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Study of Marriage Migration and Distance

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Abstract

Nature of marriage migration varies depending on social rules associated with marriage. It is more or less a universal tradition for brides to shift to husband's home after wedding. Migration of men in India usually occurs for work, whereas life time migration is universal among women because of marriage. The main aim of this paper is to test the suitability of a polynomial model on Indian data, collected from the Hindu dominated rural areas at different times i.e. in 1978 and 2002 and 2015.

Keywords: Marriage migration, Pareto exponential model, Polynomial model.

Introduction

Most of the studies on migration have discussed movement of people in the context of economic reasons, especially for searching a suitable job outside the place of origin[1-4]. However, there exists another type of movement, especially of females, which involves a change of usual place of residence. The migration caused by the marriage of females is called as 'marriage migration' and is a special feature in developing countries like India.

A major part of migration of females caused by marriage in rural areas is mostly rural to rural, at small distances and only a small number of are from rural area to urban area. The character of migration due to marriage varies depending on social customs associated with marriage e.g. in Indian society where village 'endogamy' is frequent, 'marriage migration' is not very frequent. Men migration in India usually occurs for work, whereas life time migration is common among women due to marriage.

It is a universal tradition for brides to shift to husband's home after wedding. In this type of migration the population of the village/area remains unchanged. The changing pattern of the distribution related with marriage migration in India, has rarely been analysed. This may be due to lack of pertinent data as well as lack of interest among social researchers. However, a number of scholars have discussed the pattern of marriage migration as a function of distance[5-7].

Some years ago, Islam[8] studied the functional relationship between distance and marriage migration with the help a polynomial function. An application of this model to Bangladesh data was found satisfactorily well. The aim of this chapter is to test the suitability of this polynomial model on Indian data, collected from the rural areas dominated by Hindu population at different times i.e. in 1978 and 2002 and 2015.

Review Literature on Marriage Migration Models

To describe the association between marriage distance and marriage migration, Morril and Pits[6] proposed a model as follows:

$$Y = aD^{-b} \tag{1}$$

here Y represents total number of marriages at 'D' distance, which is a Pareto function. Since, similar to the gravity model, Pareto function tends to overestimate close-in-frequencies, they modified the model as follows:

$$Y = ae^{-bD} \tag{2}$$

which is an exponential model. They argued that this model is suitable for the data where successive contacts or moves are actually correlated in direction and length.

Further, they suggested another model as:

$$Y = ae^{-(b\log D)^2} \tag{3}$$

which is a Log-normal function and mentioned that this model gave a good fit to data with a multiplicative component, like repeated trips over the same lane. However, both Exponential and Log-normal functions tend to under estimate the close-in frequencies, though many empirical data have been fitted successfully to this distribution.

For avoiding the difficulty of overestimate and under estimate of very close frequencies, Morril and Pits combined the Pareto and Exponential distributions with gravitational thought and proposed another model known as Pareto-Exponential function. After applying the model to several sets of data, they found that the Pareto-Exponential model was found superior than either of the distributions separately, but this was not true all the time. They further mentioned that this model is suitable for the movements combining the notions of purposeful and accidental behaviour. Almost all of the functions proposed to explain the distribution of marriage distance are based on the assumption that the number of marriages is a decaying function of distance, i.e. the number of marriages decreases as distance increases.

The Pareto-Exponential distribution given by Morril and Pits[6] seems to suit for such a situation and may describe the marriage distance reasonably well. The function is as follows:

$$Y = aD^{-b} e^{-cD} \tag{4}$$

where the number of marriage is given by Y, D is the distance related with marriage, a, b, & c are the parameters. Taking logarithms in both sides of equation (4), it becomes as

$$Log_e Y = Log_e a - bLog_e D - cD \tag{5}$$

The parameters a, b and c can easily be estimated using least-squares method. This model is used by many researchers to describe their data[5,9].

This Pareto-Exponential model is found to be superior to both of the functions separately, but this is not always correct. However, the functions discussed above are found not suitable to provide good fit for the Indian data especially societies dominated by Hindu. No doubt, the marriage pattern in India and in other developing country is moderately different from those of European societies. For example, Libbee and Sopher[10], in their study of marriage migration in rural India, based on census data of 1961, have reported a larger marriage field (i.e. distance traveled by a bride to marry) than the rural Europeans.

A stochastic function to explain the distribution of marriage distance was first proposed by Sharma[11] by keeping in mind the Indian marriage society, under the assumptions that (i) for a fixed distance say 'D' marriages are uniformly distributed over the space, i.e. number of weddings with distance interval d_1 to d_2 ($d_1<d_2<D$) are proportional to π (d_2^2 – d_1^2), and (ii) after distance 'D' marriage probability is a decaying function of distance, i.e., the number of weddings in the interval d_1 and d_2, ($D<d_1<d_2$) is proportional to

$$[e^{-\lambda (d_1-D)} - e^{-\lambda(d_2-D)}]\, \pi\, (d_2^2 - d_1^2) \tag{6}$$

where λ is the hazard related with the exponential model.

However, one limitation of this distribution is the problem of estimation of the distance 'D' theoretically. In real situations, the value of 'D' cannot be taken as constant. The distance may vary from one cultural group to another depending upon the marriage alliance, travelling expenses, and prosperity and geographical contacts of a family.

The distribution given by Sharma[11] was extended by Yadava[12] as follows:

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

$$M \,\alpha\, \pi\, r\, f(r)\, dr \tag{7}$$

where,

$$f(r) = \begin{cases} e^{-\lambda(r-D)} & \text{if } r > D \\ 0 & \text{if } r \le D \end{cases} \tag{8}$$

This model provides a better approximation as compared to previous model and both parameters λ and D are being estimated theoretically.

However, the models proposed by Sharma[11] and Yadava[12] are found appropriate for Hindu society. A number of data sets available from Bangladesh were fitted and both the models did not give a good fit to the data sets[2]. As mentioned above the marriage pattern among Muslim dominated society is almost different from that of a Hindu society. In a Hindu society, most of the marriages usually fixed in a village other than the village of residence, whereas due to acceptance of cross-cousin marriages in Muslims societies most of the marriages occur within the village or nearby villages.

Hossain[5] applied the Pareto-Exponential function given by Morril and Pitts[6] (Expression 1.4) to express the pattern of marriage distance the Bangladesh data. Though this model provides a better estimate than the models given by Sharma[11] and Yadava[12] but still did not adequately fitted to the data 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 reduces, Srivastava[9] fitted exponential model as

$$f(x) = \begin{cases} \theta e^{-\theta x} & \text{if } x > 0 \\ 0 & \text{otherwise} \end{cases} \tag{9}$$

Where x denotes the distance related with marriage and θ is the risk parameter.

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

Singh[13] used another model to explain the pattern of marriage migration as follows: Let *D* be a random variable denoting the distance related with marriage of a woman, naturally it takes only non-negative values.

When the marriage distance is increasing the probability of getting appropriate male partner is increasing thus we can say the probability of marrying is also increasing. Thus in this situation for the modeling purpose we may think any distribution whose hazard increases, therefore in the present study, we consider a hazard rate which is given by:

$$h(D;\alpha,\beta,\gamma)=\frac{\beta}{\alpha}\left(\frac{D-\gamma}{\alpha}\right)^{\beta-1},$$

where $\alpha,\beta>0,\ 0<\gamma\le D<\infty$ (10)

It is easily shown that $h(D)$ is increasing if $\beta>1,$ decreasing if $\beta<1,$ and is constant if $\beta=1$. Since, β controls the shape of the distribution so it is called the shape parameter, while α and γ are usually referred to as the scale and location parameters.

A Polynomial Model

A polynomial model was used by Islam[8] and Singh[14] to describe the marriage migration. A general expression of the polynomial model is

$$y=b_0+\sum_{i-1}^{n}b_i x^i+u \quad (11)$$

Where, x is independent variable say distance, y is dependent variable say, number of marriage migrations, a_0 is constant, b_i is coefficient of x^i (i=1, 2, 3 . . . n), u is the stochastic error of the function. For minimizing the error sum of square a suitable n is selected.

Recently, Islam[8] describes the distribution of migration due to related with distance, using the Bangladesh data and fitted a polynomial model with respect to distance of third degree and established an improved fit than models mentioned above with a high explanatory power (R^2 = 0.998).

However, the pattern of marriage in India (Hindu dominated society) is pretty different from Bangladesh (Muslim dominated society). Because of endogamy, cross-cousin wedding in Bangladesh is common and marriage field is comparatively very short as compared to societies like India. In India, there is a roughly common custom of the bride moving to the groom's home, generally situated in another village or region, and leaving her parent's home permanently and hence a larger marriage field.

Here, we have used a polynomial model of third degree because for higher degrees, explanation of parameters becomes difficult.

Application

The above discussed model is verified by the data set collected in a primary survey entitled "Migration and its Impact in Rural Varanasi" has been conducted during September - October 2015 in four villages of two blocks of Varanasi District by the Department of Statistics, U. P. Autonomous College, Varanasi. Apart from this three sets of data, collected in sample surveys conducted in 1978 and 2002 sponsored by the Center of Population Studies, Banaras Hindu University, has also been used for application and discussion. All data sets belonged to Hindu dominated rural society of India.

In sample survey 2015, data on mirage migration was noted and grouped in the intervals 0-6, 6-12, 12-18,… 72+ kilo meters and in 2002 data on distance are grouped as 0-8, 8-16, 16-24 . . .64-72 km while in 1978 survey, data on distance of marriage was noted and divided in the intervals of 0-2, 2-3, 3-4 . . .34+ miles (1 mile=1.6 km). It is found that a polynomial model fitted (2015) data satisfactorily well (R^2 = 0.979) and all the parameters of the used model are also found very significant (Table-1, see also Figure-1). It is established that this model also approximated 2002 survey data satisfactorily well (R^2 = 0.916) and every parameter of the used model are also found very much significant (Table-2, Figure-2), but for 1978 data set this model could not provide a good fit (Table-3).

It is seen that the mean distance of marriage migration has considerably increased from 12 miles in 1978 to about 20 miles in 2002. The increased social contacts of the persons of different society may be one of the reasons for this increased marriage distance. Increased facilities of roads and highway and due to increasing level of education and communication systems have also affected the marriage migration. Keeping in mind the difference in marriage fields in India over the time the mean distance of 1978 and 2002 data are taken up to 24 miles, i.e. a truncated distribution, than this polynomial model provides a good fit for both the data set. This shows that a polynomial model explains the pattern of distance related with marriage in Indian situation satisfactorily well if marriage fields are standardised (adjusted). The line plot of marriage migration related with distance for all three sets of data 2015, 2002 and 1978 are also depicted by Figures-2 and Figure-3 respectively. The results indicate that the role of polynomial model depend on the group intervals of the distance of marriage migration and nothing else.

Conclusion

The study indicates that marriage field associated with distance has increased over the last two-three decades. 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 related with marriage to different set of rural Indian data fits satisfactorily well only if distance related with marriage i.e. marriage field is standardised. That is, a polynomial model approximates the distribution of distance related with marriage satisfactorily well for both the Hindu and Muslim society if grouping of the distance is standardised.

Table-1
Observed and expected distribution of distance associated with marriage migration (Sample Survey 2015, Varanasi)

Distance (in Km)	**Observed**	**Expected**
0-6	19	17.27
6-12	58	61.91
12-18	83	89.76
18-24	101	103.40
24-30	121	105.39
30-36	102	98.30
36-42	84	84.73
42-48	65	67.23
48-54	46	48.28
54-60	28	30.76
60-66	16	16.64
66-72	10	9.35
Mean		p-value
Constant	-53.75	0.341
b_1	0.459	0.005
b_2	-11.67	0.016
b_3	79.07	0.003
R^2	0.979	

Table-2
Observed and expected distribution of distance related with marriage 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)

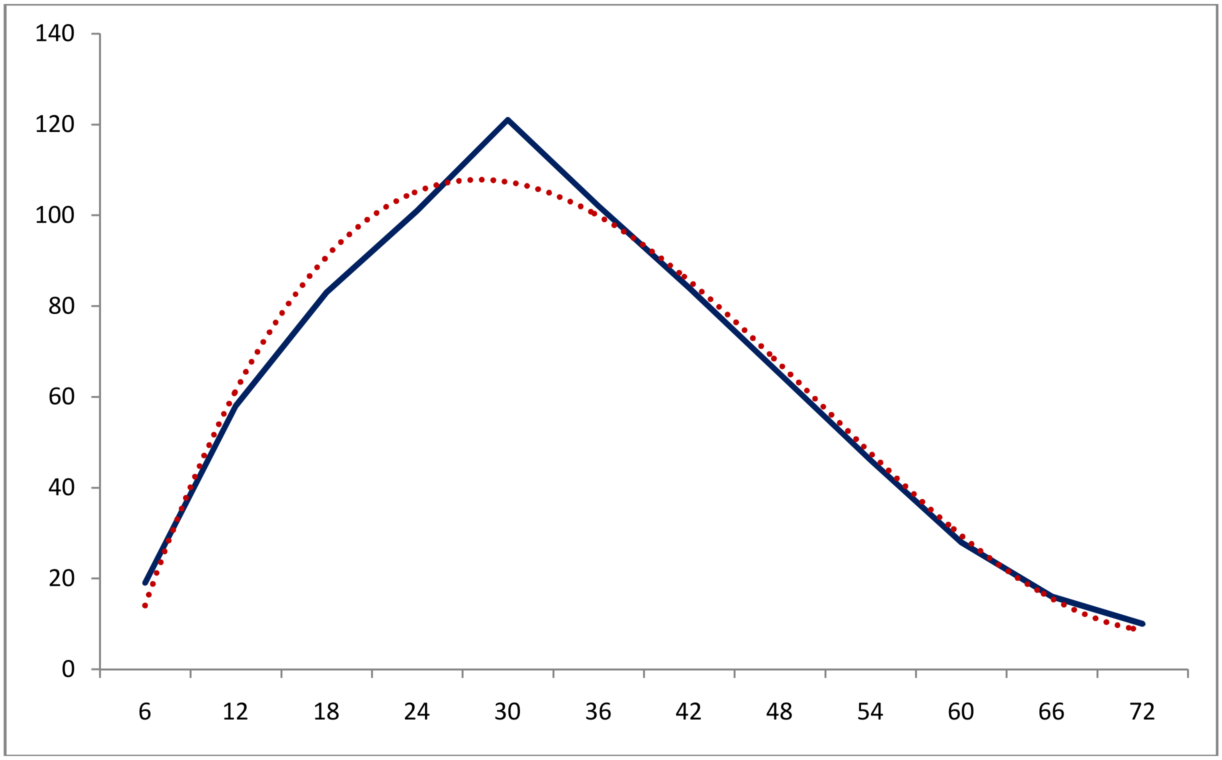

Figure-1
Observed and expected distribution of distance related with marriage (Sample Survey 2015, Varanasi)

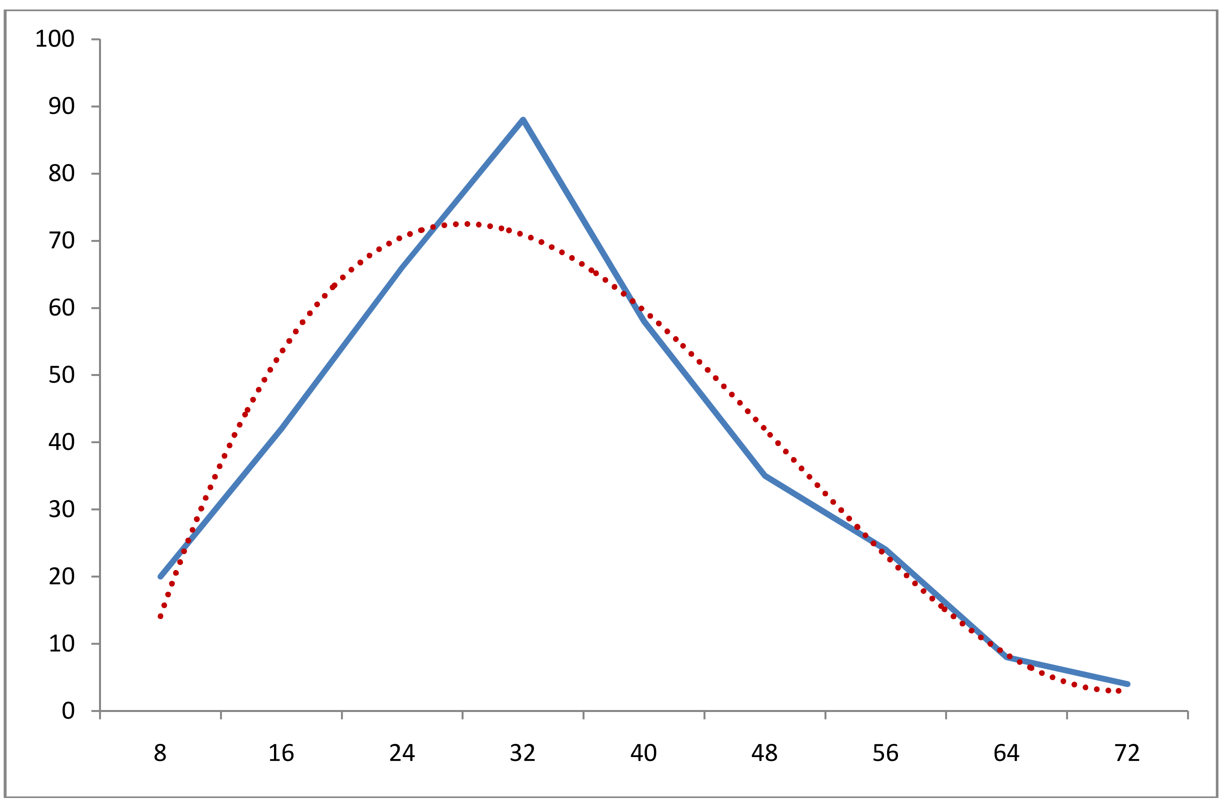

Figure-2
Observed and expected distribution of distance related with marriage in India (Sample survey, 2002)

Table-3
Observed and expected distribution of distance related with marriage in India (Sample survey, 1978)

Distance	1978	
	Observed	**Predicted**
0-2	63	105
2-4	153	183
4-6	288	233
6-8	357	260
8-12	265	266
10-12	257	255
12-14	190	231
14-16	159	197
16-18	131	157
18-20	87	115
20-22	58	74
22-24	45	37
24-26	38	8
26-28	20	*
28-30	29	*
30-32	11	8
32-34	21	47
34+	100	113
Mean	12.32	p-value
Constant	54.5847	0.192
b_1	54.4596	0
b_2	-4.1128	0
b_3	0.07442	0
R^2	0.874	

* Negative estimates

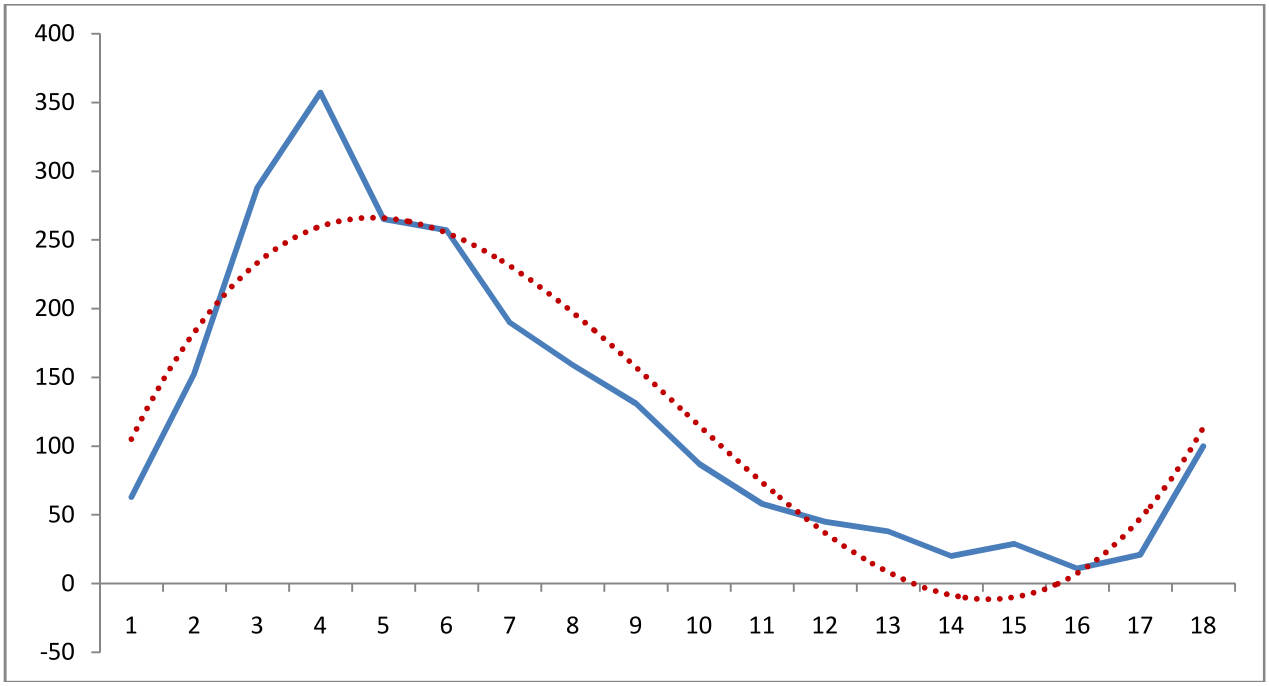

Figure-3
Observed and expected distribution of distance related with marriage in India (Sample survey, 1978)

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