

The Male Wage Advantage in Pakistan: Results from the 2001-02 HIES

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ABSTRACT

The examination of monetary compensation of females, relative to males in Pakistan has been an under-explored area of research. It appears that the only work in this field has been a series of articles authored by Ashraf and Ashraf (1993, 1996, 1998a, 1998b). In this article, the authors have updated the earlier work by Ashraf and Ashraf, using data from the 2001-02 Pakistan Integrated Household Survey (PIHS).

INTRODUCTION

In a series of articles appearing between 1993 and 1998, Ashraf and Ashraf (1993, 1996a, 1998a, 1998b) estimated the male-female earnings differential in Pakistan. They used different data sets, with two of the studies using national-level data, and two of them covered two major cities, Rawalpindi and Karachi. The studies employed a statistical technique pioneered by Cotton (1988) and Neumark (1988). The last of the Ashraf and Ashraf papers was published a decade ago. This study uses the *2001-2002 Pakistan Integrated Household Survey* to update the results from Ashraf and Ashraf's earlier work. These new results are compared with those from their earlier studies.

REVIEW OF LITERATURE

Since the only work on estimating male-female earnings differentials in Pakistan appears to have been conducted by Ashraf and Ashraf, their papers are the only ones included in this brief literature review. The data sets used in these four studies were:

1. Ashraf and Ashraf (1993): *PIDE Socio-Economic Household Survey of Rawalpindi City, 1975.*
2. Ashraf and Ashraf (1996): *Household Income and Expenditure Surveys, 1979 and 1985-86.*
3. Ashraf and Ashraf (1998a): *Household Income and Expenditure Survey, 1984-85.*
4. Ashraf and Ashraf (1998b): *AERC/KDA Socio-Economic Survey of Karachi, 1987-88.*

There was considerable variation in estimates of the gender earnings gap in these four studies. Part of this is attributable to faulty data collection techniques, and to respondents with low levels of education who may have provided inaccurate responses. Estimates of the earnings gap from the four studies are listed below:

<i>Study</i>	<i>Male-Female Earnings Gap</i>
Ashraf and Ashraf (1993)	68.55% (PIDE Socio Economic Survey of Rawalpindi City)
Ashraf and Ashraf (1996)	63.27% (HIES 1979) 33.09% (HIES 1985-86)
Ashraf and Ashraf (1998a)	47.90% (HIES 1984-85)
Ashraf and Ashraf (1998b)	14.55% (AERC/KDA Karachi, 1987-88)

As stated earlier, there is considerable variation in the estimates. While the accuracy of these results can be questioned, what is not in doubt is the existence of a positive, and in some cases, large differential between the earnings of men and women, after controlling for productivity-enhancing characteristics.

DATA AND METHODOLOGY

The data used for this study were drawn from the *2001-02 Pakistan Integrated Household Survey (PIHS)*, and were collected by the Government of Pakistan's Federal

Bureau of Statistics. The objective of the *PIHS*, a national sample survey, is to provide household and community level data which can be used to monitor, evaluate and assess the impact of the Social Action Program. The *PIHS 2001-02* is the fourth round of the project. Previous rounds were conducted in 1995-96, 1996-97, and 1998-99. The *PIHS* is a large sample survey covering 16,182 households. The occupation variables were determined using the *Pakistan Standard Classification of Occupations (PSCO)*, 1994 as revised by the *International Standard Classification of Occupations (ISCO)*, 1988. A detailed listing of the occupational categories is available in Sadiq and Akhtar (2006).

The statistical techniques used in this article are largely the same as employed in the earlier Ashraf and Ashraf papers. The wage equation used for this study is:

$$\text{Log Monthly Salary} = \alpha + \sum_{i=1}^{11} \beta X_i + \sum_{i=1}^8 \delta_i OC_i + \sum_{i=1}^9 \mu_i IC_i \quad \text{equation (1)}$$

where the X_i represent eleven characteristics of faculty that impact earnings, OC_i are eight occupational categories, and IC_i represent nine industrial categories. In addition to AGE (which was a proxy for experience), and AGE-SQUARED (which captures the concavity of the age-earnings profile), we included the following variables:

- i) MARITAL STATUS represented by a dummy variable. This variable was included to test the hypothesis that a correlation exists between marital status and earnings, as is suggested in the literature.
- ii) ENGLISH INSTRUCTION. This dummy variable applied to survey respondents who received their education in English. We are not aware of a previous study using Pakistani data that has included this variable in an

earnings equation. The rationale for its use was straightforward. Schools where the medium of instruction is English are generally viewed as elitist, and cater to the more affluent segments of the society. The quality of instruction is regarded as superior to those schools with mediums of instruction in other languages.

- iii) URDU INSTRUCTION. This dummy variable applied to survey respondents who received their education in Urdu. A number of schools in Pakistan impart instruction in a regional language. Our hypothesis is that while schools where students are taught in Urdu are superior to those in the regional languages, they are generally not as good as those with English as the medium of instruction. In using dummy variables for ENGLISH-INSTRUCTION and URDU-INSTRUCTION, the REGIONAL LANGUAGES was the omitted base variable in the regression equations.
- iv) We used five dummy variables for different levels of education: Middle, Matric, Intermediate, BA/BSc, and Masters or other advanced degree. The missing base variable was education below Middle level. The *a priori* expectation was that earnings would rise monotonically as the level of education rises.
- v) Dummy variables were used for eight different occupational categories:
 - (a) legislators, senior officials, and managers;
 - (b) professionals;
 - (c) technicians and associate professionals
 - (d) clerks;

- (e) service workers, shop and market sales workers;
- (f) skilled agricultural and fishery workers;
- (g) plant and machine operators and assemblers.

The missing base variable for the occupational categories was *Elementary Occupations*.

- vi) Nine industrial classifications were also recognized, and dummy variables were used in the regressions to identify each of them. These industries were:
 - (a) mining and quarrying;
 - (b) manufacturing;
 - (c) electricity, gas and water;
 - (d) construction;
 - (e) trade hotels and restaurants;
 - (f) transport and storage;
 - (g) finance and real estate;
 - (h) community services;
 - (i) other activities not defined.

The missing base variable for industrial classifications was *Agriculture, Forestry, Hunting and Fishing*.

Oaxaca's (1988) landmark article has been used often to compute gender earnings differentials. In the Oaxaca formulation the earnings differential is expressed as:

$$\ln W_m - \ln W_f = X'_m \beta_m - X'_f \beta_f \quad \text{equation (2)}$$

where X_m and X_f are vectors containing means of the variables for male and female faculty, while β_m and β_f are vectors with the OLS coefficient estimates for male and

female faculty, respectively. The log wage differential represented in equation (2) can also be expressed as:

$$\ln W_m - \ln W_f = (X'_m - X'_f) \beta_m + X'_f (\beta_m - \beta_f) \quad \text{equation (3)}$$

or as

$$\ln W_m - \ln W_f = (X'_m - X'_f) \beta_f + X'_m (\beta_m - \beta_f). \quad \text{equation (4)}$$

Focusing on the right-hand-sides of equations (3) and (4), the first term in each can be interpreted as the component of the log wage differential accounted for by different characteristics of male and female faculty. The second term in each equation is viewed in the literature as the component due to discrimination.

Cotton and Neumark independently concluded that Oaxaca's formulations are misleading, since equation (3) and equation (4) represent the extreme position that the male wage structure or the female wage structure would prevail in a discrimination-free environment. Specifically, Cotton's log wage differential is given by:

$$\ln W_m - \ln W_f = \beta^* (X_m - X_f) + X_m (\beta_m - \beta^*) + X_f (\beta^* - \beta_f) \quad \text{equation (5)}$$

where Cotton computes β^* as a vector containing the weighted averages of the male and female OLS coefficients, with the proportion of males and females in the sample as the relevant weights. For details of the Cotton and Neumark positions, see Ashraf (1996b).

We recognize that our estimates may actually overstate or understate the true level of discrimination. Relevant variables that affect productivity may have been omitted. If males on average, possess more of the productivity-enhancing attributes not included in our model, discrimination is overestimated. In like manner, discrimination is underestimated if females possess a higher mean level of favorable characteristics

omitted in the model. Furthermore it has been suggested in the literature that some of the differences in such attributes may stem from discrimination *prior* to an individual's entry into the labor market. This paper recognizes biases in reported estimates stemming from the inability of the data to capture such influences. Specifically, reported estimates of discrimination most likely include the effects of both pre-market and extra-market forces.

EMPIRICAL RESULTS

Table 2 lists the means of the variables used in this study. Only individuals between the ages of 16 and 65 were used in this study. We note that the mean age of 37 indicates that the sample is relatively young. Eighty percent of the survey respondents were married. The sample is heavily biased toward men, with 96% being male. We identified English, Urdu, and Regional Languages as the mediums in which instruction is imparted in Pakistan. Only 3% of the respondents attended English-medium institutions, 50% went to Urdu-Medium institutions, and the remaining 47% received their education in regional languages. A majority of the respondents, 48% had a level of education below Middle. The percentage of those with higher levels of education was Middle (12%), Matric (17%), Intermediate (8%), Bachelors (7%), and Masters or other advanced degree (4%).

Table 3 lists the coefficient estimates from three different regressions: the first for the entire sample, and the other two for males and for females separately.

a) *AGE*: We used *AGE* as a proxy for experience. The data did not contain a more precise variable to capture the effect of work experience. Mincer (1974) in a widely known formulation, computes experience as $(\text{Age} - \text{Education} - 5)$. However, given the

wide divergence in the ages at which many respondents, especially those with lower incomes tend to begin school casts doubt on the usefulness of such a formulation in Pakistan. Furthermore, it is likely (as is common in Pakistan) that many respondents did not begin working immediately upon completion of their schooling (this is true in particular, of women) thus further eroding the legitimacy of using the Mincer framework. Such a formulation would also provide an inaccurate estimate of experience, since it does not take into account interrupted work careers. As expected, we found AGE to be positively correlated to earnings. However, both the size of the coefficient estimate as well as the statistical significance of the variable was considerably higher for men than they were for women. The negative coefficient for AGE-SQUARED confirmed the concavity of the age-earnings profile, although it was statistically insignificant for females. The coefficient estimates indicate that earnings rises by 2.3% for every year that a male advances in age. The percentage increase for women, was lower, at 1.2%.

b) *MARITAL-STATUS*: It has been suggested in the literature that married individuals tend to have higher earnings than those unmarried. Scholars supporting this hypothesis include Korenman and Neumark (1991), Nakosteen and Zimmer (1997), Ginther and Zavodny (2001), and Chun and Lee (2001). The suggestion is made that higher-earning men tend to self-select into the marriage market. It is further postulated that as a result of social conditioning, women often seek out jobs that are traditionally lower paid than those pursued by their male counterparts. Our finding of a positive and statistically significant coefficient for MALE reinforces the findings of other researchers. Our coefficient estimates indicate that married men earn approximately 8% more than their unmarried counterparts, while the gain for married women is 6%.

c) *MEDIUM OF INSTRUCTION*: Our earnings equation used a variable that we have not seen hitherto, in studies using Pakistani data. It is well known that the most elite academic institutions with the highest quality of instruction in Pakistan are generally those which impart education in English. Many institutions also impart education in the national language, Urdu. Though the quality of instruction is not considered at par with English-medium institutions, it is nonetheless superior to that at institutions which teach using regional languages. We therefore used a dummy variable for respondents who had had their education at English medium institutions as well as a dummy variable for those who were taught in Urdu. The missing base variable in the regression equation consisted of the regional languages. As we expected, the coefficient estimate for instruction in the English language was positive and highly significant for both males and females. The coefficient estimate suggests that individuals from English-medium institutions earn approximately 35% more than those from institutions using regional languages (Percentages were obtained by taking the exponent of the coefficient of the relevant dummy variable). The impact was very similar for both males and females. The coefficient estimates for URDU was also positive and statistically significant, but less so than for ENGLISH. The coefficient estimates translate to percentage earnings gains of 13% and 9% for males and females respectively, relative to those schooled in the regional languages. A number of interpretations could be suggested for these findings. *Prima facie*, the inference to draw would be that instruction in English is superior to that in Urdu, while the latter trumps the regional languages. However, as is clear to any Pakistani observer, the level of resources (financial, manpower, and capital) is highest in the case of English-medium institutions, followed by Urdu-medium

institutions, and finally, the schools that impart education in the regional languages. English continues to be the language of the powerful elite, who ensure the provision of ample resources to the institutions where their offspring are nurtured. Buildings including laboratories are acceptable, sometimes even by Western standards in the best of the English-medium institutions, but are often non-existent in the regional language schools. The resultant difference in the quality of education imparted, and the outcome of significant differentials in earnings, is a reflection of the biases and power plays inherent in our society. The data, without getting into a social commentary, clearly uphold the benefits of receiving education in the English language. For those not as privileged, the Urdu language is to be preferred to the regional languages. It must be stressed that it is very likely not the medium of instruction itself, but the attendant resources that generally accompany English medium instruction, and to a lesser degree, Urdu medium instruction (relative to the regional languages) that are likely the reason for the earnings premiums reported in this article.

d) *LEVEL OF EDUCATION*: Five levels of education were identified in the earnings equation: Middle (eight years of schooling), Matric (ten years of schooling), Intermediate (twelve years of schooling), Bachelors (fourteen years of schooling), and Masters and Other Advanced (sixteen or more years of schooling). Less than Middle level of education was the missing base variable in the regression equation. Consistent with *a priori* expectations, coefficient estimates rose monotonically with the level of education. The percentage gain to men and women from different levels of education (relative to the base of “less than middle level of education”) is shown below in Table 1:

Table 1

Percentage Earnings Gains from Different Levels of Education

	All	Males	Females
Middle	5%	5%	13%
Matric	15%	15%	14%
Intermediate	30%	31%	28%
Bachelors	51%	52%	39%
Master/Adv.	80%	79%	82%

Note: Percentages were obtained by taking the exponent of the relevant dummy variables.

These results show the considerable enhancement in earnings from receiving progressively higher levels of education. The differences across gender are relatively minor, underlining the benefits that accrue to both men and women with formal academic instruction. As a clear recommended policy measure, it reinforces the need to provide education as a means to combat poverty in the country. Even the attainment of Middle level of education would, in the case of females, enhance earnings by 13%. Given distressing levels of economic well-being, such an enhancement of income would be welcome.

e) *OCCUPATION*: Nine different occupations were identified in the data. Our regressions included eight of these, with Elementary Occupations as the missing base variable. The coefficient estimates associated with each of these occupations (listed in Table 3) indicate the earnings premium relative to respondents employed in the

elementary occupations ranged from 5 percent to 70 percent. Given the broad definitions of the occupational categories, it is difficult to provide much meaning to these estimates.

f) INDUSTRIAL CATEGORY: Ten industrial categories were identified in the data. Nine of them were included in the regressions, with Agriculture, Forestry, Hunting and Fishing being the missing base variable. As with the occupational categories, the industrial categories were very broadly defined. The only industry with a considerable premium relative to the omitted base was Finance and Real Estate, where the earnings premium was 39% above those from the omitted base industry.

Gender Earnings Gap for Different Subgroups:

Table 4 provides the male-female earnings differential for various subgroups of the sample. Although we report an overall male-female earnings differential of 15.4% for the entire sample, there is considerable variability in this gap when we identify smaller subgroups within the sample.

The gender earnings differential is smallest in the lowest age category of 16-25 (8%). It remains flat thereafter (ranging between 12% and 14%) until age 55. But for those between 55 and 65, the differential escalates sharply to 27%. With only 31 working females in the 55-65 age group, this result must be viewed with caution.

In line with literature for Western countries, we find that marital status does indeed impact earnings. We reported earlier that married men earn 8%, and married women 6% more than their unmarried counterparts. However, within married individuals, we find males earning 17% more than females, while the percentage earnings differential is only 10% among unmarried respondents.

We had reported earlier that earnings tend to be highest for those who received their education in English, followed by those taught in Urdu, while instruction in the regional languages ranked third. For those taught in English, we found the male-female earnings differential to be essentially zero. It was high at 18% among Urdu-medium respondents, and 13% among those who went to regional language institutions. The results for English language respondents could indicate much less discrimination against women, and is likely correlated to economic class. Women receiving education in English are very possibly more liberated, more highly-educated and in higher-paying jobs than their peers in Urdu medium and regional language institutions.

Among respondents with different levels of education, we found the male-female earnings gap to be lowest (0.02%) for those with advanced degrees, and 9% for those with Bachelors degrees. It was higher for those with lesser levels of education. The 33% differential that we report for respondents with Middle level of education should be viewed with suspicion, since there were only 19 women in that category.

Table 4 also presents the gender earnings gap by occupation and industrial affiliation. Some of the cells indicate a small number of women, and results should be interpreted accordingly.

SUMMARY AND CONCLUSIONS

This paper is the first updating of the four articles by Ashraf and Ashraf which were written more than a decade ago. The articles estimated the male-female earnings differential in Pakistan. As with the Ashraf and Ashraf papers, we find an earnings differential between men and women of 15.4%. This is considerably less than the

differentials that were reported in the earlier Ashraf and Ashraf papers. Because of sampling errors, and differences in methods of data collection, reaching the conclusion that discriminatory treatment of women (at least with regard to earnings) has gone down, would be a bold statement. It would be safer and more pragmatic to state that after controlling for a variety of earnings impacting factors, there continues to be a difference between the compensation levels of men and women. This difference appears to be robust, having been determined to exist in previous studies, using both national and city-level data in Pakistan. The variability in the estimates of this earnings gap can be attributed to the use of different data which have been collected using different techniques, faulty data collection methods, and sampling error.

Table 2
Maximum, Minimum, and Mean of Each Variable

<u>Variable</u>	<u>Minimum</u>	<u>Maximum</u>	<u>Mean</u>
natural log of monthly earnings	7.60	11.74	8.23
age in years divided by 100	0.16	0.65	0.37
age in years divided by 100, squared	0.03	0.42	0.15
age in years	16	65	37.19
age in years, squared	256	4225	1527.44
married	0	1	0.80
male	0	1	0.96
english language instruction	0	1	0.03
urdu language instruction	0	1	0.50
middle education	0	1	0.12
matric education	0	1	0.17
intermediate education	0	1	0.08
BA/BS education	0	1	0.07
advanced education	0	1	0.04
occupation: legislators, senior official and managers	0	1	0.03
occupation: professionals	0	1	0.07
occupation: technicians and associate professionals	0	1	0.07
occupation: clerks	0	1	0.05
occupation: service workers, shop and market sales workers	0	1	0.19
occupation: skilled agricultural and fishery workers	0	1	0.18
occupation: craft and related trades workers	0	1	0.10
occupation: plant and machine operators and assemblers	0	1	0.09
industry: other activities not defined	0	1	0.00
industry: mining and quarrying	0	1	0.01
industry: manufacturing	0	1	0.11
industry: electricity gas and water	0	1	0.02
industry: construction	0	1	0.09
industry: trade hotels and restaurants	0	1	0.16
industry: transport and storage	0	1	0.10
industry: finance and real estate	0	1	0.02
industry: community services	0	1	0.28

N = 14381

Table 3
Coefficient Estimates for Entire Sample, Males, and Females
Pakistan Integrated Household Survey, 2001-02

<u>Coefficient</u>	<u>Entire Sample</u>		<u>Males</u>		<u>Females</u>	
Intercept	7.11	(152.88)	7.26	(166.29)	7.34	(39.64)
Age	2.29	(10.24)	2.31	(10.04)	1.22	(1.19)
Age-Squared	1.76	(-6.52)	1.79	(-6.45)	0.58	(-.43)
Married	0.08	(6.74)	0.08	(6.57)	0.06	(1.70)
Male	0.15	(7.86)				
English Language Instruction	0.33	(13.60)	0.33	(12.79)	0.32	(4.47)
Urdu Language instruction	0.12	(11.97)	0.12	(11.88)	0.09	(1.83)
Middle Education	0.05	(3.69)	0.05	(3.82)	0.13	(-1.33)
Matric Education	0.14	(10.95)	0.14	(10.69)	0.13	(1.95)
Intermediate Education	0.26	(15.15)	0.27	(15.29)	0.25	(1.28)
BA/BS Education	0.41	(22.46)	0.42	(21.64)	0.33	(4.86)
Masters and Other Advanced Degrees	0.59	(25.30)	0.58	(23.32)	0.60	(8.14)
Legislators, Senior Officials and Managers	0.53	(20.83)	0.52	(20.12)	0.89	(6.79)
Professionals	0.23	(11.26)	0.24	(10.77)	0.17	(2.40)
Technicians and Associate Professionals	0.19	(9.95)	0.20	(9.70)	0.12	(1.65)
Clerks	0.05	(2.55)	0.05	(2.35)	0.19	(1.58)
Service Workers, Shop & Market Sales Workers	0.16	(11.54)	0.16	(11.30)	0.12	(1.60)
Skilled Agricultural and Fishery Workers	0.23	(11.55)	0.23	(11.17)	0.30	(3.47)
Craft and Related Trades Workers	0.14	(9.04)	0.14	(8.91)	0.12	(1.45)
Plant and Machine Operators and Assemblers	0.12	(7.19)	0.13	(7.23)	0.08	(-.42)
Industry: Other Activities Not Defined	0.14	(-2.39)	0.15	(-2.42)	0.17	(.47)
Industry: Mining and Quarrying	0.08	(1.57)	0.09	(1.64)	0.03	(-.12)
Industry: Manufacturing	0.05	(2.21)	0.05	(2.22)	0.03	(-.26)
Industry: Electricity Gas and Water	0.03	(1.01)	0.03	(.91)		
Industry: Construction	0.02	(-1.06)	0.02	(-1.07)	0.02	(.08)
Industry: Trade, Hotels and Restaurants	0.13	(6.16)	0.13	(5.99)	0.02	(-.14)
Industry: Transport and Storage	0.09	(3.74)	0.08	(3.52)	0.66	(2.45)
Industry: Finance and Real Estate	0.33	(9.42)	0.33	(9.29)	0.04	(.17)
Industry: Community Services	0.10	(-5.11)	0.11	(-5.19)	0.03	(.31)

Note: Figures in parentheses are t-statistics

Table 4
Male-Female Earnings Differentials for Different Subgroups of Sample

Group	Male- Female Difference	Sample Size	(No. of Males, Females)
<u>Entire Sample</u>	0.154	14,381	(13767, 614)
<u>By Age</u>			
Age between 16 and 25	0.084	2,193	(2079, 114)
Age between 25 and 35	0.132	4,135	(3901, 234)
Age between 35 and 45	0.121	3,865	(3697, 168)
Age between 45 and 55	0.144	2,639	(2572, 67)
Age between 55 and 65	0.269	1,549	(1518, 31)
<u>By Marital Status</u>			
Married	0.167	11,566	(11166, 400)
Unmarried	0.097	2,815	(2601, 214)
<u>Medium of Instruction</u>			
English	-0.001	473	(412, 61)
Urdu	0.184	7,162	(6833, 329)
Other Languages	0.13	6,746	(6522, 224)
<u>Level of Education</u>			
Less than Middle	0.155	7,510	(7303, 207)
Middle	0.339	1,736	(1717, 19)
Matric	0.116	2,419	(2311, 108)
Intermediate	0.184	1,090	(996, 94)
Bachelor's	0.086	994	(897, 97)
Master's/Other Advanced	0.016	632	(543, 89)
<u>By Occupation</u>			
Elementary Occupations	0.159	3,116	(3045, 71)
Legislators, Senior Officials, Managers	-0.125	419	(409, 10)
Professionals	0.042	1,037	(792, 245)
Technicians and Associate Professionals	0.125	969	(841, 128)
Clerks	0.054	786	(774, 12)

Service Workers, Shop & Mrkt Sales Workers	0.144	2,672	(2619, 53)
Skilled Agriculture and Fishery Workers	0.112	2,602	(2548, 54)
Craft and Related Trades Operators	0.183	1,438	(1401, 37)
Plant and Machine Operators	0.405	1,342	(1338, 4)

By Industrial Category

Agriculture/Fishing	0.134	3,054	(2981, 73)
Other Activities Not Defined	-0.194	63	(62, 1)
Mining and Quarrying	0.456	85	(82, 3)
Manufacturing	0.271	1,552	(1504, 48)
Electricity, Gas and Water	*	260	(260, 0)
Construction	0.278	1,287	(1284, 3)
Transport and Storage	-0.492	1,463	(1461, 2)
Wholesale/Retail Trade, Hotels & Rest	0.319	2,321	(2311, 10)
Finance and Real Estate	0.137	248	(245, 3)
Community Services	0.093	4,048	(3577, 471)

*No females in this industrial category

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