THE DETERMINANTS OF MIGRATION PROSPECT : SPATIAL ECONOMETRIC APPLICATION TO THE MOROCCAN DATA

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Abstract

The adepts of international migration have attempted to develop models that can be used to examine the underlying factors that push the migrants to take the decision of leaving the country of origin. The have tried to analyse the way in which the difference in the socioeconomic determinants between spatial entities (countries, regions and provinces) may affect the decision of people to immigrate. This work has recommended first to verify empirically the validation of the theory of migratory basins within one country and to identify variables that clarify the intent of emigration. With respect to the Moroccan context, this work presents a two-fold interest. On the methodological level, this contribution is, to our knowledge, the first application of the micro econometric spatial approach on the data collected during our investigation. At the analytical level, the findings of this work complement those of the few descriptive studies. Subsequently, the results of this research should be used to reflect deeply upon the public policies related to emigration.

Key word: migration, basin, spatial analysis, Morocco.

1. Introduction

Since the end of the 1990's, international studies on migration have attracted a considerable renewed attention that is demonstrated mainly through the positive relationship between International Migration and Development (Hein de Haas, 2010).

The adepts of international migration have attempted to develop models that can be used to examine the underlying factors that push the migrants to take the decision of leaving the country of origin. From a macroeconomic perspective, we have tried to analyse the way in which the difference in the socioeconomic determinants between spatial entities (countries, regions and provinces) may affect the decision of people to immigrate. Therefore, we need to distinguish between two types of factors that shape the dreams of migrants: "push" and "pull" factors. At the microeconomic level, Fisher et al. (1997) has attempted to compare the differences perceived by people within these spatial entities through the process of deciding whether to stay or to leave the country. We then consider the macroeconomic aggregates specific to a geographic area that affect the probability of departure. According to Straubhaar (1993), migratory pressure is exerted in countries with great potential but with few migration opportunities. If the proponents of classical economics have largely influenced the theory of migrations, it could be said now that migrants are no longer a homogeneous group of rational actors that seek to maximize their usefulness and value and to minimize market risks. The followers of the human capital theory perceive migration as an investment whereby the value should be analysed in its dynamic aspect; that is to say as a process of accumulation. Therefore, it becomes easier to understand the subtle differences of interpersonal migration proclivities. Migration, in turn, encourages more young people with fewer barriers and low skills. More recently, migration has become an increasingly difficult to identify and understand phenomenon. This is the reason behind the observed increase of the studies analysing the migration motivations and intentions. The studies focus mainly on the comparisons made by the emigration candidates between the future achievements of their objectives in the host community, on the one hand, and achieving their goals in their country of origin on

the other hand. However, few studies have focused on the issue of the existence of migratory basins. In Europe, migration has always been a key factor in the history of the continent. The phenomenon has become complicated with internal movements inside the Europe. This type of migration is virtually no longer related to poverty. Indeed, it is an entrepreneurial Migration (Dumont, 2004) with intercontinental displacements and migrations. As far as Dumont (2004) is concerned, the Mediterranean intercontinental flows cover three areas of exchange. First, between Africa and Asia (inter-Arab flow). Next, between Africa and Europe and finally between Asia and Europe. Flows to the United States are drained mainly by the Caribbean basin (Gozalvez, 2006). Geographical proximity, economic power and keeping the privileged relationships with certain territories largely explain the structure of these basins. In Morocco, only few studies have investigated the emergence of migratory basins. To our knowledge, the only rigorous study that was conducted is the work of the HCP (1999). Being based essentially on a descriptive data, it shows that the Moroccan migration has only one direction, which is Rural-Urban with a special focus on migratory basins of major cities. This work has recommended first to verify empirically the validation of the theory of migratory basins within one country and to identify variables that clarify the intent of emigration. With respect to the Moroccan context, this work presents a two-fold interest. On the methodological level, this contribution is, to our knowledge, the first application of the micro econometric spatial approach on the data collected during our investigation. At the analytical level, the findings of this work complement those of the few descriptive studies. Subsequently, the results of this research should be used to reflect deeply upon the public policies related to emigration. This paper is structured as follows: in the second section, we draw up lessons from the literature review. The third section presents the evolution of migratory basins in Morocco. The fourth section is a discussion of the findings of this empirical study.

2. Lessons from the literature review

Until recent times, the international migration studies have mainly focused on the analysis of individual determinants. Recent approaches including new economics of migration model, sustainable livelihoods approaches and transnational approaches have encouraged the consideration of certain contexts. These approaches have emphasized the connection between theory and empirical works by offering the perspectives to analyse simultaneously the collected data on the individual and collective levels and taking into account the socio-spatial variations.

As an example, numerous studies have shown that individuals are not necessarily responsible for their migration (Massey, 1990). Making decisions about mobility most often involve a non-migrant group. It has a scale game within migration whereby the individual, and possibly the group whereby the decision of migration is linked to, bypasses the constraints of its environment. This game is necessarily based on an implied timeless contract (which is rather altruistic) among the groups involved in migration by optimistic desires not in terms of individual independence (the individual apart from its environment) but from mutual interdependence (individual and group) (Stark, 1991). Furthermore, the current mobility is different from the traditional model of migration of the 1960's in which a community travels from point A to point B. It includes an essentially dynamic migration field in which mobility correctly structures a transnational space (Béteille Simon) as a complex network. This new migration era triggers the development of the so-called archipelagic economics (Veltz, 1996). This concept reflects the transformation of the spatial distribution of the activity after a phenomenon of polarization that accompanies the emergence of a new territoriality. Here we see an

integration of the local, national, global, international and transnational levels where it is generally considered as a superposition of these scales. In the international level, the model "centre-periphery" is also called into question. The latter has characterised the spatial structuring of countries such as France during the years of the peripheral economic growth (decentralization process of which France presents the most advanced model) so that the periphery supplies the centre and shares the benefits in turn. It is from this model that the international division of labour in the sixties and seventies related the development of the countries of the South in hosting the execution segments of the Northern industry. Even in France, the economic coherence of regions is unstructured between 1950's and 1970's. It has moved from a dissociated to an associated segregation reflecting a good interpretation of an integrated and not nested economy (see Braudel). Today, North-South divide has become increasingly meaningless. Indeed, there emerged large development centres and sites in the countries of South in the same manner the large exclusion zones of the developed Northern countries had appeared. The geographical inequalities have become more readable in the local level than the "regional". In order to examine the tendency to emigration, we regularly rely on four theoretical approaches. Neoclassical economics approach, New Theory of Labour and Migration, the theory of dual labour market and the theory of the global systems. Neoclassical economics combines emphasis on the inequality of wages, employment conditions and migration costs disparities among countries. For the New Theory of Labour and Migration, even in the absence of wage differentials, households may have strong incentives to diversify risks through transnational migration. According to the theory of dual labour market, migration is considered as an automatic result of economic globalization ((Morawska, 1990)). Network theory explains the increase in the likelihood of migration through networks that reduce the costs and risks of movement and increase the potential net gain from migration (Massey, 1990a, 1990b). The empirical works and the reduced forms that test the validity of these theories have analysed the impact of two components: Firstly, the push factors (too low wages, high rates of unemployment and lack of opportunities and hope). Secondly, the pull factors (potential factors that attract migrants in the host countries such as higher salaries, good employment opportunities, better living conditions (De Vreyer, Gubertet Roubaud, 2007)).

3. Evolution of migration basins in Morocco

With nearly one out of ten Moroccans live abroad (over three millions), the Moroccan people residing abroad (MRE) is considered as an important human and financial pool1 (through remittances). According to the United Nations report on international migration in 2011, over than 17% of Moroccan migrants are qualified in 2000 and rank the second place after Lebanon all over the Middle East and North Africa. We can therefore talk about extroverted society to characterize the popular support on migration resource (Balac, 2003). Migration is more than just one of the complementary economic channels of the country based on different economic networks that are formed by the migrants' remittances. During the first half of the twentieth century, the labour movements were mainly from the region of Agadir. They are natural extensions of the military movements that started during the First World War. At the same time, "over than 90% of Moroccans in France before 1942 were from this region; about 80% during 1942 to 1956 and slightly

[1] The average share of remittances to the current GPD since 1975 until 2008, rose to 6, 9% and the amount of transfers has increased to 860%. Source: Calculations based on World Bank data

more than 70% in mid-1960…" (E. Atouf, 2003). After independence in 1956, Morocco has taken the initiative to carry out several institutional, political and economic reforms. Apart from the failure of the five-year restructuring plans, the fratricidal struggles among the pillars of the national liberation movement headed by the emblematic Benberka, the former professor and the future political opponent of the ambitious prince of Morocco (Hassan II) has pitched Morocco in two decades of political instability since the late 50's to the mid 70's. This period is also marked by the Rif crackdown by General Oufkir between 1957 and 1959, the riots of 1965 in Casablanca, failover strategies in the State of Emergency until 1970, and two aborted coup d'état against the king Hassan II in 1971 and 1972. The Makhzanian strategy has aimed to help pacify Morocco through the expatriation of the epicentre of the protest movements of the East and Rif regions through emigration. For this reason, several bilateral agreements of labour mobility were signed during this period between Morocco and European countries including France, Belgium, the Netherlands and Germany. This had created the right conditions for a predominantly male mass mobility with a circular nature due to the absence of migration restrictions between Morocco and the major partner countries (Mghari, 2010).

The year 1974 has marked the beginning of a turning point in the history of Moroccan migration. Indeed, the end of the thirty-year period known as "les trente glorieuses" in France and the establishment of migration flow control have contributed significantly to shape the typical profile of Moroccan workers in Europe , particularly in France. Taking into account these changes and to provide protection against the vagaries of migration policies, the trend towards family reunification and creating permanent facilities have been increased. The additional numbers of less restrictive destinations have started to attract suitors to emigration along with a shift of migration epicentres. Rural regions of Doukkala-Abda and Chaouia Ouardigha have become therefore new migratory basins from which emigrants aspire to work in Spain or Italy.

If migration has thoroughly restructured the economy of Morocco through the strong impact of remittances of emigrants, migration prospects will nevertheless have strong repercussions on the family-social and cultural relationships of suitors to emigrations and their family members and friends. The social mobility generated by academic success has been replaced by that to migrant workers in foreign countries. The study conducted by R.Bourqia (2010) over two Moroccan rural regions that were greatly affected by labour migration confirms this assumption. In fact, the research team have noted some considerable changing in the family-social, economic and cultural relations among the contenders to emigration and their entourages. Reports range from a simple complicity of familial incentives to emigrate to other extreme forms. Conflicts and pressures exerted by adolescents and young people of working age over their parents to sell a plot of land or cattle in order to buy a work contract in Italy or Spain have become common. Still worse, the authors have detected signs of a supposedly more dangerous effect. Thus, "it would not be undoubtedly an exaggeration to consider that the young people's enthusiasm and their families' to emigrate results in a widespread of school dropout phenomenon within the surveyed communities and rural areas. While the appeal of labour emigration to Italy and Spain is increasingly prevalent in young people' aspirations and their families'…" At national level, the effects generated by unemployed educated people2 have contributed

[2] At the national level, the average rate of unemployment from 1999 to 2007 is 11, 5%. However, there was a wide dispersion according to the level of education. Indeed, from 1999 to 2007, the average unemployment rate of people with a higher level of education is 25, 7% opposed to 22,2% of those who have an intermediate level, and only 5, 8% of unqualified people.

positively to strengthen the roles of the migrant worker that becomes therefore “an identificatory model” (R.Bourqia) who gives rise to rapid and successful social mobility aspirations.

4. Spatial empirical analysis of migration motivations and intentions in Morocco

The purpose of this section is, first, to identify the potential migration basins in Morocco through the construction of an index of migration intensity. Then we estimate the determinants of migration intensity using a spatial model.

4.1 Data and Methodology

4.1.1 Data

The used instrument to collect data of this study is a survey[3] . It has been conducted at national level and it includes 2,604 potential migrants. 51, 42% are male and 48, 58% are female. The population of this investigation are from 18 to 50 years old; of which 39, 59% of respondents aged between 18-29 years old, 28, 23% are between 30-39 years old and 32, 18% are from 40 to 50 years old. Out of the total sample, it is reported that 58, 21% of respondents have no intention to migrate compared with 41, 79% who claim to have the intention to go to work abroad. The majority of interviewees agree with the statement that education helps people to improve their living standards (92, 2%) and that it is important to invest in education (92, 1%).

Table 1: Demographic characteristics of the respondents

Socioeconomic characteristics	Percentage	
Sex	male	51,42%
	female	48,58%
marital status	married	39,98%
	widower widow	55,57%
	divorced	2,57%
	Never married	1,61%
	no answer	0,29%
Age	between 18 and 29 years	39,59%
	between 30 and 39	28,23%
	between 40 and 50 years	32,18%
Intention to go to work and live abroad	Yes	41,82%
	No	58,18%
the potential emigration	High migration potential	31,76%
	Low migration potential	68,24%
Activity rate	Yes	44.89%
	No	52,11%
	No answer	3,00%
Long term career opportunities in Morocco	Very Good / Good	43,12%
	Very poor / Poor	38,08%
	no idea	4,88%
	no answer	13,92%

In Table 2, we present the socioeconomic characteristics of the respondents who expressed their desire to emigrate. The spatial distribution of these potential migrants has revealed some differences amid the eight regions in which the survey was conducted. The region of Casablanca comes first with 22, 31% of those who report their intention to go

[3] AMERM and EFT, the author has participated in the various process stages of this investigation

abroad followed by the region of Marrakech (19, 21%) and the region of Fez/ Meknes ranks third (13, 86%). Regions of Rabat, Agadir and Oujda are in the fourth position with slightly higher rates of 12% and finally Tangier and Ouarzazate with lower rates of 5, 89% and 1, 49% respectively. Europe (France, Spain, and Italy) tops the list of the favourite destinations of these potential migrants (54%).

Table 2: Sample description: potential migrants

Characteristic of potential migrants			**in %**
Geographical distribution	Rabat		11,35%
	Casa		22,31%
	Fès/Méknès		13,86%
	Marrakesh		19,21%
	Oujda		12,49 %
	Agadir		12,40%
	Tanger		5,89%
	Ouarzazate		1,49%
preferred destination	France		35%
	Espagne		11%
	Italie		8%
	Autres		46%
The intention to go abroad in the company of spouse	Male	Oui	40%
		Non	53%
		autres	7%
	Female	Oui	68%
		Non	19%
		autres	13%
Because of the migration plan	Improving the economic situation		29,80%
	Seeking Employment		21,30%
	A better paid job		11,50%
	other		37,40%
business sectors of potential migrants	Hotel and catering		14,70%
	Agricultures		14%
	domestic services		9,10%
	Trade		8,50%
	Other		46,20%
	No answer		7,55%
The length of stay of potential migrants	remain abroad under 2 years		34,89%
	remains between 3 and 10 years abroad		35,11%
	stay beyond 10 years		15,12%
	stay abroad forever		9,88%
	other		5,00%

Several factors account for the willingness to emigrate. In fact, more than 29% of respondents have claimed that their purpose behind emigration is to improve the economic situation, while 21, 3% say that the main reason is unemployment and finally 11, 5% argue that they hope for better-paid jobs. People who intend to emigrate choose to work in different areas that include, among others, hotels and restaurants (14, 70%), agriculture (14%), domestic services (9, 10%), trade and construction (8, 50%). It is

highly important to mention that (7, 4%) do not know the work they will practice when they emigrate and (7, 55%) who interviewees who provide no answer.

4.1.2 Methodology

a- calculation of the index of the migration intent by province

What makes this paper unique is the ability to calculate a composite index of migration intensity by province based on individual data. The calculation of this index is based on the following seven variables:

1) The short-term migration intent
2) The medium-term migration intent
3) The financing capacity
4) The ability to speak the language of the host country
5) Have enough information and know about the culture of the host country
6) The possession of the required documents for the trip
7) Easy access to other documents

b- Exploratory spatial data analysis

We have relied on the Exploratory Spatial Data Analysis (ESDA) in order to analyse the evolution of spatial disparities of migratory intentions in Morocco. It is a set of techniques and methods that are designed to describe and visualize spatial distributions, to identify atypical locations and outliers, to detect the patterns of spatial association, and to suggest spatial regimes or other forms of spatial heterogeneity (Haining, 1990; Bailey and Gatrell, 1995; Anselin, 1998; Le Gallo, 2002; Ertur and Koch, 2004). In order to fully report on the spatial interactions, these methods take into account the relative positions of the data through the inclusion of spatial weight matrices. Therefore, the comparison of spatial observation along with its neighbours is immediately considered. In addition, these methods provide global and local measures of spatial autocorrelation (Le Gallo and Lame-Orain, 2004). Spatial autocorrelation is defined as a measure of the intensity of the relationship between the proximity of places and their degree of similarity (Anselin, 2001). When the spatial autocorrelation is positive, the neighbouring units tend to look alike. Otherwise, they are somewhat different in nature if the correlation is negative. Moran's index is one of the statistics4 used to evaluate the global spatial autocorrelation5 but it does not provide any information on the potential form of spatial autocorrelation (Upton and Fingleton, 1985; Anselin, 1992; Ertur and Thiaw, 2005). The statistical test is as follows:

$$I = \frac{n}{S_0} \frac{\sum_i \sum_j w_{ij}(x_i - \overline{x})(x_j - \overline{x})}{\sum_i (x_i - \overline{x})^2}$$

xi denotes the value of studied variable for the province i. $\overline{x}$ refers to the overall average. n is the number of provinces. wij measures the intensity of spatial interaction between the two provinces i and j. The nature of interaction among the spatial units is regrouped in a spatial connectivity matrix also known as adjacency matrix or the weight matrix. By definition, this matrix contains as many rows and columns as there are spatial units. The elements of this matrix inform us about the way the two regions i and j are connected. The simplest way to say that two regions are connected is when they share

4 It differs from other statistics of Geary C, Getis G and Ord.

5 The principle of spatial autocorrelation has its origin in the famous quote of W.Tobler, 1979: "everything is related to everything else, but closer things are more related than distant things".

common borders. In this article, we adopt the contiguity principle as a measure of interaction between two provinces; and $S_0 = \sum_i \sum_j w_{ij}$ is the total interaction coefficients. Moran's I value is a global statistic and does not assess the regional local structure of spatial autocorrelation. Its formula is written as follows:

$$I_i = \frac{(x_i - \bar{x})}{m_0} \sum_{j(voi\sin i)} w_{ij}(x_j - \bar{x}) \qquad m_0 = \sum_i (x_i - \bar{x})^2 / n$$

However, it is questionable whether there are local clusters of high or low values, what are the provinces that contribute more in the overall spatial autocorrelation, and to what extent the global assessment conceals atypical localizations. Thus, the local spatial autocorrelation is analysed with other tools (Le Gallo and Ertur, 2003).

c- The determinants of migration intensity in Morocco

After having determined the different forms of spatial interdependence of migration intensity in Moroccan provinces as well as displaying the different forms of significant spatial concentrations, we conduct an econometric analysis to explain the potential role of some socioeconomic factors to determine the level of migration intensity to which we add a variable. This variable approaches the level of migration experience through the return migration rates by the province. To do this, we test the following econometric model:

$$imp_i = \alpha + \beta_1 isse_i + \beta_2 txactif_i + \beta_3 tail\_men_i + mig\_ret_i + \varepsilon$$

Along with imp the index of migration intensity to the province i, isse refers to the synthetic index of education while txactif represents the rate of the active population in the province i. tail_men is the average size of household, mig_retest is the return migration rate living in the province i and ε is the error term. All data is calculated by province. The migration intensity data is derived from our calculations (Table 3a) and the isse data is obtained from the works of Amaghouss and Ibourk (2013). The data of txactif and tail_men is obtained from the general population and housing census of 2004. The data on return migration rates is obtained from Ibourk and Chamkh (2013). In the presence of spatial autocorrelation, the estimation of the equation using the Ordinary least square (OLS) method gives biased coefficients.

The consideration of the spatial autocorrelation in the model can be performed through several ways:

1) Through the lagged spatial variables in (Case and alii, 1993; Brueckner, 1998), the model (1) becomes:

$$imp_i = \alpha + \rho W(imp) + \beta_1 isse_i + \beta_2 txactif_i + \beta_3 tail\_men_i + mig\_ret_i + \varepsilon$$

W (imp) is the lagged endogenous variable for the weight matrix W and ρ is the autoregressive spatial parameter that indicates the intensity of interaction among the observations of *imp.*

2) Through spatial autocorrelation of errors. There exist various possibilities (Anselin, 2001c). The most widely used specification consists of considering a spatial autoregressive error model[6] (Rey and Montouri, 1999; Baumont et al, 2001), the equation 1 becomes:

[6] Further specifications are indicated in the literature. For example, the moving average process (Ccliff and Ord [1981], Haining [1978, 1990] and the process of Kelejian and Robinson [1993, 1995].

$$imp_i = \alpha + \beta_1 isse_i + \beta_2 txactif_i + \beta_3 tail\_men_i + mig\_ret_i + \varepsilon \quad \text{with} \quad \varepsilon = \lambda W\varepsilon + \mu$$

The parameter λ reflects the interdependence intensity among the residuals. u is the error term as: u ~ iid (0, σ2 I)

3) Several studies have used the specifications involving both the autoregressive variable and the autocorrelation of errors. Therefore, model 1 becomes:

$$imp_i = \alpha + \rho W(imp) + \beta_1 isse_i + \beta_2 txactif_i + \beta_3 tail\_men_i + mig\_ret_i + \varepsilon \quad \text{with} \quad \varepsilon = \lambda W\varepsilon + \mu$$

Practically, the specifications that model both types of spatial effects (presence of a spatial autoregressive variable and an autocorrelation of the error terms) are rarely retained (Anselin and Bera, 1998). The empirical analyses in this section is restricted to test the two first cases.

4.2 Results

4.2.1 Map analysis

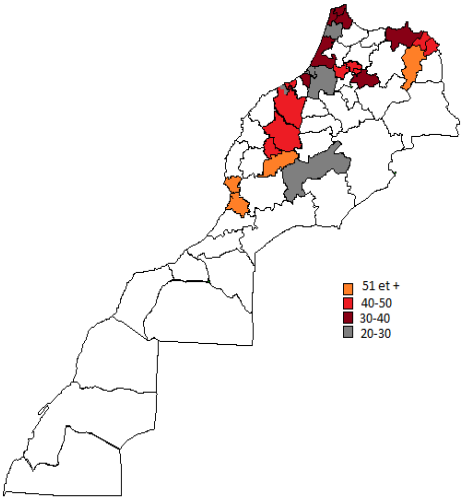
Table 3a: The index of migration intensity by province

Regions	Provinces	migration intensity
Grand Casablanca	Casablanca	40
	Mediouna	30
	Mohammedia	50
	Nouaceur	25
Chaouia-Ouirgigha	Settat	41
Fès-Boulmane	Fes	40
	Sefrou	37
	Moulay Yacoub	48
Gharb-Béni Hsain	Kenitra	36
Marrakech-Tensift-AlHaouz	Al Haouz	65
	El KelaaSraghna	40
	Marrakech	45
Meknès-Tafilalt	Meknes	50
Orient	Berkane	42
	Oujda Angad	46
	Taourirt	65
	Nador	38
Rabat-Salé-Zemmou-Zair	Khemisset	20
	Rabat	27
	Sale	23
	SkhirateTemara	30
Souss Massa Draa	Agadir Ida Ou Tanane	72
	Chtouka Ait Baha	55
	Inezgane Ait Melloul	56
	Ouarzazate	25
Tanger-Tétouan	FahsAnjra	30
	Larache	20
	Tanger Assilah	36
	Tetouan	30

The migration intensity phenomenon shows large spatial disparities. The regional distribution of this intensity reveals that three regions are of high intensity, namely Souss-Massa-Draa, Marrakech-Tensift-Al Haouz, and the Eastern region.

In fact, these regions are mainly rural areas. Numerous relationships link rural people with their land due to a number of endogenous and exogenous factors (drought, subdivision of land, urban stranglehold on agricultural land, the increasing number of landless rural workers, irrigation, automation, etc.). Thus, an increasing number of the population in rural areas tend to emigrate.

Figure 1: Map of the migration intensity



4.2.2 An exploratory analysis of the spatial data of migration intent index
Global spatial autocorrelation

The global spatial autocorrelation indices make it possible to identify clusters in the database. There are two kinds of global spatial autocorrelation: positive and negative. The positive spatial autocorrelation signifies the presence of a cluster with high/low value. The negative spatial autocorrelation demonstrates the presence of atypical spatial clusters. The positive spatial autocorrelation is the first law of geography of Waldo Tobler according to which near things are more related than distant things. For a standardized weight matrix, two tests of global spatial autocorrelation are possible: Moran's I and Geary's C statistics7. Moran's and Geary's statistics indicate the presence of a very significant global spatial autocorrelation. More details on these statistics are reported in Table3 and Table 4.

7 For a non-standardized weight matrix, a third statistic is calculated as G statistics of Getis and Ord

Table 3: Global Moran's

Variable	I	E(I)	sd(I)	z	p-value*
migration intention	0.357	-0.036	0.155	2.531	0.006

Table 4: Global Geary's

Variables	c	E(c)	sd(c)	z	p-value*
migration intention	0.567	1.000	0.178	-2.433	0.007

This Table reveals clearly that the spatial dependence is stronger if we take into account Geary's index (Geary's C equals 0.567) otherwise Moran's (Moran's I equals 0.357).

The statistics of the spatial autocorrelation present a single result. For example, in the case of a positive global spatial autocorrelation, it does not help to distinguish a spatial group with low value from another one of high value in terms of migration intentions. The detection of such spatial grouping of provinces with high level of migration intentions and others with low migration intentions is carried out by analyzing the Moran scatterplot and LISA statistics.

Spatial provinces' groupings and the detection of atypical observations: the Moran scatterplot

The Moran's scatterplot8 is used to display the pattern of the local spatial association that exists between the province and its neighbors.

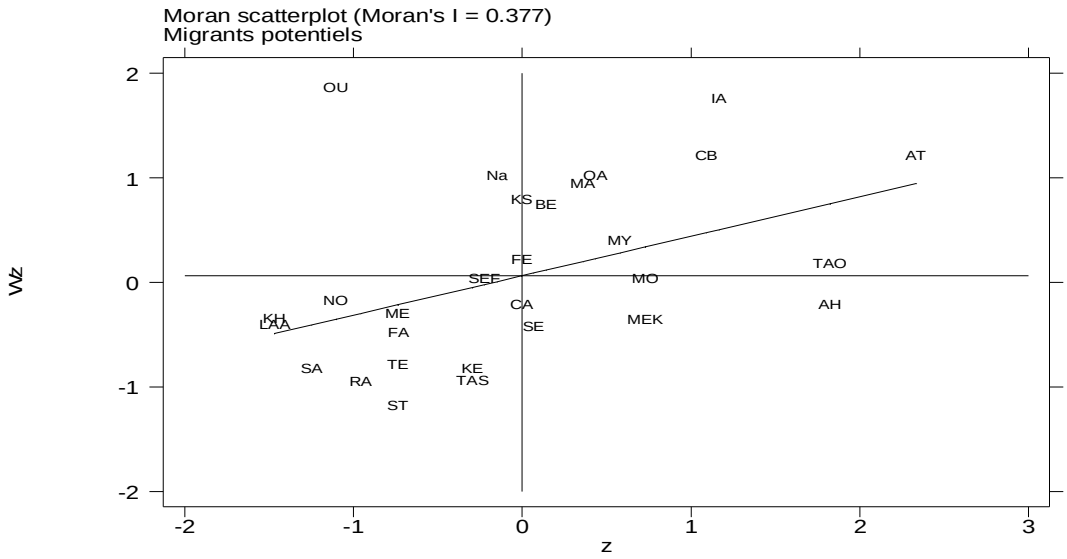
In this diagram, the standardized value of the migration intention levels is positioned along the abscissa and its spatial lag (also standardized) is located on the y-axis. By construction, Moran scatterplot helps to identify four types of local spatial association materialized through quadrants.

EE (High-High), FE (Low-High), EF (High-Low) and FF (Low-Low). The first and the last quadrants represent a positive spatial association, while the second and the third ones represent negative spatial association.

Moran diagram helps to locate outliers. By simply locating the provinces beyond the two units from the origin of the diagram. In terms of the migratory intention index, the extreme point is Agadir Ida Ou Tanane province, which is located in the South of Morocco. We note that no extreme value is detected on the y-axis (Figure 2). That is to say, no province has a neighborhood that significantly deviates from the average (Le Gallo, 2002). Table 5 shows that 82, 75% of provinces belong to a spatial association of similar values of the average index of the migratory intention. In fact, 31, 03% of provinces cluster in EE quadrant, which means that the migratory intention is rather high in those that are around. This quadrant includes mainly the Eastern provinces and Souss Massa Darra plus some provinces of the plain (Marrakesh, Moulay Yacoub). However, 51, 72% of the provinces are found in the FF quadrant. They are mainly the provinces of the North regions and the capital city Rabat.

[8] The used diagrams of Moran in this study are constructed from the adjacency matrix of order 1.

Figure 2: Moran scatterplot, Migratory intent index



Those provinces that deviate from the global association schema are located as outliers. They are situated within the EF (3, 44%) and FE quadrants (13, 79%) (Table 5).

Table 5: Moran scatterplot, spatial associations of the migratory intention levels

Index of migration intensity	positive spatial association			negative spatial association		
	EE	**FF**	**Total**	**EF**	**FE**	**Total**
	31,03%	51,72%	82,75%	3,46%)	13,79%	**17,25%**

In the light of these results, we can confirm the validity of the theory of migration basins within the same geographical area.

4.2.3 Econometric results

The identification of the spatial autocorrelation and heterogeneity among provinces does not help to get a reliable statistical inference when it is based on the Ordinary Least Squares (OLS). Therefore, the out findings show that all the coefficients are insignificant. By applying a spatial diagnostic test over the sample of 29 provinces, the results suggest that the basic model is potentially misspecified due to the omission of spatial autocorrelation. Table 6 illustrates the results of the model estimation by OLS.

Table 6: OLS estimates

Variable	**Isse**	**Tx_actif**	**Tail_men**	**Mig_ret**	**Constante**
Coefficient	-.1791227	-1.210983	11.80199	-1.145364	55.0007
N. of observation		**29**			
Fisher		**15,74*** **			
R^2		**0,1227**			

The obtained estimators by the Ordinary Least Squares (OLS) are not convergent and/or ineffective within the presence of spatial autocorrelation. For this reason, we test the presence of spatial effects. The diagnostic results are shown in Table 7.

Table 7: Diagnosis of the spatial dependence

Test	Statistic	df	p-value
Spatial error:			
Lagrange multiplier	1.341	**1**	0.099
Robust Lagrange multiplier	5.911	**1**	0.0015
Spatial lag:			
Lagrange multiplier	2.719	**1**	0.247
Robust Lagrange multiplier	7.290	**1**	0.007

The results suggest the presence of spatial autocorrelation. The Lagrange Multiplier test for spatial autocorrelation of the error terms and the Lagrange test for lagged endogenous variables are not significant at 5%. By contrast, the robustness of Lagrange Multiplier test in both models is significant. Of course, we choose the most significant model. In this case, we estimate the model that has a spatial autocorrelation of errors. The results are reported in Table 8.

Table 8: Spatial-error model estimation

	Coef.
Isse	.0461341
Tx_actif	2.809486***
Tail_men	11.18533***
Mig_ret	.331
Const	-143.367
Lambda	lambda .615386
N. d'observation	29
Wald test of lambda=0:	chi2(1) = 25.088 (0,000)
Likelihood ratio test of lambda=0:	chi2(1) = 7.904 (0,005)
Lagrange multiplier test of lambda=0:	chi2(1)=1.341 (0.247)

This model confirms the heterogeneity of the socioeconomic determinants on Moroccans' migratory potentials. Thus, the variables of both education and return migration seem to have a significant impact on the migration potential of Moroccans. However, the migration of Moroccans to Western Europe during 50's, 60's and mid-70s has several features. Among these aspects, we find the high literacy rates among the newly arrived migrant communities to Europe. As was expected, migration potential is essentially marked among those active in the workforce. Indeed, the coefficient on the activity rate is positive and significant. Therefore, the economic development, according to some theorists, is the result of the migration of active workers motivated by purely economic factors (Dumont, 1995). The weakness of local economic systems to absorb the labor force is the main reason behind international mobility. Total or partial work stoppage is often due to the mismatch between educational policies and employment policies (Losch, 2008; CEA, 2007).

The results have indicated that the larger the average household size is, the higher the migratory potential of household members increases. According to Moummi (2010), larger households are likely to be poorer than small ones. Thus, poverty might be an indirect factor pushing to migration. Looking for favorable economic situation and

increased incomes are real factors that influence currently the immigration decisions, whether initiated by an individual or a community (IOM, 2009).

5. Conclusions

There is a broad consensus on the fact that migration contributes substantially to the economic and social development of the country of origin. In this paper, we have put a lot of emphasis on migratory basins. In the discussion of the results of this study, it appears that the spatial distribution of the migration intentions confirm the validation of the theory of migratory basins. At the provincial level, the regions with high migration potentials are usually those with a predominantly rural population. They are also regions hampered by their geographical position and living an "economic backwardness" as the case of the Eastern provinces and Souss Massa Darra. Finally, these regions are not involved in the modern course of economy, as is the case of El Haouz. In the same vein, the results of the descriptive analysis have also shown that:

- The propensity to emigrate is still strong in Morocco with some particularities linked to gender and age.
- Migration has become a societal phenomenon to Morocco and it affects all regions.
- The determinants are diverse and are not related exclusively to the employment opportunities.

Based upon a spatial model, the results also have shown that the intention to emigrate emanates mainly active individuals. This intent is also indirectly linked to poverty. Morocco is a major supplier of migrants to EU countries. It is expected to remain so for the economic, social, historical, and cultural considerations and not just for the demographic dimensions. Moroccan migration is basically a labor one. The migration involves increasingly better-educated people with high qualifications. The issues revolving this new generation of migration will be treated as possible topics of future work.

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