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Understanding the Socioeconomic Status of International Immigrants in Chile Through Hierarchical Cluster Analysis: a Population-Based Study

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ABSTRACT

Immigration to Chile is not large (just under 2% of the total population) but has increased in recent years. This study aimed to analyse the socioeconomic status (SES) of immigrants in Chile and compare it with the Chilean-born, by secondary data analysis of an anonymous nationally representative survey (CASEN, 2006). Immigrants are categorized into Low, Medium and High SES through hierarchical cluster analysis. Around 1 per cent of the total sample are international immigrants; an additional 0.7 per cent did not report their migration status. Self-reported immigrants show great variability in their SES. Immigrants in the Low SES cluster appeared to be significantly younger than those in Medium and High SES, also more likely to be children, women and belong to an ethnic minority. Immigrants in the Low SES cluster appeared similar to the unemployed, poorest Chilean-born but are more than eight years younger on average and more likely to be female. Immigrants to Chile are a unique group, with socio-demographic characteristics that differ significantly from the Chilean-born population, but there is great heterogeneity and complexity within this group. Cluster analysis provided a meaningful interpretation of the multidimensional concept of SES and allowed the identification of a vulnerable group of Low SES immigrants to Chile.

INTRODUCTION

Migration and socioeconomic status (SES)

Movement of people within and between countries has become a central and necessary part of contemporary society, and migration has been recognized as an important determinant of social development and global health (Carballo, Divino et al., 1998). A comprehensive understanding of demographic and socioeconomic characteristics of international immigrants is essential to promote fair living and working conditions among them. The process of migration is inevitably selective and depends on both local and broader dynamics within a country and also at an international level. The importance of economic migration to the search for a better life, especially in the context of globalization and international industrialization, may suggest that healthy, economically active

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young people are more likely to migrate. However, more complex and possibly hidden features, like migration of vulnerable women and children, ethnic groups and people in relative socioeconomic deprivation, might also result from specific national policies and market opportunities, which in addition might selectively discriminate against certain immigrant groups in the host countries (Centro Latinoamericano y Caribenho de Demografia, 2008; International Organization for Migration, 2011). These dimensions of SES in the migration process require further understanding worldwide, as the development and implementation of key social policies depends on accurate and robust indicators of migrant populations living in socioeconomic deprivation.

A range of migration theories have been developed in the past to explain the complex relationship between socio-demographic conditions, migration, and health. At least four salient theories have been described in the past: the push and pull theory; the cumulative causation theory; the global theory; and the behavioural theory. Each of them adds a further understanding of the complexity of the migration process. The push and pull theory is one of the first theories developed to explain the causes and consequences of migration. It is related to the idea that migration is affected by demographic characteristics and growth, occurring in two different countries. It refers to the idea that high demographic growth rates are associated with migration to another country, while reduced growth rates are related to immigration (Martine, Hakkert et al., 2000). The cumulative causation theory suggests that every migration act alters the social context of the societies involved, which will mediate future decisions related to migration. These social context alterations would tend to facilitate migration movements over time, making it easier or more difficult for a new person to migrate (Martine, Hakkert et al., 2000). The tension between the factors favouring and those reducing the chance of a new migration is at the base of this theory.

Regarding a global theory approach of migration, some authors have stated that migration does not occur between unconnected countries, but between those that experience rapid economic change and the growth of global commercial relationships (Massey and Espana, 1987). The major underlying issue of global migration is the unsolved tension between *social isolation* and the efforts towards *integration* in a multicultural society, which creates several difficulties for both the migrant population and the receiver society. The capitalist economy and international division of work are the main cause of this tension, as economic disparities drive population movement (Meyers, 2000). Finally, the behavioural approach to migration suggests that intentions to move are the primary determinant of migration behaviour, along with direct behavioural constraint and facilitator factors (De Jong and Gordon, 1999). This framework uses the theory of Planned Behaviour, which includes *expectations* as its major component (Ajzen, 1971). All these theories contribute, from a different angle, to the current understanding of the relationship between socio-demographic characteristics, migration and health. They imply the need for inclusive integrative theoretical models for migration and its effects on health, which require the development of sound robust evidence. With this global need in mind, this original research aims to provide further understanding on the living conditions of international immigrants within the Latin American region. It uses Chile as a case study to inform researchers and policymakers about the latent relationship between socioeconomic status and migration globally.

Migration patterns in LAC and in Chile

International migration is of substantial interest to the Latin American and the Caribbean (LAC) region. The number of international migrants in the countries of the region amounts to about 25 million, representing 4 per cent of the population of the Americas. Of these, about 18 million reside in the USA, four million in Latin America and the other three million in the remaining regions. The largest contingent is made up of Mexicans (10 million) followed by Colombians and the Caribbean community (ECLAC, 2008).

The Economic Commission for Latin America and the Caribbean (CEPAL, 2006) has identified three major migration patterns in Latin America and the Caribbean: (i) Historical immigration into Latin America from overseas between the mid-nineteenth and mid-twentieth centuries, with a strong European component; (ii) Intra-regional migration, favoured by socioeconomic developments and structural factors, particularly during the period 1970–1990, which saw the highest rates of migration within Latin America; and (iii) South-North migration flows, resulting in the loss of qualified workers in Latin America and the Caribbean, the emergence of immigrant communities, and the development of an economic potential associated with the remittances sent by migrants to their countries of origin. These patterns indicate the complexity and heterogeneity involved in the migration process, and suggest how living conditions, needs and integration into the foreign society vary between groups of migrants and across countries (Massey, 1990).

Chile has had relatively low rates of immigration but in recent years has experienced an increase, to the highest rates since the 1950s. By 2007, 1.8 per cent of the Chilean population were born abroad (approximately 350,000 people) (International Organization for Migration, 2011). This increase in immigration reflects deep economic and demographic changes which have taken place in Chile. Governmental reports indicate that Chile is experiencing "new immigration" patterns described as marked by Latin American regional immigration to Chile of workers, with a growing proportion of non-professional and female immigrants, living mostly in urban areas and concentrating in the capital of Santiago and other large cities (Departamento de Extranjeria y Migracion, 2007).

Despite the relatively small immigrant population in Chile, their growing numbers have been the focus of national debate in recent decades. Since the 1990s some groups have disseminated the idea that Chile has become a "pole of attraction" for international immigration and this has received considerable attention from the mass media, which has made a connection between this flow of immigrants and a reduction of labour opportunities for the local population. Stigma and discrimination emerged almost immediately, especially focused upon people from Bolivia and Peru. These people were perceived as poor, "lower status" immigrants who came to the country to "steal" jobs from the Chilean-born (Martinez, 2003). These issues remain alive and are widely discussed in the country at different levels including politics, economics, human rights organizations, immigrants and the general society. For example, Nancy Yáñez, co-director of the Citizen Observatory in Chile, declared on Immigrant Day, 18th December 2011, that there are many challenges and delays in the cultural field: "discriminatory stereotypes towards non-European migrants are strong, harmful and persistent in the Chilean society" and that these issues need urgent health policy attention in the country (Pacheco, 2011).

Aim of this study

In 2006, for the first time, a national survey in Chile collected information on migration status in the country. The CASEN survey (Caracterizacion Socio-Economica Nacional) is focused on the socioeconomic status of the population living in Chile and has been conducted every three years since the early 1980s.

This study aimed to analyse the socioeconomic status (SES) of international immigrants in Chile at a population-based level. For this, cluster analysis was used as the adequate method to identify the latent variable of SES among immigrants in Chile. The purpose of cluster analysis is to identify subsets of a data set that contain similar points. Replacing these subsets by their aggregate properties creates a compact representation of the data set as a set of clusters (Maxwell, 2002). Results from this study may contribute to the development of specific policy strategies to improve the living conditions of international immigrants in Chile and to the understanding of migration more generally.

METHODS

Population and sample

This study involved secondary data analysis of a nationally representative survey conducted in Chile in 2006 (CASEN)(Chilean Ministry of Planning, 2006). This anonymous population-based survey has been carried out by the Chilean Ministry of Planning every three years since 1987 (Chilean Ministry of Planning,2004).

The CASEN survey employed multistage probabilistic sampling with two phases (county and household), stratified by urban and rural area. The sampling frame included every region in Chile. The inclusion criteria for selection of counties were:

(i) All urban counties with over 40,000 inhabitants,
(ii) All rural counties irrespective of the number of inhabitants,
(iii) a random selection of a small proportion of counties with less than 40 000 inhabitants.

Twenty hard-to-reach counties were excluded, because of their very difficult geographical access (from a total of 605 counties).

The final sample for the analysis consisted of 268,873 people who belonged to a random sample of 73,720 households (44,854 urban and 28,866 rural ones), representing 95.4 per cent of the total Chilean territory (Instituto Nacional de Estadistica, 2009). The probabilistic sample had a final absolute sample error of 0.36 per cent at the household level, assuming a confidence level of 95 per cent and maximum variance (Chilean Ministry of Planning, 2006). The mean number of households included in CASEN per region was representative of the total population within each region and also representative of the population in each urban and rural setting from each region (Instituto Nacional de Estadistica, 2009).

Data collection was via face-to-face interview by trained interviewers, using a previously validated questionnaire (Chilean Ministry of Planning, 2006). The preferred respondent was the reported head of household, followed by their spouse or any adult. The response rate for the 2006 CASEN survey was 84.8 per cent (Chilean Ministry of Planning, 2006).

Migration status

The 2006 CASEN survey asked the question: in which country was your mother living when you were born? Those who answered "in a different country from Chile" were identified as international immigrants, approximately 1 per cent of the total sample (n = 1877). An additional 0.7 per cent preferred not to report their migration status and they were excluded from this analysis. Some of these people may be international immigrants but there was no direct evidence to support this. Nonetheless, it should be noted that the sum of immigrants plus the missing values were a fairly close representation of immigrants in Chile according to the latest statistics, around 1.8 per cent (Departamento de Extranjeria y Migracion, 2007). A separate piece of analysis on the living conditions and health status of the people who preferred not to report their migration status in this survey (0.7%) has been conducted and is currently under revision for publication. This article focuses only on those who did report being international immigrants and compared with the Chilean-born population.

Socioeconomic status (SES)

1. Income: continuous variable concerning the household income per capita in the past month and converted to USD purchasing power parity for 2006 (PPP). Values are expressed in

USD ($1 USD equivalent to 530.275 Chilean pesos) (International Monetary Fund, 2011). This variable was then transformed into relative income by dividing it into quintiles, the first quintile being the poorest group and the fifth quintile the wealthiest.
2. Educational level: ordinal variable of five categories, collected by the CASEN survey as the highest level achieved for each member of the household: university, technical, high-school, primary school or no education.
3. Employment: this dimension is covered by a range of variables:

a. Employment status: binary variable indicating if the adult interviewed reported any paid work during the past month (yes/no).
b. Contractual status: binary variable indicating if the adult interviewed reported currently having a work contract (yes/no).
c. Type of occupation: categorized as collected by the CASEN survey (Chilean Ministry of Planning, 2006). Each person interviewed was asked to provide information about the *current* occupational situation of each member of the household:

i. *Active group*: including manager, self-employed, employee, and non-paid family worker.
ii. *Unemployed group*: including those of working age and interested in working but without a job at the time of the interview. No information about prior occupation or length of unemployment was collected in the survey.
iii. *Inactive group*: including those of working age but not currently interested in working (i.e. students, people with a long-term illness, housewives and the retired)

Demographic and migration-related variables

1. Demographic variables: these included age (continuous variable and also categorized into 3 groups: <16, 16–65 and >65 years old), gender (male or female), urban or rural area, ethnicity (dichotomous variable, yes/no to the question: do you belong to any minority ethnic group?), type of ethnic background (multinomial variable with 4 categories: aymara, mapuche, atacameño, and other, as collected by CASEN and legally recognized in Chile as pre-Hispanic aboriginal tribes), marital status (multinomial variable with 4 categories: single, married/cohabiting, divorced/separated, and widowed), and number of household members (count variable, range 1–24).
2. Migration-related variables: these included country of origin (multinomial variable of 5 categories: Peru, Argentina, Ecuador, Bolivia and other) and years living in the country (continuous variable, range 0–62, and then divided into 6 categories: less than a year, 1–5 years, 6–10 years, 11–15 years, 16–20 years, and over 20 years).

Cluster analysis among international immigrants in Chile: rationale and methods

Exploratory analysis among immigrants in Chile showed that this is an heterogeneous group, with great variation in their SES (Table 1). There was an apparent wealthy group of immigrants, and a separate group of relatively poor immigrants, in low-status occupations, but not necessarily uneducated. Because no clear patterns in SES were observed, besides this great heterogeneity and complexity in socioeconomic dimensions, the estimation of a latent variable of socioeconomic status via cluster analysis was explored.

Cluster analysis is a generic name for a variety of mathematical methods that can be used to find out which objects in a set are similar (Romesburg, 2004). The purpose of cluster analysis is to

TABLE 1

CHARACTERISTICS OF THE TOTAL CHILEAN POPULATION AND THE INTERNATIONAL IMMIGRANT POPULATION (IIP) IN CHILE, CASEN SURVEY 2006

Dimensions	Chilean-born population		International immigrant population	
	% or mean	95% CI	% or mean	95% CI
Sex (male)[b]	48.66	48.40–48.94	45.21	41.74–48.72
Mean age	*X* = 32.97	32.81–33.12	*X* = 33.41	31.81–35.00
Age categories:[a]				
<16[c]	25.27	24.98–25.55	13.60	11.29–16.28
16–65[c]	66.41	66.12–66.70	79.08	75.92–81.93
Over 65	8.32	8.13–8.52	7.32	5.33–9.97
Marital status:[a]				
Single[b]	50.57	50.31–50.84	45.81	42.06–49.62
Married or cohabitant couple[b]	40.76	40.46–41.06	45.49	41.66–49.36
Annulled, separated or divorced	4.56	4.42–4.71	4.21	3.06–5.77
Widow	4.07	3.95–4.19	4.49	2.89–6.91
Minority ethnic group: any	6.55	6.52–6.80	5.57	3.79–8.10
Type of minority ethnic group:[a]				
Aymara[b]	0.52	0.44–0.61	2.33	1.48–3.63
Atacameño	0.18	0.14–0.24	0.20	0.0044–0.93
Mapuche[b]	5.71	5.48–5.95	2.96	1.59–5.46
Others	0.14	0.10–0.20	0.01	0.00–0.55
Zone:[a]				
Urban[b]	87.14	87.01–87.27	93.97	92.58–95.11
Rural	12.86	12.59–13.14	6.03	4.89–7.42
Area:[a]				
Northern	11.80	11.58–12.03	13.15	10.14–16.89
Central b	62.06	61.76–62.36	73.66	69.22–77.66
Southern b	26.14	25.90–26.37	13.19	10.50–16.45
Mean number of households members:	4.52	4.49–4.55	3.96	3.80–4.12
Educational level: a				
No education[b]	7.39	7.23–7.55	2.38	1.51–3.73
Primary School[b]	34.68	34.33–35.03	18.79	16.05–21.88
High School	29.68	29.34–30.03	33.02	29.39–36.87
Technical level	14.51	14.24–14.79	16.81	14.13–19.88
University level[b]	9.86	9.57–10.15	27.32	23.16–31.98
Mean household income per capita per month (USD)[c]	X = 270.45	263.67–277.23	X = 746.69	610.98–882.41
Mean household income, per capita (USD):[a]				
Quintile 1 (poorest)	58.57	57.88–59.26	56.78	50.81–62.74
Quintile 2	107.98	107.55–108.41	110.03	106.51– 113.54
Quintile 3	159.22	158.69–159.75	162.62	157.81–167.43
Quintile 4	243.23	242.18–244.28	245.37	238.25–252.50
Quintile 5 (wealthiest)[c]	778.97	757.28–800.67	1305.60	1070.18 –1541.03
Current active worker (yes)	57.16	56.84–57.48	60.96	57.06–64.73
Type of occupation:[a]				
Head/ manager[b]	3.10	2.89–3.32	5.23	3.27–8.26
Self employed	20.55	20.05–21.03	17.50	14.02–21.64

(CONTINUED)

TABLE 1

(CONTINUED)

Dimensions	Chilean-born population		International immigrant population	
	% or mean	95% CI	% or mean	95% CI
Employee public system	9.76	9.42–10.11	6.35	4.04–9.85
Employee private system[c]	60.94	60.36–61.51	54.27	49.10–59.35
Employee domestic service[c]	5.65	5.42–5.90	16.65	13.40–20.50
Unemployed:[a]				
Can't find a job[c]	2.16	2.01–2.32	0.83	0.41–1.69
Found a job and starts soon	0.64	0.56–0.72	1.01	0.38–2.62
Doesn't want to work	5.60	5.34–5.87	8.81	5.36–14.12
Has an intermittent informal job	0.89	0.80–0.98	0.78	0.23–2.58
Other reason, not stated c	5.30	5.05–5.56	10.25	6.54–15.70
Inactive:[a]				
Student[b]	38.07	37.53–38.60	44.30	37.45–51.36
Housewife[c]	24.1	23.69–24.51	21.02	16.36–26.59
Retired[b]	16.20	15.81–16.59	11.25	7.37–16.79
Ill[c]	7.05	6.80–7.32	1.76	0.91–3.37
Contractual status (doesn't have a contract)	21.07	20.53–21.62	19.76	15.86–24.35

[a]$p < 0.0001$ when comparing categories within the same variable for either the Chilean-born or the IIP
[b]$p < 0.05$ when comparing the same category across populations, the Chilean-born population versus the international immigrant population
[c]$p < 0.0001$ when comparing the same category across populations, the Chilean-born population versus the international immigrant population

identify subsets of a data set that contain similar points. Replacing these subsets by their aggregate properties, such as means and standard deviations, for example, creates a compact representation of the data set as a set of clusters. The cluster properties can then be used for comparative data analysis (Maxwell, 2002).

There are a number of clustering techniques, the most common ones being k-means and hierarchical clustering algorithms (Johnson, 1967; Johnson, 2002). Hierarchical clustering is a step-wise process that merges the two closest or furthest data points or group of data points at each step. As the major interest in this study was to display in a clearer fashion the polarized socioeconomic groups that emerged from the descriptive analysis, hierarchical cluster analysis was selected as the appropriate method to use. Hierarchical cluster analysis has been reported as the most frequent type of cluster analysis used in health research, because of its well-structured method (Romesburg, 2004). A hierarchical clustering process creates a tree structure (dendrogram). The hierarchical clustering algorithm can generate any number of groups simply by arbitrary stopping the step-wise process (Maxwell, 2002).

Complete-linkage hierarchical cluster analysis was conducted by combining the socioeconomic variables household income per capita (continuous variable), educational level (ordinal) and employment status (binary) of the head of the household. These variables were selected as relevant dimensions of socioeconomic position, widely reported in the international literature (Galobardes, Shaw et al., 2006; Galobardes, Shaw et al., 2006; Galobardes, Smith et al., 2006; Galobardes,

Lynch et al., 2007), and easily attributable to every individual in the CASEN 2006 sample through the head of household. The complete-linkage method creates clusters from the most distant values of the selected attributes (or variables) (Maxwell, 2002). We then grouped the immigrant population into three socioeconomic clusters. These three groups displayed the polarization mentioned before (extreme distant clusters) and also displayed immigrants somewhere in the middle between the two socioeconomic poles, allowing for the classification of heterogeneous individuals with mixed socioeconomic status. It should be noted that any number of clusters could be calculated and, due to the hierarchical nature of this method, other numbers of clusters can be selected by simply dividing or combining these three clusters.

Further analysis

Descriptive statistics for each variable under study are reported as means for continuous variables and proportions for categorical variables. Comparison tests (t-tests, chi squared and anova) between populations and cluster groups are also reported. All data analyses are conducted with Stata version 10 statistical software package and estimations are weighted to take into account the complex multistage sampling strategy of the survey (Yu and Cumberland, 1996).

RESULTS

General description of the immigrant population in the CASEN survey

Descriptive results of the international immigrant population and the Chilean-born are presented in Table 1. Almost 1 per cent of the total sample in the CASEN 2006 survey reported being international immigrants (0.96%, n = 1877 observations). On average, immigrants have been in Chile for 11 years; however, a third of them have been in the country for less than a year. Around 70 per cent of immigrants come from bordering countries (Peru, Argentina, Ecuador and Bolivia).

Most international immigrants are of working age, between 16 and 65 years old, and live in urban settings and in the Central area of Chile. Around 55 per cent of immigrants in Chile are women; this percentage decreases with years living in the country, but is not different from the Chilean-born. On average, there are more married than single immigrants in Chile. However, working age immigrants are more likely to be single. Around 6 per cent of immigrants in Chile belong to a minority ethnic group and they are less frequently mapuche and more frequently aymara than the Chilean-born ethnic minority population. Additionally, there are more minority ethnic immigrants than their Chilean-born counterparts living in the Northern area. (see immigrant density by region of the country and province in Figure 1). There is also a higher proportion of widowed minority ethnic immigrants than widowed minority ethnic Chilean-born.

Immigrants are, as a whole, distinctively different from the Chilean-born with respect to their SES. Immigrants are less likely to report no education and more likely to report university level education than the Chilean-born. On average, immigrants earn 3 times more than the Chilean-born, but the bottom income quintile earns less than the equivalent Chilean-born poorest quintile, even though this difference was not statistically significant (USD$56.78 [95%CI 57.88–59.26] versus USD$58.57 [95%CI 50.81–62.74]). Immigrants also have a significantly wider gap between the wealthiest and the poorest income groups than the native population (20: 20 ratio). There is a 23-fold gap between the richest and the poorest quintile. In contrast, the Chilean-born population has a 13-fold difference between the wealthiest and the poorest income quintile. Moreover, the wealthiest quintile of immigrants appears to be 1.67 times richer than the equivalent quintile from the Chilean-born population. Regarding types of occupation, employed immigrants have a 1.7 times higher proportion of people

FIGURE 1
IMMIGRANT DENSITY BY REGION OF THE COUNTRY (DEVELOPED IN WINDOWSMAP SOFTWARE)

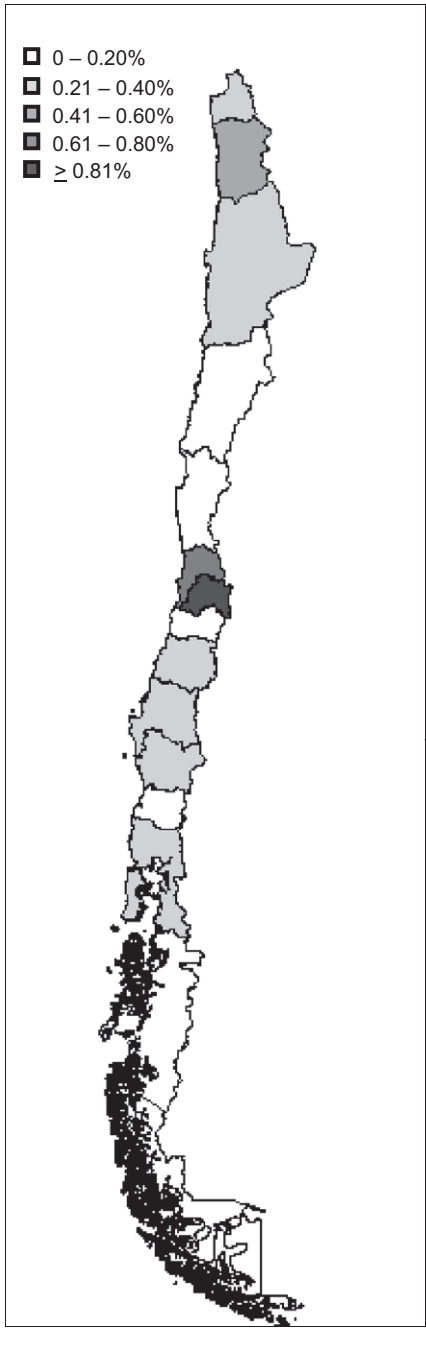


Figure 1.a Immigrant density by province and borough in the XIII Metropolitan region

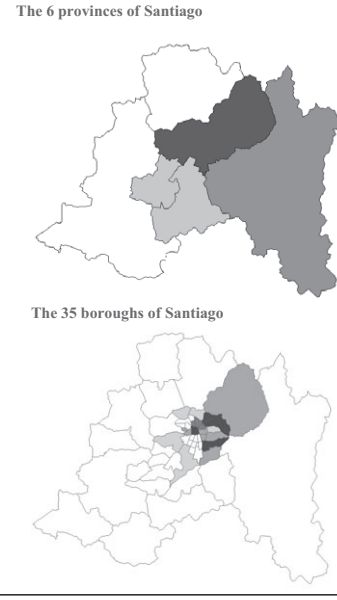
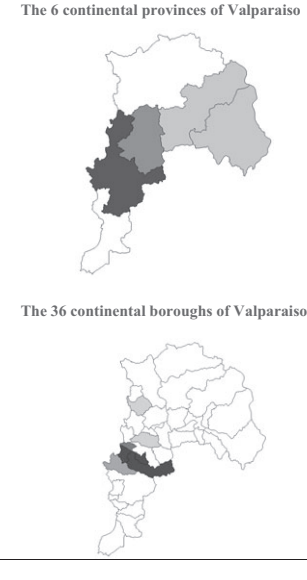


Figure 6.10 Immigrant density by province and borough in the V region of Valparaiso



with managerial/executive occupations than employed Chilean-born. However, immigrants also report a 2.9 fold higher rate of people in domestic service and a lower proportion of private employee occupations than the Chilean-born. These marked differences display the heterogeneity that exists in the immigrant population in Chile and the need for using a multivariate technique like cluster analysis to better represent the range of subgroups of immigrants existing in Chile.

Results from the hierarchical analysis

Three clusters were generated from the hierarchical cluster analysis, which categorized immigrants into high, medium and low socioeconomic groups. Table 2 presents the proportion of immigrants belonging to each cluster and Figure 2 a summary of the main characteristics of each cluster. As an expected consequence of the complete-linkage hierarchical method used, most of the sociodemographic measures included showed a clear gradient by socioeconomic status. The Low SES group emerged as the most deprived socioeconomic group, and the High SES the least deprived. Details are presented in the following paragraphs.

First cluster: immigrants with low socioeconomic status (SES)

Over 60 per cent of this group are women. They are the youngest group, with a mean age of 25 years, 10 years younger than the High SES cluster. This is mostly explained by presenting a larger proportion of children (below 16 years old) than the other two clusters (33.14% of children in this cluster versus 21.32% in Medium SES cluster and 0.89% in the High SES cluster). Over half of them are single, and they also report the highest rate of belonging to a minority ethnic group (7.91%). They have the highest proportion of people living in rural areas, but this is still low (11.57%). They are more likely to live in the Northern area of Chile than the other 2 clusters (25.64%), which is consistent with having the highest proportion of aymara ethnic people. In addition, almost 60 per cent of the immigrants in this group have been in Chile for less than 5 years and a third less than a year (34.85%). They show the highest proportion of people coming from Argentina (39.09%), Bolivia (10.11%) and Ecuador (6.17%) compared with the other two groups. This cluster includes immigrants with up to high school level education only and in the two poorest income quintiles (mean household income per capita of around 80 USD). Less than half of them are currently employed (42.70%), none of them have managerial occupations, 6 in 10 work in the private sector and 2 in 10 work in domestic service. They are more likely to report having difficulties finding a job (1.78% versus 0.21% in the second cluster and 0.90% in the third cluster) or to work in a temporary job (34.24%) than the other clusters. In addition, they have the highest proportion of housewives (33.18%) and ill, inactive people (2.73%).

Second cluster: immigrants with medium SES

Fifty-seven percent of these are women; their mean age is 33 years and almost 70 per cent belong to the active age group (15–65 years old). There is a slightly lower number of people belonging to minority ethnic groups than in the Low SES cluster (7.75%), but they belong to a wider range of ethnic groups. Most of them live in the Central area (72.62%) and over 50 per cent have lived for less than 5 years in Chile. However, they also include some immigrants living 21 or more years in Chile (16.38%). Most of them come from Peru and Argentina (35.16% and 25.18%) and most of them have technical level education (62.14%), but there are no immigrants with university level education. They report living in every income quintile, except for the poorest. Over 60% of them are employed and most of them work either in the private sector (47.26%) or domestic service (29.23%). They also have the highest rate of retired persons (16.33%) and the lowest rate of housewives (17.20%).

TABLE 2

DESCRIPTION OF THE THREE SOCIOECONOMIC GROUPS AFTER CLUSTER ANALYSIS

SES cluster	Absolute frequency	Percentage%	Weighted frequency	Weighted percentage%	95% Confidence intervals
Low	398	21.24	17 636	11.42	9.11–14.23
Medium	889	47.44	68 522	44.36	40.07–48.75
High	587	31.32	68 273	44.21	39.99–48.52
Total	1877	100	154 431	100	–

Third cluster: immigrants with high SES

Immigrants in this cluster are more likely to be men and their mean age is 35 years, which is the oldest mean age for the three clusters, but they do not have the highest proportion of elderly people. In fact, over 90 per cent of them are of working age, between 16 and 65 years old. They are likely to be married, closely followed by single status (51.10% and 42.05%). This cluster reports the lowest proportion of immigrants belonging to an ethnic minority group (2.79%) and the highest proportion of people living in urban settings and the Central area, compared with the other two groups (96.20% and 80.70%). One in three immigrants from this cluster have lived less than a year in Chile. Most of them come from Argentina (22.74%) and Peru (21.18%); however, around half of the immigrants included in this cluster come from a wide range of "other" non-Latin American countries. Immigrants belonging to this cluster have either technical or university level education (38.06% and 61.94%). People from this group report a higher household income per capita, 14.2 times that of the Low SES group ($1097 USD). Over 60% are currently employed and they show the highest proportion of people in managerial occupations (7.83%) and working in the public sector (10.21%). They also report the lowest rates of working in domestic service (6.12%), having an intermittent job (0.34%), being retired (7.65%) or ill (0.54%). In contrast, they have the highest rate of students among the three clusters (50.67%). A summary of these results appears in Table 3.

DISCUSSION AND CONCLUSION

The results of this study show that immigrants have significantly different demographic and socioeconomic characteristics from the Chilean-born and that there is also great heterogeneity within the immigrant population in Chile.

Some results are consistent with previous data reported by the Chilean Government, such as the marked regional immigration of working age people, the progressive urbanization of immigrants, and a growing rate of women immigrants coming to work (Stefoni, 2001; Martinez, 2003; Departamento de Extranjeria y Migracion, 2007).

Additional findings from this study are new to the understanding of the socioeconomic conditions of international immigrants in Chile. Results on marital status, minority ethnic status, years living in the country, and country of origin for example, add knowledge to what has already been described for immigrants in Chile. These features contribute to the so-called "new patterns" of immigration to Chile, adding relevant dimensions to the current understanding of the great complexity and heterogeneity that exists within this group.

Among different multivariate techniques, cluster analysis appeared to be the most appropriate method for grouping the immigrant population. Cluster analysis was a simple and yet robust method of identifying groups that are masked by a "cloud of individual variability" in their attributes. That is, some immigrants might simultaneously have different indicators of socioeco-

FIGURE 2
SUMMARY OF CHARACTERISTICS OF THE THREE SOCIOECONOMIC CLUSTERS, CASEN SURVEY 2006

Cluster 1 (n = 398)	**Cluster 2 (n = 889)**	**Cluster 3 (n = 587)**
63% women	57% women	51% women
Mean age 25 years old	Mean age 33 years old	Mean age 35 years old
30% < 15 years	All age categories	94% 16-65 years
Up to high school only	All except University level	60% professional degree
2 poorest quintiles 1 & 2	>50% middle quintiles 3 & 4	60% richest quintile
42% employed	64% employed	63% employed
No heads or managers	All categories of occupation	8% managers, 59% private sector
40% from Argentina	>60% from Argentina & Peru	From Argentina & Peru, followed by "other countries
60% <5 years in Chile	50% <5 years in Chile	30% <1 year in Chile
Description summary: ***Low SES***	*Description summary:* ***Medium SES***	*Description summary:* ***High SES***

nomic position, like a high level of education but a relatively poor income. When observing these variables as components of socioeconomic position, methods for dealing with so-called *weak typologies* need to be considered and cluster analysis is recommended (Olsen, 1988; Olsen and Granzin, 1988; Olsen, 2004). As a result, the immigrants living in the low SES cluster clearly emerged as a vulnerable group that needs further attention and protection in Chile.

This study supports the importance of the careful assessment of socioeconomic status to the understanding of the living and working conditions of international immigrants in Chile. Wider social and economic implications of demographic, material and migration related factors need further exploration and should be addressed in Chile in the future, especially in relation to population's health in this country and the Latin American region.

The key results from this study also allow some reflection on the range of migration theories that explain the complex relationship between socio-demographic conditions, migration, and health. Four salient theories have been considered in the background section of this manuscript, those being the push and pull theory, the cumulative causation theory, the global theory, and the behavioural theory. Although not all variables required for a complete comparative analysis between these theories are present, findings suggest the centrality of SES in the living condition of immigrants, factor that is not formalised in all migration theories. Besides, these theories provide some guide towards future research from this study, such as the inclusion of existing social links abroad and their importance in the decision to migrate, the relative importance of expectations that would be fulfilled in the foreign country, and the effect at the individual level of structural international relationships between countries, particularly in relation to economic development and work opportunities.

This study is not extent of challenges. The data used in our study belonged to a large national representative cross-sectional survey from Chile. However, due to the cross-sectional design used in this study, we cannot determine whether migration is a cause of poor SES (Rothman and Greenland, 2005). Nonetheless, the discussion on the causal relationship between migration and poor socioeconomic position has been discussed in the past decades (Wan and Tarver, 1972; Wei, Valdez et al., 1996; Fussell, Sastry et al., 2010; Conway and Rork, 2011; Keimer, Dreas et al., 2011). In terms of potential self-report bias, although some limitations have been recognized, self-reported socioeconomic status remains an important measure widely used in health research (Galobardes,

TABLE 3

SOCIAL DETERMINANTS OF HEALTH BY DIFFERENT SOCIOECONOMIC CLUSTERS AMONG THE IIP IN CHILE, CASEN SURVEY 2006

Dimensions	Low socioeconomic status		Medium socioeconomic status		High socioeconomic status	
	%	95% CI	%	95% CI	%	95% CI
Sex (male)[b]	36.85	28.37–46.22	43.81	39.25–48.48	48.52	42.47–54.61
Mean age	26.69	22.74–30.64	33.12	30.72–35.51	35.21	32.89–37.53
Age categories:[a]						
<=15[c]	33.14	23.78–44.05	21.32	17.27–26.02	0.89	0.33–2.37
16–65[c]	60.81	50.34–70.37	69.45	64.11–74.32	93.76	89.80–96.25
Over 65	6.05	2.71–12.95	9.22	6.07–13.78	5.34	3.00–9.35
Marital status:[a]						
Single	53.13	42.54–63.45	47.98	42.73–53.26	42.05	35.73–48.65
Married or cohabitant couple	39.01	29.51–49.42	41.70	36.60–46.98	51.10	44.69–58.07
Annulled, separated or divorced	3.18	1.52–6.27	4.36	2.79–6.78	4.31	2.62–7.00
Widow	4.68	1.84–11.42	5.97	3.41–10.23	2.53	0.87–12.43
Minority ethnic group: any[e]	7.91	5.06–12.17	7.75	4.52–12.92	2.79	1.40–4.47
Type of minority ethnic group:[a]						
Aymara	4.76	2.93–7.65	2.98	1.03–5.36	1.07	0.28–3.97
Atacameño	–	–	0.46	0.09–2.11	–	–
Mapuche	3.14	1.44–6.72	4.14	1.66–9.94	1.71	0.81–3.58
Others	–	–	0.18	0.02–1.25	–	–
Zone:[a]						
Urban[c]	88.43	83.83–91.85	93.20	90.97–94.10	96.20	94.71–97.29
Rural[c]	11.57	8.15–16.17	6.80	5.09–9.03	3.80	2.71–5.29
Area:[a]						
Northern[c]	25.64	16.00–38.43	15.39	10.83–21.42	7.81	5.08–11.81
Central[c]	51.88	40.00–63.56	72.62	66.35–71.18	80.70	75.25–85.02
Southern[b]	22.48	15.13–32.04	11.99	8.86–16.03	11.59	8.41–15.77
Mean number of households members:[c]	4.81	4.44–5.17	4.12	3.93–4.31	3.56	3.33–3.80

(CONTINUED)

TABLE 3

(CONTINUED)

Dimensions	Low socioeconomic status		Medium socioeconomic status		High socioeconomic status	
	%	95% CI	%	95% CI	%	95% CI
Educational level:[a]						
No education	5.58	2.63–11.45	3.93	2.25–6.80	–	–
Primary School[c]	42.68	33.92–51.93	2.66	1.44–4.87	–	–
High School[c]	47.63	37.95–51.93	31.27	26.40–36.97	–	–
Technical level[c]	–	–	62.14	56.95–67.42	38.06	31.80–44.75
University level[c]	–	–	–	–	61.94	55.22–68.20
Mean household income per capita (USD)[c]	76,92	69,14–84,70	574,26	395,96–752,55	1097,27	870,08– 1324,46
Mean household income, per capita:[a]						
Quintile 1 (poorest)[c]	50.23	48.62–63.16	–	–	58.09	50.29–65.90
Quintile 2	107.35	104.64– 110.07	109.06	102.81–115.30	113.14	106.87– 119.40
Quintile 3	–	–	161.74	156.54–167.53	165.09	157.37–172.80
Quintile 4	–	–	243.80	235.56–252.05	249.50	239.54–259.47
Quintile 5 (wealthiest)	–	–	972.93	616.32–1329.54	1552.06	1259.71–1882.14
Current active worker (yes)[c]	42.70	33.51–52.43	64.41	59.27–69.25	62.66	56.01–68.86
Type of occupation:[a]						
Head/ manager	–	–	2.62	1.01–6.61	7.83	4.58–13.07
Self employed	13.70	6.95–25.23	18.67	13.68–24.26	16.09	12.09–23.12
Employee public system[c]	1.08	0.29–3.90	2.21	0.95–5.04	10.21	6.12–16.54
Employee private system	64.73	48.39–78.27	47.26	40.55–54.07	58.94	51.09–66.39
Employee domestic service[b]	20.49	10.48–36.19	29.23	23.54–35.66	6.12	3.49–10.50
Unemployed:[a]						
Can't find a job	1.78	0.55–5.59	0.21	0.04–1.03	0.90	0.28–2.90
Found a job and starts soon	0.007	0.001–0.54	1.11	0.24–4.95	1.36	0.38–4.77
Doesn't want to work	4.43	0.95–18.26	8.61	4.75–15.11	8.97	3.28–22.23
Has an intermittent informal job	2.62	0.39–15.48	0.41	0.09–1.71	0.34	0.01–1.07
Other reason, not stated	10.24	3.95–24.04	11.04	5.74–20.18	9.68	4.23–20.63
Inactive:[a]						
Student	36.88	23.69–52.38	42.55	32.42–55.22	50.67	30.68–64.06
Housewife	33.18	22.64–45.72	17.20	11.34–25.24	19.96	12.68–30.97

(CONTINUED)

TABLE 3

(CONTINUED)

Dimensions	Low socioeconomic status		Medium socioeconomic status		High socioeconomic status	
	%	95% CI	%	95% CI	%	95% CI
Retired	8.06	2.99–19.96	16.33	9.40–26.84	7.65	3.90–14.45
Ill	2.73	1.03–7.00	2.54	0.96–6.51	0.54	0.14–2.12
Contractual status (doesn't have contract)[c]	39.97	23.41–59.19	24.32	18.08–31.66	13.92	9.41–20.10
Additional Migration Related Factors						
Years living in the country:[a]						
Less than a year	34.85	23.81–47.40	30.09	24.67–36.13	33.49	26.13–41.76
1 to 5 years	22.40	14.18–33.52	22.10	17.16–27.98	13.72	9.52–19.39
6 to 10 years	21.52	13.72–32.11	17.75	14.08–22.03	16.48	12.07–22.09
11 to 15 years	7.83	4.16–14.24	6.85	4.26–10.84	8.81	5.45–13.19
16 to 20 years	3.75	1.36–9.90	6.83	4.50–10.23	10.83	7.42–15.55
21 or more years	9.84	5.91–15.92	16.38	12.59–20.88	16.67	12.28–22.24
Country of origin:[a]						
Peru[c]	27.92	17.49–41.43	34.16	27.96–40.95	21.18	15.95–27.81
Argentina[b]	39.04	28.64–50.53	25.82	21.07–31.22	22.74	17.43–29.10
Bolivia[b]	10.11	5.68–17.37	7.22	4.06–12.50	3.38	1.71–6.59
Ecuador	6.17	2.01–17.47	4.92	2.57–9.21	4.77	2.72–8.23

[a]$p < 0.0001$ when comparing categories within the same variable for either the Low, Middle or High SES cluster
[b]$p < 0.05$ when comparing the same category across SES clusters
[c]$p < 0.0001$ when comparing the same category across SES clusters

Lynch et al., 2007). Self-reported migration status is a particularly sensitive measure and under and misrepresentation of immigrants through population-based surveys is not new (Woodrow, 1990; Premji, Duguay et al., 2010; Grit, den Otter et al., 2012; Vernon, 2012). As mentioned in the methods section, an analysis of the proportion of people who preferred not to report their migration status has also been developed by the authors and will be published in the coming months. In addition, around 15 per cent of the population did not agree to participate in this survey and they might be relevant to this analysis. For example, there is strong international evidence supporting the underestimation of migrant populations through survey studies and governmental figures (Almandoz, 1997; Flores and Abreu, 2002). Undocumented immigrants are a hard-to-reach population and tend to avoid participation in data collection processes due to their fear of being prosecuted and deported (Willen, 2012; Willen, 2012). They also tend to live in more socioeconomic deprivation and social vulnerability (Jolivet, Cadot et al., 2012). If this was the case, then results from this analysis would be a "best case scenario" and we would be underestimating the true prevalence of immigrants living in the Low SES cluster. Future studies (e.g. a migrant survey in Chile) could better inform about this "underestimation of undocumented immigrants" hypothesis and advance on the great heterogeneity found among international immigrants in Chile. Finally, cluster analysis does not allow for a goodness of fit test, as its entire purpose is to provide a better descriptive representation of the data of interest. Future studies could explore more complex techniques to approach causality between migration and SES and assess their goodness of it.

The two main policy recommendations that emerge from this study are:

(i) the importance of developing tailored policy that takes into account the great socioeconomic variability that exists within the immigrant population in Chile;
(ii) the need to continue to monitor the living conditions of this changing group to assess variations over time and across a range of policy strategies that might be implemented in the future.

The relationship between socioeconomic conditions, legal status, stigma and discrimination and working conditions should be urgently explored, in order to improve our understanding of the effects of migration in Chile, the Latin American region and more generally. Specific social policy strategies to identify immigrants with Low SES should become a focus of attention in the future in Chile, as they represent a vulnerable sub-group of immigrants, largely encompassing children and women, people from an ethnic background and living in relative poverty.

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