Urbanization and migration between cities, 1995-2000; a multi-level analysis

Enrique Pérez Campuzano and Clemencia Santos Cerquera

Instituto Politécnico Nacional/Universidad Nacional Autónoma de México

Resumen

En los últimos años del siglo XX se presentó en muchos países una tendencia a la desconcentración de la población urbana. Aunque con ritmos diferentes, la pauta de crecimiento de las grandes ciudades disminuyó en la mayoría de los países occidentales durante las décadas anteriores. Se ha elaborado la hipótesis de que el sistema urbano de México pasa por la fase denominada 'reversión de la polaridad'. Ésta se caracteriza por un menor ritmo de crecimiento de las grandes metrópolis y la emergencia de nuevas ciudades. Para entender este proceso se hace necesario conocer qué es lo que sucede con la migración interna en México. Así, en este artículo se realiza un ejercicio de regresión multinivel para explorar los factores más importantes en la determinación de la probabilidad de migrar entre zonas metropolitanas.

Palabras clave: migración interna, metrópoli, ciudad, regresión multinivel, México.

Abstract

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In the last years of the XX Century, many countries have experienced a de-concentration tendency of their urban population, despite the differences in their rhythm of de-concentration in the majority of the western countries there has been a decrease in the growth of the largest cities. In the Mexican case, it has been hypothesized that the urban system undergoes a new phase known as Polarization Reversal. In this phase the largest cities tend to growth slower than smaller and medium sized ones. To analyze this phenomenon, in this paper evidence on the importance of migration in the process of de-concentration is presented. Also, a multilevel regression is developed to explore the main factors that incentive the metropolitan-metropolitan migration.

Key words: internal migration, metropolis, city, multilevel regression, Mexico.

Introduction

Rural-urban migration has been a recurrent topic in studies devoted to research on urban growth; nonetheless, displacements between cities have been virtually unattended in the studies. This work is part of several incursions made to search and comprehend the migratory phenomenon between urban zones, in a first step to analyze it; having as a starting point the need to learn the interaction between migration and urban conditions at different scales, on the one side; and migration and distribution of urban population, on the other.

Even though there is international literature on the topic, few studies have focused on the situation of developing countries. Works on migration are still watching the rural-urban displacements as the main ones, however, as we will see further in this work, it is not necessarily the case of Mexico. The urbanization process of the country can be divided into two large stages; the first goes from 1940 to 1980, while the second runs as of then until now. The first moment is characterized by the concentration of economic and demographic growth in a handful of cities; this is the stage of the model of substitution of imports and the centralization of political power, which fostered the concentration of the economic activity; high rates of population growth linked to rural-urban migration were key elements in developing cities such as the capital of the country, Monterrey and Guadalajara.

In the 1980's decade, when the economic crises are combined with the implementation of the programs of structural adjustment, the second stage of demographic transition, as well as the improvement of the infrastructure of the intermediate cities, the first evidence of change in the urbanization patterns prevailing in the period of substitution of imports appears. Although urbanization as a process has continued, the current stage seems to be marked by an incipient deconcentration of the urban population. The percentage of population in cities of more than 50000 inhabitants changed from 41.2 to 61.6 percent between 1970 and 2000; this increment was of 202 percent of the population in this range. On their own, the number of cities with more than 50000 inhabitants changed from 59 in 1970 to 118 in 2000, and by the year 2005 they added 196, including those in municipalities that belong to metropolitan zones (MZ), out of which 75 cities are outside MZ. Rural-urban migration, although important, has tended to decrease its potential as modeler of urban growth, whereas mobility between cities has become more important (Anzaldo, 2004; Conapo, 2000).

This work is centered on the importance migration between cities has and starts from the supposition that mobility can only be understood if the interaction of economic, social and political factors is observed at different scales, as well as the characteristics proper to the population (both of that which moves and that which does not); this is say, mobility and distribution of the population are the result of the prevailing economic and political conditions, as well as the actions and aspirations of the people (Pérez, 2006). In other words, the relations that are established when determining migration depend on variables at different scales.

The studies on migration are usually divided into two large sections, in accordance with the sort of information they deal with: the macro studies and

micro studies. The former are concentrated on the influence of the characteristics of the places on the population mobility, whilst the latter have paid attention to selectivity and the characteristics of the migrants, and to the search for rational decisions (cost-benefit) the migrants make in order to move or not. Even if the former do not take into account the specific characteristics of those who move, the latter do not see what occurs in the context that influences on the displacements. In this work we present an exercise of multilevel regression to try to subsume this inconvenience, in such manner that two analysis units are taken: the individual and the urban.

Multilevel analyses have proved to be a useful tool in social research; they are the result of the need to have analytical techniques that allow assigning, in a single model, the corresponding variance of the individual and contextual variables without violating the supposition of independence. These techniques allow learning how it is that different levels (or hierarchies) are combined to produce a phenomenon (Goldstein, 2003; Merlo *et al*., 2006). Even if their application is recognized in the field of social sciences, such as psychology or in epidemiology, they have a fertile field in geographic and demographic studies; mainly on studies on urbanization and migration.

This article makes use of these techniques to learn how it is that individual and contextual factors are combined to produce movements between cities, particularly between metropolitan zones. The work is divided as follows: in the next section we present a brief review of the literature on urban development and migration; some of the central elements for the displacements between cities to occur are presented and we emphasize on the difference between developed and developing countries. The presentation of the method and the data is the objective of the third section, here we expose how the bases and the utilized model were constructed. The results of the classification of the movements and the multilevel regression are presented later. The article closes with some final considerations.

Previous studies

During the last three decades of the last century economic, social and political changes took place in most of the occidental countries; particularly, for this work interesting are those of economic and demographic nature. The recent literature has made the coexistence of two phenomena clear: the change of the accumulation model and demographic transition. While the change in the accumulation patterns not only has brought new forms of production, but also the re-localization

of industrial activities and services, demographic transition has created the conditions for phenomena such as migration to become relevant in the spatial distribution of population (Champion, 2001). Hence, the conditions created by the demographic transition and the change of the accumulation pattern at worldwide level have had concrete repercussions on the mobility of the population and thereby, in its distribution along the urban systems.

For nearly three decades there has been a discussion on the distribution of population in urban systems; although it started with the sub-urbanization of the United States (and to a lesser extent Europe), its boom occurred by the end of the 1960's and along the 1970's with a publication of a series of works on the importance of the movements of population from the cities. Below, we present the main theoretical points of the debate.

Developed countries

Some necessary references in the studies on migration and distribution of population include the works by Wilbur Zelinsky (1999, 1971), Brian Berry (1999, 1976), Walter Alonso (1980) and Geyer and Kontuly (1993). The first paid close attention to what he called the "transition of mobility"; summarizing, the author states that there are five phases of the process of mobility of the population, bound to the modernization of societies. In the early stages there are few movements and those of rural-urban nature prevail, whereas in the late stages the displacements are essentially between cities. Berry (1999, 1976), on his own, coined the term counterurbanization; the statement of the author may be summarized in the phrase: "counterurbanization is the transition from a state with high concentration to one with a lower one". With this the deconcentration of population from larger and more densely populated cities towards the smaller and less densely populated. Alonso (1980) affirms that there is relation between development and distribution of population; while economic and population concentration predominantly takes place in the early stages, when there are tendencies to economic equality there is also a redistribution of population. One of Alonso's contributions was to recognize that economy is not the only factor in the distribution of the cities; demographic and political factors influence on both the economy and distribution of population. The model of differential urbanization (Geyer and Kontuly, 1993) postulates the existence of differential patterns of growth according to the size of the cities. In the early stages, concentration is the dominant pattern; in the intermediate stages, "polarity reversal" (Richardson,

1980; Geyer and Kontuly, 1993) is produced; and finally, a deconcentration towards the intermediate cities in the influence area of the metropolises occurs. As the reader may see, these models make use of cyclic models.

In the theoretical literature on the phenomenon it is assumed that the countries undergo periods of concentration/deconcentration, as it occurs with spatial-economic models. In these last, the relation between development and concentration of population has the distribution of an inverted 'U', this is to say, in the first stages industrial concentration is the norm, whilst in the last the inverse pattern occurs (Dehghan and Vargas, 1999). Normally, a model of balance is assumed where industrial concentration comes accompanied by demographic concentration in some cities, due to the creation of agglomeration and scale economies, as well as the need to have a sufficiently large work market to meet the requirements of work force of the companies. As the stages of development advance, the availability of infrastructure for the productive processes improves; what is more, the growth of agglomeration diseconomies will foster a process of industry deconcentration, therefore, of the population. In spite that many of these models have been criticized because of their simplicity and lack of applicability when groups of countries are taken, they have been approved in specific cases with contradictory results (Derhghan and Vargas, 1999).

During the 1980's decade, the studies on distribution of population paid attention to the transformation of the productive systems and its impact on the shape of urban systems. Despite there is not a consensus on the impacts (Ortiz Davison *et al*., 2003), there are several points of discussion; among the most important we find: a) if there is a single model of accumulation or are several intertwined in a complex manner and differentially impacting on the countries, regions and cities; b) the debate on the concentration is closely linked to the discussion whether there is a local logic and whether the regions support the current accumulation model or how the production chains are established producing determinate spatial patterns; c) the importance of the local in the global market, this is to say, the productive chains constructed from the bottom; d) whether the improvements in relation to transport and infrastructure has provoked the deconcentration of economic activities or there is only a change to a re-concentrated model at another scale; and e) the role of the economy of services, particularly innovation and development, in the configuration of whole regions. In the face of these debates (many of them intertwined) it is clear that the conditions created by the new model do not only have impacts on the distribution of the economic activities, but also on the shape urban systems take

at national and international scale (see for instance the case of the European Union). Nonetheless, the role of the national and sub-national governments has the same importance on the distribution of population.

On the other side, researchers from Europe and U.S. went on to search empirical evidence of the change in the movement of population flows. Some works stated the need to know the *clean break* with the previous tendencies, while others paid attention to the need to know in detail the process of counterurbanization from the understanding of the process of economic transformation in the 1970's and 1980's (Fielding, 1982; Champion, 1989).

The empiric studies have paid attention to determine which the factors that spur the mobility of individuals are; the results indicate that migration is related to employment and income as well as the offer of housing and the variables of age, pollution, taxes, technological innovations and the reduction of production costs outside large cities, distance of commuting, and improvement in transport systems, people's aspirations, quality of life, improvement in public and private services in the cities and rural spaces (only as an instance see: Morrill, 1988; Elliot, 1997; Johnson *et al*., 2002; Chen and Coulson, 2002; Cushing and Poot, 2004; Van Haam, 2005; Fotheringham *et al*., 2004; Fuguitt and Beale, 1996).

Despite a lot of attention was paid in the past to the departure of population from large cities which had as destination rural spaces, by the end of the 1980's and in the 1990's the works tend to study the movements between the cities. With this, the concern has been centered on how it is that people move between cities, knowing the size and form of the urban systems, on the one side, and how attracting/ ejecting factors of population exist, on the other.

In recent years, literature on economic-regional development has paid attention to the mobility of population on a base broader than the traditional studies on wage differences. The appearance of a theoretical body on urban-global cities has emphasized the relation between urban planning, population movements and economic restructuring (Rennie, 2006). On the other side, works such as that by Richard Florida (2002, 2005) have revealed the importance of creating all the amenities required for an innovative class to exist, and to be frequently in charge of the economic performance of the cities; in the case of the creation of economically competitive cities, not only is a labor market with inexpensive work force required, but also with qualified workers. Many of the cities have had to improve the offer of services and create these amenities to attract population. In this case, local governments and the very companies localized in the cities have a determinant role in attracting population.

Developing and transition countries

Although they have important differences, in developing and transition countries the aforementioned trends have been observed; rural-urban migration is still present and the movements from and between cities are becoming the most relevant. With different paces and intensities it has been proved in that European, Asian (save China) and Middle East countries the processes of deconcentration started as of the 1970's decade and it grows in intensity by the 1980's. Productive transformation, structural reforms and the new functions of the cities, the increasing of the cost of life, income increments and the improvement in the quality of life, the growth of the middle classes, and the socio-environmental conditions, such as crime rate and pollution in the largest cities are accounted for as the main reasons of inter-city population mobility and that influence on the distribution of population (Cohen, 2004; Bonifazi and Heins, 2003; Mookherjee, 2003; Nefedova and Treivish, 2003; Gedik, 2003; Davison *et al*., 2003; Tammaru, 2001; Kok, 1999; Kupiszewski *et al*., 1998; Tsoulouvis, 1998, among other).

In Latin America, evidences outline a relative diminution in the rate of growth of the large cities, and an acceleration of that of the intermediate cities (Bolay and Rabinovich, 2004; Ortiz Davison *et al*., 2003; Cepal, 2000, 2002, 2005; Pinto, 2002; Dehghan and Vargas, 1999; and Lattes, 1995). In this region, the tendency of urban growth seemed to have slowed down in most of the countries between 1970 and 1990; those with the highest percentage of population considered urban are those with the slowest rates of population growth, whilst those in the less urbanized present an opposite tend.

In Latin America special attention has been given to the "concentrating-deconcentration", this is, even though the largest cities do not have the rates of growth prior to the 1970's, a number of intermediate cities have appeared, many of them became millionaire cities. Nevertheless, as well stated by Ortiz Davison *et al*. (1999) and Pinto (2002), the concentrated-deconcentration does not necessarily refers to a spatially homogeneous urban system, but to the phenomenon by means of which intermediate cities and emergent metropolises are the winners, in terms of population. From evidence collected in several studies in Latin America, large agglomerations of the period of import substitution do not grow at the rates of previous decades and they are an assortment of cities, with diverse economic functions, which as of the 1970's decade start accelerated processes of growth (Bolay and Rabinovich, 2004; Pinto, 2002).

As a descent in the fertility rate and the increment in life expectancy occur, social growth has been the main contributor to the urbanizing process in most of the Latin American countries; rural-urban movements, altogether with the growing number of displacements between cities (Cepal, 2002, 2005), have tended to model the new structure of the urban systems in the region; however, as the countries become more urban, the former are little by little replaced by the latter as the main population movements. Hence, the deconcentration of population is to a large extent caused by the emigration from large cities; intermediate cities acquire population both from the rural environment and the displacements from large cities. A complete new series of cities are growing under the wing of the accumulation model and which use their competitive advantages, such as advanced services, human capital, in addition to an important offer of public and private services (Cepal, 2000).

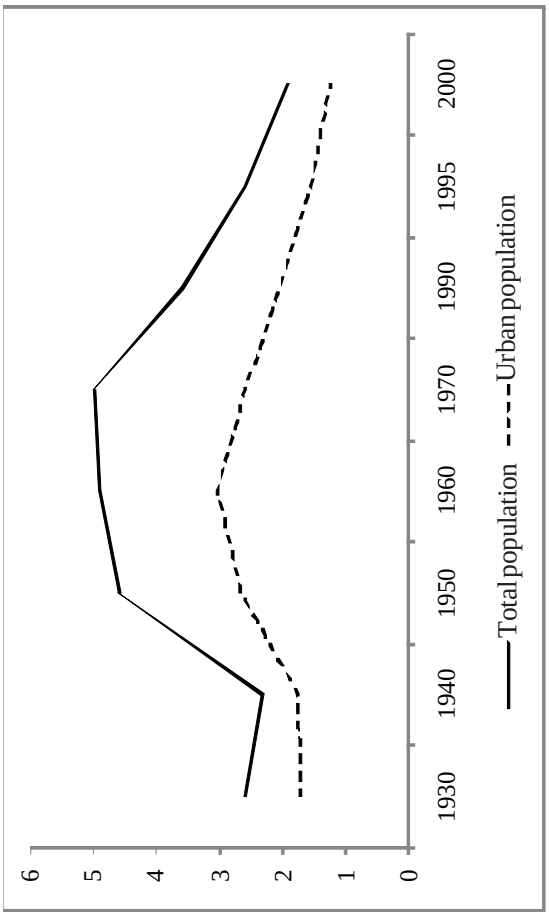
Mexico

In Mexico, as a in a good number of occidental countries, as of the 1970's decade, there was already a diminution of the rates of demographic growth, a descent in fertility and an increment in life expectancy; the most important consequence for the present work, is the fact that natural growth is no longer that which influences directly the distribution of population, but the social; to these demographic factors we would have to add other of social, economic, political and environmental character.

The urbanizing tendency presents an inflection point in the 1980's decade (Aguilar and Graizbord, 2003; Conapo, 1998, 2000; Garza, 2003; Ruiz, 1990). As of the 1960's decade, the country already exhibited a diminution in the urbanization speed, yet it is as from the 1980's when it is glimpsed as a rather consolidated tendency. The result is a decrement in the urbanization pace of the country and the convergence in rates (graph 1). Between 1930 and 1970, the rate of urbanization grew distant from that of the total population; after this last year, there is a certain convergence between them, however the total amount of urban population is still on the increase.[1]

[1] According to Brambila (1992), as of 1980 there was no more growth of urban population; on its own, urban population changed from 35.6 million in 1980 to 60.9 million in 2000, which represents 53.2 and 62.14 percent respectively.

GRAPH 1
YEARLY MEAN GROWTH RATE OF THE TOTAL AND URBAN POPULATIONS IN MEXICO, 1930-2000



Source: authors' elaboration.

As the 1980's decade passes, it becomes evident that large cities do not necessarily grew indefinitely; the Metropolitan Zone of Mexico City (MZMC), the Metropolitan Zone of Guadalajara (MZG) and, to a lesser extent, the Metropolitan Zone of Monterrey (MZM) present slower rates than in previous decades, while a series of intermediate cities appear as an alternative of localization of the economic and demographic activities (Corona and Tuirán, 1994; Ortiz Davison *et al*., 2003; Garza, 2003). This allowed Ruiz (1990, 1999), as well as Aguilar and Graizbord (2003), to produce the hypothesis that the Mexican urban system had reached the upper limit of growth in the cities and the process of concentration would begin, known as 'polarity reversion' or "concentrated-deconcentration".

Data on the total urban population is presented in table 1: number of cities, percentages and growth rates, according to the size of the city; the number of cities changed from 124 to 352 between 1960 and 2000; nonetheless, in the last 30 years is when the most important qualitative change has taken place, as for the growth and distribution of the cities that do not belong to the three metropolises of the country. The total of cities with more than 500000 inhabitants changed from one in 1970 to 25 in 2000, whilst its population grew four times. This panorama is more severe if we take into consideration that, between 1980 and 2000 the three cities were joined by other six, whose population surpassed one million inhabitants; the relative contribution of these new six cities represented 12.3 percent of the total of urban population; linked to this, the number of cities with between 500000 and one million inhabitants changed from four in 1980 to 190 in 200, and their relative weight, from 2.9 to 19.2 percent of the total urban population. If we tally both categories, their contribution to the total of urban population changed from 2.9 in 1970 to 32.5 percent in 2000; if we analyze from the viewpoint of which the contribution of each of the categories to the total growth of urban population was, we find that between 1980 and 1990, 24 percent of the urban growth is explained by the growth of Mexico City, Guadalajara and Monterrey, while the cities with more than 500000 inhabitants contributed with 55 percent; in the next decade, the three main metropolises explained 27 percent (a slight recovery of their growth), however the cities with more than 500000 inhabitants contributed with 60 percent of the total growth of urban population. A different story is that of the cities with less than: although their absolute number has grown (from 170 to 324), their contribution to total urban population decreased from 47.5 to 30.7 percent between 1970 and 2000. To sum up, it may be stated that urban growth in Mexico is taking place in a reduced number of

intermediate and large cities, outside the traditional metropolitan zones in Mexico.

The depletion of the previous economic model, the impact of the economic crisis in the early 1980, the economic reconversion of intermediate cities, as well as the processes of administrative decentralization (both public and private) and the saturation of the infrastructure in the largest cities are the most common phenomena in the literature as the agent of this change.

Migration had a very important role in the distribution of urban population in the turn of the XX century; Corona and Luque (1993) pinpoint that during the 1980's decade there was a quantitative and qualitative transformation of the movements of population. The traditional rural-urban movements were joined by those of urban-urban nature, mainly from MZMC; on their own Corona and Tuirán (1994) show the existence of a redistribution of population as a consequence of new mobility patterns. The data presented indicated the existence of a "downward movement in the urban hierarchy" altogether with the consolidation of regional urban networks (Brambila, 1998; Velázquez and Arroyo, 1992) which work as a recipient for the individuals who leave large cities.[2] According to Anzaldo (2003: 32) out of the total of displacements occurred between 1995 and 2000, 34.9 percent headed for intermediate cities, and 28.8 percent for large cities; out of the total of movements, 48.7 percent occurred between cities and only 18.3 percent was of rural-urban character.

It is well known that Mexico City has changed from being a population attraction center to an ejecting city; data presented in several studies (Conapo, 1998, 1999, 2000; Chávez and Savenberg (1995); Corona *et al*., 1999; Pérez, 2006) indicate that it is the main contributor to the total of flows in the country.

From the theoretical and empirical evidence thus far presented we can notice the need of paying attention to migration between cities. In the following section of the article some data on internal mobility in Mexico according to the sort of municipality are presented.

[2] The work by Velázquez and Arroyo (1992) is a good instance of the configuration of urban systems at regional level.

TABLE 1
TOTAL POPULATION AND NUMBER OF CITIES, 1960-2000

	Absolutes					
	1960		1970		1980	
	Population	Num. of cities	Population	Num. of cities	Population	Num. of cities
National total	13 511 447	124	22 045 241	174	35 782 094	227
Largest	6 556 410		11 346 187		17 247 064	
Mexico City	4 993 871		8 623 157		12 994 450	
Guadalajara	867 035		1 480 472		2 264 602	
Monterrey	695 504		1 242 558		1 988 012	
Other cities	6 955 037	121	10 699 054	171	18 535 030	224
More than a million	0	0	0	0	1 136 875	1
Between 500 & 999 999	0	0	629 344	1	2 299 684	4
Between 100 & 499 999	3 050 882	14	5 747 433	30	10 032 136	44
Under 100 000	3 904 155	107	4 322 277	140	5 066 335	175

Source: own calculations with information from Garza (2003).
Only the totals of the localities of more than 15000 inhabitants are included.

TABLE 1
TOTAL POPULATION AND NUMBER OF CITIES, 1960-2000
(CONTINUATION)

	Absolutes			
	1990		2000	
	Population	Num. of cities	Population	Num. of cities
National total	50 646 303	307	65 739 198	352
Largest	20 787 521		24 889 892	
Mexico City	15 226 800		17 968 895	
Guadalajara	2 987 194		3 677 531	
Monterrey	2 573 527		3 243 466	
Other cities	29 858 782	304	40 849 306	349
More than a million	1 686 044	1	8 083 751	6
Between 500 & 999 999	9 998 687	15	12 590 019	19
Between 100 & 499 999	10 159 143	41	10 814 916	42
Under 100 000	8 014 908	247	9 360 620	282

Source: own calculations with information from Garza (2003).
Only the totals of the localities of more than 15000 inhabitants are included.

TABLE 2
TOTAL POPULATION AND NUMBER OF CITIES, 1960-2000

	Percentage				
	1960	1970	1980	1990	2000
National total					
Largest	49	51	48	41	38
Mexico City	37.0	39.1	36.3	30.1	27.3
Guadalajara	6.4	6.7	6.3	5.9	5.6
Monterrey	5.1	5.6	5.6	5.1	4.9
Other cities	51	49	52	59	62
More than a million	0.0	0.0	3.2	3.3	12.3
Between 500 & 999 999	0.0	2.9	6.4	19.7	19.2
Between 100 & 499 999	22.6	26.1	28.0	20.1	16.5
Under 100 000	28.9	19.6	14.2	15.8	14.2

Source: own calculations with information from Garza (2003).
Only the totals of the localities of more than 15000 inhabitants are included.

TABLE 3
TOTAL POPULATION AND NUMBER OF CITIES, 1960-2000

	Mean annual growth rates			
	1960-1970	1970-1980	1980-1990	1990-2000
National	4.8	4.8	3.4	2.6
Largest	5.4	4.1	1.9	1.8
Mexico City	5.3	4.0	1.6	1.7
Guadalajara	5.2	4.2	2.8	2.1
Monterrey	5.6	4.6	2.6	2.3
Other cities	4.2	5.4	4.7	3.1
More than a million			3.9	13.1
Between 500 & 999 999		11.4	12.5	2.3
Between 100 & 499 999	6.1	5.4	0.1	0.6
Under 100 000	1.0	1.6	4.5	1.5

Source: own calculations with information from Garza (2003).
Only the totals of the localities of more than 15000 inhabitants are included.

Migration between cities in Mexico, 1995 – 2000

In order to understand urban-urban migration it is necessary to know how much population moves; it is so, that in this section we present evidence on the importance of mobility between cities, the net migratory balances for each of the metropolitan zone and urban municipalities, the contribution migration has on total population and the main migratory flows (in schemas).

To define the flows, we decided to make a classification that responded to minimal differentiation criteria between metropolitan zones, cities and the rural; to do so we take the definition of metropolitan zones by Sedesol-Conapo and INEGI (2005), in which 55 cities in the country fall. As there is not sufficiently detailed information on the cities, we take the municipalities that had at least one locality with more than 15000 inhabitants and were classified as urban. The other municipalities were cataloged as non-urban, separating these categories into other two: rural municipalities (those with localities under 5000 inhabitants) and mixed (municipalities that at least have a locality between 5000 and 15000 inhabitants). The need to work with municipalities in place of localities comes from the lack of information on migration for the latter. Moreover, working with municipalities provides us with better comparisons of longitudinal data (even though they are not presented in this moment).

Making operational the migration variable is a complicated task; diverse conceptions of the phenomenon make it even harder (Herrera, 2006). In this work we take a simple definition of migration; this is the result of the addition of all those individuals who changed their residence between metropolitan zones, urban and rural municipalities. For the first case (metropolitan migration) the requisite was the change of metropolis of residence, while for the two last was the crossing of a municipal border.[3]

Total of movements and net migratory balances

Data from the censual sample of the year 2000 indicate that there was a total of 3961450 displacements between 1995 and 2000, of which 27 percent corresponded to a displacement between metropolitan zones; if analyzed as a whole, the movements from rural and mixed municipalities toward urban and metropolitan localities accounted for 21.2 percent.

[3] In this work the movements inside metropolitan zones are not included.

TABLE 4
TOTAL OF MIGRATORY MOVEMENTS IN MEXICO, ACCORDING TO PLACE OF RESIDENCE AND SORT OF MUNICIPALITY, 1995-2000

	Movements	Percentage
Rural-Metropolitan	313 258	7.9
Rural-urban	156 909	4.0
Rural-rural	47 717	1.2
Rural-mixed	46 126	1.2
Mixed-Metropolitan	254 399	6.4
Mixed-urban	116 883	3.0
Mixed-mixed	47 387	1.2
Mixed-rural	54 381	1.4
Urban-Metropolitan	582 157	14.7
Urban-urban	378 407	9.6
Urban-mixed	57 495	1.5
Urban-rural	97 090	2.5
Metropolitan-metropolitan	1 056 682	26.7
Metropolitan-urban	439 296	11.1
Metropolitan-mixed	136 681	3.5
Metropolitan-rural	176 582	4.5
Total	3 961 450	100

Source: own elaboration with data from the Extended Questionnaire of the XII General Census of Population and Housing, 2000.
Movements inside metropolitan zones are not included.

Well now, if the pattern of displacements is analyzed from the perspective of the downward movements in the urban hierarchy, we find that circa 12 percent of the total amount had as an origin an urban municipality or a metropolitan zone and as destination a rural or mixed[4] municipality and 11 percent, a metropolitan zone and as a destination another urban.

[4] It would be important to learn which the rural/mixed municipalities that receive population from the cities are, and whether this migration is related to returning movements or not; likewise, it is important to learn whether they are movements of population that reinforce the patterns of expansion of the cities or if its migration towards rural spaces from the middle class in the search for better conditions of life, which was referred to in the first part of this work; unfortunately, these objectives are out of the reach of this article.

Either the migratory movements are analyzed grouping or not rural and mixed municipalities, the results indicate that upward movements in the urban hierarchy were less important than those of urban-urban and metropolitan-metropolitan nature in the 1995-2000 period. This makes us wonder which the urban and metropolitan municipalities that received most of the population movements in this period were; below we make a brief explanation of this.

Boosted by the process of internationalization of economy, the cities which have positive net migratory balances are to be found in the Mexican northern and southeastern borders (figures 1 and 2); they are a series of cities closely linked to international economy, either because they are hub cities for both people and products (northern border), or else they are cities highly specialized in touristic services (Yucatan Peninsula).

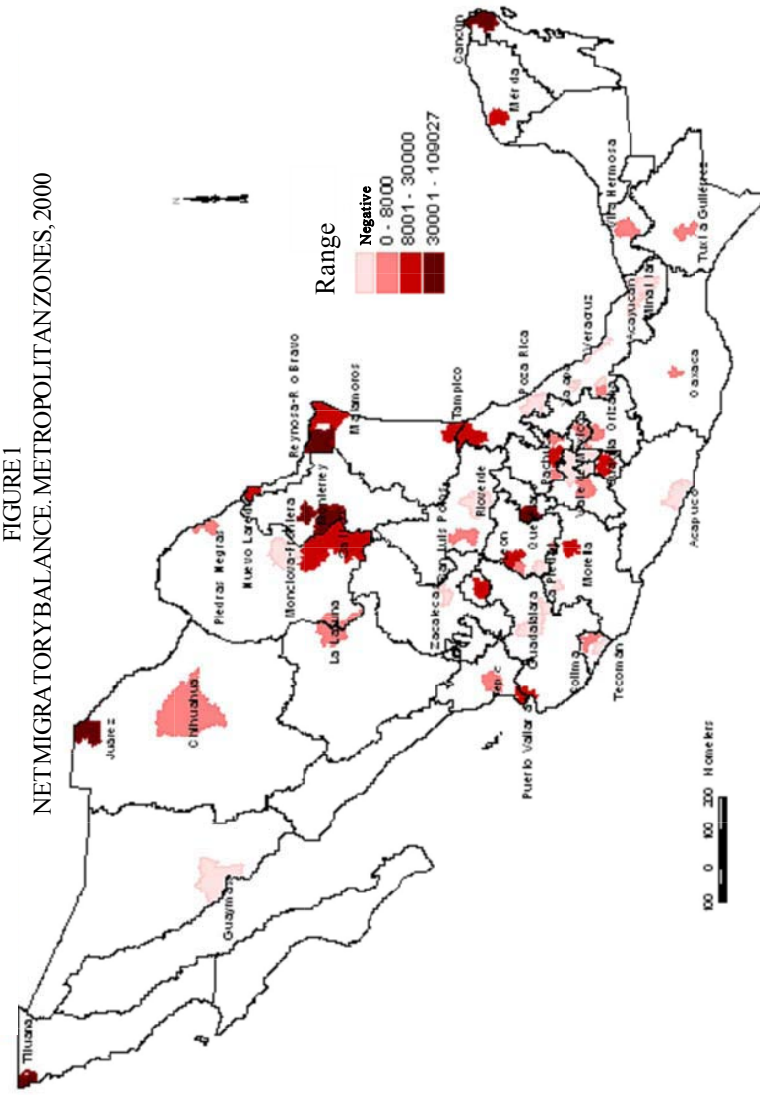
The metropolitan zones that present greater attraction are: Tijuana (109 027), Juarez (97 847), Cancun (68 583), Monterrey (57 059), Reynosa-Rio Grande (47 377) and Querétaro (39 973) (figure 1).

On the other side, the cities which grew under the wing of the model of substitution of imports have the most unfavorable migratory balances; these are the Metropolitan Zone of Mexico City (-155 594), Veracruz (-52 488), Minatitlan (-22 507) and Poza Rica (-18 530).

On their own, the most dynamic urban municipalities are Mexicali, Baja California (22 236); Acuña, Coahuila (21 501); Solidaridad, Quintana Roo (17 236); Ensenada, Baja California (17 083), and Los Cabos, Baja California Sur (15 989); these also present the same pattern as the most dynamic metropolitan zones (figure 2), this is to say, they are concentrated at the northern and southeastern borders. In this pattern of social growth we would have to notice the distribution of the urban municipalities with negative net migratory balances.

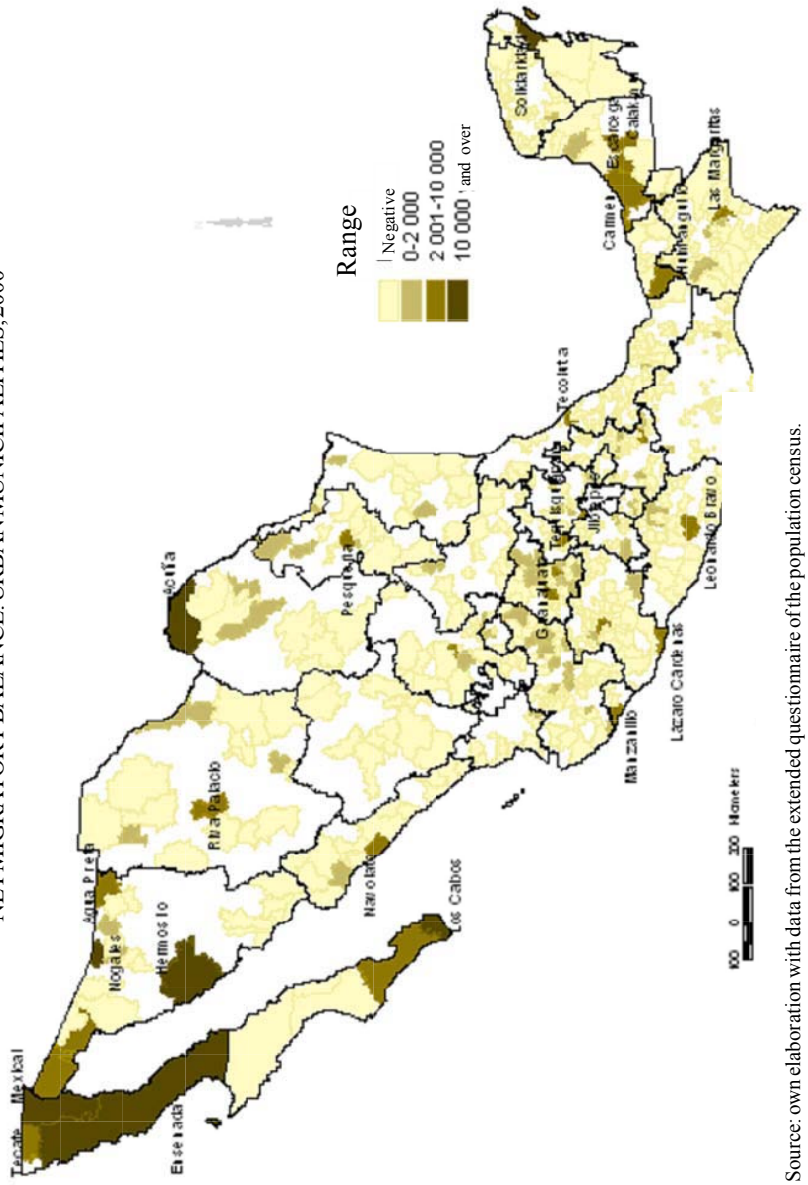
The southeastern municipalities (those highly specialized in touristic services), as well as the Lowlands and the north-center of the country are characterized by being population ejectors.

FIGURE 1
NET MIGRATORY BALANCE. METROPOLITAN ZONES, 2000



Source: own elaboration with data from the extended questionnaire of the population census.

FIGURE2
NETMIGRATORY BALANCE. URBANMUNICIPALITIES, 2000



Source: own elaboration with data from the extended questionnaire of the population census.

Contribution of migration to the demographic total

Even if it is true that elaborating migratory balances is necessary to identify the dynamism of certain cities, it is also important to distinguish which the contribution of migration to the total growth of population is (figures 3 and 4). The metropolitan zones where migration contributes to a higher extent to demographic growth are in the northern and southeastern borders, in addition to some zones in the center of the country and the Pacific coast (for instance, out of the total of population metropolitan zones of Vallarta and Pachuca had in 2000, approximately 10 percent corresponded to population that arrived between 1995 and 2000).

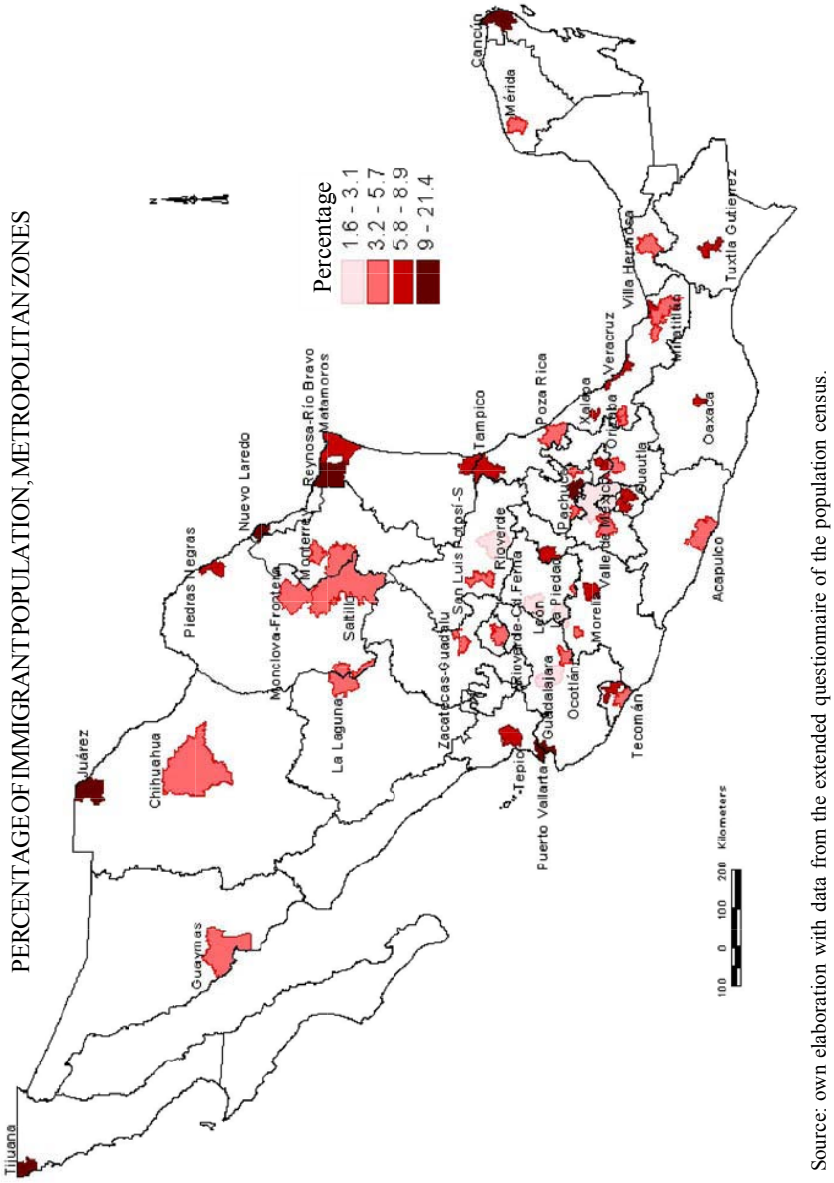
On their own, the urban municipalities with a higher participation in migration in the demographic total are: Solidaridad (30.7 percent), Acuña (21.8 percent), Los Cabos (19.3 percent); Puerto Peñas, Sonora (14.6 percent); Cozumel, Quintana Roo (14.0 percent); Carlos A. Carrillo, Veracruz (13.8 percent); Cadereyta, Nuevo León (12.9 percent); Nogales, Sonora (12.6 percent); Ixtepec, Oaxaca (12.4 percent); Escarcega, Campeche (12.4 percent); and Tecate, Baja California Sur (12.1 percent). As it is observed in figure 4, other municipalities, mainly at the northern border and in the coast of the Gulf of Mexico, have a high participation of migrants in their total population. The rest of the municipalities are in the mean.

Main migratory flows toward metropolitan zones

Let us see which the new migratory patterns in the country are; if we take into account the place wherefrom the main flows come, one immediately notices that emigration from MZMC has a heavy impact on the total of immigration of the other metropolitan zones, as the largest contingent of 18 of the metropolitan zones comes from MZMC; well now, if we take both the first and second important flows, it is present in 38 of the 55 metropolitan zones.

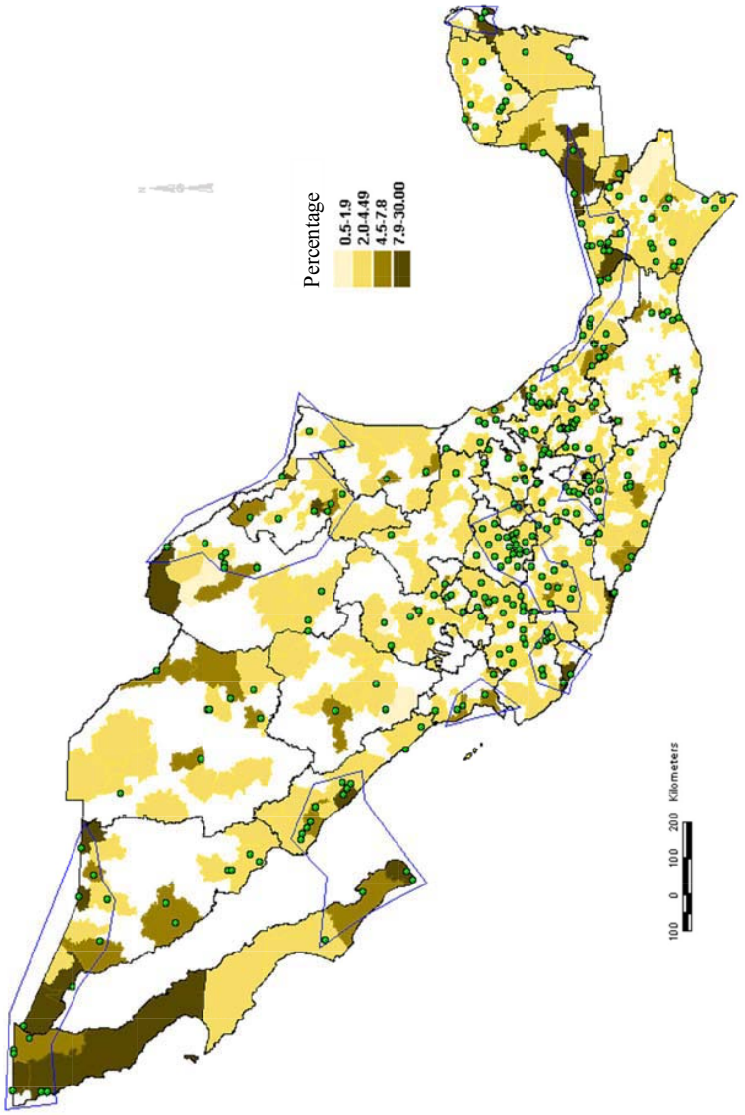
From this we can distinguish two conclusions; the first has to do with the quantitative importance of emigration from the largest city of the country in the total of movements, in other words, the urban migratory map of the country cannot be understood if it is not considered that MZMC is the most important entity as for population ejection, what here occurs will model to a large extent the outcome at national level. The second is the diversity of movements of population from this city; as one sees, the destinations of the population that left MZMC are widely varied, as they include metropolitan zones at the northern and in southern

FIGURE3
PERCENTAGE OF IMMIGRANT POPULATION, METROPOLITAN ZONES



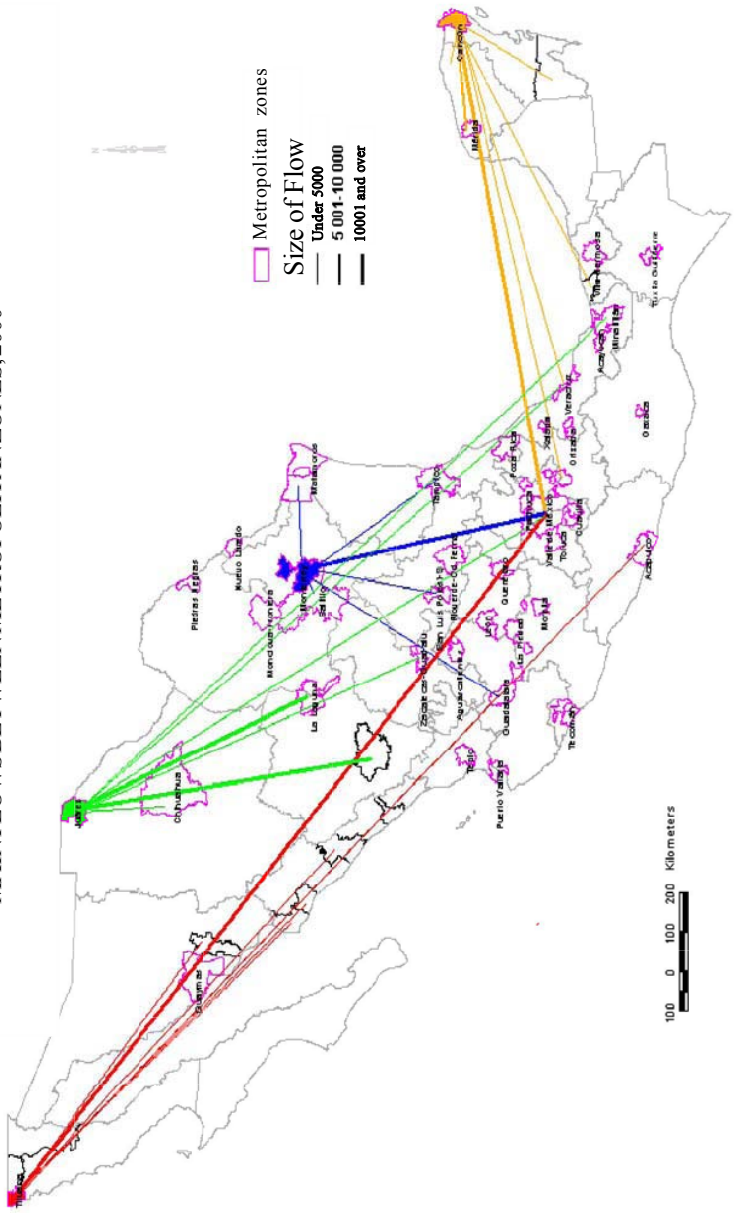
Source: own elaboration with data from the extended questionnaire of the population census.

FIGURE4
PERCENTAGE OF IMMIGRANT POPULATION, URBAN MUNICIPALITIES



Source: own elaboration with data from the extended questionnaire of the population census.

FIGURE 5
MAIN FLOWS BETWEEN METROPOLITAN ZONES, 2000



Source: own elaboration with data from the extended questionnaire of the population census.

borders (figure 5), as well as those in the center, occident, north and south of the country.

Data and methods

Being migration a multifaceted process, it is necessary to construct a number of indicators, both to measure it as well as to explain it. The methodology utilized in this work is supported on the integration of the database of 10 percent of the Census of Population and Housing of the year 2000 (corresponds to 10 million registrations), the tables by municipality from the same census (of the total of the municipalities for the 32 States and Federal District) and on the application of a model of multilevel logistic regression.

Data

The integration of the data bases was carried out as follows: with the first, out of a total of 10 million of registration taken at random from the census, the characteristics of the subjects are covered, while with the second some light is shed on their place of residence. Having built a single database for the all of the States of the country, in the end we included three variables that gave an account of the sort of residence municipality (whether it belonged to a metropolitan zone, or it is urban, mixed or rural) in 1995 and 2000; and if they had performed a movement in those years.[5]

The municipal data needed a double treatment; in the first place, the municipalities were identified in each of the categories, the municipal totals of those which belonged to a metropolitan zone were added and a mean obtained to build larger units (metropolitan zones). This procedure allowed having an important reduction in data and construct indicators that represented the different sorts of municipalities.

As we have insisted, in this moment we are only interested in mobility between cities, particularly between metropolitan zones. For this article we only took into account those individuals who changed residence between 1995 and 2000, from this selection we make a difference between those who changed residence between metropolitan zones (migra_met = 1) and other migrants (migra_met = 0).

[5] The coding was carried out according to the classification of metropolitan zones, urban and non-urban municipalities previously cited.

The variables in the model (table 5) try to include important aspects in the literature on migration, such as gender, age, schooling level, condition of activity, qualification, sector of activity and income. As it is observed in the same table, there is a higher percentage of feminine population that changed residence between 1995 and 2000; the educational levels are concentrated on secondary and below (77 percent, approx.); 35 percent is single and slightly less than a third lives with their partner in any of their modalities; as for workforce, two thirds work as employees and 16.5 percent as self-employed; 41.4 percent may be grouped in those workers who are unqualified and only 14.5 percent in qualified; the distribution of income was biased toward those who received less than three minimum wages (approximately three quarters of the total); finally, as in the economy in general, services comprise more than 50 percent of the total population that moves; however, migrant population devoted to agricultural and industrial activities is important.

As for the contextual variables, these include: specific rate of economic participation, percentage of the population between 25 and 65 years of age, percentage of unemployed workforce, percentage of workforce that works between 32 and 48 hours a week, percentage of workforce that earns more than five minimum wages (MW), specialization[6] in diverse economic activities, percentage of population that resides in urban localities,[7] and percentage of households with piped water and drainage. In other studies a larger number of variables have been included (for instance, rate of criminality, average temperature at diverse times of the year or the expenses of local governments in infrastructures and services) to measure the quality of life and their relation to migration (see for instance: Hemmasi and Prorok, 2002; Fotheringham *et al.*, 2004); nonetheless, for the Mexican case, many of them are unavailable or do not posses sufficient accuracy.

As it may be seen in table 5, there is little dispersion of data in most of the variables; in those where dispersion is very high, it is probably due to the high spatial dispersion or concentration of the economic activities (for instance: agricultural activities and service to production); in practical terms, these 'imperfections' in data do not present greater problems in the estimation of the parameters.

[6] By and large, when the index is above the unit it is said that there is specialization. Below this, it is considered non-specialized in a determinate activity.
[7] The size of locality is included since the basic definition of metropolitan zone is mainly built by municipal aggregates, leaving aside the internal heterogeneity in terms of size of localities inside them.

It is particularly interesting that the indexes of specialization are lower in those activities considered urban (table 5); indeed it is the number of municipalities that barely cross the line of localities with more than 15000 inhabitants considered for the analysis. As it was previously stated, the activities of services to production, as they are concentrated on some urban centers, present the lowest indexes of specialization; whilst the extractive and agricultural activities, on average, a specialization above one.

In the designed model, the variables: age, income, schooling level and qualification at individual level, population with higher education who works between 32 and 48 hours a week and receives more than five MW, water and drainage at the household, population in urban localities, in addition to the specializations in industry or services to production, at urban, level are expected to have a positive effect as they increase in the determination of the possibility of migration. With the unemployed workforce variable a contrary effect to the above is expected.

The model

For this work we only use those subjects who changed residence between 1995 and 2000, as it was already mentioned (371 520 cases),[8] and two categories are compared: a) those who moved between metropolitan zones; and b) any other displacement.[9] Hence, the metropolitan migrants were coded as one and the others as zero. Given the dichotomous nature of the dependent variable and at the time a hierarchical structure in the data, neither in the linear regression nor in the logistic regression the adequate treatment for this sort of data was found; because of this we resorted to multilevel logistic regression. We present below an outline of what this technique is.

Logistic regression is used to calculate the probability of appearance of an event in the presence of determinate factors (or co-variables); unlike linear regression models, the dependent variable is categorical (or non-continuous), in the case of logistic regression the values taken by the variable to explain are one and zero; this is supposing a binomial distribution.

[8] Which makes an estimated total, according to the extended questionnaire, of 3 746 596 individuals. This figure differs from that presented by Anzaldo (2003) in two points. The first is that we do not take into count all of the subjects who did not identified their municipality of residence in 1995, as our work is centered on their categorization; in the second place, we did not count as a movement the displacements inside the metropolitan zones.

[9] Movements inside metropolitan zones are not included.

TABLE 5
VARIABLES INCLUDED IN THE MODEL

Individual variables	N = 371 520	Percentage
Gender (ref. masculine)	371 520	
Masculine	178 582	48.1
Feminine	192 938	51.9
Age	370 401	
Under 15 years of age	87 859	23.7
Between 15-24 years	108 758	29.4
Between 25-64 years	164 159	44.3
Older than 65 years	9 625	2.6
Schooling	340 560	
Uninstructed	18 250	5.4
Up to secondary	264 029	77.5
High school	15 550	4.6
Graduated or higher	42 731	12.5
Marital status	306 217	
United	177 664	58.0
Single	108 777	35.5
Divorced/separated	12 001	3.9
Widow(er)	7 775	2.5
Labor status	168 122	
Employee or worker	111 383	66.3
Day laborer or pawn	14 999	8.9
Boss	3 778	2.2
Self-employed	27 716	16.5
Unpaid worker	6 076	3.6
Unspecified	4 170	2.5
Personal income	174 359	
Less than a MW	37 140	21.3
1-3 MW	90 407	51.9
3-5 MW	23 787	13.6
5-10 MW	15 187	8.7
10-20 MW	5 638	3.2
20-50 MW	1 805	1.0
Do not receive any income	395	0.2

P.T.O

TABLE 5
VARIABLES INCLUDED IN THE MODEL
(CONTINUATION)

Individual variables	N = 371 520	Percentage
Qualification level	165 235	
Unqualified	68 485	41.4
Semi-qualified	72 742	44.0
Qualified	24 008	14.5
Activity sector (ref. agriculture, fishing and livestock activities)	164 787	
Agriculture, livestock activities, fishing and electricity and water	25 228	15.3
Construction	14 153	8.6
Industry	32 863	19.9
Services to production	7 372	4.5
Social services	22 488	13.6
Distribution services	31 690	19.2
Personal services	30 993	18.8
Contextual variables		N = 328
	Mean	Standard deviation
Specific rate of economic participation	48.9507	5.9386
Percentage of unemployed workforce	1.14448	0.36187
Specialization in extractive activities	1.1007	1.28124
Specialization in agricultural activities	1.6452	1.63913
Specialization in construction activities	1.0775	0.2226
Specialization in manufacturing activites	0.934	0.51425
Specialization in distribution services	0.8463	0.30022
Specialization in services to production	0.5422	0.40303
Specialization in social services	0.8797	0.34534
Specialization in personal services	0.9404	0.40627
Percentage of employed workforce which works between 32 and 48 hours	47.1181	6.79245

P.T.O.

TABLE 5
VARIABLES INCLUDED IN THE MODEL
(CONTINUATION)

Contextual variables		Percentage
	371 520	
Percentage of employed workforce with incomes over five MW	10.6507	6.31972
Percentage of population between 25 and 60 years of age	48.6165	4.60553
Percentage of population in localities of more than 15 000 inhabitants	54.0893	39.39559
Percentage of households with water and sewerage	49.1075	23.82606

Source: own elaboration with information from the 10-percent database of the 2000 Census of Population and Housing.

What the model of logistic regression makes is to transform the response (dependent) variable into a logarithm of probabilities:

$$\text{Ln } (p/1\text{-}p) \qquad (1)$$

Making this modification a traditional equation of regression can be realized:

$$\ln(p/1 - p) = a\eth + b \qquad (2)$$

Another way to see the equation would be as follows:

$$y=1/1+e^{-(b\eth 1X1+b\eth 2X2.....b\eth nXn)} \qquad (3)$$

This formula is that of the logistic curve; the exponent of *e* is a multiple linear equation and where each independent variable receives a value according to their capability to predict *y*.

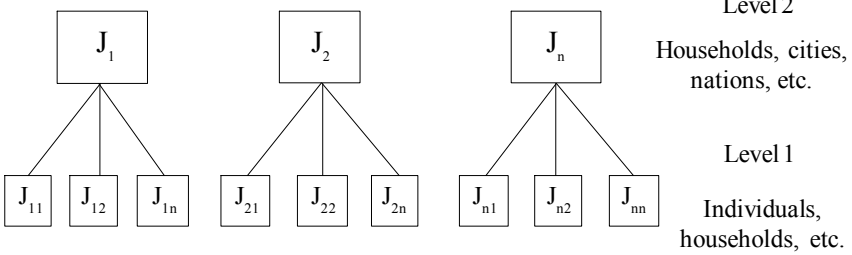
In traditional regression notation the expression is:

$$Y = b\eth_0 + b\eth_{i\eth} x_i + e\eth_i \qquad (4)$$

Where:
Y = dependent variable
$b\eth_0$ = the interception
$b\eth_{i\eth\,\eth}$ = the slope of the line
x_j = the value(s) of the X explanatory variable(s)
$e\eth_i$ = error

In the case of multilevel regression, this puts a data structure hierarchized in units, this is to say, we start from the fact that the data are nested in larger units. For instance, subjects in a household; households in cities; etc; In figure 6 we present a schema of how the variables are distributed between the levels defining well-hierarchized units.

FIGURA 6



According to Guo and Zhao (2000: 444-445), multilevel methods are a good approach to social reality for a) they allow analyzing hierarchically structured data, i.e., recognize how the variables at different levels influence on the behavior of the dependent variable; b) they correct the errors in the estimation of parameters from the nesting of data; c) provides typical errors and, thereby corrects the confidence intervals and significance tests; d) the total variance may be decomposed in levels besides allowing the calculation of covariances at different levels.[10]

In order to transform the previous equation (4) into one of the multilevel kind, we assume that $b\eth_0 + b\eth_{i\eth} x_i$ are random variables (Caballer, 2001: 178). Hence,

[10] Even if this is true for the models with continuous independent variables, it is not so for the models that do not fall into this category; in the case of the logistic models, several approximations have been proposed, however none can be estimated with the programs used yet (Twisk, 2006).

$$bð_{0j} = bð_{oj} + uð_{oj} \quad (5)$$
$$bð_{ij} = bð_{1} + uð_{1j}$$

In both equations the existence of two random components is assumed ($uð_{oj}$ and $uð_{1j}$) which are distrusted in a normal manner with median = 0 and variance $sð_{oj}^{2}$ and $sð_{ij}^{2}$, respectively.

Combining both equations, we have that the simple model of multilevel regressions with random slopes:[11]

$$Yij = bð_{o} + bð_{1}X_{ij} + uð_{oj} + uð_{iðj} + eð_{ij} \quad (6)$$

Where:

$bð_{o}$ and $bð_{1}X_{ij}$ are called fixed terms; and

$uð_{oj} + uð_{j} + eð_{ij}$ is called random[12]

In the case of multilevel logistic regression:

$$Yij = [\ln (p/n\text{-}p)] = bð_{o} + bð_{1}X_{ij} + uð_{oj} + uð_{j} + eð_{ij} \quad (7)$$

Results

The model turned out to be more explanatory in its contextual part than in the part of individual variables, which would bring along an important discussion in the literature on the topic: are the characteristics of the "environment" those which push-pull the population? Or are the characteristics of the individuals weightier? The answer to this question is still unknown, nevertheless, in this work we can say, at least as for the included variables, the contextual ones as the ones with heavier weight.

The presented model, in this moment, includes individual and contextual variables; from the evidence presented in table 4, save they are dealt with in greater detail below, we might state that the model analyzes reliably the probability of migrating between urban areas in Mexico.

[11]The random term does not necessarily reflect what in reality occurs; multilevel models allow estimating two sorts of slopes: fixed and random. In the first case, all of the regression lines have the same slope but with different intersection; and the second, each one of the regression lines is allowed to have different intersection and slope. In this work the latter is used; this is the reason why there is an extra term ($nð_{ij}$), which corresponds to the variation of slopes.

[12] Multilevel regression methods allow calculating the interactions between levels (*cross level interactions*), this is to say, criteria can also be established to learn how is that different level variables interact between them to produce a determinate effect; nevertheless, being this a exploratory work, they are not included.

In the lower part of table 6, the results of variability and variance explained by the model. Between the first model (that which only contains the interception) and the second (individual variables) there is a reduction in variation and standard deviation of the residuals; however, as we change to the third, these parameters increase.[13] This is surely due to the increment of variation in the indicators at the city level; on the other side, the weight given to the variance of level two for the contextual (of the cities) increases in each of the three models, which shows the need to include it in the analysis. It is worth mentioning that the results are consistent between models, so we included them into a single global explanation.

In the case of the metropolitan-metropolitan migration in Mexico, the probability for an individual of having moved between 1995 and 2000 was higher for men; from previous experiences on the field (Pérez, 2006), this result is due to the importance acquired by male migration and, later, the migration of the rest of the family; contrary to that expected, those single and widowed individuals present negative coefficient (although the latter are not significant); the highest coefficient is for those divorced/separated.

As for the educational level, the probability of migrating (in respect to the reference group and controlling the rest of the variables) it grows as schooling increases, up to a limit marked by graduated individuals and even with higher education; this is important because it means migration has a large component of population mobility with mid-educational levels, whereas there are not sufficient elements to state there is a significant difference between the mobility of those who have higher education and those who do not have any school degree.

Notwithstanding, the previous results do not invalidate completely the hypothesis that the most qualified individuals have the highest probability of migrating; if the coefficient derived from the measurement of the labor qualification are analyzed, we find that these increase constantly, this is to say, if the other variables are controlled, there is a higher probability for those with better labor qualifications.[14]

In terms of income, those individuals that receive a better remuneration present higher coefficients; thus, as income increases, the probability of migrating also does. These results are complemented by those derived from the coefficients

[13] This topic has been discussed by Gelman and Hill (2006), who state that adding variables in the level might increase the variability of the model, as there may be a heavy variation in the utilized indicators
[14] If it were analyzed in terms of odds ratio, the probability of migrating for those qualified laborers would be almost twice as much as that of those considered qualified.

TABLE 6
MULTILEVEL LOGISTIC REGRESSION MODEL

Variable	Model 1		Model 2		Model 3	
Constant	0.39348	***	-0.4148	***	7.3700	**
Individual variables						
Gender (ref. masculine)			-0.1487	***	-0.1438	***
Age (ref. 15-24 years)						
Under 15 years			-0.0799		-0.0828	
Between 25-65 years			0.3674	***	0.3630	***
Older than 65 years			0.1903		0.1845	
Schooling (ref. uninstructed)						
Up to secondary			0.2161	***	0.2122	***
High school, graduated or higher			0.3438	***	0.3393	***
			-0.2442		-0.2444	
Marital status (united)						
Single			-0.0937	***	-0.0940	***
Divorced/separated			0.2170	***	0.2136	***
Widow(er)			-0.4585		-0.4405	
Labor status (ref. employee or worker)						
Day laborer or pawn			-0.2716	***	-0.2535	***
Boss			0.1956	**	0.1898	**
Self-employed			0.1205	***	0.1222	***
Unpaid worker			-0.0375		-0.0240	
Unspecified			0.1084		0.1204	
Personal income (ref: less than a MW)						
1-3 MW			0.1508		0.1445	***
3-5 MW			0.3916	***	0.3838	***
5-10 MW			0.6859	***	0.6751	***
10-20 MW			1.0102	***	0.9985	***
20-50 MW			1.2256	***	1.2075	***
Does not receive income			0.2014		0.1860	
Qualification level (ref. non qualified)						
Semi-qualified			0.1186	***	0.1155	***
Qualified			0.5689	***	0.5663	***

* = 0.05 ** =0.01 *** =0.000

TABLE 6
MULTILEVEL LOGISTIC REGRESSION MODEL
(CONTINUATION)

Variable	Model 1	Model 2	Model 3
Activity sector (ref. agriculture, fishing and livestock activities)			
Construction		0.1920 ***	0.1733 ***
Industry		0.4027 ***	0.3798 ***
Services to production		0.6595 ***	0.6454 ***
Social services		0.4133 ***	0.4032 ***
Distribution services		0.6027 ***	0.5864 ***
Personal services		0.3923 ***	0.3732 ***
Contextual variables			
Specific rate of economic participation			-0.0047
Percentage of unemployed workforce			0.0810
Specialization in extractive activities			-1.0394
Specialization in agricultural activities			-0.0036
Specialization in construction activities			-0.5338 **
Specialization in manufacturing activities			-0.6572 ***
Specialization in distribution services			-1.4545 ***
Specialization in services to production			-2.1825
Specialization in social services			-1.3994 ***
Specialization in personal services			-0.7248 *
Percentage of employed WF which works between 32 and 48hrs			-0.0596
Percentage of employed WF with income over 5 MW			0.0383 ***
Percentage of population between 25 and 60 years of age			0.0085 **
Percentage of population in localities of 15 000 inhab.			0.0276 ***
Percentages of households with water and sewerage			0.0028 *
	Coef. Error	Coef. Error	Coef. Error
Log variance	1.1667	0.8652	2.2679
Standard deviation of the residuals	1.7920	1.5412	3.1079
Variance explained by level 2	0.4940	0.4193	0.7459

* = 0.05 ** =0.01 *** =0.000
Sourcee: authors' elaboration.

of the labor situation variable; day-laborers, compared to employees or workers, present a negative coefficient (which indicates a lower probability), while the employers and self-employed people do it in an inverse way.

Finally, as for the individual variables, the sector of activity has an important role in determining migration. Compared to those individuals devoted to agricultural or extractive activities, all the categories present positive coefficient; this comes as no surprise if we take into account we are measuring the probability of migrating between metropolitan zones.

As for the contextual variables, those which present significant coefficients are specialization in construction activities, manufacturing activities, distribution services, social services, personal services, employed population that earns more than 5 MW, percentage of the population between 25 and 65, percentage of population in localities with more than 15000 inhabitants and the percentage of population that has piped water and drainage at their household. With the exception of the variables of income above 5 MW and employed population that works between 32 and 48 hours, all of the variables related to work market present negative coefficients (this indicates a negative influence on the probability of migrating). This turns out to be important since it was expected that being a migration of metropolitan-metropolitan nature that which is predicted, these variables would act in an opposed sense.

Final considerations

In this article we presented the first attempts to measure and explain migration between cities in Mexico; to do so we resorted, on the one side, to an explanatory framework that provided us with clues to what occurs in other countries of the world (both developed and developing), and on the other, to the measuring of the flows and an exercise of multilevel regression.

Mobility in many occidental countries has changed in the last 30 years; Mexico is not an exception. Even if it is true that rural-urban migration is still one of the most importance forces in explaining the demographic and spatial growth of the cities, it has lost strength. Movements between cities and downward in urban hierarchy (or city-countryside) are important, even though not necessarily for all the countries.

In the Mexican case, it is recognized that the country has undergone a series of important transformations and, undoubtedly, the modification of the accumulation

pattern or economic model is a watershed in the recent history of the country. Nevertheless, beyond understanding this change anchored to a date (1982 for many), this work makes a laxer interpretation and takes it back to 1970 to expose that the conditions created by the model of substitution of imports had already been experiencing serious conflicts for their reproduction. What occurs next is an interaction between the transformation of the conditions of production at worldwide level, the depletion of the model of accumulation of the country and the arrival of a new elite to the government.

At the same time, and this is one of the considerations to be taken into account, in the country demographic phenomena are ongoing. In the first place, the country experiences a diminution in the fertility rate; and in the second, the appearance of new migratory patterns. The result of the interaction of all the aforementioned phenomena is an incipient change in the distribution of the economic activities and in the population along the territory.

As a consequence, the measured cities start a process of growth, often fostered by the transformation in world production, some other times by the relevance of worldwide service activities (tourism, for example).

Migration is a central component in the configuration of this phenomenon; rural-urban displacements, although still important, become secondary before international mobility and the number of movements between cities.

In the face of this panorama, one of the issues that have attracted the most attention in explaining migration is that which has to do with the importance acquired by the macro and individual variables; more often than not, assertions are made on the basis of description of data and too few times on techniques appropriate to the object of research.

In Geography and Demography, but not only in these disciplines, a lot of attention has been paid to the way in which certain phenomenon is constructed at diverse scales; nonetheless, not too often how these scales interact in the development of such phenomenon is researched.

One of the statistical techniques that try to solve the problem of hierarchized data is that of multilevel regression; this, in general terms, includes in a single equation the variance explained by the different levels and calculates the coefficients for the variables at different levels. In this work we insisted on the importance of this sort of analysis to solve the problem of micro-macro integration posed by the models of traditional regression.

For this article we developed a hierarchical regression model which takes as dependent variable the probability or not of migrating between metropolitan

zones. The results indicate that the probability of migrating is closely linked to the specific characteristics of the individuals as for labor dexterities; the better qualification (controlling other variables of the model), the higher probability of migrating between metropolitan zones; the result is similar if income is taken as a reference. Conversely to that expected, the probability of migrating is not higher for those who have graduated or higher education in relation to those who do not have any. This effect may be due to the need of the people with lower schooling to move towards more dynamic metropolitan zones and, hence to enter into the labor market.

In relation to the contextual variables (or of the cities), as it has been clearly pointed out by many studies, the effects of unemployment are important. The coefficient of this variable indicates there is a higher probability of migrating between metropolitan zones when this indicator is high. On its own, income also has an important role in the determination of migrating or not between metropolitan zones; in this case, the fact that there is a higher percentage of the population that earns more than five MW plays in a positive manner in the determination of the probability of moving between metropolitan zones. These results agree with those presented in relation to the incomes of the people. The *proxy* variables used to measure the quality of life in the cities (households with piped water and sewerage and the percentage of population in urban localities) have positive effects and are statistically significant, indicating an important effect.

Two reflections are left. The first has to do with the limits of this work; given the lack of information in many indicators for the cities, the model presented could not go beyond measuring some "general conditions" of the economic life and quality of life of the cities. Surely with the inclusion of other indicators of qualitative nature at the level of cities (such as criminality rate, access to leisure services, public expenditure on infrastructure, to name just three) the estimation may be improved and predict in a better way the migration between metropolitan zones. Because of this it is necessary to underscore the importance government and enterprises have in producing and gathering data with certain frequency so that they allow tracking this sort of studies.

In the second place, more works that use "alternative" techniques (not only multilevel regressions, but also *geographically weighted regressions*, or structural modeling, to mention two) that include in a single equation (or in a system) both individual and contextual effects. Hence, the demographic studies would advance on the study of urbanization and migration, not only between cities.

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