# Nexus between Education, Migration and Earnings of Migrants in Pakistan

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**Abstract**

*The study examines effect of education on decision to migrate and on earnings of migrants within human capital framework using LFS 2006-07 data. The results showed the probability to migrate increases with education and age is an important determinant for migration; decision to migrate diminishes with age. Human capital determinants, education and experience had a significant effect on earnings of migrants. Returns to education for migrants increase as level of educational attainment raises. It implies that education and earnings have a positive relation. Concavity of earnings-experience profile of migrants shows earnings of migrants increase at decreasing rate.*

**Keywords:** human capital, migration, earnings

**JEL Classification:** C13, J31

## 1. *Introduction*

Investment in human capital improves mental abilities of the individuals and increases their productivity. Spending on education by the individuals is considered as an investment in human capital. Another form of human capital is the migration. Migration has been considered a form of human capital by the economists after the seminal work of Sjaastad (1962). The human capital theory suggests that earnings of individuals depend on level of human capital endowments [Mincer (1974), Becker (1964)]. Besides education and experience, migration also plays role in determining earnings of migrants.Migration involves costs followed by unsure returns in the future, so migration is an investment decision. The people invest in their skills in order to maximize the net present value of future earnings [Becker (1962)]. Education is an important factor which affects earnings and decision to migrate. Role of education as signaling device raises security of employment at origin as well as destination. Educated people have more information about jobs as compared to illiterates [Sirageldin et. al.(1984)]. Migration has always added to household earnings. There is evidence that education increases chances of migration which results in higher earnings[1]. Low income of household and lack of employment opportunities at origin are main causes for internal migration in Pakistan. Migration provides employment opportunities at destination which results in well being of household [Arif (2005)].

The aim of present study is to analyze effect of education on decision to migrate and on earnings of migrants. The study explains how human capital endowments affect earnings of migrants. Usually, returns to migration in terms of earnings are estimated by using income as dependent variable with a set of explanatory variables. But migration decision is not a random outcome, without taking into account the endogenous nature of migration decision results in selectivity bias. To avoid this problem, study used a model in which decision to migrate and earnings are jointly determined. The study utilizes Labor Force Survey 2006-07 data which is the most recent available data containing information on migration.
In order to reach the objective, the paper is structured as follows: Section 2 reviews the literature on migration in Pakistan; Section 3 discusses the data, and presents the brief descriptive analysis of the internal migration in Pakistan followed by the description of the model Section 4 provides the econometric specification for the models of Migration decision rule and earning function of migrants, Section 5 presents and analyses the empirical results and; Section 6 concludes.

## 2. *Literature Review*

Sjaastad (1962) considered migration as an investment in human capital and supplied micro foundation for migration theory. For an individual, migration is a rational decision. Todaro (1969) proposed a migration model, which theorized that migration based on rational behavior of economic agents,

[1] Ahmad and Sirageldin (1994), Ahmad (1998), Khan and Shehnaz (2000) and Memon (2005).

Migration is possible only if wages in rural areas are less than urban sector. Harris and Todaro (1970) provided a model which suggested that migration is due to expected difference in rural urban returns rather than actual difference. According to their model, migration is seen as a cost-benefit process. Irfan et. al (1983) analyzed migration flows in Pakistan at internal and international level. The study concluded that internal migration was a long distance fact and its direction was from rural to urban areas. Irfan (1986) studied the link among migration, economic growth and development in Pakistan. The study found that females migrate for marriages. Education and migration were positively related.

Ahmad and Sirageldin (1993) introduced a theoretical framework for empirical verification of human capital model of interval migration. The study found that decision to migration was function of age, education and choice of occupation. University graduates, professional and experienced workers were more inclined towards migration. Ahmad and Sirageldin (1994) analyzed effect of internal migration on earnings of migrants in Pakistan. Migration duration variables were used in Mincerian earning function to test learn-as-you-go hypothesis. Results based on Population, Labor Force and Migration Survey (PLM) (1979-80) data showed that earnings of those migrants, who had passed longer time period after migration, were relatively more than the recent migrants.

Ahmad (1998) evaluated sources of earning differences between migrants and non-migrants. The performance of migrants was found better than the non-migrants on account of their education. Professional migrants earned more than other categories migrant workers.Khan and Shehnaz (2000) identified the determinants of internal migration in Pakistan. They found education, technical and vocational training increases probability of migration. Migration was more evident for females and it was highest among professional and post graduates. Memon (2005) found positive effect of age and rural and urban wage differential on migration. Marriage and ownership of agricultural land had a negative effect on decision to migrate. The study also found that education had positive and significant effect on earnings of migrants and married earned more than unmarried.

## *3. Data Source and Model*

This section discusses the source of data and gives brief descriptive analysis of data related to migrants. This section identifies only internal migration pattern in terms of provincial and regional level. Data used for the present study is from Labor Force Survey (LFS) 2006-07 of Pakistan. Migration has been defined as the population's movement from one administrative district to another administrative district at any time of their lives and excludes the ones moved within the current district [(LFS) 2006-07]. The sample size of 10 year of age and over in (LFS) 2006-07 was 157308, out of which 87.42% were classified as non-migrants and 12.58% were migrants. Majority of migrants (65.47%) were living in urban areas. From these migrants, the most of migrants were from Punjab (58%) followed by Sind (24%). Rate of migration in Balochistan is very low, which is about 3%. The distribution of migrants indicates that inflow of migrants is higher towards urban areas of all provinces. The profiles of migrants in term of sex points out that female migrant (54.05%) were more as compared to their male counterpart (45.95%) in our sample [see Table 1 to 4 in appendix]. To investigate the relationship of education and earnings of migrants, analysis is restricted to the migrants aged between 15 and 65 years. The restricted sample consists of 16973 migrants out of which 3864 are earners.

**The Theoretical Model**

The model is based on the idea that migration is an investment in human capital. The individual, who migrates, compares benefits and costs of migration. It means migration not only depends on differences in gains of change in location but also on costs of migration. So, if gains at origin denoted by $R_{1i}$ , expected gains at new location denoted by $R_{2i}$ and cost of migration denoted by $C_i$ , then *ith* individual will move if

$$R_{2i} - R_{1i} - C_i > 0$$

i.e if expected gains are positive then migration takes place otherwise not. From above information migration decision rule can be formulated as follow:

Let $I_i^* = R_{2i} - R_{1i} - C_i$ ..... (1)

If $I_i^* > 0$ then migration

and if $I_i^* \leq 0$ then stay

$I_i^*$ are expected gains known to individual. Since gains and costs at origin or at new location depend on personal characteristics of individual i.e age, education, gender etc. After the inclusion of these factors migration decision rule is as under:

$$\overset{*}{I}_i = \delta Z_i + e_i \quad \text{..... (2)}$$

$Z_i$ denotes variables which affect gain and cost of migration, which in turn influence migration decision. $e_i$ is error term.

But (2) contains an unobservable latent variable $\overset{*}{I}_i$ and we can observe only

$$I_i = 1 \text{ when } \overset{*}{I}_i > 0$$

$$I_i = 0 \text{ when } \overset{*}{I}_i \leq 0$$

So migration decision rule is as under:

$$M = \begin{cases} 1 \text{ when } \overset{*}{I}_i > 0 \\ 0 \text{ when } \overset{*}{I}_i \leq 0 \end{cases}$$

This migration decision rule can be estimated by probit model as follows.

$$\text{Prob}(M_i) = \phi(\alpha + \beta Z_i + \varepsilon_i)$$

Where $M_i$ is a binary variable, which is equal to 1 for migrant and 0 otherwise. The matrix Z consists of variables thought to be determinants of migration i.e. age, gender, area and province of residence, and human capital dummy variables. The vector β is the corresponding vector of estimated coefficients (partial derivatives are evaluated at the mean values of regressors to estimate marginal effects).

**Earnings of Migrants**

In the light of aforementioned argument, we know that earnings of migrants are conditional on observable value of $I_i$. So, earning function of migrants may be expressed as

$$E(Y_i \mid M = 1) = \beta_0 + \beta_1 Z_i + E(u_i \mid M = 1)$$

Estimation of this function by using OLS results in inconsistent estimates because of truncation of sample and here $E(u_i \mid M = 1) \neq 0$. Heckman (1979) two steps method provides consistent estimates of earning equation; earning function of migrants under this method is formulated as

$$E(Y_i \mid M = 1) = \beta_0 + \beta_1 Z_i + \beta_2 \lambda_i + v_i$$

λ is selectivity term, known as inverse Mill`s ratio and error term is now normally distributed.

## *4. Methodology*

### 4.1 Decision to Migration

To find out education as determinant of internal migration, binary dependent variable is used in probit model. Binary dependent variable represents migrant and non-migrant status of respondent. The specification of the model with educational dummies variables[2] is as follows:

Mig=f(Age,Agesqr,Prim,Mid, Matric,Inter,BA,Prof,Postgrad, Male,Urban, Sind, NWFP, Baloch)

### 4.2 Mincerian Earnings Function of Migrants

The model is specified to include personal characteristics of migrants like education level, age (proxy for experience), gender of migrants and provincial dummies.

Ln(income)=f(Age,Agesqr,Prim,Mid,Matric,Inter,BA,Prof,Postgrad,Male,Urban, Sind, NWFP, Baloch), Where

Mig = dummy variable equal to 1 for migrants and zero otherwise

Ln(income) = Monthly income of migrants

Age = age of respondent in years

Agesqr = square of age of respondent

Prim = dummy variable equal to 1 if respondent`s completed highest grade is primary and zero otherwise

Mid = dummy variable equal to 1 if respondent`s completed highest grade is middle and zero otherwise

Matric = dummy variable equal to 1 if respondent`s completed highest grade is matric and zero otherwise

Inter = dummy variable equal to1 if respondent`s completed highest grade is intermediate and zero otherwise

[2] Since question about education was coded in categories of educational level. The respondent possesses education less than primary or no education is reference category.

BA = dummy variable equal to 1 if respondent has a bachelor degree and zero otherwise
Prof = dummy variable equal to 1 if respondent has a degree in engineering, medicine, computer or agriculture and zero otherwise
Postgrad= dummy variable equal to 1 if respondent has a MA/MSc or M.Phil degree and zero otherwise
Male = dummy variable equal to 1 for male and zero otherwise
Urban = dummy variable equal to 1 for urban respondents and zero otherwise
Sind = dummy variable equal to 1 if respondent live in Sind province and zero otherwise
NWFP = dummy variable equal to 1 if respondent live in NWFP province and zero Otherwise
Baloch= dummy variable equal to 1 if respondent live in Balochistan province and zero Otherwise

## *5. Empirical Results*

For the estimation of Mincerian Earning model of migrants which is free from selection bias, first migration decision model is estimated. Estimation of migration decision model provides Inverse Mill`s ratio $(\lambda)$[3]. The results of migration decision rule model are presented in Table5. The positive coefficient of age shows that probability to migrate increases as the age of migrant increases. Negative and significant coefficient of age square indicates that decision to migrate diminishes with age. The results indicate that education has a significant influence on probability of migration. These results reveal that migration is selective with respect to education. The negative coefficient of male dummy variable reveals that the females are relatively more inclined in the direction of migration as compared to males. So far as role of marital status is concerned in migration decision, the results show that probability of migration is higher for married respondents. The coefficient of regional dummy variable "Urban" indicates that urban residents have higher probability to migrate as compared to rural. Similarly, probability to migrate is lower among those who live in Sind, NWFP or Baluchistan as compared to Punjab province, which is reference category. It shows that migration decision was induced by education to a large extent.

**Mincerian Earnings Function of Migrants**

As we see above that education effects migration decision i.e. higher is the education, the more likely an individual will migrate. Table 6 reports the OLS estimates of Mincerian Earnings Function of migrants with and without correction for selection bias. If we concentrate on selectivity results, it shows that coefficients of all dummies of education level are highly significant. The positive signs of the coefficients indicate that education bring a valuable increase in incomes of migrants in Pakistan. The statistically significant coefficients of educational dummies verify the positive relationship of earnings and schoolings. Migrants with primary and middle school education earn 13.2% and 23.9% more than those migrants who are illiterates or with less than primary. With post graduation migrants earn 30% more than the graduates. Professionals gain 9% less than post graduates. These results suggest that human capital accumulation is a major determinant of earnings of migrants i.e. income increase with higher level of educational attainment.

In order to examine earnings-experience profile of migrants, age and its square was used as proxy for experience, in specification of earnings function of migrants. The estimated signs on age and age-square are consistent with human capital theory. The negative sign of age-square coefficient shows concavity of earnings-experience profile of migrants. Migrant females face a significant disadvantage in labor market; on average females earn 40% less than males in term of monthly incomes. The urban migrants earn more as compared to their rural counterparts. The results of provincial dummies indicate that those migrants reside in the Punjab are better off than those live in NWFP and Baluchistan. The insignificant coefficient on Sind suggests that migrants in Sind do not earn significantly more than Punjab`s migrant. The degree of bias can be seen by comparison of results with and without correction for selection bias. Results of both the methods indicate estimates are more or less identical in terms of signs and significance. While returns to education are higher for primary, middle, matric and intermediate for selectivity corrected results, but for graduation, post graduation and professional situation is reverse.

## *6. Conclusions*

This paper is an attempt to evaluate the effect of education on decision to migrate and on earnings of migrants in Pakistan using LFS 2006-07 data. This paper uses sample of migrants and non-migrants to estimate decision to migration rule model and sample of migrant earners to estimate the Mincerian Earning Function. The important conclusions of the study are:

[3] Estimation of Inverse Mill`s ratio is available in STATA.

a) As education is helpful in finding the job, the results showed the probability to migrate increases as education increases.
b) Age is an important determinant for migration. The negative coefficient of age square suggests that older workers have a weaker inclination to migrate than younger or decision to migrate diminishes with age.
c) Human capital determinants, education and experience had a significant effect on earnings of migrants.
d) Returns to education for migrants increase as level of educational attainment raises. It implies that education and earnings have a positive relation.
e) Concavity of earnings-experience profile of migrants shows earnings of migrants increase at decreasing rate.

The results of migration decision rule model and Mincerian earning function are in favor of to conclude that education is an important determinant of migration decision as well as earnings of migrants in Pakistan. To a large extent, migration decision is induced by education.

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**Table 1: Distribution of Population 10 years of age and over by Migration Status and Region of Residence**

| | Migrant | Non migrant | Total |
|---|---|---|---|
| Urban | 12,957 | 51,265 | 64,222 |
| | (20.18%) | (79.82%) | (100) |
| | [65.47%] | [37.28%] | [40.83%] |
| Rural | 6,833 | 86,253 | 93,086 |
| | (7.34%) | (92.66%) | (100) |
| | [34.53%] | [62.72%] | [59.17%] |
| Total | 19,790 | 137,518 | 157,308 |
| | (12.58%) | (87.42%) | (100) |
| | [100] | [100] | [100] |

Source: Labour Force Survey (2006-07), Federal Bureau of Statistics, Government of Pakistan.
Note: Values in parentheses are row-wise percentages. Values in brackets are column-wise percentages.

**Table 2: Distribution of Population 10 years of age and over by Migration Status and Province**

| | Migrant | Non migrant | Total |
|---|---|---|---|
| Punjab | 11,535 | 62,763 | 74,298 |
| | (15.53%) | (84.47%) | (100) |
| | [58%] | [46%] | [47%] |
| Sind | 4,763 | 32,590 | 37,353 |
| | (12.75%) | (87.25%) | (100) |
| | [24%] | [24%] | [24%] |
| NWFP | 2,953 | 24,603 | 27,556 |
| | (10.72%) | (89.28%) | (100) |
| | [14.92] | [17.89%] | [17.52%] |
| Balochistan | 539 | 17,562 | 18,101 |
| | (2.98%) | (97.02%) | (100) |
| | [2.72%] | [12.77%] | [11.51%] |
| Total | 19,790 | 137,518 | 157,308 |
| | (12.58%) | (87.42%) | (100) |
| | [100] | [100] | [100] |

Source: Labour Force Survey (2006-07), Federal Bureau of Statistics, Government of Pakistan.

**Table 3: *Distribution of Migrants by Province and Region of Residence***

| | Urban | Rural | Total |
|---|---|---|---|
| Punjab | 6,632 | 4,903 | 11,535 |
| | (57.49%) | (42.51%) | (100) |
| | [51.18%] | [71.75%] | [58.29%] |
| Sind | 4,185 | 578 | 4,763 |
| | (87.86%) | (12.14%) | (100) |
| | [32.3%] | [8.46%] | [24.07%] |
| NWFP | 1,725 | 1,228 | 2,953 |
| | (58.42%) | (41.58%) | (100) |
| | [13.31%] | [17.97%] | [14.92%] |
| Balochistan | 415 | 124 | 539 |
| | (76.99%) | (23.01%) | (100) |
| | [3.2%] | [1.81%] | [2.72%] |
| Total | 12,957 | 6,833 | 19,790 |
| | (65.47%) | (34.53%) | (100) |
| | [100] | [100] | [100] |

Source: Labour Force Survey (2006-07), Federal Bureau of Statistics, Government of Pakistan.
Note: Values in parentheses are row-wise percentages. Values in brackets are column-wise percentages.

**Table 4:** ***Distribution of Migrants by Sex and Region of Residence***

| | Male | Female | Total |
|---|---|---|---|
| Urban | 6,192 | 6,765 | 12,957 |
| | (47.79%) | (52.21%) | (100) |
| | [68.09%] | [63.25%] | [65.47%] |
| Rural | 2,902 | 3,931 | 6,833 |
| | (42.47%) | (57.53%) | (100) |
| | [31.91%] | [36.75%] | [34.53%] |
| Total | 9,094 | 10,696 | 19,790 |
| | (45.95%) | (54.05%) | (100) |
| | [100] | [100] | [100] |

Source: Labour Force Survey (2006-07), Federal Bureau of Statistics, Government of Pakistan.
Note: Values in parentheses are row-wise percentages. Values in brackets are column-wise percentages.

**Table5: Probit Estimates of Migration Decision Rule**

| Variables | Coefficients | t-values |
|---|---|---|
| **Age** | 0.048 | 24.1* |
| **Agesqr** | -0.0004 | -14.39* |
| **Education** | | |
| **Prim** | 0.075 | 4.91* |
| **Mid** | 0.061 | 3.65* |
| **Matric** | 0.069 | 4.51* |
| **Inter** | 0.063 | 3.09* |
| **BA** | 0.085 | 3.55* |
| **Prof** | 0.202 | 5.73* |
| **Postgrad** | 0.209 | 3.87* |
| **Male** | -0.207 | -20.86* |
| **Urban** | 0.656 | 64.34* |
| **Province** | | |
| **Sind** | -0.196 | -16.74* |
| **NWFP** | -0.163 | -12.14* |
| **Baloch** | -0.921 | -40.37* |
| **Constant** | -2.354 | -64.07* |

**Table 6: OLS Estimates for Migrants in Pakistan**

| | Without Correction | | With Correction | |
|---|---|---|---|---|
| **Variables** | **Coefficients** | **t-values** | **Coefficients** | **t-values** |
| **age** | 0.045 | 9.28* | 0.031 | 3.35* |
| **Agesqr** | -0.0005 | -7.1* | -0.0002 | -1.89*** |
| **Prim** | 0.117 | 3.65* | 0.132 | 3.95* |
| **Mid** | 0.201 | 5.81* | 0.239 | 5.93* |
| **Matric** | 0.390 | 13.36* | 0.399 | 13.31* |
| **Inter** | 0.597 | 15.12* | 0.624 | 14.73* |
| **BA** | 0.985 | 24.63* | 0.980 | 24.11* |
| **Postgra** | 1.381 | 32.64* | 1.287 | 19.59* |
| **Prof** | 1.243 | 19.09* | 1.196 | 16.88* |
| **Male** | 0.643 | 22.46* | 0.405 | 3.17* |
| **Urban** | 0.153 | 6.32* | 0.112 | 3.41* |
| **Sind** | 0.021 | 0.91 | 0.019 | 0.82 |
| **NWFP** | -0.116 | -4.05* | -0.117 | -4.1* |
| **Bal** | -0.099 | -1.67*** | -0.101 | -1.7*** |
| **Constant** | 6.637 | 71.6* | 7.306 | 20.22* |
| **lamda** | | | -0.215 | -1.92** |

*Significant at 1% , **Significant at 5 %, ***Significant at 10 %