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# Distance and Marriage Migration

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**Abstract:** *This paper attempts to analyse the pattern of the distribution of distance associated with marriage migration. Islam (2008) studied the pattern of marriage migration through a polynomial model to describe the functional relationship of distance with marriage migration and found satisfactory results with the Bangladesh data. However, the pattern of distribution of distance involved with marriage migration in other countries especially in India where majority belonged to Hindu religion may be different than that of Bangladesh. Due to non-existence of endogamy (cross-cousin marriages) among Hindus, mean distance associated with a marriage is supposed to be much higher than Bangladesh, a Muslim country. This paper tried to test the suitability of polynomial model on Indian data, collected at three different time periods i.e. in 1978 and 1984 and in 2002. It was found that the Polynomial model as discussed by Islam (2008) fitted to the distribution of distance associated with marriage migration in Indian situation too under certain standardised situations. The marriage field was found much higher in India than that of Bangladesh. Also an increasing trend of marriage field was noted in India over time.*

**Keywords:** Marriage migration, Polynomial model, Truncated distribution, Bridegroom.

## Introduction

Majority of migration studies have discussed movement of individuals in the context of economic reasons, especially for getting a job outside the place of origin (Hugo, 1991; Yadava et al., 1988). However, another type of movement especially of females occurs which involves a change of usual place of residence. This type of migration is usually caused by the marriage of females in developing countries like India and is called as 'marriage migration'.

Migration of females caused by marriage in rural areas is mostly rural to rural, at short distances and only few are from rural to urban. Nature of marriage migration varies depending on social rules associated with marriage e.g. in a society where village 'endogamy' is common, there may not be many 'marriage migration'. Migration of men in India is usually occurs for work, whereas life time migration is common among women due to marriage. It is an almost universal custom for brides to move to bridegroom's home after marriage. This type of migration is balanced in the sense that the 'out migration' due to marriage from a village is more or less same as the 'in migration' to the village. Thus, in such type of migration the population size of the village/area remains unchanged. The pattern of the distribution associated with marriage migration in India, as elsewhere has rarely been analysed. This may be perhaps due to lack of

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pertinent data as well as lack of interest among social scientists. However, a number of researchers have discussed the pattern of marriage migration as a function of distance (Hossain, 2000; Libbee and Sopher, 1975; Morrill and Pits, 1967; Perry, 1969a and 1969b; Rahaman, 2010; Sharma, 1984; and Yadava et al. 1988).

Recently, Islam (2008) studied the functional relationship of distance with marriage migration through a polynomial model. An application of this model to Bangladesh data was found satisfactorily well. The aim of this paper is to test the suitability of this polynomial model on Indian data, collected from the Hindu dominated rural areas at different times i.e. in 1978 and 2002.

**Review literature on marriage migration models**

To describe the association between marriage migrations and distance Morrill and Pits (1967) proposed a Pareto function as

$$Y = a D^{-b} \qquad (1.1)$$

Where Y is standardized number of marriages at distance D. Since Model (1.1) like 'gravity model', tends to overestimate the close-in frequencies, they proposed another exponential model as

$$Y = a e^{-bD} \qquad (1.2)$$

Further they suggested that on 'a priori' grounds a log normal function of the form

$$Y = a e^{-(b \log D)^2} \qquad (1.3)$$

Though many empirical data have been fitted successfully by both exponential and log normal functions, these tend to under-estimate the close-in frequencies. Consequently, Morrill and Pits combined Models ( 1 . 1 ) and (1.2) and proposed a model as

$$Y= a D^{-b} e^{-cD} \qquad (1.4)$$

A Pareto-Exponential function. This Pareto-Exponential function tended to be superior to either of the functions separately, but this was not always the case.

However, the models discussed above are found not suitable to provide good fit for the Indian data especially marriage market of Hindu societies. No doubt, the marriage pattern in India and in other developing country is quite different from those of European countries. For example, Libbee and Sopher (1975), in their study of marriage migration in rural India, based on 1961 census data, have reported a larger marriage field (i.e. distance traveled by a bride to marry) than the rural Europeans.

In the Indian context, a probability model to describe the distribution of distance associated with marriage migration was first proposed by Sharma (1984) under the assumptions that (i) up to a certain distance say 'D' marriages are uniformly distributed over the space, that is, the number of marriages is proportional to the area of the distance interval, i.e. number of marriages with the distance interval $d_1$ to $d_2$ ($d_1<d_2<D$) are proportional to $\pi (d_2^2 - d_1^2)$, and (ii) after distance 'D' marriage probability is a decaying function of distance, i.e., the number of marriages in the interval $d_1$ and $d_2$, ($D<d_1<d_2$) is proportional to

$$[e^{-\lambda (d_1 - D)} - e^{-\lambda (d_2 - D)}] \pi (d_2^{\,2} - d_1^{\,2}) \qquad (1.5)$$

Where $\lambda$ is the risk parameter associated with the exponential distribution.

However, one limitation of the Model (1.5) is the problem of estimating the distance 'D' theoretically. In fact, the value of 'D' cannot be taken as constant as it may vary from one cultural group to another depending upon the rules of marriage alliance, travelling expenses, and prosperity and geographical contacts of a family.

Yadava et. al. (1988) extended the model proposed by Sharma (1984) as:

If M denotes the number of marriages at distance 'r', then

$$M \alpha \pi r f(r) dr \qquad (1.6)$$

where,

$$f(r) = \begin{cases} e^{-\lambda(r-D)} & \text{if } r > D \\ 0 & \text{if } r \leq D \end{cases} \qquad (1.7)$$

This model provides a better approximation as compared to Sharma (1984) model and both parameters $\lambda$ and D are being estimated theoretically.

However, the models proposed by Sharma (1984) and Yadava et al. (1988) are found suitable to describe the marriage distance of Hindu society. A number of data sets available from Bangladesh were fitted and these models did not provide a good fit to the data (Yadava et al., 1998). As mentioned above the marriage pattern among Muslim society is quite different from that of a Hindu society. In a Hindu society, most of the marriages usually take place out-side the village, whereas due to acceptance of cross-cousin marriages in Muslims societies most of the marriages take place within the village or neighboring villages.

Hossain (2000) used the Pareto-Exponential function proposed by Morril and Pitts (1969) (Expression 1.4) to describe the distribution of distance associated with marriage migration for the data of Bangladesh. Though this model provides a better approximation than the models proposed by Sharma (1984) and Yadava et al. (1988) but still did not adequately fitted to the data set utilised. Assuming the number of marriage migration among Muslim community as a decaying function of the distance from the very beginning stage, i.e. as distance increases the number of marriages decreases, Srivastava (2002) fitted exponential distribution as.

$$f(x) = \begin{cases} \theta e^{-\theta x} & \text{if } x > 0 \\ 0 & \text{otherwise} \end{cases} \qquad (1.8)$$

Where x denotes the distance associated with marriage migration and $\theta$ is the risk parameter.

It was found that exponential distribution provides a better fit to the distribution of marriage migration for data of Bangladesh than Pareto-exponential function.

**A polynomial model**

A general expression of the polynomial model is

$$y = b_0 + \sum_{i=1}^{n} b_i x^i + u \qquad (1.9)$$

Where, x is independent variable say distance, y is dependent variable say, number of marriage migrations, $b_0$ is the constant, $b_i$ is the coefficient of $x^i$ (i=1, 2, 3 . . . n) and u is the stochastic error of the model. For minimizing the error sum of square a suitable n is selected.

Islam (2008) describes the distribution of marriage migration associated with distance, using the Bangladesh data previously used by Yadava et al. (2002), and Hossain (2000) and fitted a polynomial model with respect to distance of degree three and found a better fit than models mentioned above with a high explanatory power ($R^2 = 0.998$).

However, as mentioned above the marriage pattern in India (Hindu dominated society) is quite different from Bangladesh (Muslim dominated society). Due to endogamy, cross-cousin marriage in Bangladesh is common and marriage field is comparatively very short as compared to societies like India. In India, there is an almost universal custom of the bride moving to the groom's home, generally located in another village or locality, and leaving her parent's home permanently and hence a larger marriage field. Here, it is tried to see whether Islam (2008) model explain the pattern of marriage migration associated with distance in Indian context or not.

## Application

Three sets of data, collected in sample surveys conducted in 1978, 1984 and 2002 sponsored by the Center of Population Studies, Banaras Hindu University, are taken for application and discussion. All data sets belonged to Hindu dominated rural society of India.

**Table 1: Observed and expected distribution of distance associated with marriage migration in India (Sample survey, 2002)**

| **Distance (in kms)** | **Number of marriage** | |
|---|---|---|
| | **Observed** | **Predicted** |
| 0-8 | 20 | 14 |
| 8-16 | 42 | 53 |
| 16-24 | 66 | 71 |
| 24-32 | 88 | 71 |
| 32-40 | 58 | 60 |
| 40-48 | 35 | 42 |
| 48-56 | 24 | 23 |
| 56-64 | 8 | 8 |
| 64-72 | 4 | 3 |
| **Mean** | **28.97** | **p-value** |
| **Constant** | **-15.485525** | **0.343** |
| $b_1$ | 8.300283 | 0.006 |
| $b_2$ | -0.233995 | 0.01 |
| $b_3$ | 0.001705 | 0.024 |
| $R^2$ | **0.916** | |

Source: Shukla, (2002)

In 1978 and 1984 survey, data on marriage distance was noted and grouped in the intervals of 0-2, 2-3, 3-4 . . .34+ miles, while in 2002 data on distance are grouped as 0-8, 8-16, 16-24 . . .64-72 km (1 mile=1.6 km). It is found that a polynomial model fitted (2002) data satisfactorily well ($R^2 = 0.916$) and all the parameters of the fitted model are also found highly significant (Table 5.1, see also figure 1), but for 1978 and 1984 data set this model could not provide a good fit (Table 2).

**Figure 1: Observed and estimated marriage migration associated with distance, 2002**

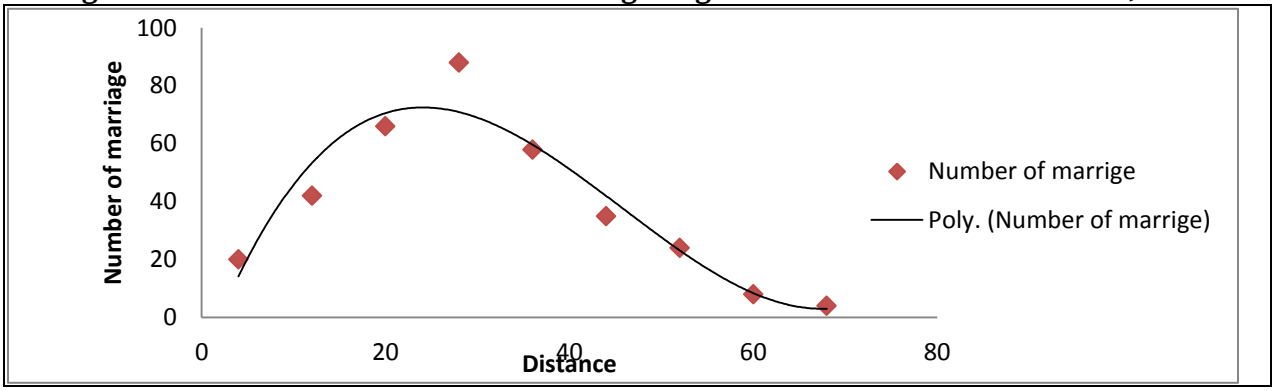



**Table 2: Observed and Expected Distribution of Distance Associated with Marriage Migration in India (Sample Survey, 1978 And 1984)**

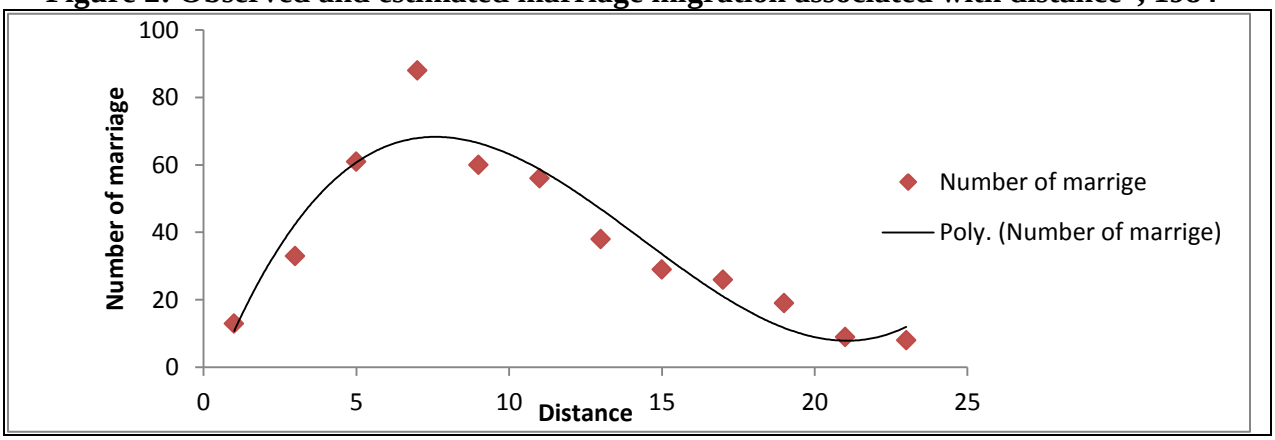
| Distance (in miles) | Number of marriages | | | |
|---|---|---|---|---|
| | 1984 | | 1978 | |
| | Observed | Predicted | Observed | Predicted |
| 0-2 | 13 | 25 | 63 | 105 |
| 2-4 | 33 | 41 | 153 | 183 |
| 4-6 | 61 | 51 | 288 | 233 |
| 6-8 | 88 | 57 | 357 | 260 |
| 8-12 | 60 | 58 | 265 | 266 |
| 10-12 | 56 | 55 | 257 | 255 |
| 12-14 | 38 | 50 | 190 | 231 |
| 14-16 | 29 | 42 | 159 | 197 |
| 16-18 | 26 | 34 | 131 | 157 |
| 18-20 | 19 | 24 | 87 | 115 |
| 20-22 | 9 | 15 | 58 | 74 |
| 22-24 | 8 | 7 | 45 | 37 |
| 24-26 | 7 | 0 | 38 | 8 |
| 26-28 | 4 | * | 20 | * |
| 28-30 | 4 | * | 29 | * |
| 30-32 | 1 | * | 11 | 8 |
| 32-34 | 4 | 5 | 21 | 47 |
| 34+ | 8 | 17 | 100 | 113 |
| Mean | 10.97 | p-value | 12.32 | p-value |
| Constant | 14.18634 | 0.240 | 54.5847 | 0.192 |
| $b_1$ | 11.3137 | 0.001 | 54.45955 | 0.000 |
| $b_2$ | -0.86049 | 0.000 | -4.11283 | 0.000 |
| $b_3$ | 0.015423 | 0.000 | 0.074423 | 0.000 |
| $R^2$ | 0.814 | | 0.874 | |

Source: Yadava et al., (1988)
* Negative estimates

It is seen that the mean distance of marriage migration has considerably increased from 1978 (about 12 miles) to 2002 (about 18 miles) almost more than three times longer than the Bangladesh data where it was about 4.5 miles. One of the reasons may be the increased social contacts of the persons of different society, increased facilities of roads and highway and due to increasing level of education and communication systems. Unfortunately for comparison Bangladesh marriage field data for this period (1978 and 1984) are not available, but it may be assumed that the mean of marriage field would be less than 4.5 miles in those periods. Looking on these differences of marriage field between India and Bangladesh, if the marriage field of

1978 and 1984 Indian data are taken up to 24 miles that is a truncated distribution as taken in the data of Bangladesh marriage field (Islam, 2008), then this polynomial model provides a good fit for 1978 and 1984 data sets also (Table 3). This shows that a polynomial model describe the distribution of distance associated with marriage migration in Indian situation too if marriage fields are standardised (adjusted) at par with the Bangladesh data (Appendix 1A). The scattered plot of marriage migration associated with distance for both sets of data 1984 and 1978 are also depicted by Figures 1.2 and 1.3 respectively. This shows that the role of polynomial model depend on the group intervals of the distance associated with the marriage migration and nothing else.

**Figure 2: Observed and estimated marriage migration associated with distance*, 1984**



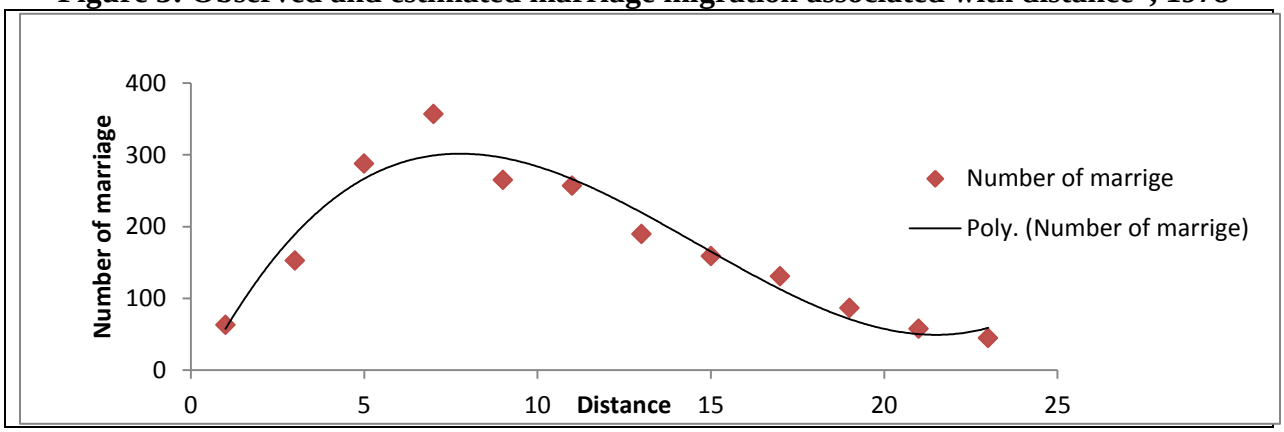

*Truncated distribution

**Table 3: Observed and Expected Distribution* of Distance Associated with Marriage Migration in India (Sample Survey, 1984 And 1978)**

| Distance (in Miles) | Number of Marriages 1984 | | Number of Marriages 1978 | |
|---|---|---|---|---|
| | Observed Values | Predicted Values | Observed Values | Predicted Values |
| 0-2 | 13 | 11 | 63 | 57 |
| 2-4 | 33 | 42 | 153 | 189 |
| 4-6 | 61 | 61 | 288 | 267 |
| 6-8 | 88 | 68 | 357 | 299 |
| 8-10 | 60 | 66 | 265 | 296 |
| 10-12 | 56 | 59 | 257 | 266 |
| 12-14 | 38 | 47 | 190 | 220 |
| 14-16 | 29 | 34 | 159 | 165 |
| 16-18 | 26 | 21 | 131 | 113 |
| 18-20 | 19 | 12 | 87 | 71 |
| 20-22 | 9 | 8 | 58 | 50 |
| 22-24 | 8 | 12 | 45 | 59 |
| Mean | 9.76 | p-value | 10.06 | p-value |
| constant | -10.875 | 0.375 | -31.817 | 0.425 |
| $b_1$ | 23.708 | 0.000 | 97.642 | 0.000 |
| $b_2$ | -2.125 | 0.001 | -8.558 | 0.000 |
| $b_3$ | 0.049 | 0.002 | 0.195 | 0.001 |
| $R^2$ | 0.891 | | 0.931 | |

*Truncated distribution

**Figure 3: Observed and estimated marriage migration associated with distance*, 1978**




*Truncated distribution

## Conclusions

It is observed that marriage field associated with distance has increased over the last two-three decades. It may be that, now a days marriage is less affected by distance due to advanced social, economic and cultural factors. It may also be due to increased social contacts of the persons of different society, increased facilities of roads and highway as well as increased level of education and communication systems. Polynomial model of third degree fitted to the distribution of distance associated with marriage migration to different set of rural Indian data, was found that the model fits the data satisfactorily well only, if distance associated with marriage migration i.e. marriage field is standardised. That is, a polynomial model approximates the distribution of distance associated with marriage migration satisfactorily well whether it is from a Hindu society or from a Muslim if grouping of the distance is standardised. It means the class intervals of the distance associated with marriage plays a major role in the fitting of a polynomial model.

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