An Application of Lee's Theory
to Study Migration Patterns in Nepal

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Abstract

Lee's theory of migration has been tested from micro level data, which are taken from a sample survey of Palpa and Rupandehi districts of Nepal. The population heterogeneity has been measured using four factors, i.e. socio-economic status, education, occupation, and caste/ethnicity. The simple and multiple regression analysis techniques have been applied to examine the theory. Lieberson's formula has been used to compute the index of diversity for the different factors. It is found that the migration rate varies from 3.82 to 10.12 and yielding 6.8 percent as the average migration rate for the villages under study. This study showed a negative relationship between volume of out-migration and diversity of socio-economic status of the people. The coefficient of socio-economic diversity has been found significantly related with the volume of migration. The maximum percentage of variation in migration was accounted for by socio-economic (67%) followed by occupation (52%), caste (51%), education (50%) as single independent variables. Following the multiple regression analysis, the coefficient of educational diversity was found significantly related with the volume of out-migration. All the four variables combined together accounted for about 91 percent variation in migration, which demonstrates that Lee's theory is, by and large, acceptable for Nepal.

1 INTRODUCTION

Several studies in different regions of the developing countries have dealt with the economic aspects of migration. However, majority of them have concentrated with the differentials & determinants of migration focusing mainly on causes and consequences of migration (Afsar, 1995; Hugo, 1991; Mehta and Kohli, 1991; Wintle, 1992). Apart from social and economic impact, migration of an individual produces a demographic impact as

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well on his/her household at the place of origin. The physical separation between husband and wife as a result of migration gives the female partner less scope for conception that results in low fertility of the household (Sharma, 1992). Therefore, it is important to understand the intentions of migration, extent of migration and its effect on the growth of urban population for a proper urban planning as well as for furthering rural development.

Mathematical models are being frequently used in social sciences to provide concise representations of extensive data sets (Aryal, 2004). Naturally structural and empirical models are used. An advantage of a structural model is that it may well provide further understanding of the underlying social phenomena. Among several approaches, a study of migration through a model has greater importance because it explains the pattern, trend, and volume of migration as well as the factors active on the process of migration.

Model building in migration at the micro-level that is at the household level, was first initiated by Singh and Yadava (1981). Many researchers have given their due attention to study the volume of out-migration by using migration models. In the late nineteenth century, Ravenstein (1885; 1889) postulated some hypotheses related to population movement, which is the landmark in the area of migration. Lee (1966) critically reviewed Ravenstein's Laws of migration and formulated some generalised hypotheses with regard to volume of migration, the establishment of stream and counter-stream, and the characteristics of migrants. One of his important hypotheses related to volume of out-migration is that the volume of migration varies with the diversity of people. Needless to mention that the diversity is present in all most all the society and the degree of diversity varies due to differences in the socio-economic status, cultural and political patterns of the society. The degree of discrimination also varies from place to place and it may be higher in developing region compared to that of the developed ones.

There have been limited attempts to test validity of Lee's theory relating to volume of migration and diversity in developing countries. Krishna Kumari (1980) tested this law by analysing the census data of India and concluded that this law should be accepted with certain modifications. Yadava and Singh (1988) criticised the limitation of the data used by Krishna Kumari (1980) and tested the Lee theory using data of rural out-migration at village level for the Eastern Uttar Pradesh of India and concluded that this law is acceptable for India. Recently, Hossain (2000) applied Lee theory to the data of Bangladesh and concluded that this theory is reasonably fitted well. However, the authors recommended more sample studies in other parts of the country to accept the model at the national level as well as micro-level data.

In Nepal, adequate work has not been done on volume of rural out-migration. This may perhaps be due to the lack of data as well as the lack of interest among the social researchers. The census data of Nepal has the limitation that there are only one or sometimes two questions relating to migration, which is not sufficient to understand the motive factors active for migration. Thus the objective of this paper is to test Lee's theory related to volume of out-migration using the household and village level data and to investigate the factors influencing out-migration.

DATA AND METHODOLOGY

This paper utilized the data collected under the sample survey "Demographic Survey on Fertility and Mobility (DSFM, 2000) in Rural Nepal: A Study of Palpa and Rupandehi Districts". For testing the Lee theory, the migrant members have been redefined. Only male migrants aged 15 years and above were considered as migrant member for this study. Several studies indicated that women are mainly migrated for familial reasons and may be considered as dependent migrant. So, women migrants as well as child migrants (age below 15 years) were considered as non-migrant member of this study. The detail of the data has been found by Aryal (2002).

POPULATION DIVERSITY: TESTING THE LEE THEORY

Lee's theory on volume of out-migration is tested by using village level data. Effects of various factors such as education, occupation, caste, socio-economic status etc. have been studied using both mathematical and empirical procedures. Lieberson's formula has been used to compute the index of diversity. The regression analysis seems to be the best tool to measure the effect of several factors active on migration. Both simple and multiple regression techniques have been applied to examine Lee's law considering population diversities in four factors such as (i) socio-economic status, (ii) education, (iii) occupation, and (iv) caste/ethnicity.

The Variables and Hypotheses

The inclusion of an explanatory variable depends on its importance and availability of its measurement. The measurement and categories of the study variables are discussed in Aryal (2002). We present here a short description of the variables used in this study and the hypotheses regarding them.

It is well-established fact that population movement is closely associated with the economic conditions of the migrant's at the place of origin. The economically better-off households of a village tend to send their children for better schooling, which are mostly located in urban areas (Aryal, 2004; Yadava and Aryal, 2001; Yadava and Singh, 1988). On the other hand, the majority of the people in the economically depressed households of villages tend to move to urban areas in search of white color jobs. Thus it is observed that the rate of migration is higher for both the economically well-off and economically depressed peoples, but people from middle-income group tend to have lower migration rate. It is observed that the per capita income (also family income) was directly correlated with standard of living and therefore the areas with high levels of living standard tend to be the areas of in-migration whereas the areas with low levels of living standard tend to be the areas of out-migration (Singh, 1986). In the developing countries it is obvious fact that the standard of living is comparatively lower in the rural areas as compared to in the urban areas. Therefore, we can assume that the diversity of socio-economic status is inversely related with the volume of out-migration.

The rural-urban migration rate is usually found higher among educated people than that among illiterates' people. This may be due to the fact that the white color jobs for the educated persons are not available in rural areas and they are not interested in agricultural and other household worker available in the rural areas (Yadava and Aryal, 2001). If the level of education of a household is high, there would be a high rate of migration.

Several studies (Krishna Kumari, 1980; Yadava and Singh, 1988; Yadava and Aryal, 2001) have shown a positive relationship between occupational heterogeneity and internal migration. The occupational diversity also indicates the diversity of economic activity and predicts the potential of the occupational opportunities in the society. Although agriculture is the dominant source of employment in the rural areas, other sources such as non-crop husbandry (dairy, poultry, fishing), small-scale cottage, and household based industries and service have also been observed. Due to this, we assume that occupational diversity is positively related with the volume of migration.

In Nepalese society, the rate of migration may also vary according to the caste/ethnicity of the people too. The people of certain caste/ethnicity are more mobile than other caste/ethnicity. Thus, we can assume that caste/ethnicity diversity is positively related with the volume of out-migration.

On the view of this, we assumed that (i) there is an inverse relationship between out-migration and diversity of socio-economic status and (ii) the diversity of education, occupation and caste are positively related with out-migration.

MIGRATION AND DIVERSITY INDICES

Migration Index

The volume of migration has been computed as the ratio of the number of migrants to total population, i.e. migration index Y (say) is defined as

$$Y_i = \frac{M_i}{P_i} \times 100$$

where Yi is the migration score or index for the *ith* strata village (i=1, 2, 3,..., 10); M_i is the number of adult male migrants from the ith village and P_i is the total population of ith village. It is mentioned that the volume of migration is measured with respect to the place of origin. The migration scores for all 8 strata villages are given in column 2 of Table 1. It is observed that the migration index varies from 3.82 to 10.12 that yielding 6.8 percent as the average migration rate for the villages under study.

Diversity Index

Diversity or heterogeneity in the population is computed by using Lieberson's diversity index as follows:

If C_i (i=1, 2, 3, ..., n) denotes the proportion of individuals in the *ith* sub-class such that

$\sum C_i = 1$, then Lieberson's index of diversity D (say) is defined as

$D = 1 - \sum_{i}^{n} C_i^2$, where $\sum C_i^2$ gives up persons/individuals of the same characteristics if successive selections are made. Theoretically, the diversity index varies from 0 to 1. It is zero in case of perfect homogeneity in the study areas and 1 if every individual of the community possesses different characteristics.

RESULTS AND DISCUSSIONS

The diversity indices for the study variables viz. socio-economic status, education, occupation and caste/ethnicity are shown in Table 1. The variation of diversity was found almost identical for all the variables and the diversity varies from 0.7230 to 0.7960, 0.7257 to 0.7909, 0.7020 to 0.7967 and 0.5686 to 0.7368 for socio-economic status, education, occupation and caste category, respectively. This indicates that the strata villages under study show almost similar heterogeneity among the variables.

Table 1. Population Diversity and Volume of Migration in Different Villages

Village	Migration Rate (Yi)	Diversity indices of characteristics of population			
		Socio-economic status (x1)	Education (x2)	Occupation (x3)	Caste/ethnicity (x4)
1	9.05	0.7699	0.7700	0.7384	0.6039
2	10.12	0.7230	0.7587	0.7967	0.7368
3	6.98	0.7701	0.7297	0.7465	0.7025
4	8.46	0.7680	0.7909	0.7463	0.6751
5	5.12	0.7915	0.7353	0.7109	0.5969
6	3.82	0.7960	0.7257	0.7193	0.5686
7	6.83	0.7897	0.7601	0.7020	0.6270
8	7.69	0.7538	0.7505	0.7239	0.6520

Table 2 shows the correlation matrices among the study variables. A negative correlation (-0.835) was observed between migration and diversity of socio-economic status, which indicates that the rate of migration decreases with increasing diversity of socio-economic status. The volume of migration showed a positive relationship with diversity of education (+0.711), occupation (+0.722) and caste (+0.710). However, only the socio-economic diversity has been found to be significantly related with the volume of out-migration. The correlation between migration and diversity indices establish the hypotheses as stated above. Moreover, a significant negative correlation found between occupational diversity and socio-economic status indicates that increasing diversity of socio-economic status leads to a

concentration of people in certain occupational categories. Similarly a significant correlation found between caste diversity and socio-economic status and occupation.

Table 2. Correlation Coefficients between Migration Index and Diversity Indices of Study Variables

	Y	X1	X2	X3	X4
Y	1.000	-0.835*	0.711	0.722	0.710
X1		1.000	0.399	-0.873*	-0.823*
X2			1.000	0.267	0.273
X3				1.000	0.795*
X4					1.000

* significant

Table 3 shows the regression analysis of migration and diversity indices of study variables by truncating the diversity indices at some stages to test curvilinearity of the data. The

Table 3. Simple Regression Analysis of Migration Index and Diversity Indices of Four Study Variables above the Truncated Points

Diversity above truncated points	Sample size	Simple correlation	Regression equation	R^2 values
For Socio-economic status				
0.7230 0.7701	4 8	-0.851* -0.835*	$Y=48.492-53.332* x_1$ (17.523) (23.250) $Y=61.523-70.430 x_1$ (15.529) (20.147)	0.73 0.67
For Education				
0.7257 0.7587	4 8	0.715 0.711	$Y=-79.250+115.810 x_2$ (58.950) (80.175) $Y=-42.394+66.24* x_2$ (20.136) (26.746)	0.51 0.50
For Occupation				
0.7020 0.7384	4 8	-0.012 0.722	$Y=11.206-7.480 x_3$ (90.709) (127.032) $Y=-29.668*+50.203* x_3$ (14.463) (19.631)	0.04 0.52
For Caste/ethnicity				
0.5686 0.6520	4 8	0.650 0.710	$Y=-30.405+61.107 x_4$ (30.268) (50.491) $-9.252+25.581* x_4$ (6.700) (10.347)	0.42 0.51

regression analysis between socio-economic status and migration indicated a definite negative relationship between volume of migration and socio-economic diversity. The negative relation obtained here indicates that the greater diversity may hamper out-migration from villages. The repeated regression analysis showed positive relationship between migration and diversity of education, occupation and caste/ethnicity at all truncated points. The regression coefficient was found significant for education, occupation and caste/ethnicity diversity in case of all the observations. However, the coefficients were found insignificant at the different upper truncated points. The maximum percentage of variation in migration accounted for by socio-economic status followed by occupation, education and caste. The contribution of R^2 value for all the factors ranges from 50 to 68 percent, which indicates that diversity of all the factors have had some significant impact on rural out-migration in Nepal.

The combined effect of the four study variables on migration has been studied through multiple regression analysis (Table 4). The coefficient of education was found significant in multiple regression analysis. Further, the coefficient of socio-economic status was found negative and others coefficients were found positive, which confirms the hypotheses stated earlier. All the four variables combined together accounted for 91 percent of the variation in migration.

Table 4. Multiple Regression Analysis of Migration and Diversity of Study Variables

Variable	B	SE (B)	Sig T
Socio-economic status (X1)	-51.88	35.399	0.239
Education (X2)	45.103	17.537	0.082
Occupation (X3)	0.188	26.319	0.995
Caste/ethnicity (X4)	2.882	11.647	0.821
Constant	11.276	47.833	0.829
R^2	0.906		

CONCLUSIONS

The volume of migration showed a positive relationship with the diversity of education, occupation and caste/ethnicity and a negative relationship with the diversity of socio-economic status. The regression coefficient of occupational diversity has been found to be significantly related with the volume of out-migration. The maximum percentage of variation in migration was accounted for by occupation, followed by education and socio-economic status. The higher value of R^2 indicates that the Lee theory may be, by and large, acceptable for the society like Nepal.

For the development of a more effective and equitable rural and urban policies in the developing countries like Nepal, the policy planners and social researchers may get an idea from this study about the factors active for out-migration in rural areas of Nepal.

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