

Marriage Migration in India: The Enlargement of Marriage Markets in the Era of Declining Sex Ratios.

Introduction:

India has witnessed tremendous decline in sex-ratios (number of males per 100 females) since 1980's. Even the latest census of 2011 shows the deterioration of sex ratios in several pockets of country. Researchers have mostly studied the role of son preference and reasons for low and declining sex ratios, but few studies have paid attention to the manner in which this is affecting other social practices and processes. The attention needs to be focused on the consequences of too many men in addition to the determinants of few women. There is an evidence of severe shortage of females in certain parts of the country especially north-western India leading to unequal representation of both sexes for marriage. As per census 2011, the sex ratios of never married population ranges from 147 in India, to 169 and 193 in Punjab and Haryana respectively (authors computation). These crude number also suggests that there will be unavailability of local girls in the marriage market of Punjab and Haryana. In demographic terms, India is under male marriage squeeze which will become severe in next coming years (Attane & Guilmoto, 2007; Guilmoto, 2012; Kashyap et al., 2015). The same situation which is in South Korea and China has been addressed using extreme steps. While China is resorting to long distances marriages 'where poor women are migrating to prosperous areas for the purpose of marriage', also kidnapping and even abduction; South Koreans are importing brides from China and other neighbouring countries (Davin, 2005; Edlund et al., 2010; Fan & Huang, 1998). Marriage squeeze has consequences on both men and women. The most fundamental institution which will be affected due to marriage squeeze will be marriage. There will be an unusual response to this shortage of females in north India. One of the responses include increase in long distance marriages barring the rules of caste (*jati*), community and hypergamy (Blanchet, 2005; Kaur, 2014; Mishra, 2011) but the studies are limited to micro level areas and mostly qualitative in nature.

Given the declining child and juvenile sex ratios, there is an absolute scenario of further shortfall in marriageable age of women in low sex ratio regions. And the question is how will the communities address such shortfall? Will they relax the caste and *gotra* exogamy and look for brides beyond their own state and community? The most possible solution it seems is importing of brides from states with a better sex-ratio and availability of women.

Most of the scholars working in the field of migration, have studied the flow of people between various countries. There is an estimate that around 231 million people were living in countries other than their place of birth. This number is comparable to the internal migration estimates of countries like India and China. In India, the estimates of UNESCO 2013 suggest that up-to 400 million people could be internal migrants. Thus, internal migration in India could be triple of that of global migrants. These migrants are a significant aspect of the socioeconomic transformations these countries are undergoing (ref).

In both of these countries the majority of internal migrants are women. There is a growing body of research on female migration in china, who for most are either seeking employment or getting married (Fan & Huang, 1998; L. Liu et al., 2014; Y. Liu & Shen, 2014). In India, a large and growing proportion of migrants are temporary or circular migrants (ref).

Among India's permanent migrants, women make up 83 percent (208 million) of the total according to 2008 National Sample Survey (NSS) data, up from 75 percent in 1983. Marriage migration is by far the largest form of migration in India and is close to universal for women in rural areas. Across India three quarters of women older than 21 have left their place of birth, almost all on marriage. Yet there is little research on this group, primarily because most women state their reason for moving as marriage (among the few studies see Premi 1980; Rosenzweig and Stark 1989; Bhattacharya 2000; and Fulford 2013) (Fulford, 2013; Premi, 1980). Part of the reason, as suggested by Lucas (1997), is a lack of good information on rural to rural migration and the focus on rural to urban migration. Since women moving into an area are generally approximately balanced by the women moving out, the net flow is typically very low, even if the gross migration is large. That makes marriage migration easy to miss since there are no expanding urban populations or new slums that signal change. The assumption appears to be that marriage migration is explained by unnamed "socio-cultural factors" (Kundu 2009) and is therefore less relevant to understanding economic change in India today.

The lack of attention to marriage migration means that very little is known about its extent, geographical distribution, how it has changed over time, and the relationships of distance, economics, age-structure of never married population and geography. Hence, the current study was aimed to understand the female marriage migration in India based on information from large macro level migration data for the last three decades in India. The current study explored how the declining sex ratios were impacting the marriage markets in India. For the present study, it was hypothesized that the shortage of women relative to men will lead to an increase in inter-state female marriage migration from low sex ratio states to high sex ratio states to compensate for the shortage of women in that region. Some previous research mostly

qualitative has indicated that men from worsened sex ratio regions are resorting to getting brides from faraway regions (Blanchet, 2005; Chaudhry & Mohan, 2011; Kaur, 2012, 2014) but the studies were limited to few cases. There is a need to model the macro level data to assess the role of marriage squeeze, declining sex-ratios and unavailability of brides in marriage migration.

Data and Methods:

Data Source:

The empirical analysis in the current study was conducted using three censuses of India: 1991, 2001 and 2011. The Indian Census is the largest single source for a variety of statistical information on different characteristics of the people of India. The responsibility of conducting the decennial Census rests with the Office of the Registrar General and Census Commissioner, India under Ministry of Home Affairs, Government of India. The census provides information about age, disability, education, language/mother tongue, Migration, Marital status, Religion, Fertility, Scheduled Caste, Scheduled Tribe, households and workers (economic/occupation).

Indian census uses dual criteria to capture Migration. When a person is enumerated in census at a different place than his / her place of birth, she / he is considered a migrant. This may be due to marriage, which is the most common reason for migration among females-or for work, what is the case as generally among males, etc. It also happens that many returns to their place of birth after staying out. To capture such movements of population census, collect information on migration by last place of residence, which helps to understand the current migration scenario better.

For the current study, information on migration due to marriage among women was collected from the three censuses: 1991, 2001 and 2011. Women who had migrated to other states from their state of last residence in last 10 years for each census were considered for the analysis. Last ten years is selected to avoid the overlapping of the censuses. States were the unit of the analysis to understand the marriage migration characteristics in India. A total of 1126 flows matrix was constructed for 2001 and 2011 census and 1054 flows matrix for 1991 census.

Variables:

The population of each state, as well as NSDP per capita, literacy level, Sex-Ratio of never married Population aged 10 years and above and inter-state marriage migrants were compiled

using various series of Census of India, 1991 and 2001. Never married sex ratio (10+ years) was computed using marital status information from census. Information on marriage migration was compiled using C and D series of Census 1991, 2001, 2011, further, NSDP of states were collected from Planning Commission report, GoI, and Rail road Distance between the capital of states was estimated using google earth. All the figures were log-transformed before the analysis.

Statistical tools:

The most popular models to predict migration flows are based on the gravity approach also known as spatial interaction models. This family of models relate migration with the origin's population, destination's population and the distance between origin and destination, based on the principle that the frequency and interaction between two places are akin to the gravitational attraction between two masses (Zipf, 1946). Numerous modified versions of the gravity models have been predicted and tested and even came out more accurate than the original ones (Bunea, 2012; Cohen et al., 2008; Greenwood, 2005; Ramos & Suriñach, 2013; Simini et al., 2012). Researchers have used gravity models to understand the migration behavior of migrants adding several constrains such as income at origin and destination, employment, education, and age structure etc (Greenwood, 2005; Ramos & Suriñach, 2013). Gravity models haven't much been used for modelling marriage migration behaviour. Thus, in the current study attempts to assess the determinants of marriage migration during two time periods in India using gravity model of migration. Basically, the primary focus of the study was to test whether sex ratios are increasing the marriage markets or not. Census based data enables us to model the migration directly.

The formulation of basic gravity model is

$$M_{ij} = k \frac{P_i^{a1} P_j^{a2}}{d_{ij}}$$

(Where P_i and P_j are the population of the two states and d_{ij} is the distance between them and k is constant)

The basic gravity model can be linearized as, Model I

$$\ln M_{ij} = a^0 + a_1 \ln P_i + a_2 \ln P_j + a_3 \ln d_{ij} \dots\dots\dots \text{I}$$

Where,

P_i is the origin state's population,

P_j is the destination state's population,

d_{ij} is the Cartesian railroad distance between the capitals of the states.

The vales of a^0 is $\ln k$ and $a_3 = -c$. The expected signs are positive for a_1 and a_2 and negative for a_3 . Model I was estimated for the 1981-1991 and 1991-2001 and 2001-2011 periods using the 1226 flows from 2011 census; 1126 flows from 2001 census and 1054 flows from 1991 census.

The basic gravity model (I), however doesn't address directly the effect of uneven regional development of the states. The previous literature has regarded uneven development as one of major push factor for migration. Migration and regional disparities are strongly interlinked. Lee's theory (1965) of volume of migration states that the "volume of migration within a given territory varies with the degree of diversity of areas included in that territory". Economic Criteria is the basic motive behind most of the migration. Though it is still unclear and undocumented for marriage migration. Using GDP of states i.e. NSDP (National State Domestic Product) as an indicator of the level of economic development, the following model improves upon the basic gravity model by including the effect of uneven regional level development differences. Thus, we further modified the basic gravity model by including GDP per capita of states at origin and destinations.

$$\ln M_{ij} = a^0 + a_1 \ln P_i + a_2 \ln P_j + a_3 \ln d_{ij} + a_4 \ln GDP_i + a_5 \ln GDP_j \dots\dots\dots \text{II}$$

Where,

GDP_i is origin state's GDP per capita and

GDP_j is destination state's GDP per capita.

If marriage migrants are moving from the less developed to more developed states, then a_4 and a_5 are expected to be respectively negative and positive. Like P_i and P_j , the two variables GDP_i and GDP_j were evaluated for 1991, 2001 and 2011 respectively.

Finally, to assess the role of sex ratios in marriage market expansion was assessed by adding the Never Married population sex ratio (age 10+) to the Model II, it became our Model III. If marriage migration is flowing from low sex ratio states to states with high sex ratio, then the coefficients of Sex Ratio at origin and destination will be negative (lower) and positive respectively.

$$\ln M_{ij} = a^0 + a_1 \ln P_i + a_2 \ln P_j + a_3 \ln d_{ij} + a_4 \ln GDP_i + a_5 \ln GDP_j + a_6 SR_i + a_7 SR_j \dots III$$

Where,

G_i and G_j are the GDP of origin and destination places and,

SR_i & SR_j are the sex ratio of origin and destination places of migration respectively.

Results:

Table 1 presents the sex ratios of the never married population and net female marriage migration during the census year 1981-2011. Total number of migrants has increased in last three decades (225.9 million in 1981 to 455.8 million in 2011). Similar increasing trend was observed for rural and urban areas and male and females. The total number of migration due to marriage has also increased over time (129.3 million in 1981 to 211.2 million in 2011). Similar increasing trend was observed for rural and urban area, however the increase was more drastic in the census year 2011. For example, the number of marriage migration in urban area during 1981-1991 was 13.8 million which increased to 14.5 million during 1991-2001, which further increased to 41.8 million during 2001-2011. Marriage migration accounted for 57% of total migration during 1981-1991 which decreased to 46% during 2001-2011, of which majority was from rural areas. Huge gender differential was observed in the percentage share of marriage migration out of total migration, with very low percent among male (4.1%-3.6% during 1991-2011) compared to females (76.9%-66.5% during 1991-2011). The proportion of marriage migration among females has declined over time, however, in urban areas it has increased during 2001-2011 (from 26.5% in 2001 to 43.5% in 2011).

The inter-state net-female marriage migration are presented in Table 2 along with sex ration of never married (10+ years) population. During 1981-1991, Uttar Pradesh was the leading state for out migration due to marriage among females followed by Bihar. Delhi has observed highest net-in migration of females due to marriage during the same period. In 2001, Uttar

Pradesh remained the leading state for net-out migration followed by Tamil Nadu and Assam, however again in 2011, Bihar was the second leading state. Net-in marriage migration of female was highest in Maharashtra followed by Delhi during 1991-2001- and 2001-2011. Assam had net out marriage migration during 1991, however in 2001-2011 the net migration was out migration. On contrary, Mizoram, Sikkim, Meghalaya, Karnataka, Daman & Diu which had net out migration in 1991, turned to be net in migration state in 2001 and 2011. Nagaland was donor state till 2001, however in 2011 it became receiver state. Andhra Pradesh had very low net migration due to marriage in 1991 (106 out migration), which increased drastically over time (35440 in 2001 and 42060 out migration in 2011).

Macro level determinants of marriage migration was examined using Gravity model of migration. The analysis was performed into three parts: Population of origin and destination and distance only (Model 1); NSDP of origin and destination along with Model 1 variables (Model 2); Sex ratio of never married population of origin and destination along with Model 2 (Model 3). The population of origin state was found to be negatively associated with marriage migration during 1991 and 2001, however, in 2011 it had positive association with both population of origin as well as destination (Model 1: Table 3). Contrary, the distance between the capital city of origin and destination states was found to have positive impact on marriage migration till 2001, however in 2011, it had negative impact. During 1991-2001, for a unit increase in population of origin state, there would be 2.06 units decline (95% CI: -2.17 - -1.94) in marriage migration, however, during 2001-2011, for a unit increase in population of origin state, the marriage migration would increase by 0.86 unit (95% CI: 0.82- 0.91). During 1981-1991 and 1991-2001, for a unit increase in distance between the capital of state would result into approximately 0.75 unit increase in marriage migration from origin to destination state. However, during 2001-2011, the distance had negative impact; for a unit increase in distance would result in 2.08 units decline (95% CI: -2.19 - -1.23) in marriage migration. NSDP of origin was found to be negatively influence the marriage migration, and NSDP of destination state influence marriage migration positively (Model 2). For example, during 2001- 2011, for a unit increase in NSDP of origin state, the marriage migration would decrease by 0.15 unit and for a unit increase in NSDP of destination state, marriage migration would increase by 1.09 unit (95% CI: 0.94- 1.23). The magnitude of the coefficients for NSDP has also increased over time. Sex ratio of the never married population (10+ years) was found to be positively associated with the marriage migration in India with higher coefficients for destination states (Model 3). The difference in the coefficients for origin and destination sex ratio was very wide

during 1981-91 and 1991-2001, however during 2001-2011 the difference had bridged. During 1981-1991, for a unit increase in sex ratio at origin state and destination state, would result into 0.47 (95% CI: 0.31 – 0.63) and 3.96 (95% CI: 2.68- 5.23) unit increase in marriage migration respectively. While during 2001-2011, for a unit increase in sex ratio at origin and destination state would result in 2.58 unit (95% CI: 1.61- 3.54) and 3.33 unit (95% CI: 2.38- 4.29) increase in marriage migration respectively. The adjusted R² value increased with the addition of the co-variates and was highest in case all were included in the analysis. The selected co-variates: Population, Distance, NSDP and Sex ratio were able to explain 62%, 80% and 86% of the variation in the marriage migration during 1991, 2001 and 2011 respectively.

Conclusion:

Marriage is one of the largest reasons of migration for women and around 90 percent of female migration is due to marriage. The major purpose of the paper was to understand the role of sex-ratio in interstate female marriage migration in India. The results show that states with poor sex ratio are more likely to pull female marriage migrants from better off sex ratio states. This is the first attempt to understand female migration under the purview of sex ratio in India using gravity models. Models based on gravity approach (Spatial interaction models) are increasingly relevant in migration research in India. This empirical analysis of the paper has demonstrated that gravity models are indeed relevant and effective tools for describing and explaining marriage migration flows.

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Table 1: Volume of marriage migration in India during past three decades (1981-2011).

Census Year	Place of Residence	Number of Migrants (in Millions)			Marriage Migrants (in million)			Percentage distribution of Marriage Migrants by gender		
		Persons	Male	Female	Persons	Male	Female	% Person Marriage Migration	% Male Marriage Migrants	% Female Marriage Migrants
1991	Total/Rural/Urban									
	Total	225.9	61.1	164.8	129.3	2.5	126.8	57.2	4.1	76.9
	Rural	159.2	31.2	128	115.1	2.2	112.9	72.3	7.1	88.2
	Urban	66.7	29.9	36.8	13.8	0.4	13.5	20.7	1.3	36.7
2001	Total	309.4	90.7	218.7	155.5	2.2	153.3	50.3	2.4	70.1
	Rural	207.8	42.5	165.2	138.5	1.9	136.6	66.7	4.5	82.7
	Urban	101.6	48.1	53.5	14.5	0.2	14.2	14.3	0.4	26.5
2011	Total	455.8	146.1	309.6	211.2	5.3	205.8	46.3	3.6	66.5
	Rural	278.2	64.7	213.5	167.9	3.9	164	60.4	6.0	76.8
	Urban	177.6	81.4	96.1	43.3	1.4	41.8	24.4	1.7	43.5

Table 2: Never married (10+ years) sex ratio and inter-state net-marriage migration in India between Census 1981-2011

States	Never Married Sex-Ratio (10+ years)			Female Net-Marriage Migration		
	1981-1991	1991-2001	2001-2011	1981-1991	1991-2001	2001-2011
Jammu & Kashmir	NA	133	131	NA	-17708	-3968
Himachal Pradesh	140	139	143	-14036	-4998	-11623
Punjab	153	150	155	19246	9785	28482

Chandigarh	166	167	161	12251	15741	20008
Uttarakhand	NA	139	140	NA	-14685	7648
Haryana	173	164	163	10698	64285	99958
Delhi	164	162	153	153863	191833	236080
Rajasthan	177	159	149	-10105	-27173	-779
Uttar Pradesh	178	158	144	-185312	-293446	-386212
Bihar	180	164	153	-98251	-19892	-324515
Sikkim	144	135	132	-1594	2528	2420
Arunachal Pradesh	165	139	126	2745	4930	3135
Nagaland	133	126	121	-396	-21803	2164
Manipur	122	116	115	-2519	-1824	-2325
Mizoram	134	126	120	-1736	450	304
Tripura	151	144	150	-3845	-1515	-1780
Meghalaya	132	126	124	-1054	1232	1646
Assam	153	147	144	4260	-48633	-8356
West Bengal	169	162	159	-6472	-15144	-56920
Jharkhand	NA	150	143	NA	4865	45388
Odisha	142	136	136	-4920	-22478	-42910
Chhattisgarh	NA	135	129	NA	5066	43205
Madhya Pradesh	168	158	146	70156	17949	-23639
Gujarat	147	147	149	36733	26948	109725
Daman & Diu	142	230	286	-248	2043	4423
Dadra & Nagar Haveli	141	186	197	287	3920	6673
Maharashtra	163	159	157	101071	245164	289169
Andhra Pradesh	164	154	149	-106	-35440	-42060
Karnataka	157	154	158	-604	5052	46140
Goa	138	144	149	3773	7887	10626

Lakshadweep	150	147	141	-1268	-36	-591
Kerala	131	138	144	-42960	-33912	-52818
Tamil Nadu	148	147	150	-40091	-70605	-13379
Pondicherry	145	144	138	8823	16247	11541
Andaman & Nicobar Island	175	162	161	3653	3383	3140

Source: Compiled from Census of India (1991, 2001, 2011), Directorate of economics Statistics of respective state Governments, Central Statistical Organization

Table 3: Estimates of models for inter-state marriage migration flow using gravity models in India (1981-2011).

Female Marriage Migration between 1981-1991 census						
Attributes	Model 1		Model 2		Model 3	
	Coefficients	95% CI	Coefficients	95% CI	Coefficients	95% CI
Constant	4.32*	2.64-5.99	3.29*	1.65-4.92	-16.47*	-22.71--10.23
Population Origin	-1.75*	-1.94--1.57	-1.8*	-1.97--1.62	-1.73*	-1.9--1.56
Population Destination	0.29*	0.14-0.44	0.25*	0.1-0.39	0.01	-0.14- 0.17
Distance ^{&}	0.78*	0.71-0.84	0.77*	0.71-0.83	0.69*	0.63- 0.76
NSDP Origin			0.53*	0.4-0.67	0.53*	0.4-0.65
NSDP Destination			0.11	-0.03-0.26	0.09	-0.04-0.23
Sex Ratio Origin [#]					0.47*	0.31-0.63
Sex Ration Destination [#]					3.96*	2.68-5.23
R ²	0.5546		0.5581		0.621	
Female Marriage Migration between 1991-2001 census						
Attributes	Model 1		Model 2		Model 3	
	Coefficients	95% CI	Coefficients	95% CI	Coefficients	95% CI
Constant	-6.66*	-8.01--5.31	-6.68*	-8.02--5.32	-28.26*	-33.68--22.84

Population Origin	-2.06*	-2.17--1.94	-2.06*	-2.18--1.94	-2.01*	-2.11--1.89
Population Destination	0.87*	0.83-0.91	0.88*	0.83-0.91	0.87*	0.83-0.91
Distance ^{&}	0.75*	0.7-0.78	0.74*	0.69-0.77	0.71*	0.66-0.74
NSDP Origin			-0.01	-0.09-0.08	0.01	-0.08-0.1
NSDP Destination			0.09**	0-0.18	0.31*	0.21-0.4
Sex Ratio Origin [#]					0.16	-0.58-0.9
Sex Ration Destination [#]					4.05*	3.31-4.77
R ²	0.7803		0.7807		0.8031	
Female Marriage Migration between 2001-2011 census						
Attributes	Model 1		Model 2		Model 3	
	Coefficients	95% CI	Coefficients	95% CI	Coefficients	95% CI
Constant	-6.01*	-7.33- -4.69	-17.48*	-20.44- -14.52	-37.84*	-43.38- -32.31
Population Origin	0.86*	0.82- 0.91	0.85*	0.81- 0.89	0.77*	0.71- 0.82
Population Destination	0.73*	0.68- 0.77	0.87*	0.83- 0.92	0.77*	0.72- 0.82
Distance ^{&}	-2.08*	-2.19- -1.96	-2.26*	-2.37- -2.16	-2.26*	-2.36- -2.15
NSDP Origin			-0.15**	-0.29- -0.01	-0.38*	-0.54- -0.21
NSDP Destination			1.09*	0.94- 1.23	0.79*	0.63- 0.95
Sex Ratio Origin [#]					2.58*	1.61- 3.54
Sex Ration Destination [#]					3.33*	2.38- 4.29
R ²	79.24		84.89		85.94	

Note: All the values were in natural log form; *p-value<0.01; **p-value<0.05; # Sex ratio was calculated for non-married aged 10 or more years;
[&] Distance was calculated using the rail-road distance between the capitals of the states.

Appendix: Net Inter-state Marriage Migration of females during the decade of 1981-1991, 1991-2001 & 2001-2011

