

# International Journal of Statistics and Applied Mathematics

ISSN: 2456-1452  
Maths 2018; 3(2): 01-04  
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www.mathsjournal.com  
Received: 01-01-2018  
Accepted: 02-02-2018

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## A regression model approach to study the rural out migration

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### Abstract

Migration process is affected by a large number of socio economic factors like age, sex, education, occupation, marital status, economic status etc. as well as the role of social status or family attachment, characteristics of area, household and individuals. The aim of present study is to study the effect of some socio-economic variables on current migration status and to evaluate the effect of recent past prior migrants along with some other variables on current migration. An attempt has been made to find out the factors responsible for migration decision process at village level with the help of multiple regression models. We have limited the present study to ten variables which are more significant. F-ratio's have been calculated to test the goodness of fit. Findings reveal that out migration is highly related to the past prior migration. The study shows that the pattern of out migration from the studied area is well explained by multiple regression models modified by taking prior migrants and other variables as independent.

**Keywords:** Prior migrants, F-ratio, multiple regression

### Introduction

Migration is a complex phenomenon which involves social, economic, political and psychological factors. With industrialization, development and the changing pattern of population, all the efforts to cope with the social, cultural, economic, political and demographic problems have been proved futile before the rising population of a country. Thus in recent years, planners, social scientists and researchers are highly concerned with economic and social development of nations and recognize great importance to the ways and means of tackling the complex problem of population. The inter-relationship between population and development has been widely recognized as a vital input for formulating policies for economic development and population control. Since economic, social and political development of a nation is linked directly with the size and the pattern of growth of its population, it requires a thorough study and analysis of the factors, having a direct bearing on high rate of population increase as well as in depth understanding of the population distribution.

In the process of regional and economic development, urbanization and industrialization, migration has long been recognized as an important tool for redistribution of population either by performing it in a well defined manner or allowed to have its own course through spontaneous movement (Singh *et al.* 2015; Yadava *et al.*, 1989) [3, 4]. A household, especially in Indian context is a basic socio-economic unit for the integrated rural development. Household characteristics (age, size, occupation, socio-economic status, etc.) play a vital role in decision of its members to move or not to move. A study of movement process at the household level is also useful for the prediction of future size of the households as well as to study the imbalances in sex-ratio occurred due to such migration (Aryal 2002; Singh *et al.*, 2014, 2016; Yadava *et al.* 1991; 2002) [5, 6, 1, 8, 7].

Apart from above discussed factors, the role of social status or family attachment, characteristics of the area, household and the individuals have also played an important role for migration decision process. Thus there is a relationship between various demographic, social-psychological and economic factors in explaining the propensity to migrate an individual (Cadwall, 1968) [9]. Different models and techniques have been evolved to study the effect of various factors associated with migratory flows from rural areas. One of these models is models is multiple regression analysis which enables exploratory analysis of the significance

of numerous factors in the act of migration. It can also be used for prediction and policy making. Its main application has been to investigate the dependency of a measure of migration on one or more explanatory variables,  $X_1, X_2, \dots, X_n$ .

Several studies in both developed and developing countries regarding the migration had established the fact that rural to urban migration is highly selective in nature specially in case of educated people (Kothari, 1980; Hugo, 1991; Singh, 1986) <sup>[11, 10, 12]</sup>. Education acts as a catalyst and enables people skillful and capable of doing the jobs which cannot normally be done by illiterate or untrained person.

The propensity of an individual to move or not to move depends, to some extent, on the location of the place of origin under study. In some studies, it has been pointed out that distance of the village from the nearest town affects migration decision process (Caldwell, 1968, Yadava, 1977; Singh, 2013) <sup>[9, 13, 2]</sup>. It has been found that the propensity to migrate declines with the increasing distance of the village from the nearest city or town.

Apart from education, it is also a well-established fact that migration come from relatively large family. This suggests that extended families or joint families are more prone than small families to migrate (Mukherjee, 1979) <sup>[14]</sup>. In the present study, this variable is thought in terms of type of family and is divided as follows:

- i. Nuclear (consists of one eligible couple)
- ii. Joint (consists of more than one eligible couple).

Quantitative explanations of migration have been given by many researchers in past with the help of multiple linear regression model by using different independent variables depending upon the scale of investigation and availability of data. The main independent variables used by these authors are the proportion of non-agricultural households, the number of adult persons, the extent of labour force, the school enrolment rate for children, the sex ratio, the local rates of daily wage, in connection with the place of origin.

Yadava (1977) <sup>[13]</sup> had used a regression analysis to describe the nature of out-migration at village level using variables (i) number of prior migrants, (ii) distance of the village from the nearest large city (iii) percentage of households belonging to the upper caste group (iv) the educational level and (e) socio-economic condition of the particular village. These variables explain 58 percent of variation in the current flow of migration from villages.

### The Regression Model

For this study we taken 8 variables: (i) recent past prior number of migrants (ii) remote past prior number of migrants (iii) percentage of those owing land less than four bighas from the particular village (iv) the percentage of households belonging to upper caste group (v) distance of the village from the nearest town (in km) (vi) the educational level of the villages (vii) type of family and (viii) the diffusion of information. Some of them were found significant in the past studies.

Incorporating these factors, the regression model can be written in the form

$$Y_i = \beta_0 + \sum_{j=1}^8 \beta_j X_{ji} + \varepsilon_i \text{ for } i = 1, 2, \dots, N$$

Where,

$Y_i$  = the percentage of out-migrants to the total population from the  $i^{\text{th}}$  village defined in the period (2009-14) under consideration.

$X_{1i}$  = the percentage of recent past prior migrants to the total population defined in the period (2004-2009) from  $i^{\text{th}}$  village

$X_{2i}$  = the percentage of remote past prior migrants to the total population defined in the period less than or equal to the year 1995 from  $i^{\text{th}}$  village

$X_{3i}$  = the percentage of households owning landless than 6 bighas from  $i^{\text{th}}$  village

$X_{4i}$  = the percentage of households belonging to upper caste group from  $i^{\text{th}}$  village

$X_{5i}$  = the distance of the  $i^{\text{th}}$  village from the nearest town (km)

$X_{6i}$  = the educational level of  $i^{\text{th}}$  village

$X_{7i}$  = type of family of  $i^{\text{th}}$  village

$X_{8i}$  = the percentage of households which were receiving different kinds of information regarding opportunities at the place of destination from different sources in  $i^{\text{th}}$  village

### Measurement of Variables

We have used the primary data for this study. The data has been collected in a primary survey entitled "Migration and its Impact in Rural Varanasi", conducted during September-October 2015 in four villages of two blocks of Varanasi District by the Department of Statistics, U. P. Autonomous College, Varanasi. This analysis is based on the information collected from 649 households.

The dependent variable  $Y_i$  in the model is the percentage of current migrants to total population at the time of survey of  $i^{\text{th}}$  village, i.e.

$$Y_i = \frac{\text{Current migrants from } i^{\text{th}} \text{ village}}{\text{Total population in } i^{\text{th}} \text{ village at the time of survey}} \times 100$$

Similarly, the independent variables  $X_{1i}$  and  $X_{2i}$  from  $i^{\text{th}}$  village respectively, are the percentage of recent and remote past prior migrants to the total population of that village at the time of survey i.e.

$$X_{1i} = \frac{\text{Recent past prior migrants from } i^{\text{th}} \text{ village}}{\text{Total population in } i^{\text{th}} \text{ village at the time of survey}} \times 100$$

And

$$X_{2i} = \frac{\text{Remote past prior migrants from } i^{\text{th}} \text{ village}}{\text{Total population in } i^{\text{th}} \text{ village at the time of survey}} \times 100$$

To measure the variables  $X_{3i}$  for  $i^{\text{th}}$  village, the percentage of households having less than 6 bighas owned land to the total household of that village is computed.

$$X_{3i} = \frac{\text{Households having less than four bighas owned land}}{\text{Total population in } i^{\text{th}} \text{ village at the time of survey}} \times 100$$

The variable  $X_{4i}$  for  $i^{\text{th}}$  village is defined as

$$X_{4i} = \frac{\text{Total number of upper caste households in the } i^{\text{th}} \text{ village}}{\text{Total number of households in } i^{\text{th}} \text{ village}} \times 100$$

The geographical distance (in km) of each village is measured from the centre of the nearest town and is denoted by the variable  $X_{5i}$  for  $i^{\text{th}}$  village.

We have divided the educational group in four parts i.e. (i) illiterate (ii) Primary (iii) high school (iv) more the high school. On the basis of these four categories, the households of a village is grouped in two parts i.e. (a) households consisting of educational group (iii) and (iv) and (b) households consisting of educational group (i) and (ii). The percentage of the former part out of the total households of each village is calculated. Thus we have one percentage value corresponding to each village and median of these percentage is computed. Then  $X_{6i}$  is defined as

$$X_{6i} = \begin{cases} 1, & \text{if the percentage of education of a village is more than or equal to the median percentage} \\ & \text{of village} \\ 0, & \text{otherwise} \end{cases}$$

To calculate  $X_{7i}$  the total households having eligible couples of particular village is divided in two groups. One group consists of households with more than one eligible couple and second contains others.

$$X_{7i} = \begin{cases} 1, & \text{if the percentage of a village is more than or equal to the median percentage of village} \\ 0, & \text{otherwise} \end{cases}$$

### The Regression Findings

After computing the dependent variable  $Y$  and independent variables  $X_j$  for  $j= 1,2,\dots,8$ , for each village, the corrected sum of squares and product terms are calculated. To test the goodness of fit, F-Ratio's are also computed.

The expected percentage of migrants  $\hat{Y}_i$  is calculated without considering the prior migrants, and is given by

$$\hat{Y}_i = -0.521 + 0.413X_{3i} + 0.0431X_{4i} + 0.1381X_{5i} + 0.0312X_{6i} - 0.4133X_{7i} - 0.0139X_{8i}$$

(0.0193)\*      (0.0231)      (0.481)      (0.5103)  
(0.5103)      (0.0159)

From the above model, it was observed that the variable  $X_7$  and  $X_8$  are insignificant. However the value of  $R^2$  was found to be 0.71 which was satisfactory. Here the value of  $R^2$  is found to be 0.51 which is not satisfactory. Thus in the next model we dropped the insignificant variables and included one variable i.e., recent past prior number of migrants, another multiple linear regression model is derived and is given below in equation (2). After adding the prior migrants, the multiple linear regression model is given below:

$$\hat{Y}_i = -0.47 + 0.71X_{1i} + 0.011X_{3i} - 0.021X_{4i} + 0.13X_{5i} - 0.49X_{6i}$$

(0.1061)      (0.0137)      (0.0201)      (0.0295)      (0.393)

The bracketed figures denote the standard error (S.S.) corresponding to the estimate of coefficients.

In this model the value of  $R^2$  is found to be 0.84 which is satisfactory well. The coefficient of variables  $X_1$ ,  $X_3$  and  $X_5$  are significant at 5% level of significance. Thus the variable prior migrant is found to be very influential in the migration decision making. Previous studies had also showed the same results.

### Discussion

The results reveal that the out migration in the current period is highly affected by the recent past prior migration and then remote prior migration. It is clear from the study that the pattern of out migration from the village is well followed by multiple linear regression model proposed on the basis of the prior migrants and other variables in the present situation at micro level. Education is the second most important factor responsible for out migration. Many people at early ages migrate for better education and after

getting education they migrate for suitable jobs. The study describes some of the important factors responsible for migration and thus may be helpful for social demographers and policy makers.

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