

Residential Segregation and Adequate Housing among Migrants from Bolivia and Peru in Córdoba, Argentina

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ABSTRACT

In a large part of Latin America, residential segregation has been examined almost exclusively from a socioeconomic perspective, with an ethnic approach far less common. The aim of this article is to analyze segregation of Bolivian and Peruvian migrants residing in the city of Córdoba and its association with access to adequate housing, based on data from the 2010 Census. Both groups are segregated and in deficient residential conditions. Although the most segregated group does not present the worst residential indicators, it is a paradox which underscores the complex relationship between segregation and access to adequate housing.

Keywords: 1. immigration, 2. spatial distribution, 3. residential precariousness, 4. Córdoba, 5. Argentina.

Segregación residencial y vivienda adecuada en los migrantes de Bolivia y Perú en Córdoba, Argentina

RESUMEN

En gran parte de América Latina la segregación residencial ha sido abordada casi exclusivamente desde una perspectiva socioeconómica, siendo mucho menos frecuente su abordaje étnico. El objetivo de este trabajo es analizar la segregación de los migrantes bolivianos y peruanos que residen en la ciudad de Córdoba y su vinculación con el acceso a una vivienda adecuada, a partir de datos del Censo de 2010. Ambos grupos se encuentran segregados y en condiciones residenciales deficientes. Aunque el colectivo más segregado no presenta los peores indicadores habitacionales, es una paradoja que evidencia la compleja relación entre segregación y acceso a una vivienda adecuada.

Palabras clave: 1. inmigración, 2. distribución espacial, 3. precariedad habitacional, 4. Córdoba, 5. Argentina.

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Introduction

In most receiving countries of international immigration, an unequal distribution of foreign populations has been observed, with immigrants tending to be spatially concentrated in a small number of cities or regions (Vono & Bayona, 2010). In Argentina, for example:

Immigrants from bordering countries and from Peru present two relatively differentiated traits in their patterns of settlement, one characterized by a significant concentration in the city and in the province of Buenos Aires, and the other by a broader geographic dispersion. The first comprises immigrants from Uruguay, Peru, and Paraguay, while the second applies to Chileans and Bolivians (Cerrutti, 2009, p.19).

Also, immigrants tend to concentrate geographically in specific areas within cities. Since the early 20th Century, the study of spatial distribution of foreign populations in urban areas has centered on the concept of residential segregation. Under that denomination, we analyze the spatial differentiation of population groups or categories in a given territory, with special emphasis on measurement and/or methods of analysis (Bayona, 2007).

The notion of segregation implies unequal distribution of different populations in urban space. In that sense, it is a concept with a marked spatial quality, although in use (but not always in definition) it usually implicitly incorporates a close correlation between social and spatial differentiation (Bayona, 2007). Also, as Bayona mentions:

Housing and its characteristics constitute core elements to understand the distribution of the population of foreign nationality in an urban context ... From that perspective, housing in relation to the foreign-born population has been approached from two points of view. First, to understand residential trends in terms of how it conditions its localization. Secondly, in contrast, as an indicator of immigrants' living conditions and social position, as a fundamental element to understand the type of process of integration the foreign population undergoes (Bayona, 2007).

The purpose of this study is to contribute to our knowledge of the residential segregation of foreign nationals born in Bolivia

and Peru, in the city of Córdoba¹ (Argentina) in the early 21st Century, and analyze in comparative terms the characteristics and conditions of the dwellings and residential environments where each of those groups resides.

The importance of studying the residential segregation of these migratory groups in the city of Córdoba lies in that they are the most numerous and dynamic migratory collectives today. Whereas the former form an older current, with consolidated networks and a recognized spatial position in the city, the latter appeared abruptly as a new current starting in the nineteen-nineties, consolidating their presence in late 2010 as the migratory group with the greatest presence in the city.

Socio-Historical Contextualization

In the southern cone, Argentina has historically been a receiver of cross-border migration. However, the relevance of such migration can be appreciated only from the mid-20th Century, when immigration from overseas dropped to near zero (Bologna & Falcón, 2012).

In numerical terms, Paraguayans represent the largest group, followed by immigrants from Bolivia, Chile, and Peru. In the city of Córdoba, in contrast, Bolivians were the largest and oldest immigrant group in the 20th Century; however, in the nineteen-nineties, Peruvians abruptly emerged as a new segment, becoming the most numerous and dynamic immigrant group of the early 21st Century (Bologna & Falcón, 2012).

Between 2001 and 2010, the Bolivian-born population grew (45 %), but its relative weight in the total foreign-born population remained similar (near 20 %). In contrast, the growth of Peruvian immigration was notable, as the population from Peru nearly doubled and its relative weight rose from 24.8 to 36 percent of the total foreign-born population. As a result of this higher rate of growth, Peruvians consolidated their position as the leading immigrant group by 2010 (Table 1).

¹ The city of Córdoba, capital of the province of the same name, is located 703 kilometers northwest of the Autonomous City of Buenos Aires (capital of Argentina). Based on data from the last National Census available (2010), it is the second largest city in terms of population, with 1 329 604 inhabitants. Its municipal demarcation forms a square measuring 24 km on a side, for a total area of 576 km².

Table 1. Evolution of Population Born in Bolivia and Peru.
City of Córdoba, 2001 and 2010

<i>Population*</i>		<i>Bolivia</i>	<i>Peru</i>	<i>Rest of immigrants</i>	<i>City Total</i>
2001	N	4 999	6 178	13 721	1 284 582
	%	0.39	0.48	1.07	
2010	N	7 234	11 476	11 524	1 329 604
	%	0.54	0.86	0.87	
<i>Variation</i>	<i>N</i>	2 235	5 298	- 2 197	45 022
<i>2001-2010</i>	<i>%</i>	44.7	85.8	- 16	3.5

* Includes persons living in both private and collective homes.

Source: Prepared by the authors based on processing of microdata from CN2001 and CN2010 (Indec, 2013).

The sociodemographic profiles of these migratory streams present distinctive characteristics which differentiate them both among themselves and in relation to the total population of the city of Córdoba. On the one hand, the Peruvian-born population has an average age similar to that reported for the city's total population, although with a large presence of women and people of active age. Also, it has a higher educational level, with a substantial proportion of persons with higher education (higher tertiary or university studies complete) (Table 2).

Table 2. Select Sociodemographic Indicators for the Population Born in Bolivia and Peru. City of Córdoba, 2010

<i>Sociodemographic Indicators</i>		<i>Bolivia</i>	<i>Peru</i>	<i>City of Córdoba</i>
Large age groups (%)	0-14	15.8	10.7	23.6
	15-64	75.4	86.4	66.2
	65 and over	8.8	2.9	10.2
Average age		34.2	32.5	32.8
Percentage of males ^a		99.2	86.8	91.2
Educational level (%) ^b	Low ^c	25.5	5.4	10.1
	Medium ^d	74.5	78.6	69.3
	High ^e	9.2	16.1	20.6

^aNumber of men per 100 women; ^bPopulation age 25 years and over; ^celementary education incomplete; ^dbetween elementary school complete and higher education incomplete; ^ehigher education complete.

Source: Prepared by authors based on processing of microdata from CN2010 (Indec, 2013).

On the other hand, the Bolivian-born population has an average age two years above that seen among Peruvians and in the city's total population, and an almost perfectly balanced ratio of men to women. The group's educational level is lower, with one in four persons not having finished basic education (Table 2).

Residential Segregation and Ethnic Groups

Ethnic Residential Segregation: A Theoretical View

The use of the notion of segregation to study the spatial concentration of ethnic and racial groups in urban areas gained prominence in the early 20th Century with the investigations conducted by members of the Chicago School.

Such studies, interested in the new and rapid urban expansion of downtown Chicago and associated problems, placed special emphasis on the spatial concentration of immigrants in the downtown areas of major U.S. cities, under the hypothesis that it is a first step in the process of upward social mobility, linked to assimilation with the receiving society and the subsequent dispersion of immigrants toward the suburbs (Duncan & Lieberson, 1959).

This line of analysis, influenced by social Darwinism, emphasizes competition for urban space, postulating that humans, by analogy with animals, tend naturally and spontaneously to compete for territory, attempting to occupy the most attractive areas of a city (Linares & Lan, 2007). Consequently, segregation is understood as the product of a natural concentration of the urban population and should determine the existence of natural areas in a city (Park, 1999).

Beginning in the nineteen-seventies, there was a theoretical-methodological and ideological shift in how the phenomenon of segregation was approached. Studies rooted in Marxist theory interpreted it as a structural element of capitalist production of space, where the city constituted, as explained by Henri Lefebvre's formula, "the projection on the ground of social relations" (Preteceille, 1995, p.6) (translation by the authors).

The influence of Max Weber led to the incorporation of the notion of unequal distribution of prestige, reputation, and power in the approach to segregation as a form of organization of physical space in a city. This influence is clearly explained in the notion of social space of Pierre Bourdieu, who interprets physical distances as manifestations of the struggles between social groups to appropriate the city as a resource (Ribeiro, 2003).

The relationship between social space and physical space is reinforced in most available studies, where segregation is one of the factors that may intervene, helping to perpetuate the existing social stratification, preventing full social participation, and blocking opportunities for social mobility. According to Bayona (2007), behind the growing number of studies on residential segregation of the immigrant population conducted in recent years in the European context, there is a latent concern in the receiving society regarding the insertion and integration of the immigrant population, at the same time, and indirectly, as they observe how the existence of concentration and segregation may hinder opportunities for evolution of this process.

Migrants, like other itinerant groups, are particularly vulnerable to a variety of violations of their human rights, among them the right to adequate housing. This, added to their vulnerability to discrimination, racism, and xenophobia, increase the difficulty they encounter in attaining satisfactory and sustainable living conditions (OHCHR, 2010).

Although this right is incorporated in several international declarations and treaties, there is a strong association between high levels of residential segregation and deficient residential conditions, which exacerbates the inequalities of migrant groups (Bayona, 2007; Checa & Arjona, 2006; Gallinatti & Gavazzo, 2011; Mera & Vaccotti, 2013).

Residential Segregation by Place of Birth in Argentina

In Argentina, like Latin America, studies on residential segregation have focused mainly on processes of socioeconomic stratification and to a lesser extent on ethnic or racial issues (Rodríguez, 2001;

Sabatini, 2003), despite a noteworthy series of investigations on segregation and migration, mostly involving cross-border movements: Paraguayans (Mera, 2012) or heads of households born in bordering countries (Groisman & Suarez, 2006), both for the Autonomous City of Buenos Aires; Paraguayans in two cities in Northeast Argentina (Mignone, 2012); Chileans in the city of Neuquén (Perren, 2013) or in the city of San Carlos de Bariloche (Matossian, 2010); and cross-border migrants in the leading urban areas of Argentina (United Nations Development Programme, 2009), among others.

In particular, for the city of Córdoba, there is a study conducted by Bologna and Falcón (2012) on Peruvian and Bolivian migration based on census data. Whereas the first Peruvian migrants settled mainly in the city center and surrounding neighborhoods, late in the aughts there were minimal movements toward neighborhoods near historic residential areas.

For their part, in the early 21st Century, Bolivians also tended to concentrate in neighborhoods near the city center; however, Villa Libertador—a neighborhood in the southwest of the city—saw the highest concentration of Bolivian migrants. Around 2008, there was spatial mobility southward and toward the agricultural area, known as the city's green belt (Bologna & Falcón, 2012).

On residential conditions of Bolivian migrants, history shows that those pertaining to lower social strata tend to concentrate in specific areas of the city, where access to housing is less expensive and living conditions more disadvantageous. They have tended to prefer peripheral areas and areas near their workplaces—fruit and vegetable farms and brickmaking facilities. Historically, such spaces have been characterized by substantial structural deficiencies in both housing and urban infrastructure (Alda & Barberis, 2011; Domenach, Celton, & Alvares, 1998; Bologna & Falcón, 2012; López, 1999; Pizarro, 2008).

In contrast, studies of Peruvian migration are rarer and more likely to focus on analyzing migration as an individual process driven by aspirations for social betterment (Bologna & Falcón, 2012). However, a documentary produced by the program *Derecho a la Cultura* at the National University of Córdoba, "Un día, todos los días," reveals Peruvians' preference for the Alberdi neighborhood

and its vicinity, due to its proximity to the city center and job opportunities. Also, rents there are higher than in other neighborhoods, but it is one of few places where migrants can lease dwellings without guarantees (Spollansky & Apontes, 2011).

Methodology

Measurement of Residential Segregation by Place of Birth

In measuring residential segregation, it is necessary to make certain methodological decisions which affect, to a greater or lesser extent, the results, among them the scale of disaggregation, the data source, and the criteria of differentiation relating to the groups of foreign nationals to be observed.

The scale of disaggregation used is the smallest unit of surface area for which census data are available: census radii. In the case of Córdoba, the average number of inhabitants per radius is 890 persons, although there is significant variability depending on whether data are taken from spatial subunits located in central areas with high population density or others located in less dense peripheral areas.²

Population Censuses are the most reliable source to estimate the number and characteristics of immigrants. Also, census data is the ideal source when working with high levels of geographic disaggregation, to capture the specificities which characterize contemporary spatial dynamics. This study is based on the last National Population and Housing Census of 2010 (CN2010) published by the National Institute of Statistics and Censuses (Indec, 2013).

As regards the criterion of differentiation to identify the foreign groups to study, this study defines Bolivian and Peruvian migrants as all persons born in Bolivia and Peru who, at the time of the Census, resided in private homes in the city of Córdoba.

To calculate residential segregation, we revisit some of the dimensions proposed by Massey and Denton (1988) with their respective classic measurements, which were chosen from a review of the specialized literature and its pertinence for quantification of the phenomenon (Table 3). Those indices account for the different perspectives

² The values of the segregation indicators calculated may be affected by high heterogeneity in size and shape of census radii.

from which the spatial distribution of a population group in an urban area can be approached, all of which are relevant in the study of segregation based on ethnicity, racial makeup, or place of birth.

Although they provide synthetic and global information on segregation, these indices alone do not allow us to describe the trends in spatial localization of the different groups. However, knowing their limitations does not equate to not using them, because their inclusion is considered important for two main reasons: on the one hand, taken together, these indices account for the multidimensional nature of the phenomenon analyzed, and on the other permit comparability with other similar studies and discussion of their results.

Table 3. Classic Indices of Segregation Chosen

Dimension	Description	Index Chosen
Equality	Refers to the distribution of a group in the spatial units in which we can divide a geographic space and takes as reference citywide parameters	$IS = \frac{1}{2} \sum \left \frac{N_{li}}{N_1} - \frac{N_i - N_{li}}{N - N_1} \right $ <p>Where IS is the segregation index; N_{li} = population of group 1 in the i-th territorial subdivision; N_1 = population of group 1 in the highest territorial unit; N_i = total population in the i-th territorial subdivision; and N = total population in the highest territorial unit</p> <p>Varies between 0 (absence of segregation) and 1 (maximum segregation), and can be interpreted as the proportion of inhabitants in that group who must change their place of residence to achieve a representation in each area identical to its proportional representation in the entire urban area</p>
Interaction	Incorporates the concept of probability and refers to potential contact between populations in a group which share a given spatial unit*	$\eta^2 = \frac{xP_x - P}{1 - P}; \text{ where } xP_x = \sum_{i=1}^n \left(\frac{X_i}{X} \right) * \left(\frac{X_i}{t_i} \right)$ <p>Where η^2 is the corrected index of isolation; xP_x is the uncorrected index of isolation; P is the proportion of population of group X in the city; X_i is the population of group X in the i-th territorial subdivision; X is the population of group x in the city; and t_i is the total population in the i-th territorial subdivision.</p> <p>Varies between 0 (absence of segregation) and 1 (maximum segregation)</p>

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Dimension	Description	Index Chosen
Concentration	Refers to the occupancy of a physical space in terms of surface area by part of a population group	$DEL = \frac{1}{2} \sum_{i=1}^n \left(\frac{x_{1i}}{X_1} - \frac{a_i}{A} \right)$ <p>Where DEL is the Duncan's Delta index; X_{1i} = population of group 1 in the i-th territorial subdivision; X_1 = population of group 1 in the highest territorial unit; a_i = surface area of the i-th territorial subdivision; $y A$ = total surface area in the highest territorial unit</p> <p>Varies between 0 (absence of segregation) and 1 (total segregation) and can be interpreted as the percentage of the population of group x which must change residence to achieve a uniform citywide density</p>
Centralization	Determines the degree to which the minority group is spatially located near and/or in the urban center**	$ACE = \sum_{i=1}^n (x_{i-1}a_i) - \sum_{i=1}^n (x_i a_{i-1})$ <p>Where ACE is the absolute index of centralization; n is the number of sections, arranged in increasing order of distance separating them from the center; X_i is the cumulative proportion of group X in section i, (quotient between the populations of group x in i, and in the city, cumulative from 1 to i); a_i is the cumulative proportion of surface area of section i (quotient between the surface area of i and that of the city, cumulative from 1 to i). Is negative if the members of the group tend to reside far from the city center and positive when the opposite occurs. If its value is 0, it means that the group is perfectly distributed throughout the city</p>

Notes: *To properly interpret indices of isolation, in both the corrected and uncorrected versions, we need to adopt two theoretical assumptions. First, that all contacts are between persons who inhabit the same residential area, and second that each person has the same chance of making contact with any other in each area (Jargowsky, 1996). **In this study, the central area encompasses the sector delimited by Municipal Ordinance 8057/85, referring to regulation of land occupancy and preservation of historic sites in the Central Area (Instituto de Planificación Municipal, 2013).

Source: Prepared by authors based on Bayona (2007), and Massey and Denton (1988).

Table 4. Moran's Index: Global and Local

Moran's Index	Description	Formula
Global	<p>This index constitutes a statistical summary of the degree of spatial autocorrelation and synthesizes in a coefficient—the slope of the regression line—the degree of association between a given level in the variable of interest in a geographic area in relation to the weighted average of the same variable in contiguous or neighboring areas. Its values range between -1 and 1, in other words from a perfect negative autocorrelation (perfect dispersion) to a perfect positive autocorrelation (perfect concentration), where 0 means a completely random spatial pattern</p>	$I = \frac{n \sum_i \sum_j w_{ij} (x_i - \bar{x})(x_j - \bar{x})}{s_o \sum_i (x_i - \bar{x})^2}; s_o = \sum_j \sum_{i \neq j} w_{ij}$
Local	<p>This kind of indicators allow us to determine significant local spatial clusters around a concrete point in space and obtain areas of spatial instability, in other words the presence of atypical values. Also, it helps in creating a map, where we can detect spatial units (in this case, census radii) which are surrounded by others, similar or not</p>	$I_i = \frac{(x_i - \bar{x}) \sum_j w_{ij} (x_j - \bar{x})}{\sum_j N}$

Where I is the Global Moran's Index; x_i the proportion of the population of group x in the i-th territorial subdivision; x_j the proportion of the population of group x in the j-th territorial subdivision; s_o is the proportion of the population of group x in the highest territorial unit; and w_{ij} is equal to 1 if the spatial units are adjacent or equal to zero if they are not

Note: The classic indices were calculated with the free source software *Geo-Analyzer Segregation* and the measurements of spatial autocorrelation with the free source software *GeoDa*.

Source: Prepared by the authors based on Anselin (1995) and Chasco (2003).

For our description of trends in spatial localization, we incorporated a measurement based on spatial autocorrelation, Moran's Index, which evaluates the existence of clusters in the spatial distribution of a given variable. This index illustrates another dimension

of segregation, spatial grouping or clustering. A high level of spatial aggregation would imply a residential structure of the minority group trending toward ghettoization, where the effects of uniformity in the ethnic composition of territorial units would be accentuated the larger the territorial unit with the same or similar composition (Table 4).

Access to Adequate Housing

To evaluate the residential conditions of migrants in the urban space of the city of Córdoba, we start from the concept of adequate housing.

Table 5. Access to Adequate Housing. Indicators

Dimension	Indicator	Description
Security of Tenure	Percentage of Homes by Home Tenure and Land Ownership Regime.	<p>Refers to the set of legal or de facto norms under which a household occupies all or part of a dwelling</p> <ol style="list-style-type: none"> 1) <i>Home and land owner</i>: the dwelling and the land it is on belong to one or more members of the household 2) <i>Owner of the dwelling only</i>: the dwelling (but not the land it is on) belongs to one or more members of the household 3) <i>Tenant</i>: the household pays, to use all or part of a dwelling, an amount in currency or in kind (annual, monthly, biweekly, etc.), regardless of whether or not there is a legal contract 4) <i>Occupant by loan</i>: the household uses a dwelling which is made available free of charge by the owner. The dwelling is not the property of any of the occupants, is not under lease, and no consideration is paid for its use 5) <i>Occupant for work</i>: the household uses a dwelling which is made available wholly or partially free of charge by the employer, organization, or company for which any member of the household works, by virtue of their employment 6) <i>Other situation</i>: the household uses a dwelling under a modality which does not match any of the above descriptions
Availability of Services, Materials, Facilities, and Infrastructure	Percentage of Homes by Quality of Connections to Basic Services	<p>Refers to the type of facilities dwellings have for sanitation: source of water and type of sewerage. The categories are:</p> <ol style="list-style-type: none"> 1) <i>Satisfactory quality</i>: refers to dwellings with water and sewerage from public networks. 2) <i>Basic quality</i>: describes the situation of dwellings which receive water from public networks, with drainage into a pit with septic tank. 3) <i>Inadequate quality</i>: dwellings which do not match either of the above two descriptions.

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Dimension	Indicator	Description
Habitability	Percentage of Homes by Quality of Construction	Refers to the quality of materials with which a dwelling is built and the internal connections to basic services (running water and sewerage) with which it is equipped. The categories are: 1) <i>Satisfactory quality</i> : refers to dwellings made from strong, solid materials, with adequate insulation, as well as sewage lines inside the dwelling and toilet with proper drainage. 2) <i>Basic quality</i> : the dwelling lacks adequate insulation or has a sheet metal or cement board roofing, but like the above definition has sewage lines inside the dwelling and toilet with proper drainage. 3) <i>Inadequate quality</i> : dwellings which do not match either of the above two descriptions
	Percentage of Homes With Overcrowding by Room	Represents the quotient between the total number of persons in a household and the total number of rooms it has (not counting bathroom/s and kitchen/s). A home is considered overcrowded by room when the quotient is above three

Source: Prepared by the authors based on data published by the Instituto Nacional de Estadística y Censos (2013).

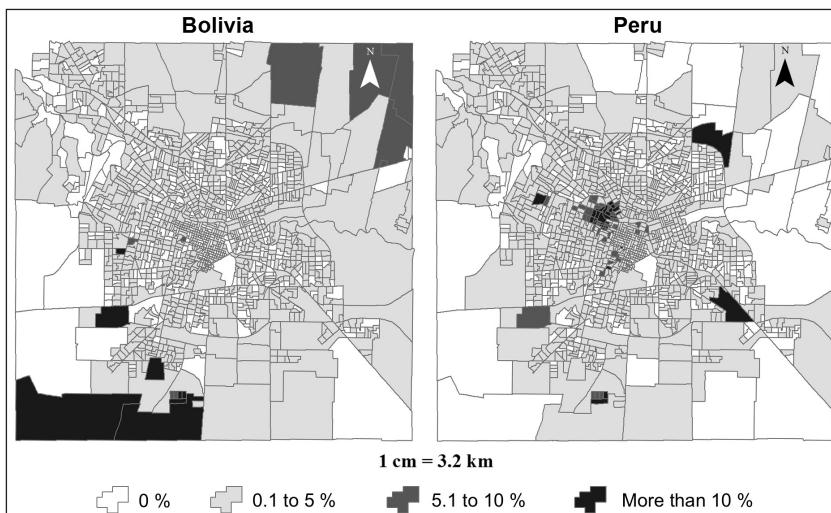
The United Nations High Commissioner for Human Rights (OHCHR, 2010) defines adequate housing as that which meets, as minimum, the following criteria: 1) security of tenure; 2) availability of services, materials, facilities, and infrastructure; 3) affordability; 4) habitability; 5) location; and 6) cultural adequacy. Considering the variables published by the 2010 Census—and currently available in the form of microdata—four indicators were chosen (Table 5).

Results

Spatial Distribution of Migrants from Bolivia and Peru

As our first approach, we analyzed the relative spatial distribution of persons born in Bolivia and in Peru. Although the presence of both groups of foreign nationals in the city is small—only 0.5 and 0.9 percent of residents are born in Bolivia and in Peru, respectively—we can observe specific localizations (Map 1).

Map 1. Percentage of Population Born in Bolivia and Peru, by census radius. City of Córdoba, 2010



Source: Prepared by the authors based on processing of microdata from CN2010 (Indec, 2013) on cartography provided by the Dirección General de Estadística y Censos, Province of Córdoba.

In a large part of the city, we observed a null or very low presence of migrants from the countries in question. However, in some census radii in the northeast and southwest, we found percentages of Bolivians exceeding 10 percent of the total population. Although these areas do not have significant numbers of residents (around 8 500), the relative weight of Bolivians greatly exceeds the average observed in the city (0.5 %) (Map 1).

On the other hand, the presence of Peruvians in the central census radii is greater than that reported for the rest of the city, whereas the citywide average of Peruvian-born migrants is less than one percent; in those radii their relative weight is between 10 and 30 times greater (Map 1).

Residential Segregation of Migrants from Bolivia and Peru

As reported by the IS, migrants from Bolivia and Peru are highly segregated in the city of Córdoba (Table 6). More than 50 percent of migrants from those countries would have to change their place of residence to achieve a citywide distribution similar to that observed in each area.

In relation to the degree of isolation, the results suggest that the two groups are not isolated and share their places of residence with the rest of the city's population (Table 6).

Table 6. Indices of Segregation of the Population Born in Bolivia and in Peru, by Census Radius. City of Córdoba, 2010.

Migratory Group	Segregation Index	Corrected Index of Isolation	Duncan's Delta Index	Absolute Index of Centralization	Moran's Index*
Bolivia	0.5446	0.0505	0.6948	0.3889	0.2488
Peru	0.6235	0.0735	0.7843	0.6624	0.5761

* Pseudo p-values significant to 0.001. The null hypothesis of randomness is rejected for all the cases.

Source: Prepared by the authors based on processing of microdata from CN2010 (Indec, 2013).

As regards the groups' physical occupancy in the urban space, we observed that they all occupy a small part of the city's total area, with approximately three fourths of migrants needing to change their place of residence to achieve a uniform citywide density (Table 6).

Another aspect evaluated involved the proximity of minority groups to the city center. Both immigrant groups display a significant tendency toward centralization; however, it is more marked in the case of Peruvians (Table 6).

The inclusion of georeferenced measurements, like the global version of Moran's Index, help evaluate the presence or absence of spatial clusters. For both groups, the index presents positive and significant

spatial autocorrelation values, meaning that their pattern of distribution is non-random and, considering the plus sign of the indices, concentrated in ethnic terms. However, this residential trend is more marked for Peruvians, who present a higher index, tending to be distributed in immediately contiguous spatial units (Table 6). In order to visually explore the patterns of clustering formed based on the percentage of migrants found in the units of observation analyzed and in neighboring units, we used the local version of Moran's Index.

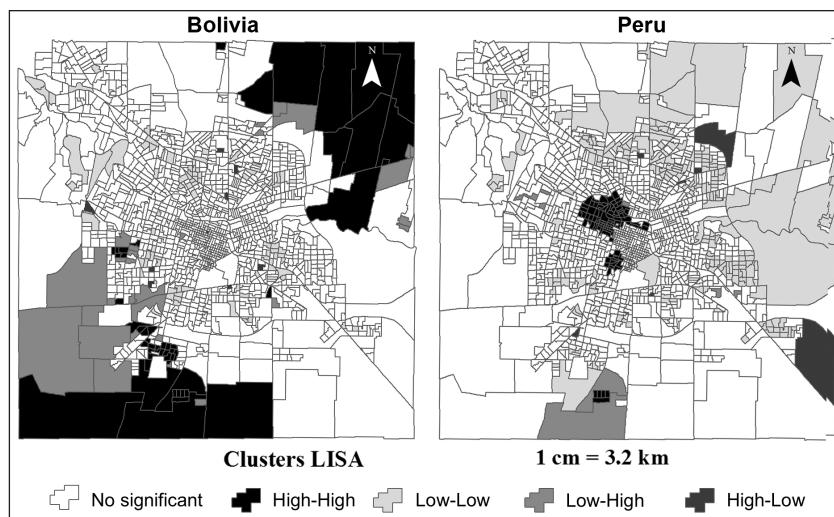
The Bolivian population is highly concentrated in peripheral radii located in the northeast and southwest quadrants of the municipal territory (LISA High-High cluster, in black). Both residential spaces are located on the edges of the city, adjacent to semirural or rural areas (Map 2). Whereas the first quadrant comprises cultivated areas of the Green Belt devoted to fruit and vegetable production, the second quadrant is home to brickmaking facilities (Alda & Barberis, 2011; Domenach, Celton, & Álvarez, 1998; Bologna & Falcón, 2012; López, 1999; Pizarro, 2008).

To a lesser extent, we observe clusters in opposite conditions, in other words with a presence of Bolivian migrants far below the citywide average, distributed over different areas in the city with no specific pattern (LISA Low-Low cluster, in light gray) (Map 2).

In contrast, the Peruvian population is spatially concentrated in the city center and adjacent neighborhoods (Map 2). As shown in the documentary *Un día, todos los días* (2011), such localization is associated with job opportunities provided by proximity to the center, and by less stringent demands from owners when leasing.

Although we also observed a high concentration of Peruvians, and of Bolivians, in a neighborhood in the southwest of the city, Nuestro Hogar III. The informally formed neighborhood occupies a site of high environmental risk and urban and social controversy (Marengo & Monayar, 2012). Also, the settlement reports significant deficiencies, mainly in basic services (e.g. drinking water), and a substantial percentage of the foreign-born population lacks Argentinean documents (Defensor del Pueblo de la Provincia de Córdoba, 2010). On the other hand, we observed an opposite pattern (Low-Low) on the east side of the city, especially in the northeast quadrant (Map 2).

Map 2. Local Moran's Index. Percentage of Population Born in Bolivia and in Peru, by Census Radius. City of Córdoba, 2010



Source: Prepared by authors based on processing of microdata from CN2010 (Indec, 2013) on cartography provided by the Directorate General of Statistics and Census, Province of Córdoba.

Access to Adequate Housing Among Migrants from Bolivia and Peru

Security of Tenure

Security of tenure is a highly complex and vital issue for the most vulnerable groups, among them migrants, who, when looking for a place to live, encounter numerous obstacles of various kinds and are forced to live in precarious residential conditions. Such situations are aggravated in the case of migrants in an irregular situation (Filardi & Muñoz, 2012).

The data reveal that, whereas among Bolivians the most common means of gaining access to housing is through ownership of homes and land (59.9 %), for Peruvians it is leasing (60 %) (Table 7). This circumstance may be associated to the latter group's preference to live in or near the city center, where rental homes predominate over opportunities for ownership, and the fewer obstacles associated

with access, as described by Peruvian migrants in the documentary *Un día, todos los días* (2011).

Table 7. Population in private homes by regime of tenure and country of birth.
City of Córdoba, 2010

<i>Regime of Tenure</i>	<i>Bolivia</i>	<i>Peru</i>	<i>Rest of Migrants</i>	<i>Non-migrants</i>	<i>Total</i>
Owners of dwelling and land (%)	59.9	30.6	59.5	63.2	62.9
Tenants (%)	21	60.3	30.9	21.9	22.3
Occupancy for Work (%)	2.5	0.8	0.8	0.4	0.4
Formal Occupancy (%)	83.4	91.7	91.1	85.5	85.6
Owner of dwelling only (%)	4.5	2.6	2	2.8	2.8
Occupancy by loan (%)	7.4	3.2	5.3	8.6	8.5
Other situation (%)	4.6	2.5	1.5	3.1	3.1
Informal Occupancy (%)	16.6	8.3	8.9	14.5	14.4
Total	7 188	11 426	12 639	1 286 901	1 318 154

Source: Prepared by authors based on processing of microdata from CN2010 (Indec, 2013).

Although a large majority of these migrants live in dwellings under a formal occupancy regime—a point which should be analyzed more extensively with data from other sources, because CN2010 does not examine aspects related to the legal security of tenure, such as the existence of deeds of title or leases—the presence of a substantial number of persons under a regime of informal occupancy is noteworthy. This characteristic is more marked in the case of Bolivian-born immigrants, of whom some 17 percent live in homes on land they do not own, occupied on loan or through other, informal arrangements, compared with 8.2 percent observed in the Peruvian population (Table 7).

Access to basic services

Access to basic services, in particular drinking water and sanitation, is fundamental to ensure the health of persons living in a dwelling. A high percentage of the population born in Bolivia and Peru reside in dwellings with inadequate connections to basic services, in other words without access to water from the public network or adequate sanitation. In the case of Bolivians, with nearly 40 percent of the

population living in such conditions, the percentage is 3.2 times above the citywide average (Table 8).

Table 8. Population in Private Homes by Quality of Connection to Basic Services and Country of Birth. City of Córdoba, 2010

<i>Quality of Connection to Basic Services</i>	<i>Bolivia</i>	<i>Peru</i>	<i>Rest of Migrants</i>	<i>Non-migrants</i>	<i>Total</i>
Satisfactory (%)	23.5	58.6	55.6	43.8	43.9
Basic (%)	39.1	21.2	35.6	44.8	44.4
Inadequate (%)	37.4	20.2	8.8	11.5	11.7
<i>Total</i>	7 188	11 426	12 639	1 286 901	1 318 154

Source: Prepared by authors based on processing of microdata from CN2010, (Indec, 2013).

Habitability

Habitability of dwellings is the primary defining element for adequate housing. Based on an indicator developed by INDEC, which combines the quality of materials and interior installations for basic services, the percentage of migrants who live in dwellings with inadequate quality construction is between 2.6 and 4.6 times greater than the citywide average, and is higher in the case of Bolivians (Table 9).

Table 9. Population in Private Homes by Quality of Home Construction and Country of Birth. City of Córdoba, 2010

<i>Quality of Home Construction</i>	<i>Bolivia</i>	<i>Peru</i>	<i>Rest of Migrants</i>	<i>Non-migrants</i>	<i>Total</i>
Satisfactory (%)	31.6	46.2	59.6	49.4	49.4
Basic (%)	31.5	32.9	35.5	42.9	42.6
Inadequate (%)	36.8	20.9	4.8	7.7	8
<i>Total</i>	7 188	11 426	12 639	1 286 901	1 318 154

Source: Prepared by authors based on processing of microdata from CN2010, (Indec, 2013).

Another of the factors which define the adequacy of a dwelling is overcrowding. The critical level of overcrowding—more than three persons per room—is significantly above the citywide average

observed. Whereas in the city of Córdoba, 6.2 percent of persons live in overcrowded conditions, for the Bolivian and Peruvian population the percentage is approximately 2.5 times greater (Table 10).

Table 10. Population in Private Homes by Presence of Overcrowding and Country of Birth. City of Córdoba, 2010

<i>Overcrowding</i>	<i>Bolivia</i>	<i>Peru</i>	<i>Rest of Migrants</i>	<i>Non-migrants</i>	<i>Total</i>
W/o overcrowding (3 persons or less per room) (%)	84.1	86.4	96.6	93.9	93.8
With Overcrowding (More than Three Persons per Room) (%)	15.9	13.6	3.4	6.1	6.2
<i>Total</i>	7 188	11 426	12 639	1 286 901	1 318 154

Source: Prepared by authors based on processing of microdata from CN2010 (Indec, 2013).

Living Conditions of Migrants from Bolivia and Peru in Segregated Areas

Although the foregoing analysis provides evidence of the living conditions of migrants from Bolivia and Peru in the city of Córdoba, an exploration of such conditions in areas with high spatial concentration of such immigrant groups—census radii identified as High–High in the analysis of local spatial autocorrelation—helps add to our understanding of the relationship between residential segregation and access to housing.

As regards the first indicator, security of tenure, we observed less informality in access to land and housing among persons born in Bolivia and in Peru who reside in segregated areas compared with that observed for the total. This situation is much more marked in the case of Peruvians (4.2 vs. 8.3 %) than Bolivians (14.6 vs. 16.6 %) (Table 11).

Such greater security of tenure in segregated areas may be explained by the existence of social networks among compatriots, through which migrants can gain access to housing with some level of formality (either by buying land or leasing dwellings) (Mera, 2014). The issue, however, warrants further examination,

because the census data does not allow us to determine the level of legal security of such purchases or leases.

However, if we observe indicators for access to basic services and habitability, the living conditions of Bolivians are comparatively more disadvantageous for those located in segregated areas. In relative terms, we observe that, while residential deficiencies affect 3 in 10 migrants citywide, in areas with high concentrations of Bolivians the ratio increases to 6 in 10. In contrast, among Peruvians no significant differences from those observed in the citywide average were detected (Table 11).

Table 11. Bolivian and Peruvian Migrants in Segregated Areas Based on Chosen Indicators. City of Córdoba, 2010

Migrants	Informal Ownership Regime (%)	Insufficient Access to Basic Services (%)	Inadequate Construction Quality (%)	Critical Overcrowding (%)	Population
Bolivian					
City of Córdoba	16.6	37.4	36.8	15.9	7 188
Segregated Areas*	14.6	62.8	62.2	22.3	2 089
Peruvian					
City of Córdoba	8.3	20.2	74.8	13.6	11 426
Segregated Areas*	4.2	19.9	25.2	15	5 514

* Census radii identified in the analysis of local autocorrelation as High-High.

Source: Prepared by authors based on processing of microdata from CN2010 (Indec, 2013).

Such differences between Bolivian and Peruvian migrants, especially access to basic services, may be explained by the localization of segregated areas of the respective groups. Whereas segregated areas occupied by Bolivians are located in predominantly rural areas, those occupied by Peruvians are primarily urban and highly consolidated.

The presence of critical overcrowding is more marked in clusters with high percentages of Bolivian and/or Peruvian migrants than in the citywide mean, and this difference is even more marked in the case of Bolivians (Table 11).

Conclusion

The quantitative study of residential segregation by place of birth, and of other types, poses important challenges, mainly due to the diversity of dimensions from which it can be approached and the multiplicity of indices developed for its quantification. The measurements chosen in this study—in keeping with the principal antecedents—suggest that, in the early 21st Century, groups of migrants from Bolivia and Peru are highly segregated and occupy specific areas in the geographic space of the city of Córdoba. For example, the index of segregation, perhaps the most widely known and used in research on this issue, suggests for both groups the presence of hyper-segregation, presenting values close to (Bolivia) or above (Peru) 0.6 (Glaeser & Vigdor, 2001).

However, the other indices applied reveal certain particularities. On the one hand, such hyper-segregation is not correlated with high indices of isolation. On the other hand, the Peruvian population—the principal migrant group—displays a high physical concentration and a tendency to reside in the central area and surrounding neighborhoods. In contrast, the phenomenon is seen in a lesser degree among Bolivians, who prefer to occupy peripheral areas near rural zones.

The inclusion of spatial parameters, based on the notion of contiguity, in addition to helping to identify residential patterns in Córdoba's urban space, corroborates some results obtained in our first analysis and relativizes others. On the one hand, it confirms that Peruvians are significantly more physically concentrated than Bolivians, and in Peruvians significant proximity to central areas, as evidenced by the clusters shown in black on the maps of local autocorrelation.

On the other hand, the results of the spatial analysis relativize the hyper-segregation of the Bolivian-born population detected in the classic analysis, given that the Global Moran's Index, despite present-

ing a significant positive value of spatial autocorrelation, is substantially below that obtained in the Index of Segregation.

What factors are behind these specific residential patterns? While the first studies on spatial distribution of migrants in cities conceived segregation as a process of natural concentration, recent investigations have seen greater complexity in the phenomenon and incorporated new dimensions, either including social networks as mechanisms which articulate patterns of settlement and create areas of concentration in a city, performing the functions of protection and assistance, or analyzing the socioeconomic conditions of the receiving society and access to the real estate market (Mera, 2014).

This question has special importance in a city like Córdoba, with a high housing shortage and considerable obstacles blocking access to land and adequate housing through the formal real estate market (Marengo & Monayar, 2012; Rebord, 2006). Although social networks among compatriots which facilitate the exchange of information and arrival in the city are a core element—as shown by several studies on Bolivian and Peruvian migration in the city (Alda & Barberis, 2011; Domenach, Celton & Álvarez, 1998; Bologna & Falcón, 2012; López, 1999; Pizarro, 2008)—such networks are built on structural difficulties of access to land and housing.

The data shown throughout this article show that the right to adequate housing of Peruvian and Bolivian migrants is highly compromised, most markedly in the case of the Bolivian-born population. Although a majority of those migrants formally occupy homes, their dwellings do not satisfy the minimum requisites, in the areas of habitability and access to basic services, to be considered adequate and decent, and consequently to improve their chances for greater social integration.

Our crossed analysis of residential segregation and living conditions gives rise to a kind of paradox: the most residentially segregated immigrant group is not necessarily that with the lowest residential indicators. Although several studies mention an important association between segregation and deficient living conditions (Bayona, 2007; Checa & Arjona, 2006; Gallinatti & Gavazzo, 2011; Mera & Vaccotti, 2013), in the case of the city of Córdoba, this paradox may be explained by the specific localization of segregated immigrant groups in the city: although Peruvian migrants are more spatially

concentrated, they occupy, predominantly, the city center and surrounding neighborhoods, historically characterized by offering better living conditions. In contrast, Bolivians, who occupy peripheral areas near rural areas, have more limited access to adequate housing, which coincides with the structural deficiency of such spaces.

In summary, the results obtained in this study help advance our objective knowledge of the residential patterns of the main groups of immigrants in the city of Córdoba and their predominant living conditions. However, the complex issues inherent in the problem of residential segregation, and access to adequate and decent housing demand greater efforts, both theoretical and methodological, if we are to understand the factors which explain how migrants occupy, appropriate, and co-construct residential space, and their relationship with processes of social integration.

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