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REVIEW THE EFFECT OF CLIMATE CHANGE ON MIGRATION: IRAN, 1996-2006

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Abstract: *The aim of present study, to evaluate the influence of climatic factors on the rate of net migration by using the factor analysis has been studied in Iran. In this analysis of the 12 climate variables with the use of factor analysis into three basic dimensions have become associated with variable degrees of development for the country's 30 provinces over the 1996-2006 period has been used. The results of the assessment showed that the degree's variable of development as well as related dimension to the temperature factors on the rate of net migration statistically confidence level of 99% and 95% were significant respectively. It was shown that the people of the cold weather and glacial to the warm and humid climate migrate, and also degrees of development have a positive impact on net migration.*

Keywords: *climate change, immigration, Iran*

INTRODUCTION AND STATEMENT OF PROBLEM

Migrate is a form of geographical mobility or local the population done between the two geographic units. This movement should be change normal residence the person from the source Or residence before his migrate, Lead to destination or new residence and for immigration should be considered three characteristics: 1. the local distance between the two places 2. The permanent or long-term stay in a new location 3. The distance at the time of migrate (zanjani, 2001: 5). And migrants someone who leave from one place to another land, the relatives and friends. War, food shortages, natural disasters, climate change, poverty, security, unemployment, access to health, education, social and political environment, and more income are among the reasons for migrate (Shakibai and Khatami, 2013). Because of the comprehensive immigration extensive studies have been done about it and each of the researchers and organizations have focused on the goals and views and different categories in terms of time periods, regions or countries of origin and destination, migration motives, type and class of immigrants and the positive and negative consequences have been conducted. Migration from a view can be divided

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into two types, internal migration and international migration. (Migration from one country to another), while internal migrations within the borders of a country done and into two categories: Inter-provincial migrations and interprovincial migrations is divided. If migration into the cities of the province. Done, Inter-provincial migration and if one province to another province be done, provincial migration Is. Internal migrations consist of four groups; Migration from town to town, moving from village to village, migration from town to village and migration from rural to urban is (Ardahaei Ghasemi *et al.*, 2003). Statistical center of Iran the number of interprovincial migrants in Iran During the years 1966 to 2006 estimated as follows:

Table 1
The process of changing the number of interprovincial migrants

Period	*The number of interprovincial migrants (people)*
1966-1976	1872350
1986-1996	2939921
1996-2006	4774046

Reference: Statistical Center of Iran (2010)

According to the United Nations during the past two decades (2010-1990), international migration is increasing so dramatically that in 2010 about 3.1 percent of the world's population. This situation over the last few decades has become a sensitive issue in political debate, especially in countries with high-income and is very important for the authorities of these countries (Miguet, 2008). The table below shows the increase in the number of international migrants in the past two decades.

Table 2
Process of change in the number of international migrants from 1990 to 2000

Year	*The number of international migrants as a percentage of world population*
1990	2.9
1995	2.9
2000	2.9
2005	3
2010	3.1

Reference: United Nations (2010)

The table below shows the number of international migrants compared to the level of development is shown. So that 10.3% of the population in developed countries are international migrants.

Table 3
The number of international migrants compared to the total population according to the levels of development

Country of the year	*1990*	*1995*	*2000*	*2005*	*2010*
Most developed countries	7.2	8	8.7	9.6	10.3
Less developed countries	1.8	1.6	1.5	1.5	1.5
At least development countries	2.1	2.1	1.6	1.4	1.3

Reference: United Nations (2010)

From other hand, the International Organization for Migration (IOM, 2007) predicted that by 2050 about 200 million people migrate due to climate conditions and environmental issues. So migration as a social phenomenon has consequences and different repercussions economic, social, cultural, environmental, political, and security (Zarghani and Mousavi, 2013). One of the main issues in migration debate is its relation to various aspects of political, economic, cultural, and environmental and etc. in communities. Therefore, due to the high number of interstate and international migration, and also Statistics International Organization for Migration (IOM) on migration due to climate conditions and environmental issues, as well as the effects and consequences of migration, check the weather and economic factors on provincial migration is important.

This article was divided into 6 sections: Section 1 Introduction is expressed, Section 2 includes background the research and reiterated the model, Section 3 expresses the model estimates, Section 4 contains the conclusions, Section 5 expresses suggestions finally, and Section 6 contains References.

BACKGROUND OF RESEARCH

Some research in search of evidence of the effects of environmental phenomena focused on migration, however, in recent studies, the role of human factors, barriers to migration, economic and social factors in explaining the phenomenon of migration is considered important (Keshavarz *et al.*, 2013).

For this reason, some researcher's migrations due to climate and environmental issues like drought have studied. Due to the variety of weather factors used in research related to climate conditions, this section beginning on climatic variables used in the studies and the results are expressed in relation to migration. Usually different weather factors used in several studies that some of these studies are pointed out including empirical research in the social sciences due to climatic conditions as an independent variable, often including temperature climate as a significant factor, and is sometimes regarded as a single agent (Cragg and Kahn, 1997). Measuring temperature is usually, but not always, involves measuring the average daily temperature for the months of July and January. These two temperatures from air and water are separate indices (Cushing, 1987). In some

cases, additional factors studied including: Dudley *et al.* (2009) in an article entitled "The effect of climate on migration: United States 2000-1995 "from 11 climatic variables (temperature January, July temperature, temperature index, hot day index, cold day index, morning humidity index, humidity of pm index, rain index, cloudy day index, sun index, wind index) To examine the relationship between migration and the climate as harmonious to the big cities of America, 50 states were used and another most extensive analyses of climate and migration by Graves (1980). In an analysis entitled "Migration and climate" from 5 different climate index, the variance in the average temperature, wind speed, average humidity, temperature warm weather and the degree of cold weather use. While Helene Bie, *et al.* (2011) and Rowhani and *et al.* (2011) for the expression of climate change, in an article entitled "The economic providers immigration and climate change"; And "unstable weather and grain production in Tanzania", respectively, the change in the average temperature and precipitation levels, which implies an increase in climate change in these factors with a corresponding increase in extreme weather events, As refers to the distribution is longer and wider used. However, a small number of climate and migration analyses are that the relationship between these aspects of weather, such as temperature, humidity and wind speed to examine (Dudley et al., 2009).

After expressing climatic factors that were used in previous studies, some research results are included below:

Historically, drought and desertification the main providers of the coast of Ethiopia, Argentina, Brazil, Syria, and Iran (Leighton, 2006) Rowhani et al. (2011) and Ahmed (2001), both in separate studies to examine the atmospheric instabilities in Tanzania, to the negative impact on grain production increased climate volatility and poverty vulnerability noted. Mahdavi (2000) in a study to "investigate the cause of abandoned villages of the northern edge of the desert Garmsar" states that on the basis of studies over 30 years, the population of 65 villages in the area were evacuated and abandoned most of their agricultural lands and about 34 villages to salt of the earth slightly, water, Slightly population and attracting migrates up and the lack of Services of economic, health and cultural In the coming years, its population will lose certainly the fate of physical space and agricultural lands, as well as 65 villages would be abandoned village. The other hand Jalalian and Yeganeh Mohammadi (2007) the most important causes of rural migration in the province of Zanjan (over decades 1986 - 1996) to water and land scarcity, deprivation and lack of services, unemployment and low income mentioned.

RESEARCH METHODOLOGY

This study, by using factor analysis and econometric model the effects of climate change on migration net migration (NET-MIG) is checked.

Choice model to estimate is as follows:

$$NET - MIG = a_i * x_i + \beta * Dd + \in$$

And model variables are introduced as follows:

(A) Dependent variable (NET-MIG)

In a division of migration, migration based on the population mobility in one place to three categories (the rate of immigration (IN-MIG), attracting migrates rate (OUT-MIG) and net migration rate (NET-MIG)) for the period under study is divided. Considering that period examined in this study time interval between November 1996 and November 2006, censuses is. Therefore census data from 1996 and 2006 have been used. In this study, the rate of net migration including both categories origin and immigration rates has been used.

(B) The independent variables

Independent variables affecting migration into two group's climatic factors (x_i) and the degree of development (Dd) provinces are divided as follows:

B-1 weather factors (x_i)

Many of the climate factors in the 0.4 or 0.5 with one and greater number of other climatic factors are interrelated. But all these factors are not dependent on each other at a high level. For example, factors associated with moisture (the number of days of cloudy, wet evening, the morning moisture, rain, cold day index) high dependence each other, have but high dependence with factors related to temperature (temperature means temperature warmest month of the year, temperature coldest month of the year, hot day index temperature Index) not have. On the other hand the storm factors only have dependence with each other and not affiliated with any other factor. Given the correlation between the independent variables in this study, factor analysis was used to assess these factors and 12 factors with an orthogonal rotation were assessed. And the results of the evaluation of these factors are described in Table 4. The results of this analysis, 3 dimensions major dimensions From 12 climate factors created all these 3 dimensions values were greater than one. These 3 dimensions at total 83.04% of the distribution 12 factors Climate entry Formed for factor analysis.

The first dimension of climate Humidity has been introduced and 32.615% of the dispersion 12 factors are formed. these dimension by factors related to moisture Means The number of cloudy days, wet evening, the morning moisture, rain, cold day index, respectively, with factor loadings 0.789, 0.936, 0.919, 0.325 and 0.369 were created.The hottest months factors of the year and the number of sunny days with high and negative factor loadings (respectively 0.736 and 0.802) with a humidity index is not directly related, and these relationship between the two factors and moisture dimension expresses.

The second dimension of climate temperature has been introduced and 30.533% of the dispersion 12 factors are formed. these dimension by factors related to temperature Means temperature warmest month of the year, the temperature of the coldest month of the year, hot day index, temperature index alternatively, the factor loadings are 0.424, 0.982, 0.891 and 0.939 have been formed.

And finally the third and final dimension is known as the wind that 19.894% of distribution this12 factors have formed. These dimension by two storm factors with factor loadings 0.844 and 0.607, respectively is expressed.

Table 4
Load factor 12 climate factors 3 dimensions weather, the 30 provinces of Iran, the main dimensions analysis with frequency or orthogonal rotation

Variable	*Component*		
	Humidity	*Temperature*	*Wind*
Cloudy day	.789	.068	-.491
Firth	-.736	.424	.318
Farm	.087	.982	.116
Gram	-.019	.891	.337
Huff	.936	.221	-.050
Humor	.919	.129	-.129
Inch	.325	.171	-.755
Indextemp	.296	.939	-.011
Sard	.369	-.804	.263
Sunday	-.802	.197	.424
Toofan	-.130	.236	.607
Wind	-.178	.068	.844
Eigenvalue	3.914	3.664	2.387
% Variance	32.615	30.532	19.895
Cumulative Variance	32.615	63.148	83.042

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

These three dimensions of physical climate as factors affecting on migration is used.

B-2 degrees of development (Dd)

According to the theories of migration, mainly the most important immigration factor economic factors have expressed, from variable mix degrees of development as a control variable is used. This variable by Jamali et al (2008) in a study entitled "analytical on process of inequality in urban areas Provinces of Iran (2006-1986)" has been measured. The composite index degrees of development, consisting of 54 sub-indicators; Includes the following indicators of health care, cultural,

educational, economic, infrastructure, housing and sport that is calculated by utilizes the factor analysis method.

Finally, the models have been used to estimate the following:

$$NET - MIG = a_0 + a_1 * Humidity + a_2 * Temperature + a_3 * Wind + \beta * Dd + \varepsilon_3$$

In this paper first due to the limitations existence the data in weather and other statistical limitations, the main cities of each province to represent the province was chosen and then population of the city is divided by the sum of all the cities of the province to obtain the weight of any city in the province. Then meteorological data as harmonious (average weight of the population) for selected cities in each province to represent each province in by period were used at least 30 years old (in selected cities in the appendix presented) Demographic data and meteorology alternatively, using the census Bureau's website and weather's website were collected.

Estimate Model: After using the method of factor analysis and composition of variables, the effect of temperature on the rate of net migration in Iran during the years 1996-2006 by using simple linear regression model and the results are as follows:

Table 5
The regression coefficients for net migration rate: 30 provinces of Iran

Independent variable	*Net-migration*	
	Unstandardized Coefficients	*Standardized Coefficients*
Humidity	-0.19	-0.06
Temperature	9.42*	0.307
Wind	3.99	0.13
Dd	3.39**	
Constant	-240.54**	
R^2	0.50	
R^2 (adj)	0.42	
F	6.22**	

*P< 0.05 and **P< 0.01

For testing significance of variables the overall test model, Respectively of T & F coefficients were used. According to Table 5, variables, humidity and wind, which respectively represents dimensions related to water and wind, were not statistically significant.

But variable temperature, which are indicative of dimension temperature, In terms of statistically in significance level of 5% have a positive effect on net migration rate are; So that these indicators suggest that high temperature migrants move are in line and as an attraction acts.

CONCLUSION

This study first question is that if there is a relationship between climatic factors and migration how is the direction and rates the impact of these factors on population movements?

The second question is, is the non-thermal effects of climate change on migration with others factors - will be sustained? For this purpose the independent variable degree of economic development in an environment used for testing migration. Variable degrees of development in this model became significant. Given the high unemployment rates in developing countries such as Iran mentioned index became consistent with the expected significant. Population movements from one province to another province, In addition to the degree of development variable significantly with temperature factors Related And according to previous theories (including Dudley et al. (2009)) showed that people to escape being exposed to the bitter and cold of winter, summer too much hot and wet Prefer. It has been observed that dimensions of moisture on the net migration has been ineffective, that this conclusion are not expected and also not in compliance with the past theories. Therefore, this result can be attributed to the following factors:

A. In the regions with rainfall and high humidity, which have mostly fertile land, surplus of labour exist that from attracting immigration is prevented.

B. The lack of mechanisms of modern agriculture has caused in Iran that people due to low efficiency, are not attracted to agriculture. As mentioned in previous studies dimension of wind on the climate conditions is not very effective, and in many climate measurements and association studies will not be considered. In our study also its lack of significant was shown.

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