1734	0.0000
Matric	-0.0708	0.3145	-0.2437	0.0000
Intermediate	-0.0527	0.3077	-0.2550	0.0000
Graduate	-0.0001	0.3723	-0.3722	0.0000
Post Graduate & Professional	0.0325	0.3800	-0.4125	0.0000
Technical Training	0.2805	-0.1995	-0.0810	0.0000

In order to carry out a dynamic analysis, a set of probabilities of occupational categories for 1996-97 and 2007-08 are presented in Table 5. The trend in probabilities shows that in comparison to 1996-97, the probability of a women being in an elementary occupation has significantly increased in 2007-08. In contrast, these probabilities show a declining trend for men during the same period. Moreover, the probability of a women being employed in a high-level occupation substantially decreases in 2007-08 as compared to 1996-97 in all educational levels. For instance, the probability that a woman would be employed in a high-level occupation with a post graduate level of education was 0.93 in 1996-97, which declined to 0.34 in 2007-08, a drop of almost 60 percent.

Table 5									
Changes in Probabilities in three broad Occupational Categories between 1996-97 and 2007-08									
	Elementary Occupations			Mid-Level Occupations			High-Level Occupations		
	1996-97	2007-08	Difference	1996-97	2007-08	Difference	1996-97	2007-08	Difference
For Female Sample									
Primary	0.4561	0.4777	0.0216	0.3733	0.4211	0.0478	0.1706	0.1012	-0.0694
Matric	0.0226	0.1115	0.0889	0.3425	0.7978	0.4553	0.6349	0.0907	-0.5442
Intermediate	0.0028	0.0534	0.0506	0.2361	0.8384	0.6023	0.7611	0.1082	-0.6529
Graduate	0.0008	0.0530	0.0522	0.0928	0.7860	0.6932	0.9064	0.1610	-0.7454
Post Grad & Professional	0.0000	0.0659	0.0659	0.0680	0.5951	0.5271	0.9320	0.3390	-0.5930
Technical Training	0.0148	0.3609	0.3461	0.7997	0.6188	-0.1809	0.1855	0.0203	-0.1652
For Male Sample									
Primary	0.3359	0.3001	-0.0358	0.4327	0.4253	-0.0074	0.2314	0.2746	0.0432
Matric	0.2060	0.1990	-0.0070	0.4750	0.4810	0.0060	0.3200	0.3200	0.0000
Intermediate	0.1090	0.1070	-0.0020	0.4880	0.5010	0.0130	0.4040	0.3920	-0.0120
Graduate	0.0570	0.0550	-0.0020	0.3570	0.4260	0.0690	0.5860	0.5190	-0.0670
Post Grad & Professional	0.0340	0.0250	-0.0090	0.1850	0.3430	0.1580	0.7810	0.6320	-0.1490
Technical Training	0.2210	0.1260	-0.0950	0.6980	0.7100	0.0120	0.0810	0.1640	0.0830

6. Conclusion and Recommendations

The role of labour market in attracting both female and male workers and providing decent jobs to them is a complex matter and requires empirical investigation in both developed and developing countries including Pakistan. An attempt is made in this paper to investigate this issue in a comprehensive manner by focusing on three aspects including labour force participation, access to paid jobs and inequality in occupation for 1996-97 and 2007-08 by applying a nested logit model. The result shows that women are highly disadvantaged in labour force participation reflected through estimated probabilities in both years. Although this disadvantage marginally declines from 82 percentage points in 1996-97 to 76 percentage points in 2007-08, it is still very high. This is attributed not to less human capital among women as compared to men but to unobservable factors called discriminatory factors. It is hypothesized that once these unobservable factors are eliminated from society, women labour force participation as well as overall labour force participation will increase in Pakistan.

A prime reason of less participation of women in labour force is their less chances of being employed and has higher chances of unemployment if participating in labour force activities. This discourages women to actively participate in labour market. Moreover, they have fewer chances to get into jobs in high level occupations as compared to men. The analysis indicates that the probability of women participation in the labour force increased in 2007-08 compared to 1996-97. This could be due to higher economic growth in Pakistan during the early 2000s. Based on employment probabilities, it can also be concluded that chances of being employed also increased in 2007-08 as compared to 1996-97 especially for educated women. The sad part of the story however is the decline in probability of high-level occupations for educated women, which indicate that this high GDP growth resulted in greater vertical gender segmentation in labour market.

In order to improve labour force participation in Pakistan, the following policy measures are recommended.

- Increase in female and male education which plays a positive role in attracting both sexes into labour force. Therefore, greater investment in education is needed, with other gender friendly measures and through gender responsive budgeting.
- In order to provide more opportunities to women in formal sector, a tax credit can be provided to women employees.
- For both women and men working in informal sectors, there should be a compulsory coverage of EOBI and other benefits and safety nets.
- There should be an equal-pay policy aimed at tackling direct or indirect gender wage discrimination, equal opportunities policy aimed at encouraging women to have continuous employment patterns, without discouraging men, and de-segregating employment by gender; and wage policies aiming at reducing wage inequality and improving the remuneration of low-paid and/or female-dominated jobs.
- The recent growth experience shows that economic growth and revival of the economy create more jobs for both sexes. Therefore, policies for boosting agricultural growth, especially in livestock and other labour-intensive activities; industrial revival policies, in

particular, enabling the growth of exports, and enhanced public expenditure priorities for social sectors like education and health will create the more employment opportunities.

Selected Bibliography

Albrecht, et al. (2003) Is there a glass ceiling in Sweden? *Journal of Labor Economics*, vol. 21, pp. 145–77.

Anker, Richard. (1998), *Gender and Jobs: Sex Segregation of Occupations in the World*. Geneva: ILO.

Blackburn R. M., Jarman J. and Brooks B. (2000), ‘The Puzzle Of Gender Segregation and Inequality; a Cross-National Analysis’, *European Sociological Review*, 16, 2, 119-35.

Blackburn, R. and Jarman, J. (2005), “Gendered Occupations: Exploring the Relationship Between Gender Segregation and Inequality.” GeNet Working Paper 5. ESRC Gender Equality Network, University of Cambridge at <http://www.genet.ac.uk/workpapers/GeNet2005p5.pdf>

Blau, Francine, Simpson, Patricia and Anderson, Deborah (1998), “Occupational Progress? Trends in Occupational Segregation in the United States Over the 1970s and 1980s.” NBER Working Paper 6716 at <http://www.nber.org/papers/w6716>

Bayard, *et al.* (2003), New Evidence on Sex Segregation and Sex Differences in Wages from Matched Employer-Employee Data. *Journal of Labor Economics* 21(4), 887-922.

Becker, G.S. (1957) , *The economics of discrimination*. Chicago: The University of Chicago Press.

Becker, G.S. (1975), *Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education*. Chicago: University of Chicago Press.

Chzhen, Y. (2006), *Occupational Gender Segregation and Discrimination in Western Europe*, Centre for Research in Social Policy (CRSP), Loughborough University, UK

Cohen, Philip N. and Matt L. Huffman. (2003), "Individuals, Jobs, and Labor Markets: The Devaluation of Women's Work." *American Sociological Review* 68(3):443-63.

FBS (Various Years), *Labour Force Survey, Various Issues*, Federal Bureau of Statistics, Government of Pakistan.

Heckman, J.J. (1979), “Sample selection bias as a specification error”, *Econometrica*, 47, 153-162, 1979.

Huber, P.J., (1967), The behaviour of maximum likelihood estimates under non-standard conditions, in Proceedings of the Fifth Berkley Symposium on Mathematical Statistics and Probability, Berkley, CA: University of California Press, 1, pp.221-23.

Manpower Research and Statistics (2000), Occupation Segregation: A Gender Perspective, April 2000 Research Brief, Manpower Research and Statistics Department, Ministry of Manpower, Singapore <http://www.gov.sg/mom/manpower/manrs/manrs5.htm>

OECD (2002), *Manual for the PISA 2000 Database*. OECD, Paris.

de Ruijter, Judith and Huffman, Matt. (2003), "Gender Composition Effects in the Netherlands: A Multilevel Analysis of Occupational Wage Inequality." *Social Science Research* 32: 312-334.

Siddique, et al. (2006), *Gender and Empowerment, Evidence from Pakistan*, Pakistan Institute of Development Economics, Islamabad

Semyonov, M. and Frank L. Jones (1998), *Dimensions of Gender Occupational Differentiation in Segregation and Inequality: A Cross-National Analysis*, *Social Indicators Research* 46: 225–247, 1999, Kluwer Academic Publishers, the Netherlands.

Tam, Tony (1997), "Sex Segregation and Occupational Gender Inequality in the United States: Devaluation or Specialized Training?" *American Journal of Sociology* 102:1652–1692

de-Zeeuw, -Maarten (1996), *The Household Integrated Economic Survey of Pakistan 1990-91: Internal and External Consistency*, *The Pakistan-Development-Review* Vol. 35, No. 1, pp. 71-84.

Table A1: Definitions of Variables

Variable	Description
Dependent Variables	
LFP	value 1 for those who are either employed or unemployed otherwise 0
Employed	value 1 for employed otherwise 0
High Level Occupations	value 1 for employed persons working as professionals, legislators, senior officials and managers otherwise 0
Elementary Occupations	value 1 for employed persons working in elementary occupations otherwise 0
Mid Level Occupations	value 1 for employed persons working in rest of the occupations excluding high level and elementary occupations otherwise 0
Explanatory Variables	
age	Age in years
Age ²	Square of Age
Never Married	value 1 for never married otherwise 0
Married	value 1 for married otherwise 0
Widowd	value 1 for widowed otherwise 0
num_infant	Number of infant in a household
fhh	value 1 for female headed household otherwise 0
hh_size	Number of person in a household
Urban	value 1 if living in urban area, otherwise 0
Punjab	value 1 for all household in Punjab otherwise 0
Sindh	value 1 for all household in Sindh otherwise 0
Primary	value 1 if the highest level of education is primary, otherwise 0
Matric	value 1 if the highest level of education is matric, otherwise 0
Intermed	value 1 if the highest level of education is intermediate, otherwise 0
Graduate	value 1 if the highest level of education is graduation, otherwise 0
Post_pro	value 1 if the highest level of education is either post graduation or professional education, otherwise 0
tech_train	value 1 for the person having technical trainings otherwise 0
hhinc_fem	Total household earnings excluding female earnings
Female	value 1for female otherwise 0

Table A2								
Estimated Results of Logit Models for Labour Force Participation								
	1996-97				2007-08			
	Female Sample		Male Sample		Female Sample		Male Sample	
	Coefficient	Std. Error	Coefficient	Std. Error	Coefficient	Std. Error	Coefficient	Std. Error
age	0.0988	0.0047	0.4499	0.0062	0.0988	0.0047	0.4499	0.0062
age2	-0.0012	0.0001	-0.0056	0.0001	-0.0012	0.0001	-0.0056	0.0001
never married	0.4966	0.0358	-0.8068	0.0492	0.4966	0.0358	-0.8068	0.0492
widowd	0.1295	0.0470	-0.8842	0.0792	0.1295	0.0470	-0.8842	0.0792
num_infant	-0.0428	0.0133			-0.0428	0.0133		
fhh			-0.3963	0.0783			-0.3963	0.0783
urban	-1.1025	0.0263	-0.4740	0.0249	-1.1025	0.0263	-0.4740	0.0249
punjab	0.8633	0.0254	0.3061	0.0274	0.8633	0.0254	0.3061	0.0274
sindh	0.5417	0.0298	0.4820	0.0315	0.5417	0.0298	0.4820	0.0315
primarym	-0.8354	0.0337	-1.1842	0.0349	-0.8354	0.0337	-1.1842	0.0349
matric	-0.6799	0.0461	-1.6573	0.0396	-0.6799	0.0461	-1.6573	0.0396
intermed	-0.3281	0.0591	-2.2691	0.0485	-0.3281	0.0591	-2.2691	0.0485
graduate	0.3695	0.0633	-2.0151	0.0637	0.3695	0.0633	-2.0151	0.0637
post_pro	1.7237	0.0814	-1.4135	0.0906	1.7237	0.0814	-1.4135	0.0906
tech_train	1.0127	0.0432	1.1418	0.0613	1.0127	0.0432	1.1418	0.0613
hhinc_fem	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
constant	-3.2402	0.0981	-3.9467	0.1270	-3.2402	0.0981	-3.9467	0.1270
Pseudo R2	0.0965		0.3695		0.1014		0.3419	
Number of obs	34,555		37,359		69,523		72,875	

Table A3
Estimated Results of Logit Models for Access to Employment

Variables	1996-97				2007-08			
	Female Sample		Male Sample		Female Sample		Male Sample	
	Coefficient	Std. Error	Coefficient	Std. Error	Coefficient	Std. Error	Coefficient	Std. Error
age	0.0416	0.019	0.1257	0.010	0.0339	0.016	0.0991	0.009
age2	-0.0009	0.000	-0.0017	0.000	-0.0010	0.000	-0.0015	0.000
never_marr~d	-1.0413	0.149			-1.2400	0.117	-1.5922	0.082
widowd	-1.0706	0.153					-0.8442	0.120
fhh					-0.0713	0.150	-0.4202	0.137
married			1.3657	0.084				
hh_size	-0.1020	0.013	-0.0484	0.009				
urban1	0.5255	0.116	-0.1791	0.062	0.2083	0.114	-0.3484	0.047
primarym	0.2855	0.149	-0.4201	0.078	0.2311	0.116	-0.0809	0.057
matric	-0.9115	0.140	-1.1089	0.081	-0.4120	0.128	-0.5351	0.064
intermed	-0.5388	0.205	-1.0929	0.117	-0.3664	0.152	-0.6230	0.088
graduate	-0.9377	0.258	-0.9570	0.161	-0.8505	0.158	-0.4246	0.114
post_pro	-1.5358	0.351	-1.2839	0.182	-1.5726	0.219	-0.7068	0.128
tech_train	-1.2034	0.211	0.1044	0.111	-0.3956	0.151	0.0623	0.081
hhinc_fem	0.0000	0.000	0.0001	0.000	0.0000	0.000	0.0000	0.000
mills	-1.3179	0.096			-1.1520	0.097		
constant	5.1262	0.527	1.1017	0.197	5.0005	0.410	3.0373	0.206
Pseudo R2	0.1326		0.1237		0.153		0.0908	
Number of obs	4,090		30,115		13,192		59,385	

Table A4
Estimated Results of Multi-Logit Models for Occupation Categories 2007-08

Variables	Female Sample		Male Sample	
	Coefficient	Std. Error	Coefficient	Std. Error
Mid Level Occupations				
age	-0.0915	0.020	0.0731	0.006
age2	0.0010	0.000	-0.0011	0.000
fhh	0.3775	0.160	0.2907	0.100
married	-0.2272	0.122	0.0703	0.036
widowd	0.5291	0.182		
urban	2.9539	0.142	1.5157	0.024
primarym	1.7979	0.120	0.6727	0.027
matric	3.8760	0.158	1.2892	0.034
intermed	4.6195	0.233	1.8450	0.053
graduate	4.5651	0.310	2.2839	0.081
post_pro	4.0426	0.484	2.0508	0.119
tech_train	2.4690	0.133	2.6650	0.056
hhinc_fem	0.0001	0.000	0.0000	0.000
mills	-0.9912	0.125		
constant	0.1791	0.396	-2.9717	0.095
High Level Occupations				
age	-0.0593	0.034	0.0473	0.006
age2	0.0011	0.000	-0.0004	0.000
fhh	0.0236	0.286	-0.1106	0.127
married	0.0249	0.212	0.0451	0.042
widowd	0.5873	0.301		
urban	3.1614	0.239	1.8870	0.028
primarym	2.3752	0.231	0.9743	0.032
matric	3.6341	0.281	1.6182	0.039
intermed	4.5120	0.325	2.1313	0.059
graduate	4.9329	0.354	3.2310	0.083
post_pro	5.4595	0.539	4.0132	0.116
tech_train	0.8703	0.276	1.0903	0.071
hhinc_fem	0.0001	0.000	0.0000	0.000
mills	-1.1508	0.220		
constant	-2.9257	0.719	-3.5617	0.106
Pseudo R2	0.4539		0.2105	
Number of obs	11,869		57,106	

Table A5
Estimated Results of Multi-Logit Models for Occupation Categories 1996-97

	Female Sample		Male Sample	
	Coefficient	Std. Error	Coefficient	Std. Error
Mid Level Occupations				
age	0.1604	0.055	0.0151	0.007
age2	-0.0019	0.001	-0.0003	0.000
never_marr~d	1.7793	0.438		
widowd	1.1419	0.390		
married			0.1293	0.047
hh_size	-0.0181	0.019	0.0066	0.005
urban1	1.0493	0.474	1.4788	0.031
punjab	1.3932	0.553	-0.4299	0.035
sindh			-0.0672	0.041
primarym	-0.1628	0.326	0.7490	0.035
matric	3.0025	0.304	1.3147	0.047
intermed	4.7196	0.682	1.9117	0.081
graduate	5.0352	1.008	2.2163	0.129
post_pro	24.9342	0.796	2.0643	0.189
tech_train	4.3641	0.757	1.5680	0.061
mills	1.8252	0.619		
constant	-10.2936	2.725	-1.7196	0.127
High Level Occupations				
age	0.2286	0.065	0.0459	0.009
age2	-0.0023	0.001	-0.0003	0.000
never_marr~d	1.7729	0.510		
widowd	1.1384	0.495		
married			0.2508	0.063
hh_size	-0.0177	0.028	0.0187	0.006
urban1	0.3204	0.541	1.4267	0.041
punjab	2.0497	0.630	-0.7304	0.046
sindh			-0.1788	0.051
primarym	0.5156	0.421	1.1390	0.049
matric	5.1916	0.347	1.9109	0.060
intermed	7.4231	0.712	2.6810	0.091
graduate	8.9067	1.093	3.6794	0.130
post_pro	29.0945	.	4.4969	0.180
tech_train	4.3021	0.861	0.2236	0.093
mills	2.3450	0.698		
constant	-15.4156	3.112	-3.9598	0.171
Pseudo R2	0.4144		0.1908	
Number of obs	3,171		28,782	