The Usage of Multiple Correspondence Analysis in Rural Migration Analysis

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Abstract

In general terms, the notion of 'internal migration' is defined as one's relocation from a permanent place of residence to another between politically or administratively defined regions. In Turkey, as in all countries, the reasons for internal migration include economic, social, cultural, geographical, environmental, demographic and political factors. For this study, 9 forest villages located in the southernmost part of Turkey were selected as subjects. A questionnaire was designed to determine the reasons why local peasants prefer migration. The poll helped determine the effects of such factors as profession, age, and annual income. The technique entitled Multiple Correspondence Analysis (MCA) was employed in this study. Analysis conducted on the data collected for this study indicates that the highest tendency of migration lies with peasants who work as illegal charcoal-makers, below age 30 and earning an average annual income under the local economic conditions.

Resume

En general, par "migration interne" on entend le emplacement d'un lieu de residence permanente a un autre lieu, a Vinterieur des regions bien defmies sur le plan politique ou administratif. En Turquie, ainsi que dans tous les autres pays, la migration interne est le resultats de divers facteurs d'ordre economique, social, culturel, geographique, environnemental, demographique et politique. Dans le present travail, neuf villages deforets ont ete selectionnes dans Vextremite meridionale de la Turquie. Un questionnaire a ete mis au point afin de determiner la raison pour laquelle les paysans locaux preferent emigrer. Cette enquete a contribue a determiner les effets de ces facteurs tels la profession, I'dge et le revenu annuel. La technique de VAnalyse de Correspondance Multiple (MCA) a ete utilisee dans cette etude. Les donnees collectees indiquent que la tendance migratoire la plus significative peut etre observee chez les paysans ages de moins de 30 ans, qui travaillent ille'galement dans des mines de charbon et avec un revenu annuel moyen inferieur par rapport au niveau economique local.

1. Introduction

Migration is one of the most difficult notions to define in demography (Aksit, 1997). However, various researchers have developed some definitions of migration. In general terms, the notion of 'internal migration' is defined as one's relocation from a permanent place of residence to another between politically or administratively defined regions (Hosgor, 1997). It is commonly recognized that internal migration, defined as a change of residence from one county to another, is the most important component of small area population change (Voss, 2001). In the late 1960s, migration analysis was dominated by research that was strongly influenced by neoclassical economic theory. The economic approach was individualistic: at the micro level, migration was understood to provide individuals with a mechanism for maximizing returns to their human capital; at the macro level, it was viewed as redistributing population between labour markets with differing levels of demand.

Sociological analysis rejected both the individualistic view of migration behaviour and the exclusive focus on economic determinants and consequences. Instead, sociological approaches relied heavily on human ecology and social demography, and in doing so they created a space for the role of community in the migration process. Ecologists, in particular, conceptualised migration as a communal adaptation to organizational, environmental, and technological pressures with origins both internal and external to a given social system. Thus, migration was viewed as both a cause and an outcome of changes in local social organization. In this new approach to migration research, scholars sought a conceptualisation of migration in which social behaviour and social relations were theorized fully and measured directly. They rejected both the neoclassical economic framework, in which aggregate-level migration streams were thought to reveal individual residential preferences and cost-benefit calculations, and the human ecological approach, in which individual agency was explicitly excluded. According to the contemporary perspective on migration, migration is structured by social networks that develop, operate, and become self-sustaining between the origin community and one or more destinations; further, migration is a multilevel social process in which individuals are embedded in households (Brown, 2002). Thus, in an era of globalization, migration is the most ubiquitous form of globalisation (Abu-Laban, 2000). For demographers it is a well-known phenomenon that such changes affect the demographic behaviour of the population. Migration is the most sensitive component of growth in this context (Kupizewski et al, 1998). Degrading environments also affect human migration (Bates, 2002).

Migration can be studied at many levels: within the parish; between towns; between town and countryside; between regions, countries and continents. There are individ-

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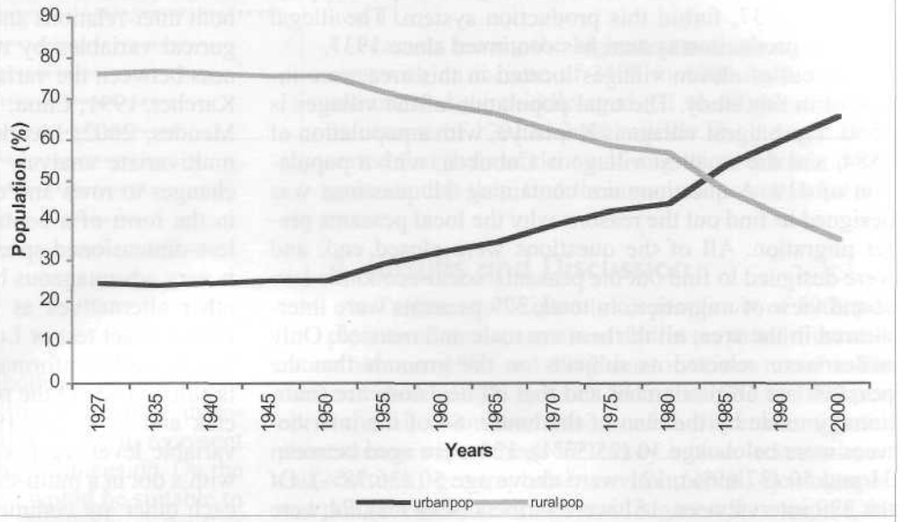
uals, families, groups and societies to consider along with their economic and demographic structures. As in most countries, reasons of the internal migration phenomenon experienced in Turkey include economic, social, cultural, geographical, environmental, demographic and political reasons. Results of a number of studies conducted in Turkey since the 1960s indicate that the economic reasons are the primary factor in determining migration (Keles, 1998). However, it might not be accurate to explain a sociological phenomenon with a single reason. Data files kept by the State Institute of Statistics reveal that from the formation of the Turkish Republic in 1923 to the 1950s, natural population increase (births and deaths) happened at local level. In the 1950s, industrialization accelerated m the cities thanks to certain policies applied by the government, so that internal migration and urbanization began to gain speed. As Graph 1 shows, total urban and rural population was 3.305.879 and 10.342.391' respectively in 1927. This trend did not significantly change until 1950; at this time a considerable change began. In 1950 urban population increased by 11.8% from 4.687.102 in 1945 to 5.244.337. Urban and rural populations equalized between 1980 and 1985, thereafter rural population increase dropped to -0.19% between 1985 and 1990, causing urban population to exceed rural population for the first time, so that urban population raised to 64.9% of the total population in 2000.

Graphic 1. *Rural and Urban Population in Turkey (1927 - 2000)*



Source: State Institute of Statistics (2005)

Latest data indicates that there are 20080 settlement areas within or next to forest areas owned by the State and covering a total surface area of 20.7 hectares. The total population of these settlement areas is 7.600.000 people (Ministry of Forestry, 2001). In Turkey, villages containing a forest within their administrative borders are defined as 'forest villages' and are divided into two categories: villages within a forest and villages adjacent to a forest. The former category is officially defined as "Villages containing a forest within their administrative borders, whose settlement area is surrounded with the said forest on all sides"; the latter category is officially defined as "Villages containing a forest within their administrative borders, whose settlement area is surrounded with the said forest on minimum one side". Inhabitants of these villages live at a level much below the average national living standard, and their fields are insufficient, fragmented, broken and unproductive. Educational and healthcare services available to them are limited. Migration arising from the everlasting unemployment problem of the forest villages causes their active populations to decrease. This leads to decreased local production, causing internal migration to increase.

41% of the Turkish rural population lives in forest villages. In spite of the urbanization process expanding since the 1950s, as well as internal migration from rural areas to urban areas, population of the forest villages steadily increased between 1970 and 1980. These increases were primarily due to increasing number of births. Later, between 1980 and 1990, internal migration accelerated so much so that populations of the forest villages decreased despite the fact that births remained high. As a result, total population of the forest villages raised from 8.3 million in 1970 to 9.3 million in 1975, then dropped to 8.8 million in 1990 and to 7.6 million in 2001 (Celik, 1993).

2. Material and Method

Nine forest villages located within the borough of Samandag, city of Hatay at the southernmost part of Turkey, close to the Turkish-Syrian border, were selected as subjects of this study. In terms of living standards, forest villages are the most underdeveloped areas in Turkey (State Planning Organisation, 1990). Furthermore, rural poverty is more dominant in these villages in comparison with the rest of the area. Local people deal with agriculture and husbandry extensively on unproductive fields. Forestry works cannot be practiced all year long, so they are not a significant source of income for this area. However, almost all of these villages are involved in illegal charcoal production, which earns them some economic input, however small. In the region, charcoal production has been practised for cen-

Settlement areas having less than 10,000 people are classified rural areas.

turies by charcoal workers. These charcoal workers are a traditional group and have always had a presence in rural Turkey. The first forest law of the Turkish Republic, published in 1937, forbid this production system. The illegal charcoal production system has continued since 1937.

Nine out of eleven villages located in this area were included in this study. The total population of the villages is 7560. The biggest village is Kapisuyu, with a population of 2584, and the smallest village is Cubukcu, with a population of 419. A questionnaire containing 11 questions was designed to find out the reasons why the local peasants prefer migration. All of the questions were closed end, and were designed to find out the peasants' socio-economic level and view of migration. In total, 329 peasants were interviewed in the area; all of them are male and married. Only males were selected as subjects on the grounds that the peasants are all patriarchal and that all decisions are traditionally made by the man of the house. 84 of the interviewees were below age 30 (25.53%), 124 were aged between 31 and 50 (37.69%), 121 were above age 50 (36.78%). Of the 329 interviewees, 151 were farmers (45.89%), 74 were workers (22.49%), 29 were artisans (8.81%), and 75 were (22.79%) illegal charcoal-makers. The education level of 302 of the interviewees (91.79%) is primary school or less. 266 of them (80.85%) are not under any social insurance cover.

The basis of this study is a poll held to examine the effects of such factors as profession (farmer, artisan, charcoal-maker), age (<30, 31-50, 50+), and annual income (<600 million TL[2], 601 to 1200 million TL, 1201 to 2400 million TL, 2400 to 4800 million TL). It is clear that migration is a complex process, and none of the peasants decide to migrate due to a single factor. It has been found out that education level is not a factor influencing the migration process, because the majority of the local people were educated at the basic primary school level.

It is a known fact that the review of variables influencing a phenomenon does not reveal that a single variable is individually distributed across the population, it is more or less related with one or more other variables. It is not always possible to review a certain variable and to fix other variables, which change with the said variable. It is especially difficult to do so in sociological phenomena. What is necessary is to add changes to the circumstances in the problem solution process and to employ multivariate statistical methods to develop realistic solutions. Therefore, the technique entitled Multiple Correspondence Analysis (MCA) was employed in this study, which is suitable for assessing poll data. The MCA technique was used for reviewing the effects of the above-mentioned variables (age, profession, income level) on tendencies to migrate. Thus, it was possible to study both inter-variable changes and intra-variable changes. The technique in question also allowed presenting a visual diagram of the results obtained. The diagram is a useful tool aiding to interpret the study results.

MCA is a multivariate technique designed to discover both inter-relations and intra-relations of two or more categorical variables by reviewing the closeness and remoteness between the variables (Anderson, 1990; Devillers and Karcher, 1991; Chou, 1994; Greenacre, 1998; Baspinar and Mendes, 2002; Mendes, 2002). The MCA technique is a multivariate analysis method aiming to show the group changes to rows and columns of categorical data arranged in the form of a contingency table in graphical form in a less-dimensioned space (Ozdamar, 2002). This technique is very advantageous because it is easier to apply than such other alternatives as Chi-square analysis, G-test, Z test, Fisher Exact test or Log-linear models, because it provides more detailed information to the researcher, and because it is able to present the results in visual form (Gifi, 1990; Kaciak and Louviere, 1990; Greenacre, 1998). Each of the variable levels reviewed by means of MCA is represented with a dot in a multi-dimensional space. Dots being close to each other are commented to be similar to or related with each other depending on the areas they fall into. Similarly, dots being far from each other are commented to be unrelated (Dunteman, 1989).

The initial step of employment of the MCA technique is to create Matrix I (indicator matrix). Columns of the matrix in question contain the total number of the levels of the relevant variables, lines of the matrix contain the number of the test units. Therefore, Matrix I of this study consists of 14 columns (2+5+4+3=14) and 329 lines. Matrix I is created by assigning code 1 for the levels of the categorical variable containing the test units, and code 0 for the remaining levels. In this study, Matrix I was analysed by means of the Burt matrix consisting of internal multiplies of Matrix I. The results of the MCA analysis conducted to research the interrelations of the relevant variables have been given in Table 1, Table 2 and Figure 1, respectively. The analysis in question was conducted by using the Minitab for Windows (ver. 13.0) statistical software package.

Table 1. *Results of the Matrix I analysis*

Variables	Categories	1st Dimension	2nd Dimension
Migration Tendency	Yes	–0.606	–0.520
	No	0.316	0.271
Income Level (million TL)	<600	0.780	-0.288
	601-1200	–0.582	-0.159
	1201-2400	–0.691	0.807
	2401-4800	–0.331	1.793
Profession Class	Farmer	0.571	–0.319
	Worker	–0.198	0.797
	Artisan	–0.611	1.261
	Charcoal-maker	–0.711	–0.739
Age Class	<30	–0.655	–0.895
	31-50	–0.486	0.527
	50+	0.991	0.071

[2] Average exchange rate for US dollar was 1,400,000.- TL when this study was conducted in late 2001 and early 2002.

Table *2. Weights of variable categories at each dimension*

Axis	Inertia	Proportion	Cumulative	Histogram
1	0.3790	0.1685	0.6850	**********
2	0.2941	0.1307	0.2992	*********
3	0.2926	0.1301	0.4292	*********
4	0.2506	0.1114	0.5406	********
5	0.2430	0.1080	0.6486	********
6	0.2324	0.1033	0.7519	********
7	0.2062	0.0916	0.8435	*******
8	0.1903	0.0846	0.9281	*******
9	0.1618	0.0719	1.0000	******
Total	2.2500			

3. Findings

Table 1 indicates that weights of both levels of the tendency of migration are more on the first dimension; therefore it might be asserted that it would be better to represent the said two sub-categories with the said dimension. On the other hand, it is understood that that it would be suitable to show levels 1 and 2 of the income level variable on the first dimension and to show levels 3 and 4 on the second dimension. It might be asserted that Level 1 of the profession variable should be represented in the first dimension, and Levels 2 and 3 of the same in the second dimension. On the other hand, one might say that Level 4 of the said variable can be represented on both dimensions. It is possible to represent Levels 1 and 2 of the age variable on the second dimension, and Level 3 of the same on the first dimension.

Results of the Matrix I analysis have been given in Table 2. The table in question indicates that within the total change (inertia or variance) assessed as the average value of the changes happening on the levels of the above-mentioned 4 variables, change amounts corresponding to each dimension are very close to each other except for the first and ninth dimensions. Their share in explaining the total change of each dimension was calculated by comparing each dimension's inertia value with the total inertia value, so that it is observed that the highest explanation rate is 16.85% for the first dimension, and that the lowest explanation rate is 7.19% for the ninth dimension.

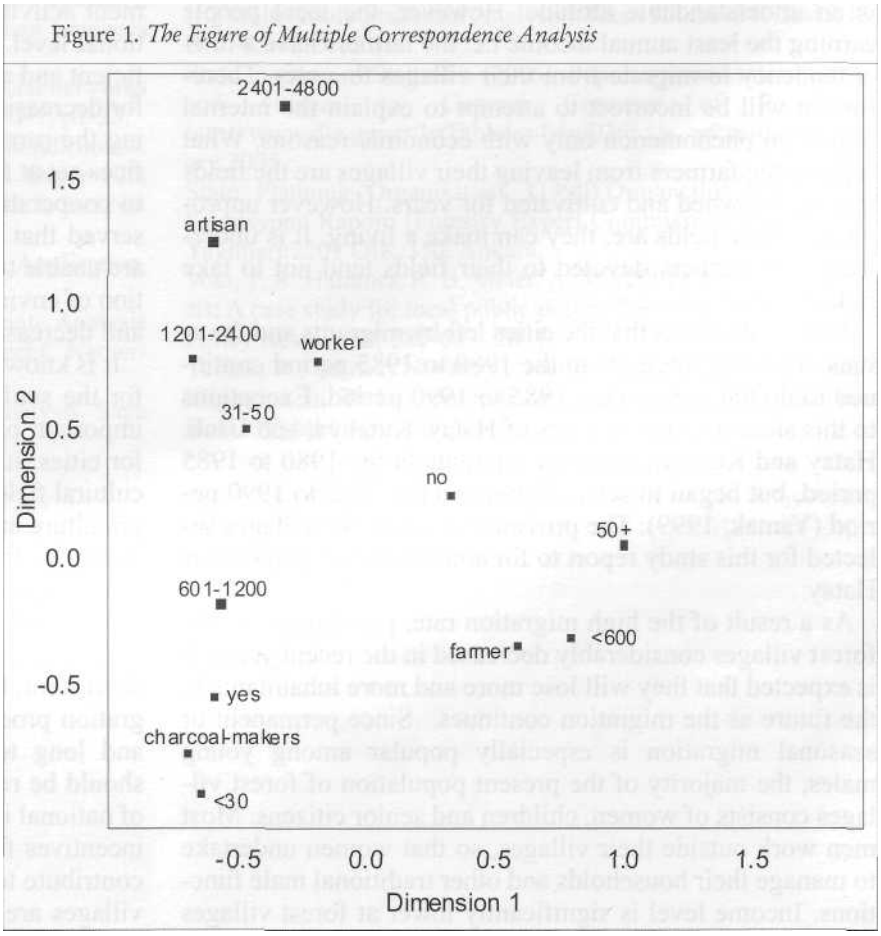
Figure 1 indicates that:

1. Interviewees who refused the tendency of migration are people over age 50. In other words, the older the peasants get, the more they reject the idea of migration to a city.
2. Peasants having the least annual income are farmers, but their tendency of migra tion from their villages to a city is lower.
3. Peasants having the highest tendency of migration from their villages to a city are young (<30) charcoal-makers earning an annual income of 601 to 1,200 mil lion TL.
4. Peasants having the highest annual income are arti sans with an income of 2401 to 4800 million TL per annum, and the middle-aged (31 to 50) workers with an income of 1201 to 2400 million TL. It might be as serted that their tendency of migration is lesser on the grounds that they find their annual income satisfacto ry.

4. Results and Discussion

In Turkey approximately 65 people out of 1000 people moved their permanent addresses to a different location between 1980 and 1985 due to various reasons. This rate increased by 25% to reach 81 in the 1985 to 1990 period. As in all countries, reasons of the internal migration phenomenon experienced in Turkey include economic, social, cultural, geographical, environmental, demographic and political factors. However, it is generally accepted that most of the migrating people move to a different permanent address due to economic reasons, and that the most important factor of the internal migration phenomenon is the unbalanced income level in both local and individual terms, Yamak (1999). This country's population is approximately

Figure 1. *The Figure of Multiple Correspondence Analysis*



68 million in the present, with 64% and 36% living in urban areas and rural areas respectively. Migration from rural areas to cities and towns is still going on, so that it is estimated that approximately 90% of the population will be living in urban areas in 25 years' time (Ministry of Forestry, 2003).

The analysis conducted on the data collected for this study indicates that the highest tendency of migration lies with peasants who work as illegal charcoal-makers, below age 30 and earning an average annual income under the local economic conditions. Since the people in question are young, dynamic and enterprising, they find their present income level insufficient. Furthermore, the fact that they are doing an illegal job for a living disturbs them, and leads them to migrate. Given that communication means are available at almost every village, the young peasants are influenced by the dazzling life style of urban centres and do their best to leave their villages as soon as possible. However, most of them are unable to make their dreams come true after moving to urban centres, so that they have to live under difficult conditions in slums where infrastructure facilities are insufficient. The unjust structure of income distribution at big cities disappoints these migrants and shatters their dreams. In this case, some migrants might fall under the influence of political extremists and begin to commit crimes. Results of the analysis indicate that local people over age 50 have the least tendency of migration. This is an understandable attitude. However, the local people earning the least annual income i.e. the farmers have a lower tendency to migrate from their villages to a city. Therefore, it will be incorrect to attempt to explain the internal migration phenomenon only with economic reasons. What refrains the farmers from leaving their villages are the fields they have owned and cultivated for years. However unproductive their fields are, they can make a living. It is understood that farmers devoted to their fields tend not to take risks.

A study indicates that the cities left by migrants and the cities attracting migrants in the 1980 to 1985 period continued to do the same in the 1985 to 1990 period. Exceptions to this situation are the cities of Hatay, Kutahya, and Usak. Hatay and Kutahya attracted migrants in the 1980 to 1985 period, but began to send migrants in the 1985 to 1990 period (Yamak, 1999). The province to which the villages selected for this study report to for administrative purposes is Hatay.

As a result of the high migration rate, populations of the forest villages considerably decreased in the recent years. It is expected that they will lose more and more inhabitants in the future as the migration continues. Since permanent or seasonal migration is especially popular among young males, the majority of the present population of forest villages consists of women, children and senior citizens. Most men work outside their villages, so that women undertake to manage their households and other traditional male functions. Income level is significantly lower at forest villages than other types of villages, so that poverty is widespread. Some studies indicate that average annual income per capita is approximately US$ 200 at forest villages (Geray and Ozden, 2003), and generally US$ 3000 in Turkey. It is known that the overall share of forest villages in the overall forestry incomes is very small, so that this situation decreases the forest village people's expectations and interests from and in forestry resources, and increases their tendency of migration.

The contributions of forest village people to the process of developing policies and strategies for forestry resources and planning, decision-making and application for these resources have proven to be insufficient to date. The existing policies and strategies are based on the concept of ensuring the forest administration offices to assist the peasants, so that they do not consider the forest village people as one of the administrative parties for forestry resources, and are unable to invite these people to undertake authorizations and responsibilities for the management of resources. Both corporative capacities and legal structure have been developed under the above-mentioned frame. Traditions and capacities of the forest village people to act in an organized manner for protecting their own rights and solving their own problems are insufficient. Although forest village cooperatives make significant contributions to the protection of the forest workers' rights, it is observed that they have turned out to be insufficient in terms of contributing to rural development activities and to political will and support at the national level. At the political level, it is observed that no efficient and stable policies or strategies have been developed for decreasing the forest villages' poverty level and increasing the rural development level. Various governmental offices act at forest villages in a detached way, and are unable to cooperate and integrate with each other. It is also observed that most of the Non-Governmental Organizations are unable to channel their sensitivity and efforts on protection of environmental resources to protection of local rights and decreasing rural poverty.

It is known that internal migration causes many problems for the settlement areas left by immigrants too. The most important problem is that as rural active manpower leaves for cities, it becomes impossible to take care of rural agricultural fields or to find workers for forestry jobs. Since agriculture and husbandry are still vital parts of the Turkish economy, this trend causes prices of the agricultural products to increase on the one hand and increases the share of agricultural products in overall import items on the other.

Finding a solution for this problem looks difficult in the short term, but it can be possible to reverse the internal migration process by taking certain measures in the medium and long terms. In the medium term, relevant policies should be revised in such a manner to increase the portion of national income enjoyed by the rural areas and to provide incentives for agricultural activities and husbandry. It will contribute to solve this problem if inhabitants of the forest villages are allowed to enjoy economic benefits from the

forestry resources under the sustainability principle. In the long term, measures should be taken to solve the infrastructure problems of these villages, so that migration from rural areas due to educational or healthcare purposes will decrease.

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