



<https://doi.org/10.25115/riem.v12i2.4656>

ISSN: 2173-1950

## **Characterization of immigration in the Chilean Pension and Unemployment Insurance Systems**

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**Abstract:** The levels of immigration recorded in Chile over the last few decades are unprecedented. Despite the magnitude of this phenomenon, the literature on immigration in Chile is scarce. Even though it is expected immigration has important effects on the Chilean labour market, there is not much historical neither systematic evidence available for a better understanding of the phenomenon. This can be mainly explained by the fact that related sources of information are limited and infrequent.

This paper aims at describing the demographic and socio-economic characteristics of the immigrants' formal working population in Chile (i.e. individuals working in the formal sector who by law contribute to the social security system), using administrative records of the Pension Systems and the Unemployment Insurance System, in addition to information provided by the Civil Registry and Identification Service on their nationality and country of origin.

The results obtained show an exponential increase in new foreigners to the social security system over the last few years. Haitians and Venezuelans are the largest groups, representing 70% of the total number of new foreign affiliates to the Pension System in 2018. The average wage difference between Chileans and foreigners increased by over 600% during the 2010-

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2018 period, differing by almost USD 300 in 2018 in favor of Chileans. This difference deepens with higher wages. Finally, there is an important gender gap both for Chileans and foreigners (around 10% in 2018). The gender gap for foreigners has importantly decreased during the last decade reaching the relatively more stable, but still important, Chilean gender gap of around 10%. However, foreign women are in a much weaker relative situation than Chilean women when age, cohort and time effects are obtained.

**Keywords:** immigration, migration trends, administrative data, labor market, Chile.

We deeply appreciate Ximena Quintanilla, Alexandra Rueda, Diego Herrera and Dagoberto Valenzuela for their comments and suggestions.

## **Caracterización de la población inmigrante en el sistema de pensiones y seguro de cesantía chileno**

Paulina Granados Zambrano<sup>4</sup>, Nicolás Rivera González<sup>5</sup>, María Fernanda Toledo Badilla<sup>6</sup>

**Resumen:** Los niveles de inmigración registrados en Chile durante las últimas décadas no tienen precedentes en su historia. A pesar de la magnitud de este fenómeno, la literatura sobre inmigración en Chile es escasa. Si bien es esperable que la inmigración tenga efectos importantes en el mercado laboral chileno, no hay evidencia histórica ni sistemática que permita entender mejor el fenómeno. Esto se explica, en gran parte, porque las fuentes de información afines son limitadas y presentan una baja periodicidad.

En este sentido, el objetivo de este documento es caracterizar demográfica y socioeconómicamente a la población inmigrante que trabaja en el sector formal en Chile (es decir, individuos que se afilian por ley al sistema de seguridad social), utilizando registros administrativos del Sistema de Pensiones y Seguro de Cesantía, en conjunto con información provista por el Servicio de Registro Civil e Identificación sobre nacionalidad y país de nacionalidad.

Los resultados obtenidos muestran un incremento exponencial de nuevos afiliados extranjeros durante los últimos años. Destacan, principalmente, haitianos y venezolanos, quienes llegan a representar, en conjunto, 70% del total de nuevos afiliados extranjeros en 2018. Respecto a los cotizantes, es decir, trabajadores que mensualmente pagan contribuciones a la seguridad social, se observa que la diferencia salarial promedio entre chilenos y extranjeros aumentó más de 600% durante el período 2010-2018, llegando a alcanzar casi \$200.000 en 2018 en favor de los chilenos. Esta diferencia se exacerba mientras mayores son los salarios de los cotizantes. Finalmente, existe una importante brecha de género tanto para chilenos como para extranjeros (alrededor del 10% en 2018). La brecha de género para los extranjeros ha disminuido significativamente durante la última década alcanzando los niveles de la relativamente estable, aunque importante, brecha de género de Chile. Sin embargo, las mujeres extranjeras se encuentran en una situación relativa mucho más débil respecto de sus pares hombres que las

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chilenas cuando se obtienen los efectos de edad, cohorte y tiempo de la dinámica de ingreso laboral.

**Palabras Clave:** inmigración, datos administrativos, mercado laboral, Chile.

Agradecemos profundamente a Ximena Quintanilla, Alexandra Rueda, Diego Herrera y Dagoberto Valenzuela por sus comentarios y sugerencias.

## **1. Introduction**

Immigration in Chile has gone from an invisible issue to one firmly established in public debate- The number of foreigners permanently residing in the country has increased explosively over the last few decades. According to the Census and the National Institute of Statistics (*Instituto Nacional de Estadísticas*, INE) in conjunction with the Department of Foreigners and Migration (*Departamento de Extranjería y Migración*, DEM), the number of resident foreigners increased from 187,008 to 1,251,225 between 2002 and 2018, equivalent to more than 500%. For the same period, the percentage of foreigners in relation to total population increased from 1.3% to 6.7%.

The economic implications of immigration to the host country have widely been studied (e.g., Borjas, 1995; Friedberg & Hunt, 1995; Friedberg, 2001; Borjas, 2003). Even though the magnitude of the current immigration phenomenon in Chile is unprecedented in its history, the literature on immigration has limited quantitative studies. In spite of studies on historical immigration flows, there are no adequate sources of information to understand, quantitatively, the effects that these flows have had on the economy. In respect to the most recent waves of immigration, Aldunate et al. (2019) use microdata from the Census, the National Employment Survey (*Encuesta Nacional de Empleo*, ENE) and the National Socio-economic Characterization Survey (*Encuesta de Caracterización Socioeconómica Nacional*, Casen) to carry out a demographic characterization of the immigrant population and to analyze its insertion into the labor market. Furthermore, Aninat and Vergara (2019) and Martínez Pizarro and Cano Christiny (2022) analyze the multidimensional dynamics of this phenomenon using data from the Survey data and the Census.

The main objective of this paper is to characterize the immigrant formal sector working population in Chile from a demographic and socioeconomic point of view. Therefore, this document uses administrative records from the Pension System - specifically those of new affiliates and contributors - complemented with information provided by the Civil Registry and Identification Service on the nationality and country of origin of individuals. We specifically analyze the dynamics between Chileans and foreigners of the following interest groups: (i) new affiliates (1981-2018); (ii) domestic workers (2011-2018); (iii) contributors (2010-2018); and (iv) “non-contributors” and beneficiaries of unemployment insurance (2010-2018).

This paper only covers the formal sector of the labor market (i.e., salaried workers), and not those informally employed who do not participate in the Pension System. However, foreign workers belonging to the formal sector represent an important part of the total number of foreigners residing in the country. For example, in 2006, the total number of foreign affiliates to the Pension System was equivalent to 68% of the total number of foreigners living in the country, which increased to 74% in 2018. In addition, only those immigrants who have a valid RUN<sup>7</sup> issued by the Civil Registry and Identification Service up to September 2019 have been considered in the present study. This procedure takes between 13 and 14 months from the moment of entry into the country.

The main innovation of this paper is to offer an exhaustive and detailed analysis of the immigration phenomenon in Chile through the use of administrative records of workers belonging to the formal sector of the labor market. In this regard, the Superintendence of Pensions aims to highlight the potential of using administrative records, whose use and development for statistical and research purposes are still incipient in Chile, in contrast to international standards (INE, 2015a). Therefore, this document is expected to contribute to the existing literature on immigration in Chile and to be used as a reference for the analysis, discussion and design of public policies in this area.

The rest of the document is organized as follows. Section 2 reviews the literature on immigration. Section 3 analyzes the evolution of immigration in Chile and a perspective of the representation and coverage of workers affiliated to the pension system. Section 4 describes the data. Section 5 characterizes the new affiliates. Section 6 describes domestic workers. Section 7 describes contributors to the pensions system. Section 8 compares Chileans and foreigners labour income gender gaps and its evolution over the life cycle. Finally, Section 9 concludes.

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<sup>7</sup> In Spanish, *Rol Único Nacional* (RUN) is a unique national identifying number given for identification purposes.

## **2. Literature Review**

There is extensive literature measuring the effects of immigration on a given domestic economy. Borjas (1995) points out that domestic population benefits from immigration due to complementary productive factors, and that these benefits are greater when foreigners provide productivity factors not available domestically. The author concludes that the economic benefits of immigration to the United States are not considerable, amounting between 6 and 20 billion dollars a year.

On the other hand, Friedberg and Hunt (1995) point out that there is no economically significant evidence that immigration causes a reduction in domestic employment. In particular, evidence for the United States and other countries, shows that a 10% increase in the proportion of foreigners to the total population reduces the wages of domestic workers by 1% at the most. The authors also point out that the impact on domestic GDP per capita critically depends on the level of education of foreigners.

Friedberg (2001) looked into the occupations of foreigners in Israel and determined that immigration had no negative impact on the labour market outcomes of the domestic population. In addition, Borjas (2003), using data on immigrant heterogeneity in terms of education and work experience, estimates the impact of immigration on a given country's labour market outcomes, concluding that immigration reduces the wages of competing workers. Specifically, a 10% increase in the labor supply reduces wages by 3-4%.

In the Chilean case, the literature on immigration is scarce, which is explained essentially by two reasons. First, although Chile has received various waves of immigrants throughout its history, the relevance of this issue, both in public and academic discussion, arises mainly given the recent immigration levels. Second, the sources of information for the study of immigration are limited and infrequent (Census and Casen Survey).

Nevertheless, Cano and Soffia (2009) provide a historical description of immigration in Chile. Although the authors point out that the first overseas immigrants were the Spanish conquerors, classical historians do not consider them as immigrants (Villalobos et al., 1974; Encina, 1983-1984; Izquierdo, 1989-1990). The concept of “immigrant” is usually placed after country's Independence, characterized by iconic individual immigrants such as the German explorer Bernardo Philippi, the French naturalist and geographer Claudio Gay, the Polish naturalist Ignacio Domeyko, among others. Later, the enactment of the Colonization

Law in 1845 initiated the planned settlement of European immigrants in specific regions of Chile (for example, the German colonists who settled down between Valdivia and Puerto Montt, in the south of Chile). Thus, immigration is no longer treated as an isolated event and it begins to be understood as a complex and dynamic process.

Intraregional flows to Chile significantly increased border immigration towards the end of the 19th century, mainly due to the annexation of new territories to the Chilean State after the Pacific War and the saltpeter industry boom (Rodríguez, 1982). However, Chile only consolidated itself as an attractive destination for regional immigrants during the 1990s, influenced by the vigorous economic growth of the time (Aninat, 2000).

Recent immigration phenomena has been studied by Aldunate et al. (2019), who characterize the demographics of immigrants and analyze their insertion in the labor market using microdata from the Census, the National Employment Survey (ENE) and the National Socio-economic Characterization Survey (Casen). In particular, the authors show that immigrants, in comparison with Chileans, are younger, and have higher market participation rates, possess on average a higher level of education, and are similar with respect to the composition of employment by economic sector, occupational category, and informality. The authors conclude that foreigners have integrated well into the labor market, suggesting that immigration could be an important factor in the long-term growth of the Chilean economy.

Along the same lines, Aninat and Vergara (2019) carry out an in-depth multidisciplinary analysis of immigration using data from the Census and the Casen Survey. Specifically, authors point out that foreigners arrive mainly in search of new job opportunities, and that it takes them some years to equal the conditions of Chileans in sectors like health, pensions, education, and housing (even surpassing them in some cases). In addition, the authors show that, although immigration is currently positively assessed, the integration of foreigners into society remains a pending challenge.

Finally, Martínez Pizarro and Cano Christiny (2022) analyze the impact of recent immigration on Chile's development, in areas such as demography, labor market and economic dynamics. Regarding the contribution of immigrants to the labor market, the authors highlight the following stylized facts: (i) the immigrant labor force has grown, on average, 20% per year between 2009-2017, more than 10 times the annual growth of the Chilean labor force; (ii) immigration represents 6.5% of the labor force, with significant



differences being observed by gender (7.1% for women and 6.1% for men) and age group (9.5% between 15-39; 4.5% between 40-59, and 2.2% 60 or more); (iii) immigrants have contributed to fill the deficit in the economically active population generated by demographic aging (40% of the growth of the labor force between 2009-2017); and (iv) the employment of immigrants is concentrated mainly in two economic sectors: commerce and construction for men (31.4% and 18.4%, respectively), and commerce and personal services -such as paid domestic work and care- for women (33.1% and 23.0%, respectively).

From a gender perspective, specifically related to gender division of labor and immigration patterns, it is important to study the evolution of domestic work in Chile, a mainly female occupational category that, in recent years, has had a strong immigration component.

The gender division of labor, understood as a social mandate that assigns tasks and activities according to the sex of individuals, has historically designated women in reproductive roles, both biological and social in the private sphere, while men are associated with a productive role in the public sphere (INE, 2015b).

These socio-cultural patterns are reproduced in different social spheres, one of which is the labor market, where most of its structures and patterns are dominated both by the presence and the hierarchy of men. This results in differentiated access, by sex, to jobs, producing gender segmentation and segregation in the labor market (INE, 2015b; Vaca, 2019).

Gender segmentation determines the working conditions available to men and women and the sectors which they have access to, while segregation is observed for women having more likely access to certain segments of the labor market, particularly those related to domestic work and care (INE, 2015b).

These patterns apply as well to the Chilean labor market. According to the Casen Survey (2017), women are overrepresented in care work (education, health, social assistance and domestic employment).

Furthermore, occupations associated with domestic work present inferior working conditions in terms of formality and salary. It is observed that women working in this sector

have lower incomes, higher levels of poverty, lower levels of education, and greater informality (Órdenes, 2016).

Just as the labor market is segmented and segregated according to sex, so are other dimensions like social class, ethnicity and even nationality. Currently, it is observed that women more often migrate on their own, with the aim of inserting themselves in the labor market of the destination country, and not as a dependent affiliate of the family (OIT, 2016, 2017).

In South America in particular, migration is heavily feminized, with a strong participation of women in paid domestic work. This occupational sector has traditionally been occupied by women, especially those belonging to poor, indigenous, and Afro-descendent households. The increase in women's immigration to the cities in the second half of the twentieth century led to an expansion of paid domestic work in the region, which now accounts for the largest proportion of women's employment worldwide (CEPAL, 2019). In Chile, at the beginning of the 2000s, Peruvian immigration was particularly noteworthy, most of which was women working in “live-in” domestic service<sup>8</sup> (Martínez, 2003).

In analyzing immigrant labor patterns, it is thus important to consider gender differences, and particularly, within segmentation and segregation of the labor market, domestic work. This is useful not only for explaining women's employment behavior, but also for designing public policies, since domestic work is a particularly vulnerable and stigmatized sector, both because of its low social and economic value and because it is often the only employment option for immigrant women (CEPAL, 2019).

### **3. Immigration in Chile**

Immigration in Chile has increased exponentially over the last few decades. According to the Census, the number of foreigners who reside in the country quadrupled in fifteen years, from 187,008 in 2002, to 746,465 in 2017. For the same period, the percentage of foreigners in relation to the total population increased from 1.3% to 4.4% (Figure 1).

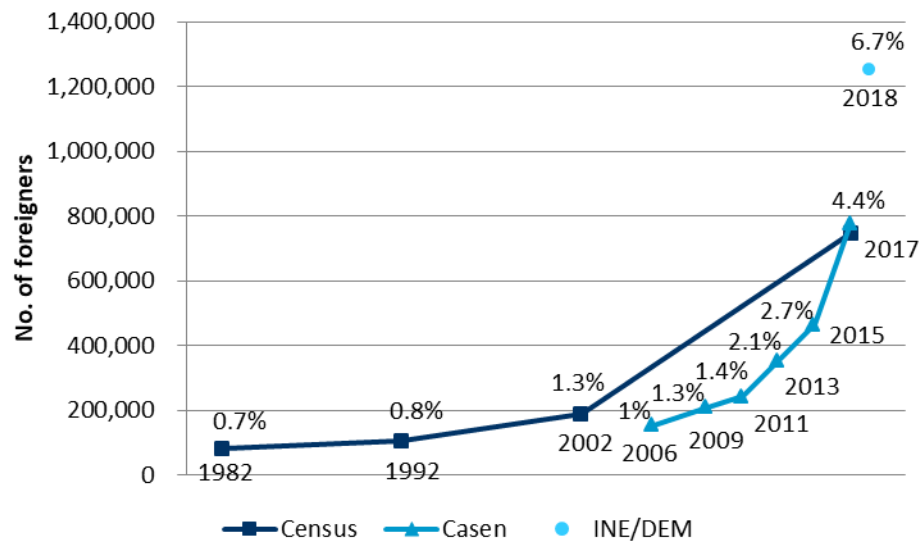
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<sup>8</sup> This term refers to domestic workers who live in the same dependences of the employer, at least during the week. There are rules to regulate daily working hours and leave/holidays/free days.

According to the INE and DEM's estimation of the foreign population in Chile (2019), the dynamics of immigration in 2018 was much more accelerated than in previous years. Specifically, the total number of foreigners habitually resident in Chile amounts to 1,251,225, which represents an increase of 67.6% with respect to 2017. Further, the percentage of foreigners in relation to the total population reached 6.7%.

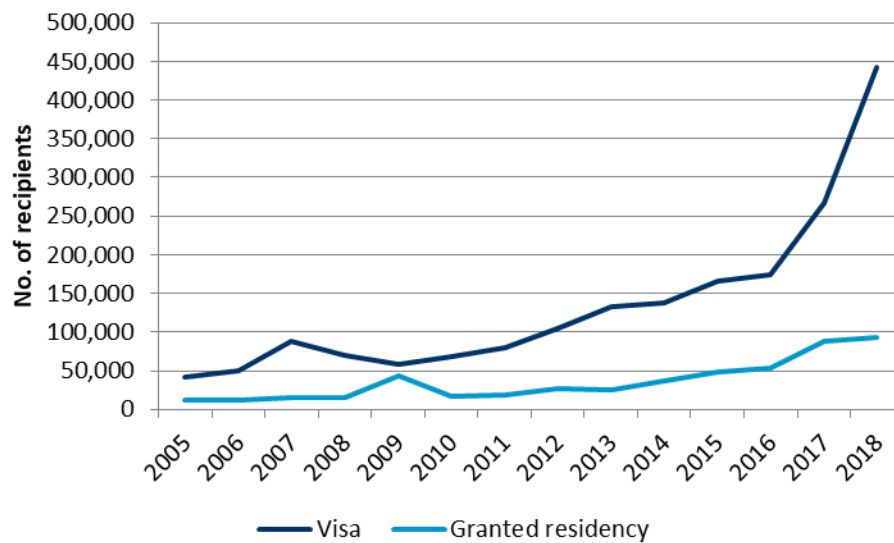
The administrative records of the DEM confirm the active dynamics of the most recent waves of immigration. As Figure 2 shows, the number of visas and permanent residency granted to foreigners increased considerably between 2005 and 2018 (969% and 683%, respectively). Of the total number of visas granted in the period, it is worth mentioning that 52.3% were received by men and 47.7% by women. In addition, the majority of visas were granted to foreigners between 18 and 29 years of age (42.5%). Finally, the three nationalities that received the most visas were Peru (28.2%), Colombia (14.0%) and Venezuela (13.8%).

**Figure 1. Immigration over time in Chile**



Source: authors, with information from Census, Casen Surveys, INE and DEM.

**Figure 2. Number of visas and granted residency to foreigners**



Source: authors, with information from DEM.

It is clear that the recent migratory flows to Chile may have significantly affected the domestic labor market. For instance, the total number of foreign affiliates to the Pension System in 2018 represented more than 70% of the total number of foreigners residing in the country the same year.

It is important to notice that since 1981 Chile has had a compulsory Defined Contribution (DC) Pension System design, which means that every employee that has a contract with an employer in Chile contributes by law 10% of his/her monthly salary to an individual saving account for retirement. Self-employed workers can also contribute to the Pension System<sup>9</sup>. Figure 2 shows the individuals contributing to the Pension System in December of each year as a proportion of the economically active population (panel A) and as a proportion of the working population (panel B). Both panels highlight the important coverage of the pension system, and the increasing relative importance of foreigners over time. The proportion contributors over economically active population for Chileans has been stable around 40% since 2012. However, the participation of foreigners has increased from 1% to 3.9% of the economically active population during the same period. The situation is similar if we look at the proportion of contributors to the pension system over the working population: it has been stable since 2012 around 63% with an increase to 64% in 2018, with an important increase in the foreigner's participation increasing from 1.5% in 2012 to 5.6% in 2018.

The difference between the working population and the contributors to the pension system correspond to the documented 30% of labour market informality in Chile (INE and DEM, 2019), population that is not included under the scope of this study.

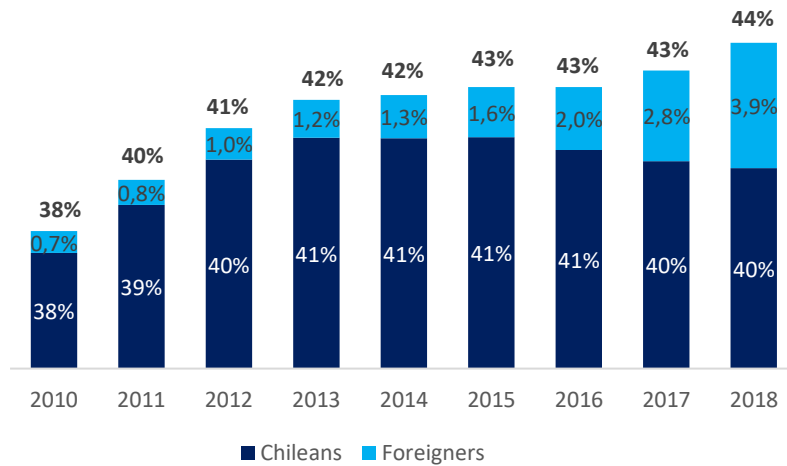
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<sup>9</sup> Self-employed workers issuing invoices for their services have since 2015 the obligation to contribute to save for retirement. There is also the option to voluntarily contribute for those self-employed workers not obliged to contribute.

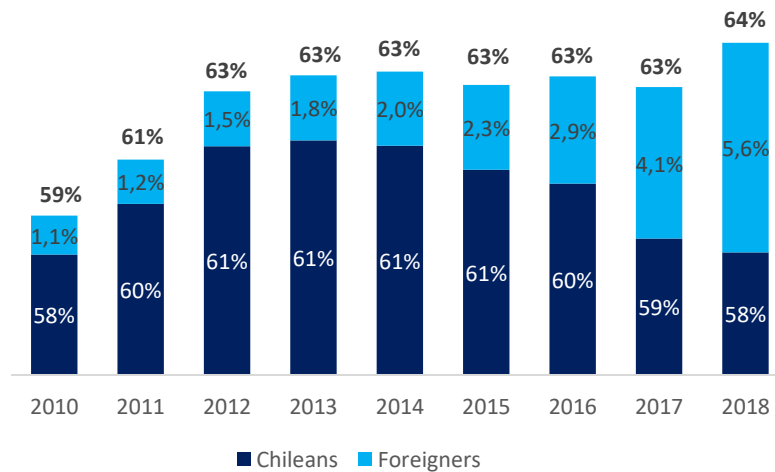
**Figure 3. Contributors to the Pensions System as a proportion of relevant labour market measures**

**Panel A:** As a proportion of economically active population

(Individuals between 15 and 64 years old)



**Panel B:** As a proportion of the working population



Source: National Bureau of Statistics and Superintendence of Pensions.

#### **4. Data**

The main source of information used in this paper is the Pension System's Database of Affiliates, Contributors, Beneficiaries, Pensioners and Deceased Persons (*Base de Datos de Afiliados, Cotizantes, Beneficiarios, Pensionados y Fallecidos del Sistema de Pensiones*, BDA), which contains administrative records of all those individuals who participate or have participated at some time in the Pension System. The BDA is monthly reported and it is based on information sent by the Pension Fund Administrators (AFPs) to the Superintendence of Pensions.<sup>10</sup>

In 1980, a pay-as-you-go scheme, in which active workers financed the benefits of those who had moved on to the passive stage, was replaced by an individual capitalization system, covering civilian population only (i.e., military and police force are excluded). Since participation in the Pension System is compulsory for every worker, it captures formal employment (Superintendence of Pensions, 2010).

The analysis focuses on the following interest groups: (i) new affiliates (1981-2018); (ii) domestic workers (2011-2018); (iii) contributors (2010-2018); and (iv) “non-contributors” and beneficiaries of unemployment insurance (2010-2018). Specifically, only new affiliates and contributors who are active in the system, i.e., those who are alive and non-pensioned, and who have made compulsory or voluntary contributions to the Individual Capitalization Accounts are considered. Only contributions corresponding to wages accrued in the current month or in the previous month are considered, thus excluding contributions that are credited late.

Although the BDA contains a large amount of data, analysis focuses exclusively on information related to the socio-economic and demographic characteristics of participants in the system. Variables included are the date of affiliation, gender, date of birth, place of residence at the date of affiliation, total number of months contributed to the individual account, date of accrual of wage, amount of contribution, AFP, and type of fund where the individual has his savings invested.<sup>11</sup>

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<sup>10</sup> The BDA is provided by the Superintendence of Pensions exclusively for the purpose of technical studies, audits and to respond to requests from users of the system (D.L. No. 3,500 of 1980).

<sup>11</sup> There are five types of funds (from “fund A” the most risky to “fund E” the more conservative) available to affiliates.

In addition, information provided by the Civil Registry and Identification Service on the nationality and country of nationality of the new affiliates and contributors (BDRC) is used, which is linked to the BDA through the RUN of the individuals.<sup>12</sup> The variable “nationality” is thus constructed through three categories: (i) Chilean (includes nationalized individuals); (ii) foreign; and (iii) “no information”. Records from the BDA that have no equivalent in the BDRC, and those that do but have no information available on nationality, belong to this last category.

The interpretation of “no information” records is not trivial, as it is highly probable that the vast majority of these records correspond to foreigners who have not yet obtained their RUN.<sup>13</sup> There are basically two reasons for this. First, as mentioned above, the time that passes from the date a foreigner arrives in the country until he/she obtains a RUN validly issued fluctuates between 13 to 14 months.<sup>14</sup> Moreover, if we consider the recent immigration boom, it is possible that these periods are now longer. Second, the time lag from combining databases also plays an important role. Given that the last BDRC merging took place in September 2019, the overestimation of “no information” records is further exacerbated, as only those foreigners who arrived in the country up to July 2018 may have a RUN.

Finally, the Unemployment Insurance Database (*Bases de Datos del Seguro de Cesantía*, BDSC) is used to identify the type contract of the workers and characterize periods without contributions. It is worth mentioning that unemployment insurance only covers workers over 18 years of age governed by the Labor Code. In other words, the following groups are excluded from this part of the analysis: (i) workers subject to training contracts; (ii) workers under 18 years of age; (iii) domestic workers; (iv) pensioners; (v) independent or self-employed workers; and (vi) public sector employees.

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<sup>12</sup> There is an agreement for the provision of data verification services, signed in April 2017, between the Superintendence of Pensions and the Civil Registry and Identification Service.

<sup>13</sup> It is estimated that approximately 49% of the 2017 “no information” records appear with RUN when updating the BDRC (September 2018 versus September 2019), which are mostly foreigners.

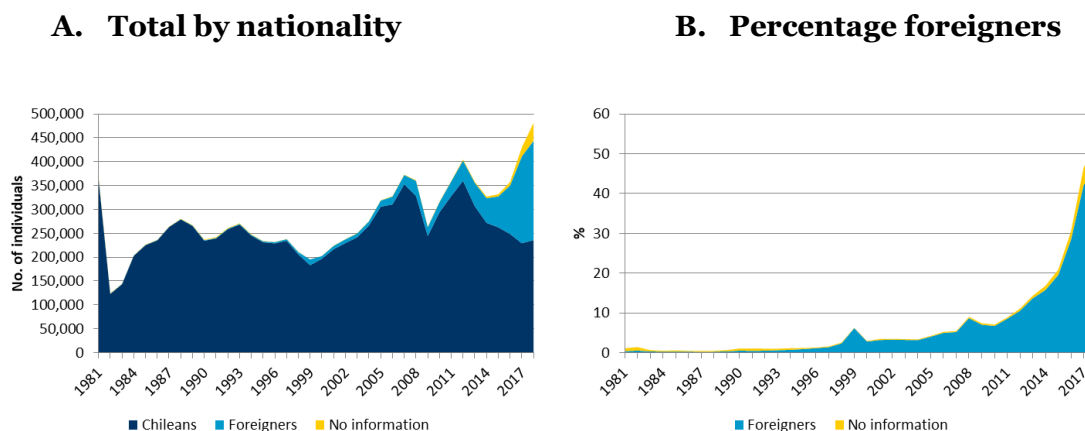
<sup>14</sup> In 2016, the average number of days between the date of arriving to Chile as tourists and the date of application for the first visa was 103 working days (Silva & Ballesteros, 2017). In addition, for the period 2017-2018, the average time for delivery of visas was 139 working days (Bellolio, 2019). Finally, the identity card must be processed within 30 days after the delivery of the visa and takes 8 to 10 working days to be delivered (ChileAtiende).



## 5. New Affiliates

Stylized facts on immigration in Chile are consistent with those observed within the Pension System. As Figure 4 shows, the number of new foreign affiliates has grown exponentially since the beginning of the system, from a share of the total number of new affiliates below 1% between 1981 and the mid-1990s, to over 40% in 2018. If it is also considered that a significant part of the records “without information” in 2018 are foreigners in the process of obtaining RUN, as explained in the previous section, the percentage of foreigners could have reached more than 50% in that period.

**Figure 4. New affiliates**



Source: Superintendence of Pensions.

The total number of new affiliates varies consistently with the economic cycle, with a significant decrease during the first years of the most recent international economic crises: the Asian crisis (1997-1999), and the Subprime crisis (2008-2009). If we look at the dynamics prior to the immigration boom, i.e., 1981-2010, the number of new foreign affiliates rose significantly during these periods (1999 and 2008, respectively), which in addition to the decline in new Chilean affiliates makes the proportion of new foreign affiliates in the total number of new affiliates also reach a maximum during these years.

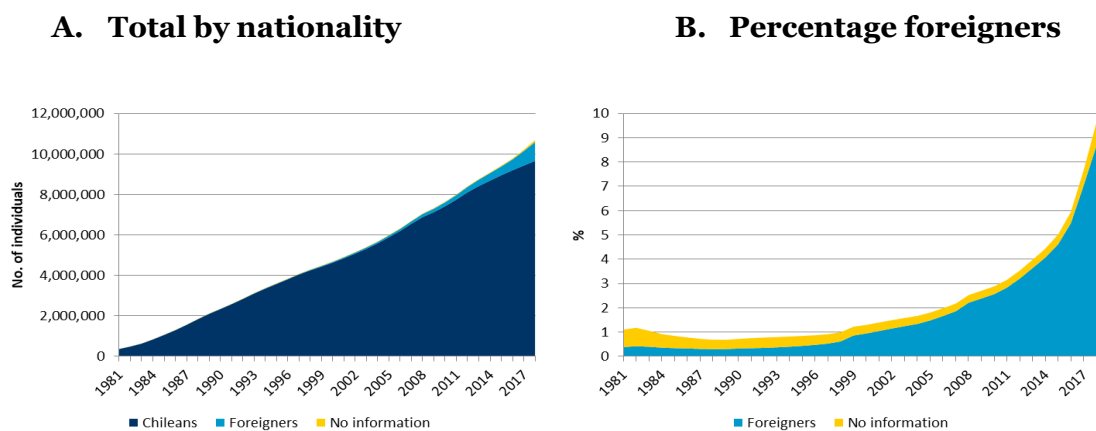
It should also be noted that the number of new foreign affiliates has increased considerably over the last decade, from 18,590 in 2009 to 208,324 in 2018, an increase above 1,000%.<sup>15</sup> In contrast, the number of new Chilean affiliates has decreased

<sup>15</sup>On the same line, Aninat and Vergara (2018) show that the immigrant workforce increased by almost 500% between 2006 and 2017.

progressively from 2012 onwards, representing even less than half of the total number of new affiliates in 2018.

As regards the stock of affiliates, Figure 5 shows that the total number of affiliates has grown progressively for the period 1981-2018, driven by the systematic incorporation of new affiliates into the system. Although foreign affiliates represent a small proportion of the total number of affiliates until the end of the 1990s (less than 1%), the percentage of foreigners increased exponentially from 2000 onward, growing to more than 8% in 2018.

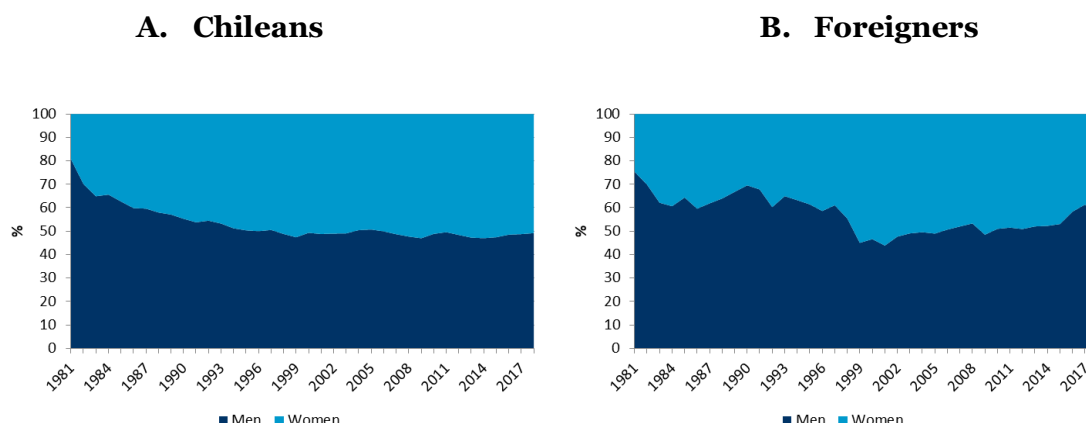
**Figure 5. Stock of affiliates**



Source: Superintendence of Pensions.

Figure 6 shows that the sex composition of new affiliates differs between Chileans and foreigners. New Chilean affiliates have progressively increasing proportions of women since the beginning of the system, reaching more than 50% of the total in 2018. This is consistent with the growing participation of women in the labor market (INE, 2015b). As for new foreign affiliates, throughout the 1980s and almost all of the 1990s, there were more men than women. Although this pattern was reversed between the end of the 1990s and the mid-2000s, from then on the proportion of men was again predominant, reaching 57% in 2018.

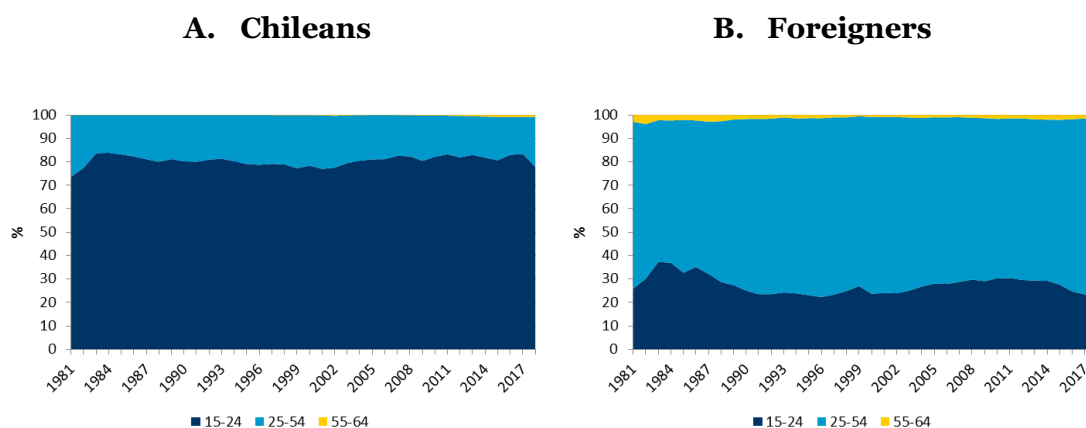
**Figure 6. New affiliates by nationality and sex (%)**



Source: Superintendence of Pensions.

It is also evident that the age of new affiliates differs substantially according to nationality (Figure 7). In particular, the greatest proportion of new Chilean affiliates is in the 15-24 years-of-age group. In contrast, the predominant age group of new foreign affiliates is 25-54 years old. In fact, for the period 1981-2018, the average age of new foreign affiliates is 31 years old, while that of Chileans is 22.

**Figure 7. New affiliates by nationality and age group (%)**

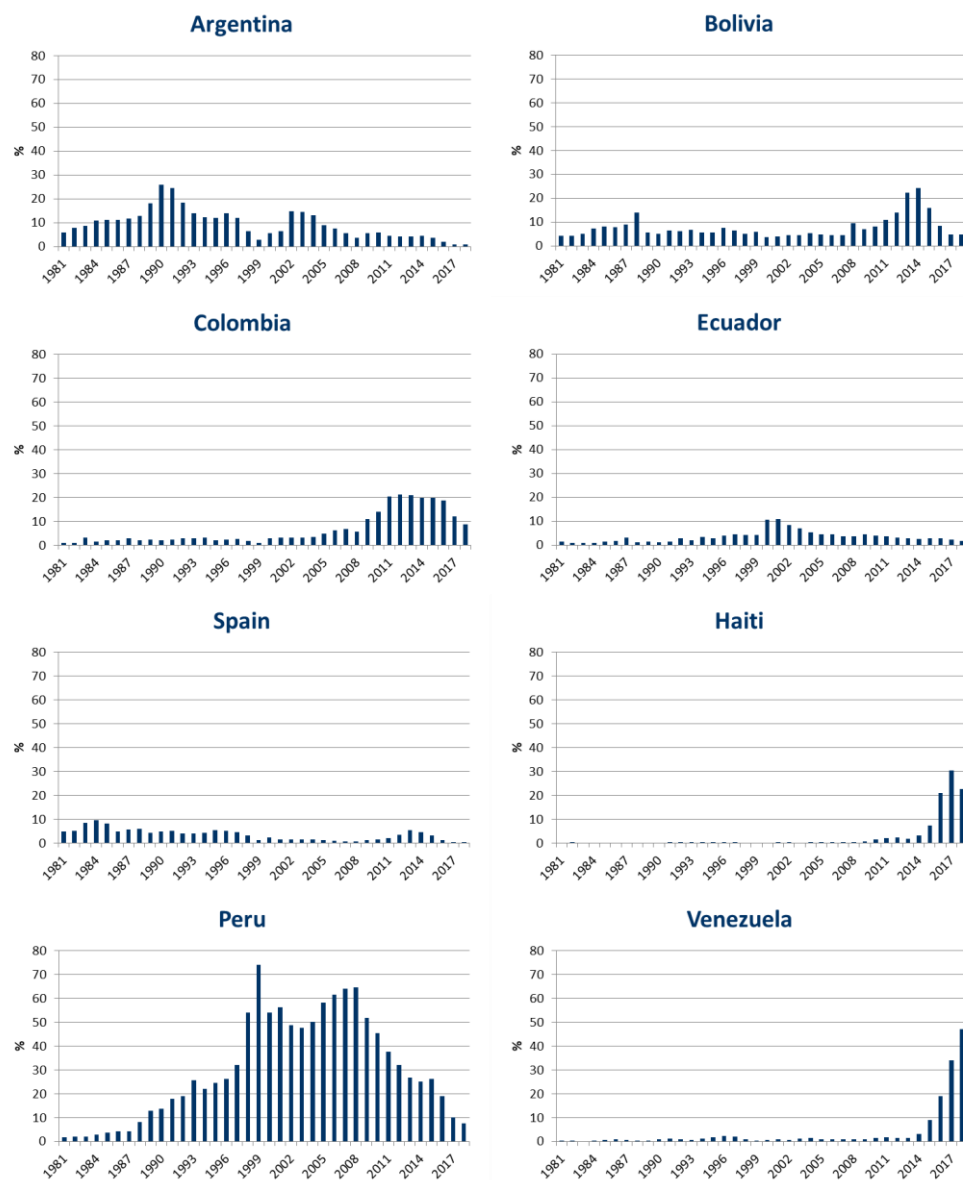


Source: Superintendence of Pensions.

The country of nationality of the new foreign affiliates (Figure 8) reveals that the majority of them came from Argentina, Bolivia and Spain during the 1980s. This scenario changed drastically in the 1990s, when the number of new Peruvian affiliates began to rise rapidly,

reaching almost 75% of the total number of new foreign affiliates in 1999. Although Peru remained the main nationality of new foreign affiliates during the 2000s, the relative importance of new Peruvian affiliates began to gradually decline towards the end of the decade. In contrast, a greater participation of new Bolivian and Colombian affiliates was observed during the first part of the decade of 2010. Finally, from 2015 onwards, the rise of new Venezuelan and Haitian affiliates is considerable, accounting for 70% of the total number of new foreign affiliates in 2018. This result is consistent with Aninat and Vergara (2019).

**Figure 8. New foreign affiliates by country of nationality (%)**



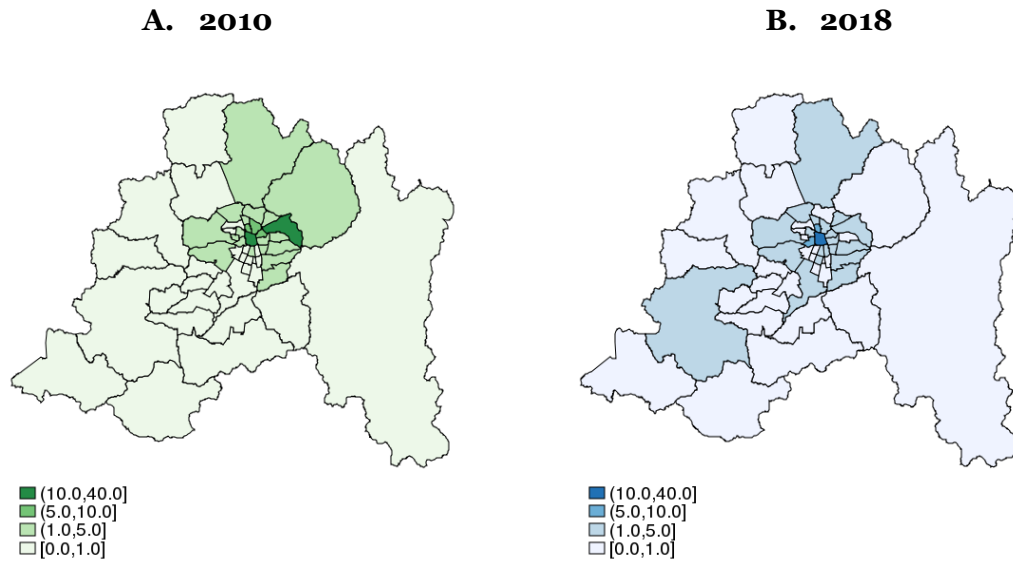
Source: Superintendencia de Pensiones.

There is consensus in the literature that the main cause of migration is the economic disparity between the country of nationality and the country of destination (Ravenstein, 1976). In this sense, it is interesting to explore the economic, political and social context of countries that represent the main groups of immigrants in Chile. For example, the rise of new Peruvian affiliates in the late 1990s coincided with the economic and political crisis experienced in Peru during the last stage of Alberto Fujimori's government (Altamirano, 2003). In the case of Haitians, the reasons for recent emigration are directly related to natural disasters (the 2010 earthquake, among others) and the country's constant political instability (Jean-Mary, 2017). In the case of Venezuelans, there has been a considerable increase in emigration since 2014 as a result of the worsening humanitarian crisis experienced during the government of Nicolás Maduro (Vargas, 2018) and the special visa benefits facilitating Venezuelan immigration offered by Chile in 2018 called *Visa de Responsabilidad Democrática* (*Oficio Circular* No. 96, Ministry of Foreign Affairs).

Consistently with the geographically distribution of population in Chile, most of new foreign affiliates reside in the Metropolitan Region (approximately 60% in 2018). Therefore it is interesting to explore how they are distributed according to municipality of residence (Figure 9). In general, there is a high territorial concentration at municipality level, since 70% of new foreign affiliates residing in the Metropolitan Region are gathered in only 10 municipalities (out of a total of 52). All of them are located in the so called *Gran Santiago* area, which is the main province and also de capital of the Metropolitan Region. This result is consistent with Aninat and Vergara (2019).

Traditionally the wealthier municipalities have been located in the eastern sector of *Gran Santiago* and the poorer in the western part. In 2010, the municipalities with the highest concentration of new foreign affiliates were Santiago (24.5%), Las Condes (11.1%), Providencia (9.6%), Recoleta (5.2%), and Independencia (5.2%), where more than 50% of the total new foreign affiliates in the Metropolitan Region live. This composition changed significantly in 2018, when the municipalities with the greatest relative increases were Santiago (35.1%), Estación Central (5.4%), Independencia (5.1%), Las Condes (4.9%), and Providencia (3.9%). Thus, new foreign affiliates are mainly concentrated in the municipality of Santiago and in the western sector of the *Gran Santiago* (Estación Central), to the detriment of municipalities located in the eastern sector (Las Condes and Providencia).

**Figure 3. New foreign affiliates in the Metropolitan Region according to municipality of residence (%)**

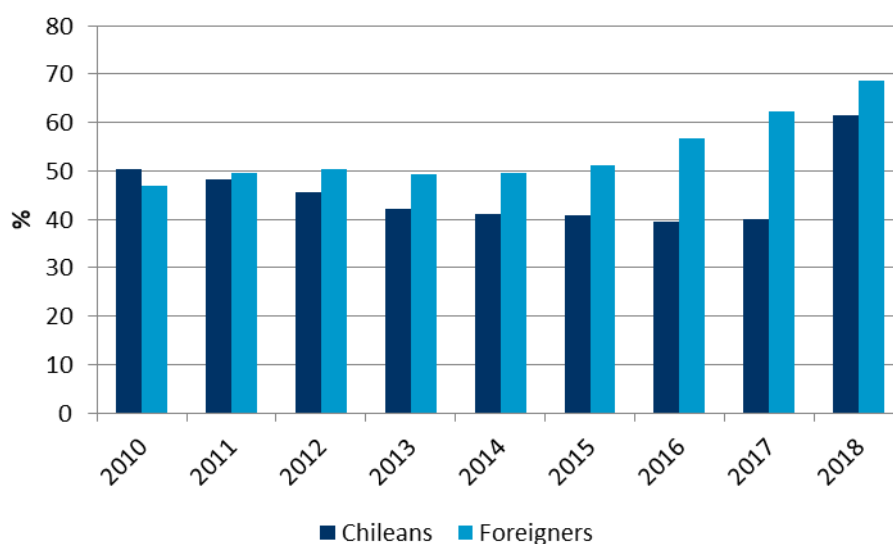


Source: Superintendence of Pensions.

Note: For each year, the percentage is calculated as the proportion of new foreign affiliates residing in each municipality in relation to the total new foreign affiliates in the Metropolitan Region.

Figure 10 shows that the density of contributions differs between Chileans and foreigners. Specifically, the density of contributions of foreigners has increased 22 percentage points in almost a decade, from 47% in 2010 to 69% in 2018. In contrast, the density of contributions has gradually decreased from 2010 onwards, with the exception of the increase in 2018. It should also be noted that the contribution density of foreigners exceeds that of Chileans as of 2011, reaching a difference of 7 percentage points in 2018. This difference can be explained by the greater incentives for immigrants to contribute, given among others the visa requirements and access to the banking system (Aninat & Vergara, 2019).

**Figure 4. Contribution density of new affiliates by nationality (%)**



Source: Superintendence of Pensions.

Note: Density is calculated as the percentage of contributed months over the total months from the date of enrollment to December 2018.

## 6. Domestic Workers

This section demographically characterizes domestic workers in private homes that belong to the Pension System. Article 146 of the Labor Code defines workers in private households as: (i) “natural persons who are employed on a continuous basis, whether full- or part-time, in the service of one or more natural persons or a family, in cleaning and assistance work required of the household”; (ii) persons who carry out work that is the same or similar to the above “in charitable institutions whose purpose is to care for persons with special protection or assistance needs, providing them with the benefits proper to a household”; and (iii) drivers in private households.

Likewise, Article 5 of Law No. 19,010 establishes that workers in private homes shall be entitled, regardless of the cause originating the termination of the contract, to an indemnity for any type of unemployment event to be financed with an employer's contribution, equivalent to 4.11% of the monthly taxable remuneration. The obligation to make this contribution lasts for 11 years in relation to each worker, a period counted from 1 January 1991, or from the date of commencement of the employment relationship, if later. The

amount of the compensation is determined by the contributions of each period plus the profitability obtained from them.

The contributions made by employers shall be administered by the AFPs, which shall create a special savings account for this purpose called the compensation savings account (*Cuenta de Ahorro de Indemnización*, CAI). This allows for the identification of those who contribute to the CAI and are, therefore, private household workers. However, CAI accounts are also created for workers governed by the Labor Code and its complementary laws, who agree, as of the beginning of the seventh year of the labor relationship, to replace unemployment payments with compensation for any unemployment event (substitute compensation).

Since it is not possible in the BDA to separate contributions to CAI accounts made by employers of private household workers from those made by substitute compensation, only those who were inscribed as private household workers are characterized, and not all those who contributed. For this purpose, those affiliated with CAI and compulsory private accounts at the AFP are included if they have contributed to the CAI accounts within 6 months after the date of affiliation (in view of the possibility of delayed contributions). This guarantees that the affiliates selected are, in their entirety, workers from private homes, since those who agree to substitute compensation must do so from the seventh year of the employment relationship.

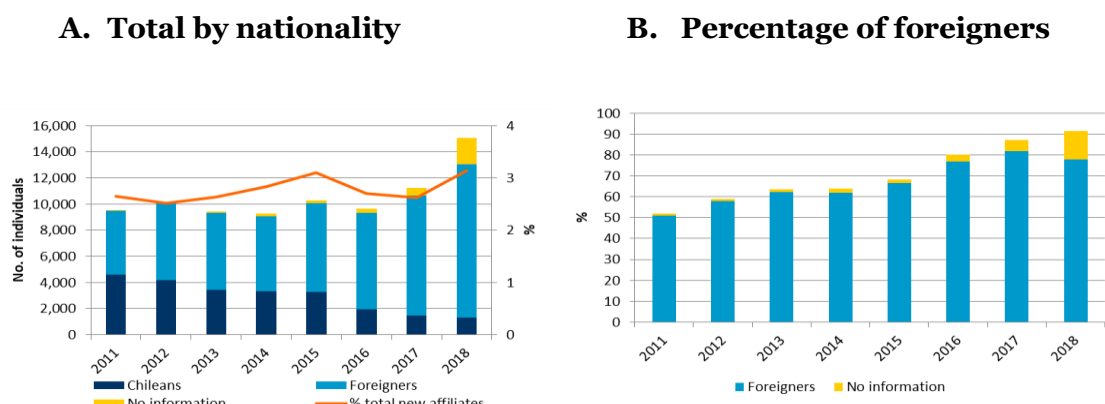
It should be noted that this analysis only focuses on a subgroup of the total number of workers in private households, specifically those belonging to the Pension System. This must be taken into consideration when drawing conclusions, since historically there has been a high degree of informality in this occupational category. According to INE, the informal employment rate of the “domestic service personnel” category amounted to 55.7% in the October-December 2018 quarter. Similarly, according to the Casen Survey (2017), 52.4% of workers in this category had a contract, while 51.5% contributed to some Pension System.

Figure 11 shows the number of new domestic workers (CAI affiliates) by nationality. In 2018, only 3.1% of the total new affiliates in the system were working as domestic worker, which corresponds to approximately 15,000 new affiliates. This is consistent with household surveys (3.5% of employed persons work in domestic service according to the Casen Survey (2017) and INE for the October-December 2018 quarter). Although this proportion has



remained stable from 2011 onwards, the number of new CAI affiliates rose in 2018 (a 34% increase compared to 2017).

**Figure 5. New domestic workers (new CAI affiliates)**



Source: Superintendence of Pensions.

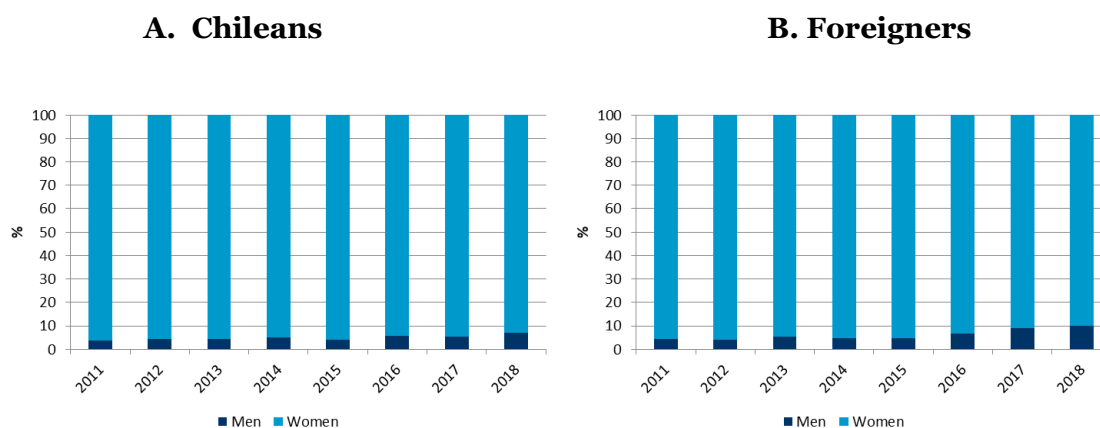
By nationality decomposition shows a steady increase in the proportion of new foreign domestic workers. While in 2011 the proportion was similar between Chileans and foreigners (48% versus 51%), new foreign CAI affiliates accounted for 82% of the total in 2017 and above 90% in 2018 given most of the registers “no information” may be later on revealed as foreigners given the administrative delay in getting a valid national identification number (RUN)<sup>16</sup>. This is consistent with the idea of “global care chains” and immigration. This phenomenon refers to national women delegating domestic and family care work to immigrant women, who in turn must delegate their own care tasks to other women in their country of nationality (OIT, 2017). In Latin America in particular, the increased participation of women in occupations that require higher qualifications and higher incomes generates a potential demand for support for domestic and care work, in order to ensure a certain level of labor productivity. Since this occupational sector has a low social and economic value, this demand is often not satisfied by national workers and may be compensated by immigrants (CEPAL, 2019).

As mentioned in the literature review, because of the gender segmentation and segregation in labor markets, there is a greater concentration of women in domestic work. This fact is corroborated in Figure 12. In particular, over 90% of new domestic workers (CAI

<sup>16</sup> See explanation in section 4.

affiliates) are women, regardless of nationality. In the case of foreigners, there has been a slight decrease in women's participation over the last three years, from more than 95% in 2011 to 90% in 2018.

**Figure 6. New domestic workers (CAI) by nationality and gender (%)**

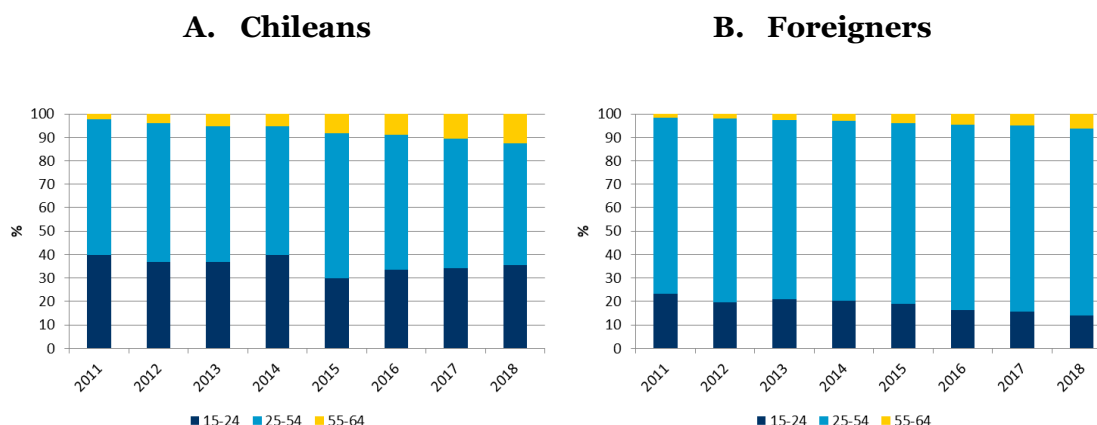


Source: Superintendence of Pensions.

These results are in line with the information reported in the Casen Survey (2017). An analysis of the distribution of the employed population by occupational category and sex shows that 7.9% of women are employed in domestic service, while only 0.2% of men are in this category. Likewise, those working in domestic service are almost all women.

Figure 13 shows that the age composition of new domestic workers (CAI affiliates) differs by nationality. In the case of foreigners, the predominant age group is 25-54 years, as it can be seen from the total number of new foreign affiliates (Figure 6). The majority of new Chilean affiliates in the CAI account are over 24 years of age, in contrast to the total number of new foreigner affiliates, where the age group 15-24 represents a very high participation. These results are consistent with those reported by Órdenes (2016).

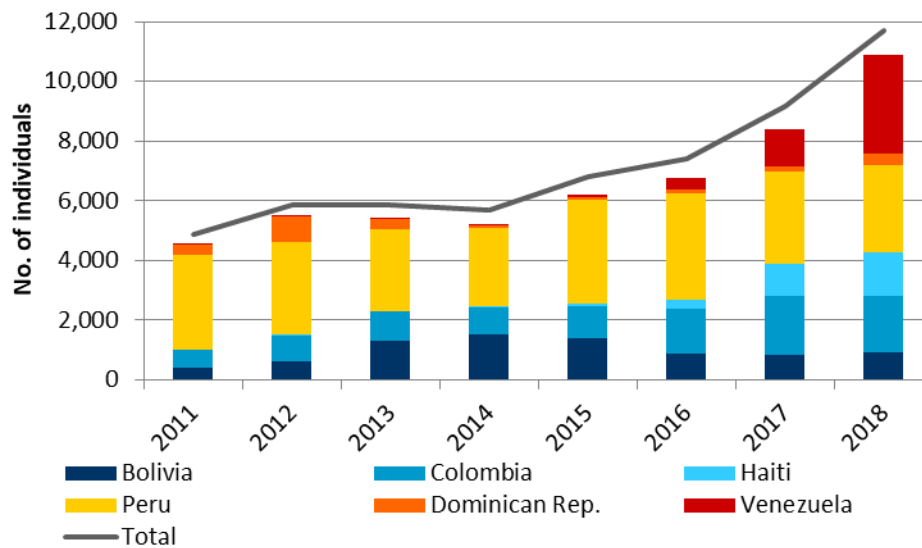
**Figure 7. New domestic workers (CAI) by nationality and age group (%)**



Source: Superintendence of Pensions.

With respect to the country of nationality of the new foreign domestic workers (CAI affiliates), figure 14 shows two interesting phenomena: the constant participation from 2011 to 2018 of Peruvians, and a greater flow of Haitians and Venezuelans in recent years. While the number of Peruvians has remained relatively stable over time, their relative participation has declined as a result of the increased affiliation of Haitians and Venezuelans to the system. On the other hand, although at the beginning of the decade most new foreign CAI affiliates came from neighboring countries (Bolivia and Peru), this situation was reversed in 2018 where Colombia, Haiti and Venezuela together account for most of the new foreign affiliates in this occupational category.

In Chile, two major migratory phenomena associated with women and domestic work have been previously documented: the Chile-Peru migratory corridor (Martínez, 2003) and the circular migration of Bolivian women (CEPAL, 2019). The first phenomenon corresponds to immigration from Peru, mostly from women working in “live-in” domestic service, who have better working conditions than their national counterparts (in terms of formality), given the requirement to have an employment contract in order to obtain a temporary visa.

**Figure 8. New foreign CAI affiliates by country of nationality**

Source: Superintendencia de Pensiones.

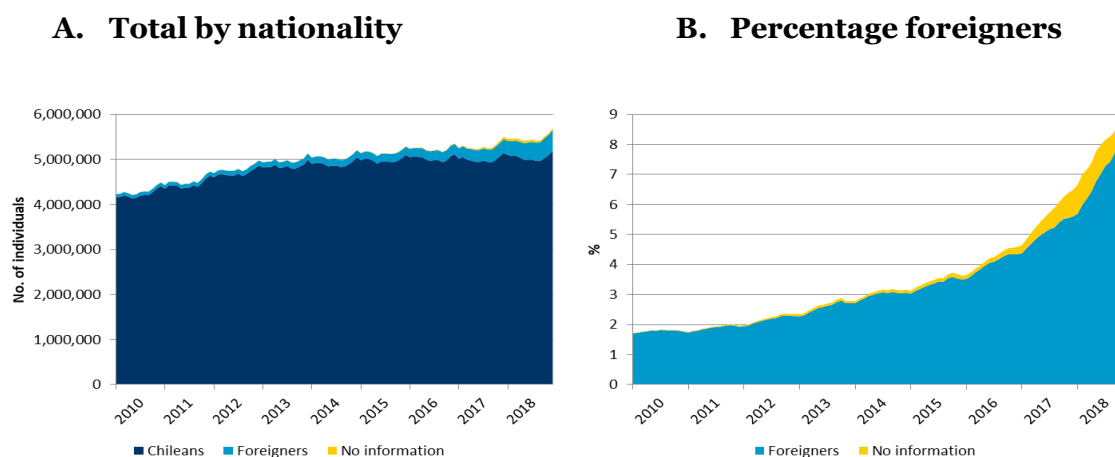
The second phenomenon refers to temporary and cyclical immigration, which is not aimed at permanent settlement in the country of destination. In contrast to Peruvian immigrant women, Bolivian women enter Chile mainly as tourists (without work permits), limiting their stay and duration of informal work to a maximum period of 90 days, and then returning to their country of nationality (this pattern is repeated over time). As a result, Bolivian women's labor relations are fragmented and precarious (no employment contract), both because of the short periods of work involved and the absence of pension contributions.

New immigration patterns from countries such as Haiti, Venezuela, and Colombia will be interesting to analyze whether the insertion of these workers in the domestic work sector follows a similar pattern to Peruvian or Bolivian cases in the future. Since these are not bordering countries, it is likely that their immigration will be permanent. In addition, Chile's current migration policy (residence visa subject to employment contract) encourages these workers to have higher levels of employment formality than their Chilean counterparts. Despite the above, this occupational sector continues to be undervalued and poorly paid, which promotes conditions of vulnerability within this group of women.

## 7. Contributors

This section analyzes labor dynamics of contributors to the Pension System. Figure 15 shows that, between January 2010 and December 2018, the number of foreign contributors increased from 72,293 to 464,891 individuals, an increase of 543%. Similarly, the proportion of foreign contributors to total contributors also increased, from 2% in January 2010 to 8% in December 2018 (almost 9%, if “no information” contributors are included).

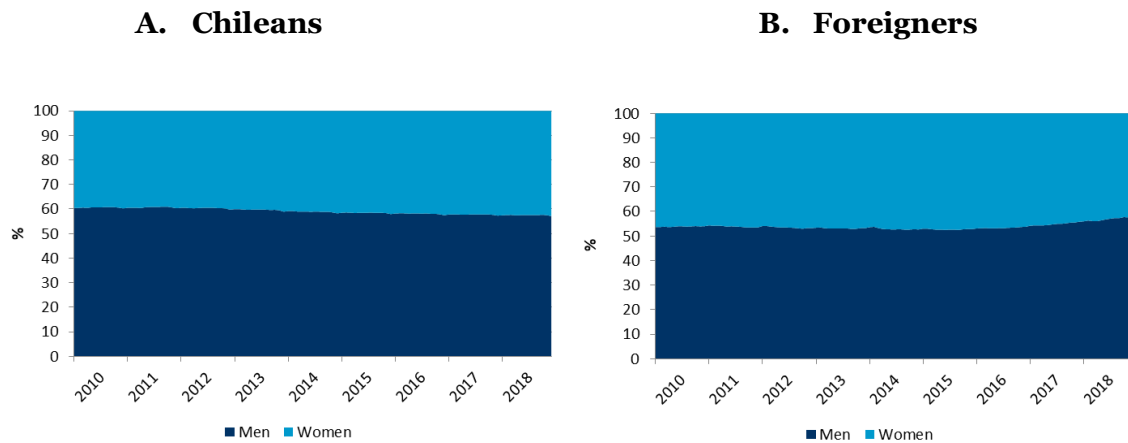
**Figure 9. Contributors**



Source: Superintendence of Pensions.

Sex composition of contributors is quite stable between Chileans and foreigners. As Figure 16 shows, the female participation of Chilean contributors increased slightly during the period observed, from 40% in January 2010 to 43% in December 2018. In contrast, the female participation of foreign contributors decreased slightly, from 46% to 42% during the same period.

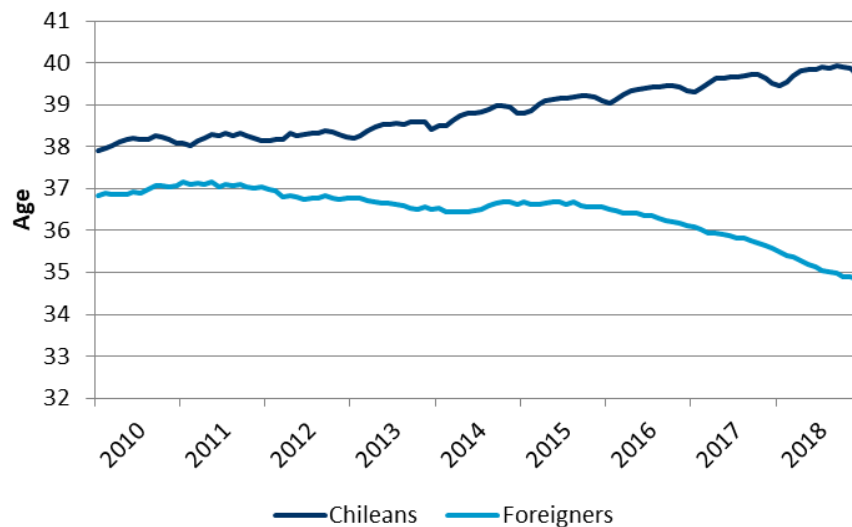
**Figure 10. Contributors by sex (%)**



Source: Superintendence of Pensions.

Furthermore, Figure 17 shows that, on average, foreign contributors are younger than their Chilean counterparts. While the average age difference between Chileans and foreigners was only one year in January 2010, it increased to five years in December 2018. The average age of Chilean contributors increased from 38 to 40 years during the period observed, while the average age of foreign contributors decreased from 37 to 35 years.

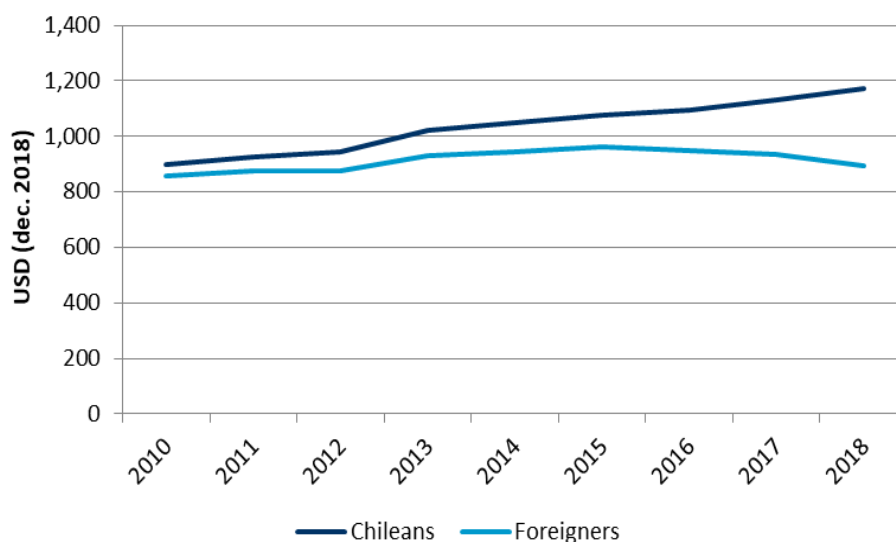
**Figure 11. Average age of contributors by nationality**



Source: Superintendence of Pensions.

Salaries of Chileans and foreigners have changed as well. On the one hand, the average monthly taxable income<sup>17</sup> of Chileans increased from USD 897 to USD 1,172 between 2010 and 2018, an increase of 31%. On the other hand, the average monthly taxable income of foreigners only increased 4% in this period, from USD 858 in 2010 to USD 893 in 2018. The average wage gap between Chileans and foreigners increased from USD 39 in 2010 to USD 279 in 2018, an increase above 600% (Figure 18).

**Figure 12. Average monthly taxable income according to nationality**



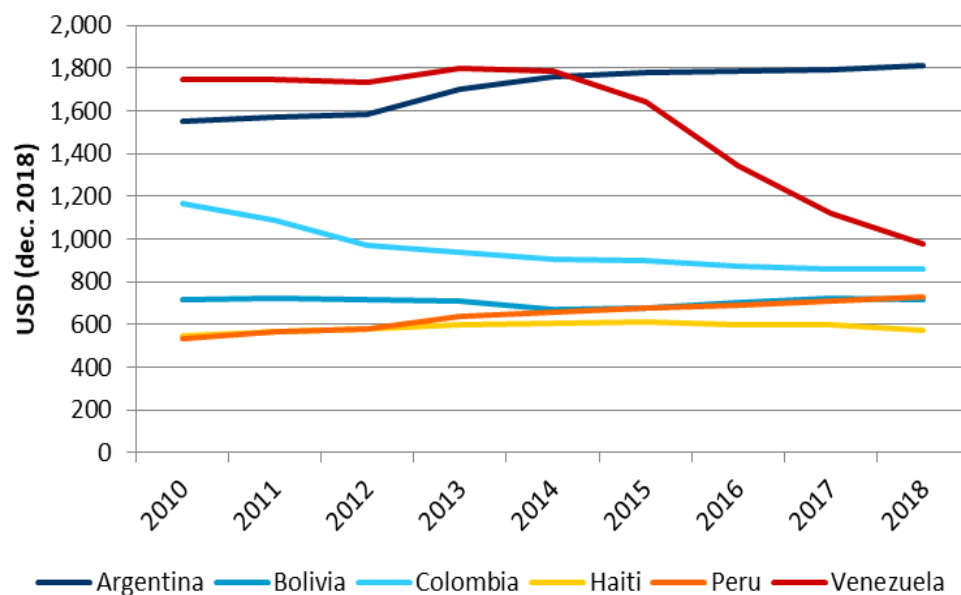
Source: Superintendence of Pensions.

Regarding the salaries of foreigners, Figure 19 shows considerable differences by country of nationality. In the group of selected countries, Bolivia, Haiti and Peru have, on average, the lowest wages, which fluctuated approximately between USD 600 and USD 800 during the period of observation. Of these countries, only the salaries of Peruvian contributors experienced a relevant increase between 2010 and 2018 (a 37% increase). For Colombians, salaries were, on average, higher than those of Bolivians, Haitians and Peruvians, but progressively deteriorated, going from USD 1,164 in 2010 to USD 860 in 2018 (a 26% decrease).

<sup>17</sup> Taxable income is the gross income minus specific deductions (health, unemployment insurance, pension and income tax). Since there is an upper limit on taxable income, wage gap between Chileans and foreigners could be even greater.

The countries that registered the highest average salaries were Argentina and Venezuela, but with important differences worth to mention. While the average salary of Argentines increased from USD 1,550 in 2010 to than USD 1,814 in 2018 (a 17% increase), the average salary of Venezuelans fell drastically, from USD 1,748 in 2010 to USD 976 in 2018 (a 44% decrease). Thus, the average salary of Venezuelans went from being the highest (between 2010 and 2014) to slightly higher to the Colombians in 2018.

**Figure 13. Average monthly taxable income of foreigners by country of nationality**

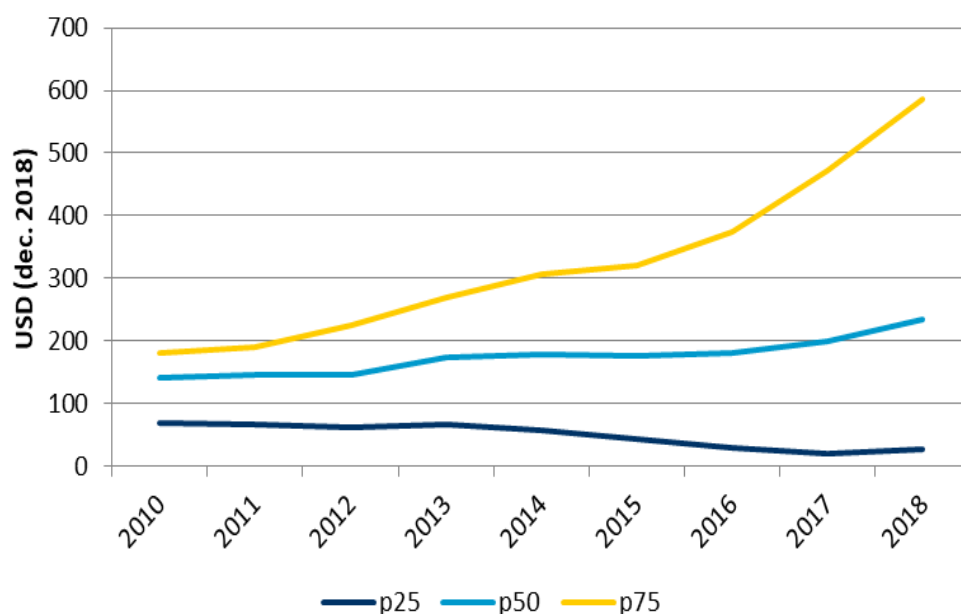


Source: Superintendence of Pensions.

The average wage gap between Chileans and foreigners has been favorable to Chileans for the entire period under study. However, this gap is exacerbated as long as wages are greater: the higher the wage, the larger the wage gap in favor of Chileans. Specifically, the gap between higher-income Chileans and foreigners (75th percentile of the wage distribution) deepened from USD 180 in 2010 to USD 585 in 2018 (a 226% increase). In contrast, the gap of “poorest” people (25th percentile of the wage distribution) decreased 61% between 2010 and 2018 (Figure 20).



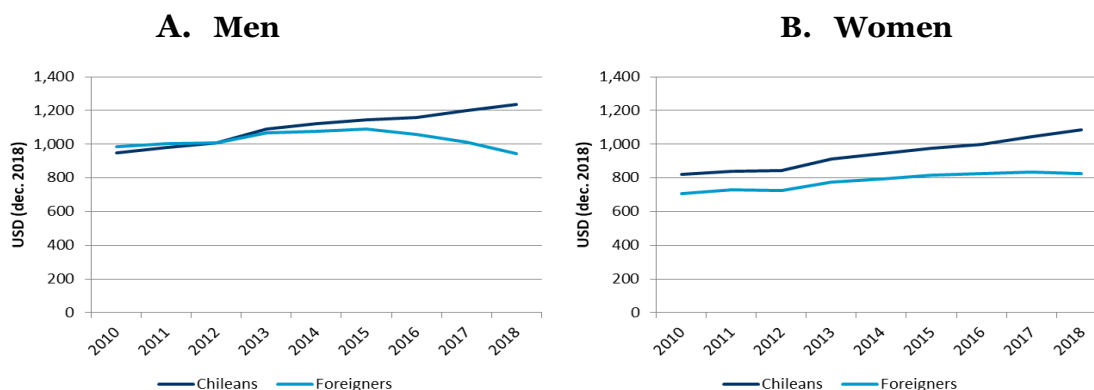
**Figure 20. Difference in monthly taxable income between Chileans and foreigners by percentile**



Source: Superintendence of Pensions.

Along the same line, Figure 21 shows the evolution of the average monthly taxable income by sex and nationality. For men, average wage of Chileans increased by 31% in 2010-2018, while that of foreigners decreased by 4%. Although foreign men earned, on average, more than their Chilean peers between 2010 and 2012, this difference reversed after 2013, where the difference of wages in favor of Chileans grew from USD 24 in 2013 to USD 294 in 2018 (an increase of over 1,100%).

With respect to women, the average wage of both Chilean and foreign women increased considerably during the period 2010-2018 (32% and 17%, respectively). However, the wage gap between Chilean and foreigner women also increased during this period, from USD 112 in 2010 to USD 256 in 2018, an increase of more than 120%.

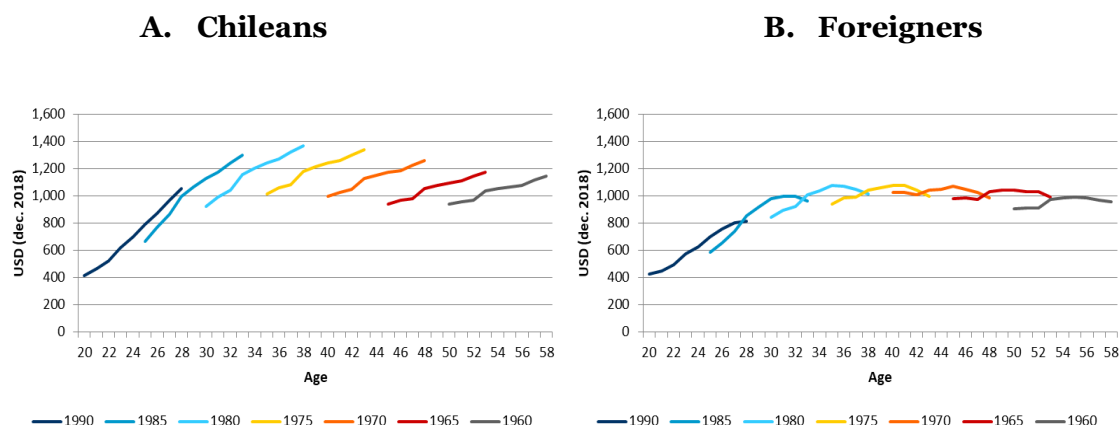
**Figure 21. Average monthly taxable income by sex and nationality**

Source: Superintendence of Pensions.

Similarly, wage patterns of Chileans and foreigners by generational cohorts are shown in Figure 22, representing the average monthly taxable income of five-year cohorts around year of birth, from 1960 to 1990. Each line represents a different cohort, observed over nine years (2010-2018). Each Chilean cohort has, on average, higher wages than the immediately following cohort of the same age. This difference increases the older the cohorts are, decreasing slightly in the cohorts of the 1960s. Wages in younger cohorts grow faster than those of the older cohorts (the lines become flatter from left to right).

However, foreigner cohorts have concave wage profiles, tending even to decrease the last years of observation. Moreover, practically all the contiguous cohorts intersect each other, so that they reach, on average, the same wage level for a certain age. Lastly, the wage difference between a cohort and the one immediately following it, for the same age, is much more moderate than that observed in the case of Chileans. This shows that the generational “prize” is not true for foreigners working in Chile, in contrast to nationals, where more recent generations have better wage paths during their working cycle than older generations.

**Figure 22. Average monthly taxable income by nationality and cohort**



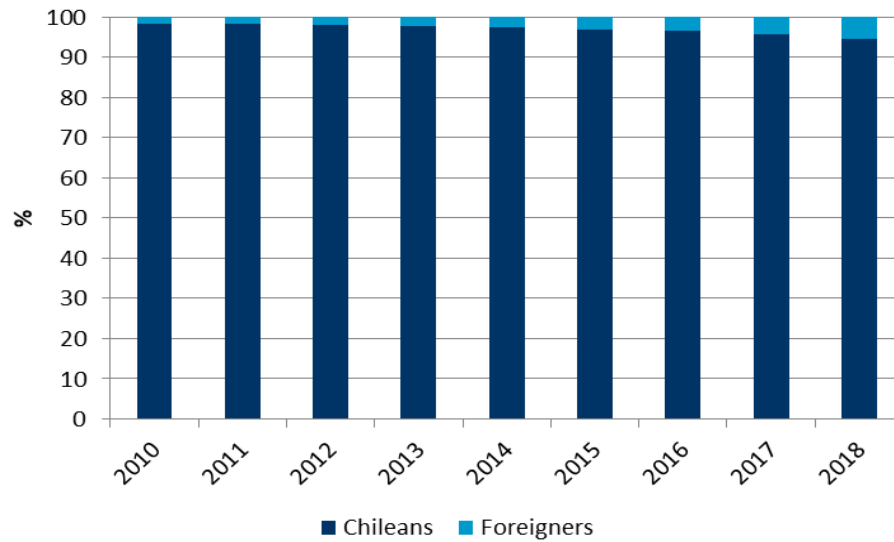
Source: Superintendence of Pensions.

Given the explosive increase in foreign contributors in recent years, the monetary contribution that they make to the Pension System, through their mandatory or voluntary contributions, has also considerably increased.<sup>18</sup> In particular, the contribution of foreigners to the system increased from USD 79 MM in 2010 to USD 415 MM in 2018, an increase of 428%.<sup>19</sup> In relative terms, only 1.7% of total contributions were made by foreigners in 2010, which increased to 5.5% in 2018 (Figure 23).

<sup>18</sup> Workers affiliated to the Pension System are required to contribute 10% of their taxable remuneration or monthly income to their individual capitalization account, where it is accumulated to pay future pensions.

<sup>19</sup> Monetary values in December 2018 USD.

**Figure 23. Monetary contribution to the Pension System by nationality (%)**

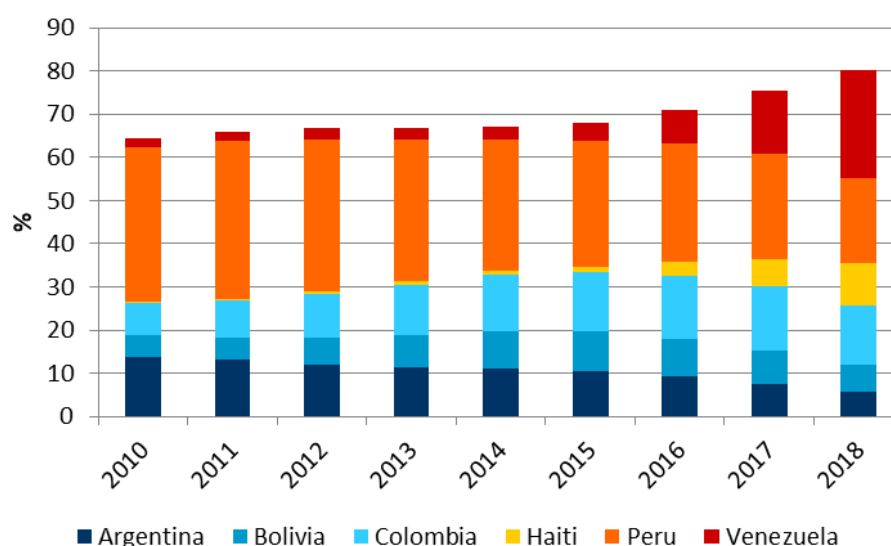


Source: Superintendence of Pensions.

Countries that contribute the most to the Pension System are shown in Figure 24. In 2010, the nationality that contributed the most to the system was Peru, with 35.9% of the total contribution made by foreigners living in Chile. However, the contribution of Peruvians has lost relative importance over time, dipping to 19.6% in 2018. In contrast, between 2010 and 2018, there is a considerable increase in the contribution made by Venezuelans and Haitians: from 2.2% to 25.1% and from 0.1% to 10%, respectively.

Moreover, a small group of countries systematically accounts for a large part of the total monetary contribution made by foreigners to the Pension System: the six countries shown in Figure 24 accounted for nearly 65% of the total contribution made by foreigners in 2010, which increased to almost 80% in 2018.

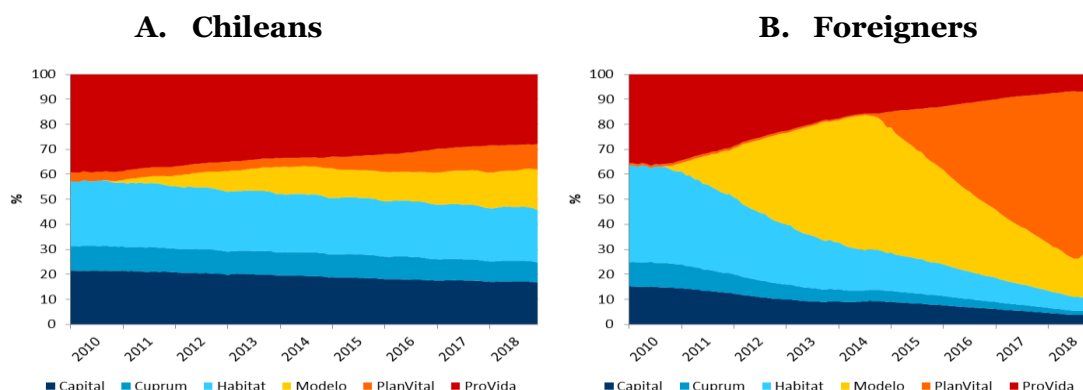
**Figure 24. Monetary contribution of foreigners to the Pension System by country of nationality (%)**



Source: Superintendence of Pensions.

With respect to the AFPs where workers deposit their pension savings, the behavior of contributors differs substantially between Chileans and foreigners (Figure 25). Although in both cases the proportion of contributors belonging to the AFP who were awarded the portfolio management contract for new affiliates increases during these periods, this increase is much more pronounced in the case of foreigners, which is consistent with the fact that most of the new affiliates are foreigners.<sup>20</sup> In particular, the proportion of foreign contributors to AFP Modelo began to increase progressively since August 2010, reaching 54% of the total in July 2014. From then on, the proportion of foreign contributors to AFP PlanVital increased rapidly, reaching a peak of 67% of the total in July 2018. From August 2018 onwards, AFP Modelo has again increased its share.

<sup>20</sup> Portfolio managers bid for new affiliates, born with the 2008 Pension Reform in order to increase competition in the industry and decrease the cost of the pension system. The AFPs who won the bids and periods tendered, in chronological order, are detailed below: (i) AFP Modelo (August 2010 to July 2012); (ii) AFP Modelo (August 2012 to July 2014); (iii) AFP PlanVital (August 2014 to July 2016); (iv) AFP PlanVital (August 2016 to July 2018); and (v) no bids tendered, with AFP Modelo having the lowest commission in the market (August 2018 to September 2019). In October 2019 a new competitor, AFP Uno, was awarded the tender.

**Figure 25. Contributors by nationality and AFP (%)**

Source: Superintendence of Pensions.

Note: For each contributor and period, only the highest contribution recorded is considered.

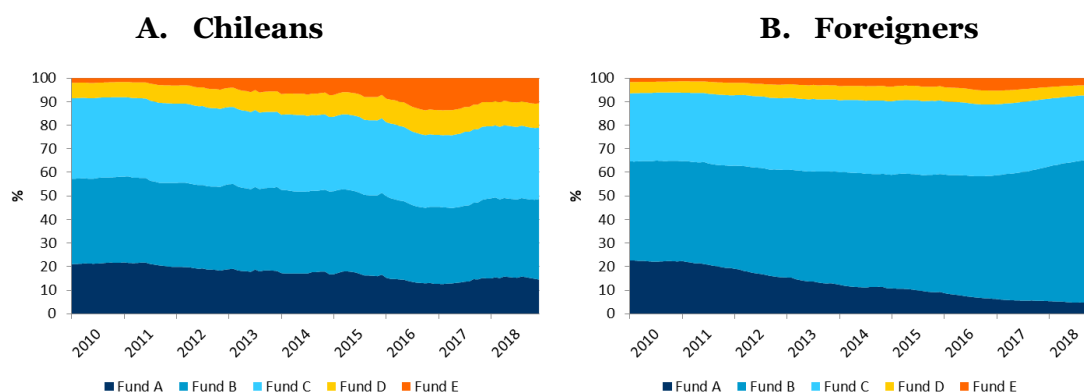
Figure 26 shows what type of pension funds the contributors choose according to nationality.<sup>21</sup> In general terms, fund selection follows a similar pattern among Chileans and foreigners. Specifically, a high proportion of contributors choose risky funds (Funds A and B, together), but with greater relative importance in the case of foreigners than Chileans (52% versus 61%, on average, between January 2010 and December 2018). As for the intermediate risk fund (Fund C), the proportion of contributors opting in does not differ significantly between Chileans and foreigners (32% versus 30%, on average). In contrast, the proportion of contributors to conservative funds (Funds D and E, together) is higher in the case of Chileans than foreigners (16% versus 9%, on average). This is consistent with the fact that the average age of Chilean contributors is higher than that of foreigners (Figure 17), as younger contributors (foreigners) tend to prefer risky funds, while older contributors (Chileans) mostly opt for more conservative funds or follow the “default” investment strategy established in the law, which automatically transfers pension funds to more conservative funds as one ages.

Also noteworthy is the drop in the proportion of Chileans who contributed to risky funds between 2016 and early 2017, in favor of an increase in the proportion of those who contributed to the more conservative fund (Fund E). In the case of foreigners, while the

<sup>21</sup> The different types of pension funds differ in the proportion of savings that are being invested in equity instruments, which are characterized by greater associated risk and expected returns. Thus, each letter represents a different level of risk, with A being the riskiest and E the most conservative.

proportion of contributors in Fund A has gradually decreased, that of Fund B has increased significantly, from 42% in January 2010 to over 60% in December 2018 (Figure 26).

**Figure 26. Contributors according to nationality and type of fund (%)**



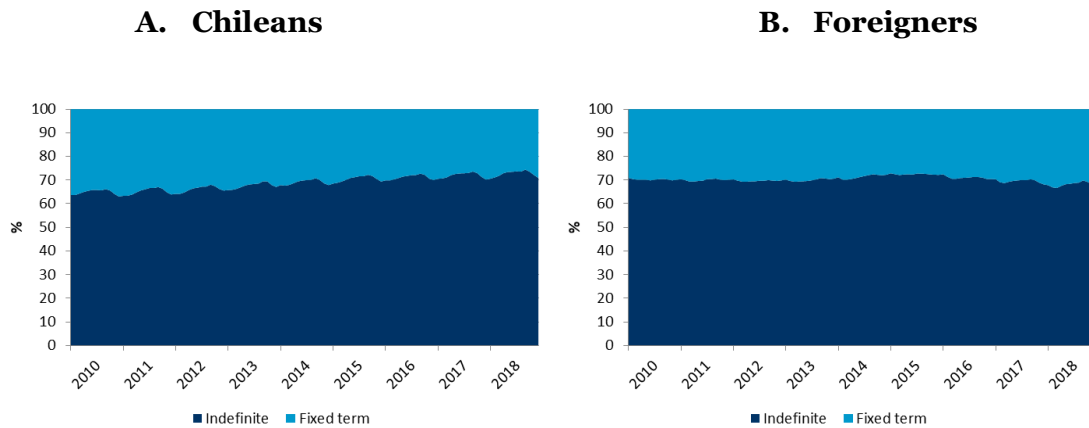
Source: Superintendence of Pensions.

Note: For each contributor and period, only the highest contribution recorded is considered.

To analyze the composition of contributors according to type of contract, unemployment insurance data (BDSC) are used (Figure 27).<sup>22</sup> Broadly speaking, the proportion of contributors by type of contract is fairly similar between Chileans and foreigners. With respect to Chileans, 64% of the total number of contributors had indefinite contracts in January 2010, while the remaining 36% had fixed-term contracts. Since then, the proportion of contributors with indefinite contracts has increased progressively, except in the last quarter of each year, when there was a systematic increase in the proportion of contributors with fixed-term contracts. At the end of the observed period (December 2018), the proportion of contributors with indefinite and fixed-term contracts reached 71% and 29%, respectively. As for foreigners, 71% of the total number of contributors had indefinite contracts in January 2010, while the remaining 29% had fixed-term contracts. This ratio shows less fluctuations than those recorded in the case of Chileans, partly because there is no very marked seasonal pattern. In fact, in December 2018, the proportion of contributors with indefinite and fixed-term contracts was 68% and 32%, respectively, barely three percentage points higher than in January 2010.

<sup>22</sup> The BDSC is used for this purpose given the BDA does not contain information on contract type.

**Figure 27. Contributions to Unemployment Insurance System by nationality and type of contract (%)**

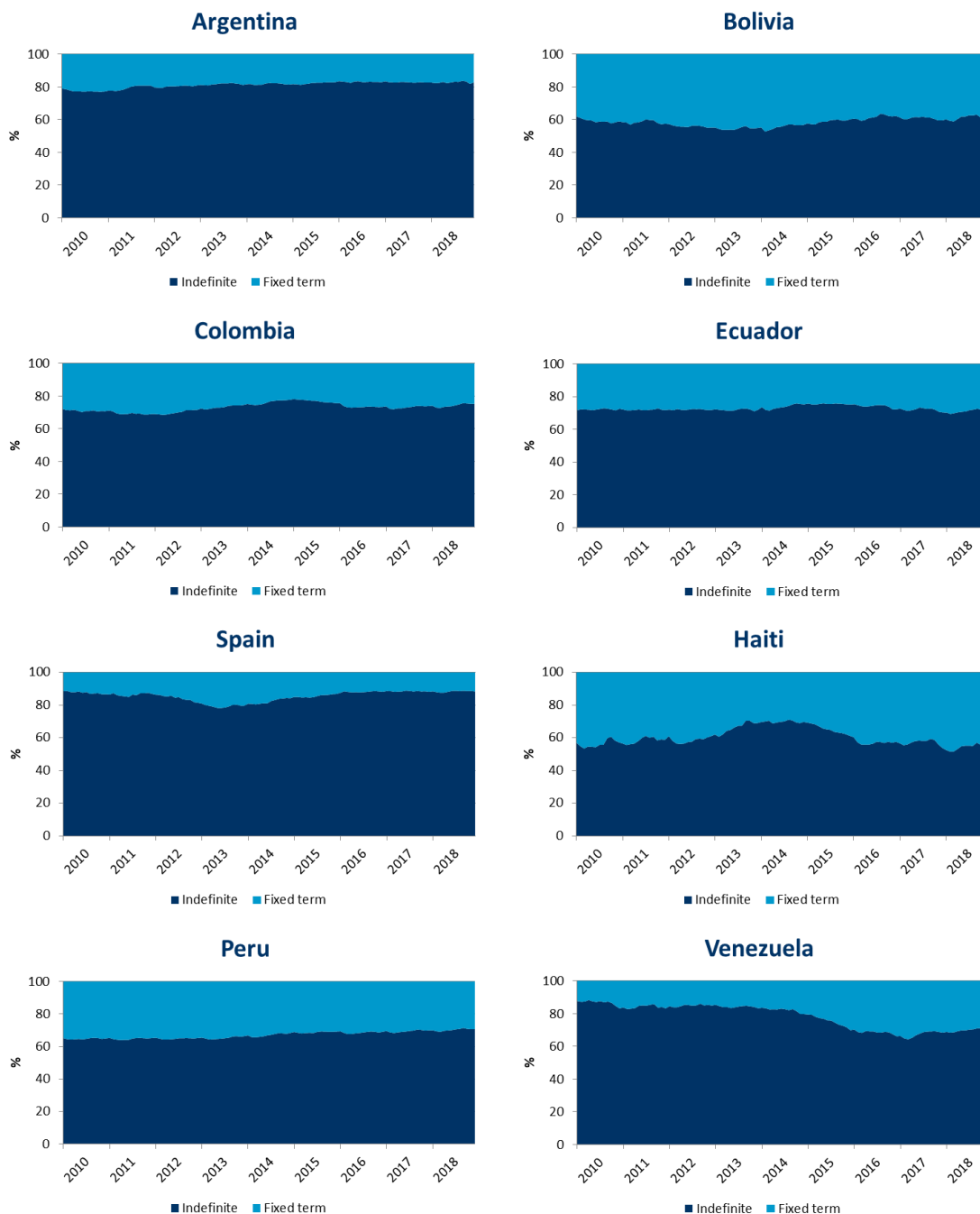


Source: Superintendence of Pensions.

The proportion of foreign contributors with indefinite and fixed-term contracts varies according to the country of nationality. Figure 28 shows that, for example, countries such as Argentina and Spain have a majority of workers with indefinite contracts. In contrast, Bolivia, Haiti and Peru have a more homogeneous distribution among workers with indefinite and fixed-term contracts. The case of Venezuela also stands out, where there has been a considerable Increase in the proportion of workers with fixed-term contracts from 2015 onwards.



**Figure 28. Foreigner contributions to Unemployment Insurance System by type of contract and country of nationality (%)**



Source: Superintendence of Pensions.

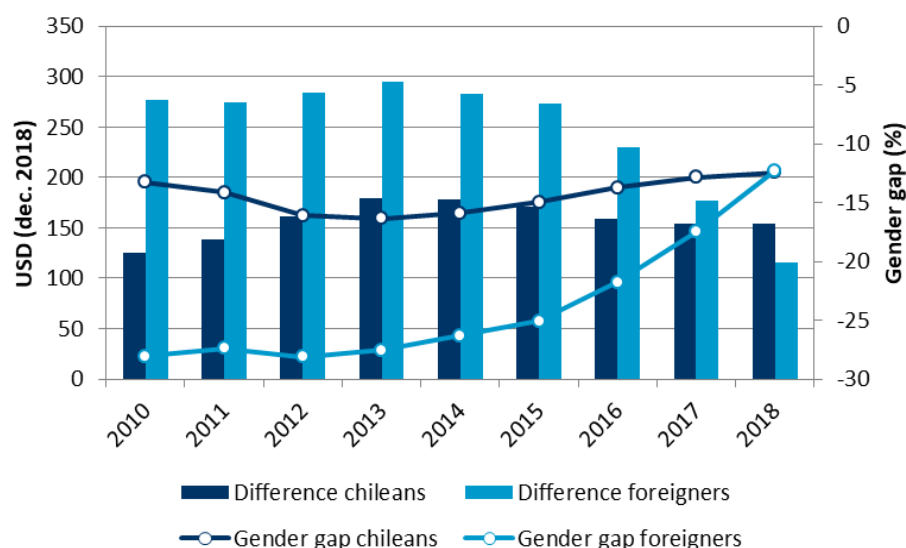
## **8. Gender gaps**

The existing gaps between men and women in the labor market have been widely studied and documented in the economic literature (Weichselbaumer & Winter-Ebmer, 2003). These gaps in wages are the results of different aspects such as the lower labor participation and labor income, as well as the poorer quality of employment for women compared to men. Specifically for Chile, it is observed that the proportions of affiliated and contributing women to the pension system and the wage gaps are consistent with the differences and gaps in the labor insertion of men and women. Indeed, women represent 47% and 42% of affiliates and contributors, respectively, where women, comparatively, are concentrated in the lowest contribution brackets, and with an average gap, as of June 2021, of -8.9% on taxable remuneration (Superintendence of Pensions, 2021).

In this section, we explore the differences in wages by sex and therefore, in gender gaps, between Chileans and foreigners. As it was shown in section 7, foreigners earn less than locals on average, as well as for different percentiles of the wage distribution.

Figure 29 shows that female contributors earn, on average, less than male contributors regardless of their nationality. In 2010, the gender wage difference between men and women for foreigners more than double that of Chileans (USD 277 versus USD 126). The gender wage differences for Chileans and foreigners reached their maximum values in 2013 (USD 179 and USD 294, respectively). This difference has decreased since then, although remains much more pronounced in the case of foreigners than Chileans. By 2018, the pattern reversed and the gender wage gap for Chileans is slightly greater than for foreigners (USD 154 versus USD 116). Similarly, the taxable income gap (measured as the percentage difference between women and men) for foreigners has decreased between 2010 and 2018, while that of Chileans has remained constant over the same period.

**Figure 29. Difference in average monthly taxable income between men and women by nationality**



Source: Superintendence of Pensions.

Note: The gap is calculated as the percentage difference between women and men taxable income.

To better understand income differences across gender and nationality, we explore the age, cohort and year effects during the working life cycle (Deaton & Paxson, 1993; Deaton, 1997).

The dependent variable is the log of taxable labor income at the end of each year from 2010-2018, for contributors, where the explanatory variables are the year, the cohort or generation to which the contributors belongs, according to the year of birth of the latter, for intervals of 5 years, from 1955 to 1994 and age, for which five-year groups are created from 25 to 60 years. To identify the age, cohort and time effects, dummy variables are used.

The estimate function has the following form:

$$y = \beta + A\alpha + C\gamma + Y\psi + u$$

where  $y$  is the vector of observations of the contributors' labor income,  $A$  is an age dummies matrix,  $C$  is a cohort dummies matrix,  $Y$  is a year dummies matrix and  $u$  is the stochastic error associated with the model.

The data are arranged as age-year pairs, with each observation corresponding to a single age in a specific year. If there are  $m$  such age-year pairs, the three matrices ( $A$ ,  $C$ , and  $Y$ ) will each have  $m$  rows; the number of columns will be the number of age groups, number of cohorts and number of years respectively.

The vector  $y$  contains the labour income observations at the end of each year in each age (each row corresponds to a single observation for each age and year). To avoid perfect multicollinearity, one column in each of the three matrices is deleted. However, even having deleted these columns, it is still not possible to estimate the model because there is an additional linear relationship between the three matrices, since, if the date and when the cohort was born is known, then we can infer the contributor's age.

One way to deal with this problem is the normalization of the age, cohort and year effect. In this document, this strategy will be based on the methodology used by Granados (2004), who in turn is based on Deaton and Paxson (1993) and Deaton (1997).

Given that labour income is the variable to be decomposed, a simple method of presentation is to attribute its growth to age and cohort effects and use the time effect to capture cyclical fluctuations or business cycle effects whose average adds up to zero over time. long term. A normalization that reflects this makes the year effect orthogonal to the time trend.

Following the normalization carried out in Granados (2004),  $y$  is regressed on: (a) dummies for each cohort, (b) dummies for each age and (c) a set of T-2 year dummies defined as follows:

$$d_t^* = d_t - [(t-1)d_2 - (t-2)d_1] \quad t=3, \dots, T.$$

where  $d_t$  is the usual year dummy, equal to one if the year is  $t$  and zero otherwise. The first two coefficients can be recovered given the fact that all year effects must add up to zero and that they must be orthogonal to a trend.

As the objective of this document is to evaluate the life cycle behavior of the wage gap between men and women, estimates are made for men and women separately and the gap is calculated as the difference of the estimators for the explanatory variables. It is important to notice that key variables for wage dynamics are omitted from this analysis, given they are

not available, such as education, ability, experience and industry, which make all the results merely illustrative.

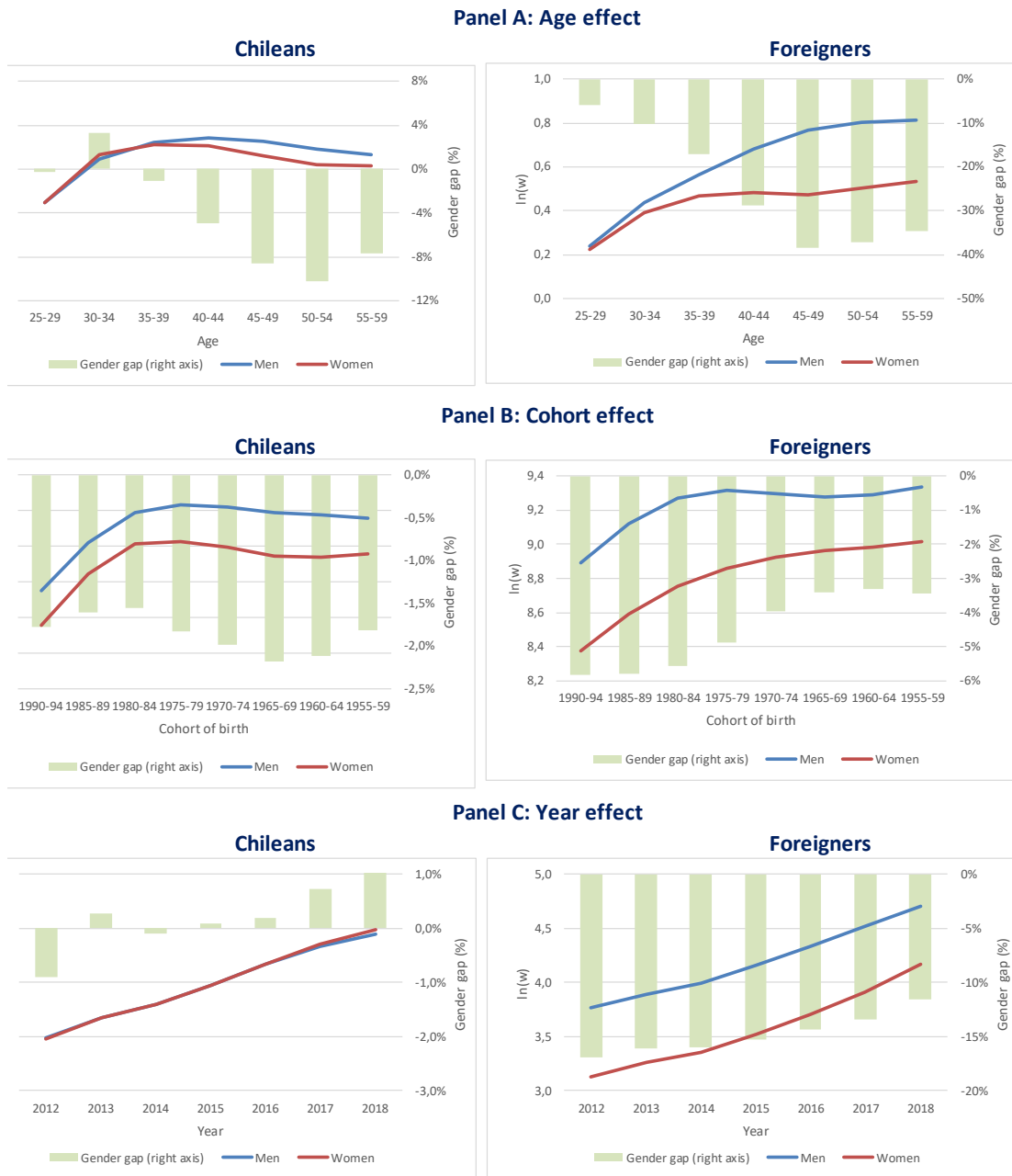
The result of the OLS estimations are presented in figure 30, where the effects of age, cohort and time are shown. All coefficients were statistically significant at 1% level.

The age effect for both Chilean men and women are increasing with age till the middle of the life cycle, declining later, more for women than for men. Indeed, the gender gap worsen between 40 and 54 years old, which can be explained by more vulnerable career paths for women, related, for example, to episodes of exiting labour market participation due to pregnancy events, home caring duties, and others, which impact the labour income options once returned to the labour market. In the case of foreigners, labour income increases with age for men until around age 49 and it stabilizes onwards, whereas for women the pattern is much flatter starting at early ages. Consistently, the gender gap is higher for foreigners than for Chileans at more advanced ages.

The cohort effect for the youngest generations under analysis are worse than for elder generations both for Chileans and foreigners, i.e. younger generations seem to be in a weaker position in terms of labour income than elder generations. This result should set an alarm in terms of the opportunities available for people just entering the labour market. In terms of the gender gap, older generations seem to be worse than younger generations in the case of Chileans but reverting back for the older generation observed. In the case of foreigners, the younger generations are always worse than previous generations, which could be an indication of the different compositions of immigration waves in key variables such as education, experience and ability, among others, which cannot be captured with the data available for this study.

The time or year effect is increasing both for Chileans and foreigners. However, whereas there is not difference across gender for Chileans, the gender gap is much more important for foreigners, shedding lights on the vulnerability of the foreign women residing in the country in terms of labour market opportunities with respect to foreign men.

**Figure 30. Age, cohort and year effects of wages during the life cycle, by sex and nationality**



Source: Superintendence of Pensions.

Note: The gender gap is calculated as the percentage estimated wage difference between women and men.

## **9. Conclusions**

Although Chile has received various immigration waves throughout its history, the level of immigration recorded over the last few decades is unprecedented. Official figures indicate that the number of foreigners permanently residing in the country increased from 187,008 in 2002 to 1,251,225 in 2018, an increase above 500%. Moreover, foreigners increased from 1.3% of the country's total population to 6.7% during the same period.

The central objective of this document is to characterize the demographics and socioeconomic status of the immigrant population in Chile. To this end, administrative records of the Pension System were used - specifically those of new affiliates and contributors - complemented with those of the unemployment insurance. In addition, information provided by the Civil Registry and Identification Service on the nationality and country of nationality of individuals was used.

The results obtained are consistent with the stylized facts of recent immigration to Chile. In particular, there is evidence of a boom in new foreign affiliates over the last few years. The proportion of Haitians and Venezuelans represent more than 70% of the total number of new foreign affiliates in 2018. With respect to contributors, the average wage difference between Chileans and foreigners increased by over 600% during the 2010-2018 period, reaching almost USD 300 in 2018 in favor of Chileans. This difference is exacerbated as long as the wages of contributors are higher. Finally, there is an important gender gap both for Chileans and foreigners (around 10% in 2018). The gender gap for foreigners has importantly decreased during the last decade reaching the relatively stable Chilean gender gap levels. However, foreign women are in a much weaker relative situation than Chilean women when age, cohort and time effects are obtained.

This document complements economic literature on immigration in Chile and it innovates through the use of administrative records from various state administration agencies. However, this work has some limitations that are important to mention. First, only workers belonging to the formal sector of the labor market are considered. Second, there is no direct information on the educational level or the ability of individuals. Finally, given the time it takes for foreigners to obtain a valid Chilean ID (RUN) and the time of database combination, recent immigration levels may be underestimated.

As evidenced in the Chilean case, immigration can very quickly change unexpectedly. It would be desirable to have more consistent data in order to correctly quantify its impact on the economy and to respond accordingly through timing public policies. In addition, government institutions directly or indirectly related to immigration must have the capacity to efficiently adapt to significant changes of this type. Notable are the efforts made by the Superintendence of Pensions to enable foreigners to receive benefits from the unemployment insurance without the need for a RUN, and to use identity documents from their countries of origin as of February 2020.

Without doubt, there is still a long way to go in analyzing immigration in Chile. Questions such as how long the current immigration phenomenon will last or what its impact on the economy will be are still unanswered. However, this gap is, in turn, a great incentive for the elaboration of new academic articles that contribute to the study of this subject. It is hoped, then, that progress will continue to be made in this same direction in the future.

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