

New entrants facing the Great Recession: wage and employment trajectories of young immigrants

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Abstract

This paper analyses the long-term effects of entering the labour market under tough economic conditions on young immigrant earnings and employment outcomes, controlling for the contemporaneous economic conditions workers face. We also analyse the native's case with the aim of studying immigrant-native differences. From a cohort approach, we focus on the Spanish case, where the impact of the recession has been particularly significant among the youngest workers. Our results show the Great Recession has initially led to a blockage at the entrance of labour market, reducing the number of participants. Additionally, we observe that there is an employment scar on less-educated immigrants and a wage penalty on immigrants with high education. These negative effects persist more than nine years. In the case of natives, however, we observe they are negatively and persistently affected in terms of earnings and employment during a recession context, regardless their educational attainment. Factors such as job losses, occupational downgrading, segmented labour market and the rigid system of collective bargaining may explain these persistent negative effects of the recession.

Key words: recession, immigrants, natives, earnings, employment, contemporaneous economic conditions

JEL Classification: J31, J61, J1

This is a work in progress.

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1 Introduction

Migratory flows around the world continue to be one of the most examined issues from different academic fields. As a result, the literature referring to the immigrant population is extensive. In particular, the labour market insertion of immigrants is a topic of great interest because it favours both economic and social integration of individuals in the host country. Thus, a wide literature analyses the assimilation of immigrants in the labour market and its effects on the native population both in terms of wages and employment (Izquierdo et al., 2009; Peri, 2014; Edo, 2016).

Previous research also suggest that it is likely that non-native population displaces the natives in terms of wages and employment (Angrist and Kugler, 2003; Brucker and Jahn, 2011; Özden and Wagner, 2014; Martins et al., 2018). The assimilation and displacement effects lead to the emergence of wage gaps between the native and immigrant population (Coulombe et al., 2014; Ingwersen and Thomsen, 2019; Murillo-Huertas and Simón, 2017).

Nevertheless, the economic conditions in the labour market may affect to these salary or employment differences between natives and immigrants, widening the gap between both groups. Several authors suggest that immigrants are particularly sensitive to business cycles, especially in times of economic downturns (Bratsberg et al., 2018; Xu, 2018; Orrenius and Zavodni, 2010). Job loss is the most frequently experienced result by immigrants due to their high sensitiveness to the business cycle (Orrenius and Zavodni, 2010). Immigrants are the first fired as business cycle conditions worsen (Xu, 2018).

The Great Recession that started in 2008 negatively affected international migration dynamics (Carrasco et al., 2019; Garrido et al, 2010). Consequently, a large set of studies have focused on the impact that economic crisis has had on the patterns of immigrant insertion into the labour market (Tilly, 2011; Fellini, 2018).

Although the crisis affected labour markets globally, the impact in Spain was particularly severe. In fact, Spain has become an interesting case to analyse migration patterns. During the years of economic expansion, Spain led the European immigration ranking (Domínguez-Mujica et al., 2014) because of job opportunities for immigrants in employment niches at the secondary sector. Nevertheless, the number of workers was drastically reduced by the Great Recession in 2008, especially for the immigrant group. The immigrant unemployment rate raised since 2007, exceeding 35% in 2013. Despite being also high, the unemployment rate of natives in 2013 was around 25%. As a consequence, the disparity between the levels of well-being of the Spanish and foreign population grew significantly in the early years of the crisis (Godenau et al., 2017).

In this context, the objective of this paper is to analyse to what extent a recession affected wages and employment of young foreign workers who entered the Spanish labour market during the recession and its persistence over time. In this sense, we compare immigrant labour market trajectories with those of native workers to analyse different responses to cyclical changes. Thus, we study which group was more affected by the economic downturn.

The Spanish case turns out to be of great interest because the effect of the Great Recession has been particularly significant among the youngest cohorts, facing unemployment rates above 40% and 50%, not only during the crisis but also when the economy started to recover. Together with its greater vulnerability to unemployment, this group is characterized by having precarious working conditions. This translates into a higher rate of temporary employment and lower wages.

Our results firstly suggest that the Great Recession has harshly hit the number of new entrants in the labour market. Evidence shows a significant wage penalty on highly educated immigrants and an employment scar on immigrants with lower education. These negative effects persist more than nine years. Natives, however, are negatively and persistently affected in terms of earnings and employment during a recession context, regardless their educational attainment.

The rest of this paper is organized as follows. Section 2 summarizes the literature review. Section 3 describes the data. Section 4 gives a brief overview of the insertion of new entrants into the Spanish labour market with our data. Section 5 presents a first evidence of the evolution of earnings and employment of natives and non-natives over the time span. Section 6 presents this evidence distinguishing immigrants by area of origin. Section 7 describes the empirical strategy. Section 8 presents the results. Section 9 presents brief conclusions.

2 Literature Review

In recent decades, the great growth of immigrant flows in different countries around the world has aroused the interest of researchers on this issue. An extensive literature analyses the assimilation of immigrants in the labour market and its effects on the native population both in terms of wages and employment (Izquierdo et al., 2009; Peri, 2014; Edo, 2016). This issue is controversial in modern labor economics (Borjas, 2015). While early studies find that the effect of immigration on the labor market outcomes of natives is negligible (Card, 1990; Hunt, 1992; Friedberg and Hunt, 1995), recent literature shows mixed results, some of them finding significant negative effects on wages and employment outcomes (see, for instance, Borjas, 2003; Dustmann et al., 2016; Edo, 2019).

Another set of studies focuses on whether the non-native population displaces the natives in

terms of wages and employment. As in the case of the assimilation of immigrants, the findings are mixed. Some authors conclude that there is a displacement effect by immigrants to natives in wages or employment (Goldin, 1994; Gross, 2002; Card, 2001; Angrist and Kugler, 2003; Brucker and Jahn, 2011). The bulk of immigrants have a low educational level and they displace natives in that educational category (see Özden and Wagner, 2014). Nevertheless, other researches show that there is little evidence for displacement effects of natives in the countries' labour markets in terms of wages (Pischke and Velling, 1997; Dustman and Weiss, 2007; Friedberg and Hunt, 1995; Longhi et al., 2005, 2008; Okkerse, 2008) or employment (Borjas, 2003; Martins et al., 2012) due to immigration.

As a consequence of possible assimilation and displacement effects, wage gaps between natives and foreigners have been analysed in a great number of studies (Coulombe et al., 2014; Ingwersen and Thomsen, 2019; Murillo-Huertas and Simón, 2017). The heterogeneity of the country of origin of non-natives is also of great interest. Income disadvantages seem to be more pronounced for immigrants from non-EU countries than for those from EU member states (Adsera and Chiswick, 2007; Lehmer and Ludsteck, 2011, 2015). These wage differences between natives and immigrants can be attributed to a lack of host country-specific human capital. Therefore, immigrants face an initial income disadvantage upon arrival relative to natives (Fertig and Schurer, 2007; Tverdostup and Paas, 2017). Likewise, occupational and workplace segregation has been found to explain to a considerable degree the wage differentials between natives and immigrants in Spain (Simón et al., 2008; García-Pérez et al., 2012).

Moreover, wage differences between natives and non-natives also may be affected by economic conditions in the labour market. There is a wide literature suggesting that there is a sensitiveness of immigrants to business cycles, especially in a recession context (Bratsberg et al., 2018; Xu, 2018; Orrenius and Zavodni, 2010). As a result to that sensitiveness, immigrants are particularly affected in terms of job loss (Orrenius and Zavodni, 2010). According to Xu (2018), immigrants are the first fired as business cycle conditions worsen and are the first hired as business cycle conditions improve (Xu, 2018). Furthermore, the author points out that immigrant population can have different observable characteristics from the native-born population in ways that relate to the cyclical sensitivity of their employment outcomes. These variations might include differences in educational attainment, skill level, language, race, occupation, among others. This could be an explanation why non-native workers might have different responses to cyclical changes in economic conditions. As shown recent studies, demographic groups involving minority racial or ethnic groups, non-whites, low-education workers, and those involved with cyclical sectors are the most negatively affected by the business cycle (Hoynes 2000; Hoynes et al. 2012; Orrenius and Zavodny 2010).

In terms of earnings and employment outcomes, the evidence found in literature shows that non-native population is more sensitive to the business cycle than natives are. In particular, the evidence provided by Orrenius and Zavodny (2009) shows that the 2007 recession had harshly hit the immigrants because they are more likely to work in cyclical sectors and to belong to minority racial or ethnic groups with a low educational level. A similar pattern is found by Hoynes (2000), where population groups with lower education attainment and non-whites are the most negatively affected by business cycles over a sample period of 1975 to 1997. Later, Hoynes et al. (2012) analyse the Great Recession and conclude that the impacts of a crisis are severe by the group of young, non-white, and low-education workers.

In addition to which groups a recession harmfully affects, it also seems important to know the duration of such effects i.e. their persistence over time. Aslund and Rooth (2007) analyse the Swedish immigrant cohorts who started their professional career between 1987 and 1991 and estimate the long-term effects on immigrant earnings and employment from labour market conditions encountered upon arrival. Based on their results, entering under a recession decreases the chances of employment and lowers earnings 5-7 years after immigration. Therefore, facing tough economic conditions has a clear impact on earnings and employment for at least ten years.

Nevertheless, the analysis of Oreopoulos et al. (2012) concludes that labour trajectory of workers is affected not only by initial economic conditions, but also by contemporaneous economic conditions that cohorts facing over their professional experience. From a cohort approach, the authors estimate a model controlling for the initial regional unemployment rate, as well as for regional and contemporaneous unemployment rates.

Based on this evidence, this paper contributes to the literature to assess the long-term impact of entering the labour market under tough economic conditions in the Spanish labour market, characterised by a dual system of employment protection, on earnings and employment outcomes of new entrants into the labour market. Moreover, we carry out an analysis distinguishing native-born worker from those non-natives with the aim to examine possible differences between this population groups facing a recession.

3 Dataset and Variables: descriptive statistics

The data source we use in this analysis is the Continuous Sample of Working Histories (CSWH), conducted by the Spanish Ministry of Labor, Migration and Social Security. It provides a representative sample of all persons who have been enrolled in affiliation or receiving a Social Security contributory pension at some point during the reference year, regardless of the time they have

remained in that situation. Data contains information on working conditions (employment spells, type of contract and firm's characteristics) as well as socioeconomic characteristics of individual workers (gender, age, level of education, country of birth, nationality and province of residence). This dataset is released annually since 2004 including all relationships with the Social Security Administration for each year. Thus, it is possible to follow the labour market trajectories of individuals allowing longitudinal studies.

3.1 Sample and main variables

The aim of this paper is to assess the impact of the Great Recession on earnings and employment trajectories of young workers. More specifically, we examine the differences between natives and non-natives. In our sample, we define as non-natives all individuals who are foreign born. Specifically, we distinguish six geographical areas from which immigrants arrive: countries from the EU15, European countries outside the EU15, Latin American countries, Asian countries, African countries and North America countries.

Our sample includes all individuals on working age between 16 and 30 years old who began their professional career in the labour market between 2007 and 2015. The sample is selected on the basis on the entry year into the labour market. After that, using all the available editions of the CSWH, we reconstruct all the labour trajectory of the workers to their last observed position in 2017. As the CSWH contains detailed information about entry and exit dates of employment, it is possible to create a panel dataset and thus observe the entire trajectory in terms of employment and earnings of workers since their entry year up to 2017.

Our final sample encompasses 997,346 employment spells. In terms of labour market participants, it includes 138,626 workers (natives and immigrants altogether), of whom about half are women, as can be seen in Table 1. Nearly 67% of young workers are aged between 16 and 22. By educational level, we observe that a significant proportion of workers are low educated. In fact, 42% of young workers in our sample have compulsory studies or lower, followed by 32% who have vocational training or post-compulsory education. Only 26% of individuals in our sample have completed a university degree.

Further, we observe differences between those who born in Spain and abroad. First, 75% of natives are between 16 and 22 years old, compared to 45% of immigrants in that age interval. Second, whereas the percentage of native-born in each educational level is approximately similar (35% - compulsory education or less, 35% - vocational or post-compulsory education and 30% - high education), the majority of immigrants are low educated (60%). About 26% of immigrants have post-compulsory studies and only 14% that are highly educated. However, the distribution

by sex is similar in both cases.

Table 1: Descriptive statistics

		All workers		Natives		Immigrants	
		Number of workers	%	Number of workers	%	Number of workers	%
Sex	Male	68,538	49.44	48,400	48.73	20,138	51.22
	Female	70,088	50.56	50,913	51.27	19,175	48.78
Age	16-22	92,783	66.93	75,271	75.79	17,512	44.55
	23-30	45,843	33.07	24,042	24.21	21,801	55.45
Educational attainment	Compulsory education	58,664	42.32	34,914	35.16	23,750	60.41
	Post-Compulsory education	44,350	31.99	34,292	34.53	10,058	25.58
	High education	35,612	25.69	30,107	30.32	5,505	14.00
TOTAL		138,626		99,313		39,313	

Notes: this table displays the number of observations in our sample by sex, age and attainment. It also shows its corresponding percentage with respect to the total.

As a measure of workers' earnings, we use the logarithm of total annual labour income, which includes all earnings workers gain each year.

Regarding employment outcomes, we use two different measures. First, we calculate the total number of days worked each year using information about entry and exit dates into employment. Second, this data allows us to create a variable referred to employment probability, understood as a rate of being working in any moment during the year once the individual entering the labor market. Thus, the variable takes value 1 whether individual works in any time during each year and 0 otherwise. Summing up, our analysis focuses on one outcome related to earnings - annual labour income- and two outcomes related to employment - days worked and employment probability.

Additionally, the information on employment spells also allows calculating worker's potential experience, as the years that the individual has been working since they began their professional career. Potential experience is computed as the difference between the last year in which workers are observed and the year in which they entered the labour market. Hence, our period of interest covers up to 11 years of (potential) working experience.

3.2 Entry cohort as unit of observation

Although there have been prior studies that examine the impact of a crisis on wages and employment at the individual level (Stevens, 2008; Hershbein, 2012; Kondo, 2015), our analysis is carried out using *fictitious cohorts*, understood as delimited groups whose members share the same characteristic in the same period (Toharia et al., 1997; Carrasco and García-Serrano, 2012; Malo and Cueto, 2014). The most commonly used cohorts are usually those that share the year of birth. In our case, we, instead, define as cohort to all individuals that share the same entry period into the labour market. Thus, we use the entry cohort as unit of observation in our research. Taking into account our time span, we examine cohorts entering the labour market between 2007 and 2015. Therefore, we analyse nine different cohorts. As we will discuss later in Section 7, we collapse our data by entry cohort, entry region and calendar year, creating the sum of 918 cells to work with.

This approach extends the literature since an aggregate viewpoint due to the analysis in terms of aggregate population groups. The longitudinal structure of our database allow us to examine the dynamic trajectory of a population group. Thus, it is possible to compare if there are differences among cohorts in terms of wages and employment in the short and long run.

We then report the summary statistics for our major key variables broken out by natives and non-natives. Descriptive statistics are displayed in Table 2. On average, native-born individuals access the labour market for the first time at the age of 20.5. However, immigrants enter the labour market at the average age of 23.3. The proportion of males in the sample is 50% in both cases. Regarding educational attainment, there is a similar percentage for natives of the different educational levels. Less educated, however, are most frequent case of immigrants. Further, we observe that natives earn on average a higher salary and a higher average probability of remaining working once they begin their professional career than immigrants. This group, on the other hand, work on average more days than natives.

Table 2: Descriptive statistics for natives and immigrants (fictitious cohorts)

Variable	Mean	Std. Dev.	Min	Max
<i>Natives</i>				
Man	0.482	0.036	0.372	0.583
Compulsory education	0.314	0.099	0.125	0.529
Post-Compulsory education	0.345	0.054	0.222	0.542
University education	0.341	0.099	0.075	0.635
Spanish nationality	0.998	0.004	0.978	1
Age of first employment	20.483	0.860	18.497	22.405
Log annual labour income	9.153	0.302	8.375	10.208
Days worked	240.472	38.008	137.273	328.589
Employment probability	0.706	0.144	0.165	0.921
Observations	918			
<i>Immigrants</i>				
Man	0.514	0.077	0.310	0.775
Compulsory education	0.629	0.108	0.385	0.838
Post-Compulsory education	0.254	0.072	0.125	0.500
University education	0.116	0.064	0	0.324
Spanish nationality	0.223	0.097	0.057	0.750
Age of first employment	23.336	0.799	20.811	24.692
Log annual labour income	9.027	0.305	6.936	9.896
Days worked	258.121	36.348	60.000	458.333
Employment probability	0.594	0.122	0.111	0.892
Observations	918			

4 Insertion of new entrants into the Spanish labour market: an overview

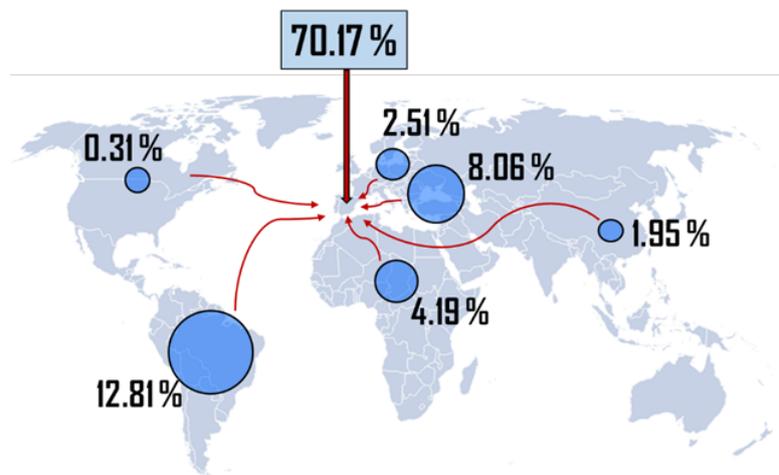
This section summarizes the main characteristics of youth immigrant flows entering the Spanish labour market during the period 2007-2015. First, we analyse the area of origin of immigrant population. Once immigrants enter the labour market, second, we examine the region where they begin their professional career. Third, we analyse the nationality of immigrants. Finally, we examine the trend that the impact of a bust phase in the business cycle have on youth workers, both natives and immigrants, over time.

4.1 Region of origin of immigrant entrants into the labour market

Although the majority of young workers who entered the Spanish labour market during the period 2007-2015 are native-born, 30% of workers in our sample were born in a foreign country. The influx of immigrants varies by region of origin. Actually, the main inflow of immigrants has been from South American countries (13%), as seen in Figure 1. During the last two decades Spain

has become the leading receiving country of the increasingly diversified Latin American inflow to Europe (Durand and Massey, 2010; Domingo et al., 2015; Bayona-i-Carrasco et al., 2017). Previous research shows that immigration from South America was encouraged not only by laws and regulations that responded to labour market needs during the expansive economic cycle in the host country, but also by Spaniards' ethnic preferences, i.e. commonalities in culture and language (see, for instance, Pellegrino, 2004; Hierro, 2013; Avila-Tàpies and Domínguez-Mujica, 2015).

Figure 1: Percentage of new entrants by region of origin



Notes: Own elaboration based on data from the CSHW.

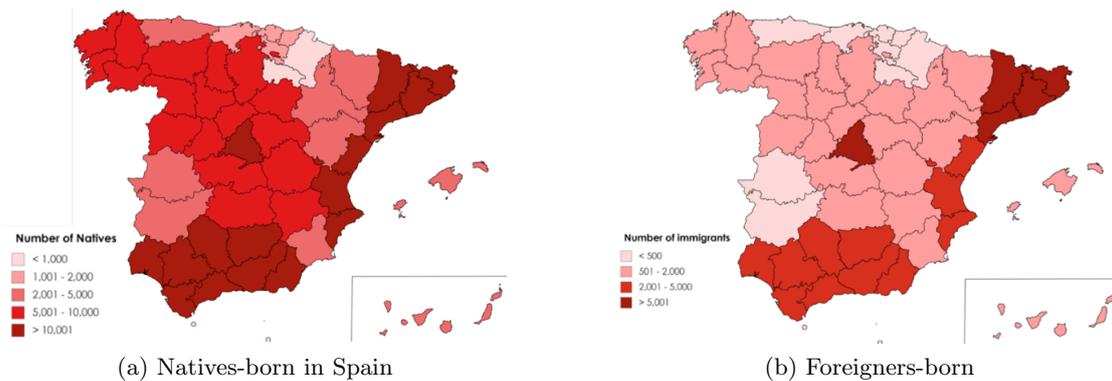
However, it is important to note that other significant migratory flow comes from European countries, but non-EU15, the majority from Romania. In particular, 8% of these immigrants begin their professional career in the period we study. Among the explanatory factors concerning the relevant percentage of Romanian immigrants in Spain, the restrictive migration policies adopted by nearby countries such as Germany, Austria or France, could be the main factor. Far from stopping migration, they have contributed to a geographical change of direction of the migration flow and to the expansion of the Romanian migration space, with its center in the Mediterranean countries, as Spain (Viruela, 2011).

Likewise, 4.2% of immigrant workers in our sample come from African countries, mainly from Morocco. Among the main reasons are labour reasons and geographical proximity (Liu and Treviño, 2019). Only 2.5% of immigrants comes from developed countries inside EU15. Finally, immigrants from Asian countries and U.S. or Canada represent 2% and 0.3% of total of immigrants in our sample, respectively.

4.2 Region of entry into the labour market of new entrans

Once immigrants arrive at the host country, another important point to note is the region chosen to begin their professional career. In other words, the geographical distribution of new entrants is relevant in the analysis. In this respect, the directions of immigrant flows are very asymmetric over the entry period 2007-2015, as shown in Figure 2. A significant share of immigrants moves to large regions like Community of Madrid or Catalonia (21% and 23%, respectively). Andalusia and Valencian Community also constitute two regions with a large inflow of immigrants, but with lower weight (12% and 10%). In the case of native new entrants, the main difference is that they concentrate more in Andalusia (23%). As before, a high percentage of natives begin their professional career in regions like Catalonia, Community of Madrid and Valencian Community (15%, 13% and 10%, respectively).

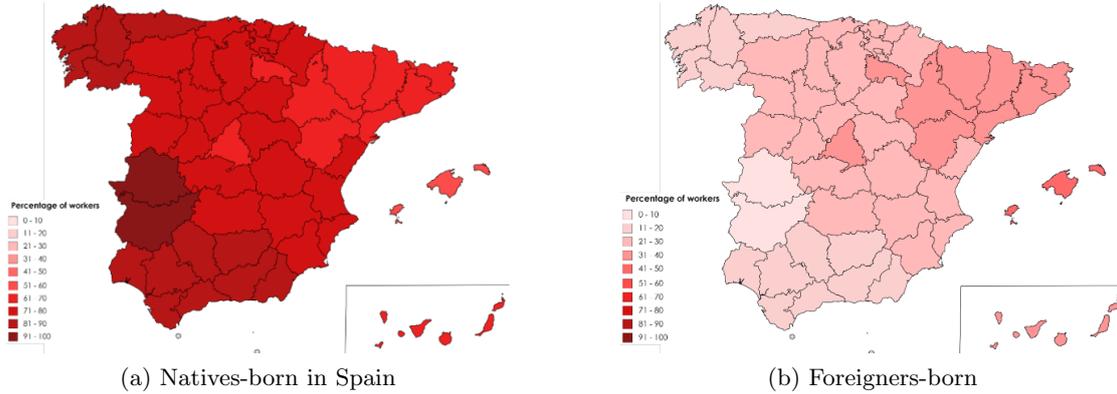
Figure 2: Geographical distribution of new entrants into the labour market during 2007-2015



Notes: Own elaboration based on data from the CSWH.

Additionally, the proportion of natives versus immigrants varies by region of entry. Figure 3 shows graphical evidence on the percentage of young workers, both natives and immigrants, who enter the labour market in each Spanish region in relation to the total new entrants (natives plus immigrants) in that region. First, we observe that of all workers who begin their professional career in the Balearic Islands, 44% are immigrants. There is also a significant percentage of immigrants entering the labour market in regions such as the Community of Madrid and Catalonia (about 38%-39% in both cases). Another significant result is the one we observe in La Rioja. Specifically, 38.4% of all workers who begin their professional career in that region are immigrants. However, in regions such as Andalusia, Asturias and in a greater proportion Extremadura, native workers predominate. In the latter case, natives represent 90% of total workers entering the labour market in Extremadura.

Figure 3: Geographical distribution of new entrants into the labour market in each region



Notes: the figure draws the percentage of workers (natives or immigrants) who enter the labour market in each region in relation to the total population (natives plus immigrants) who enter in that region.

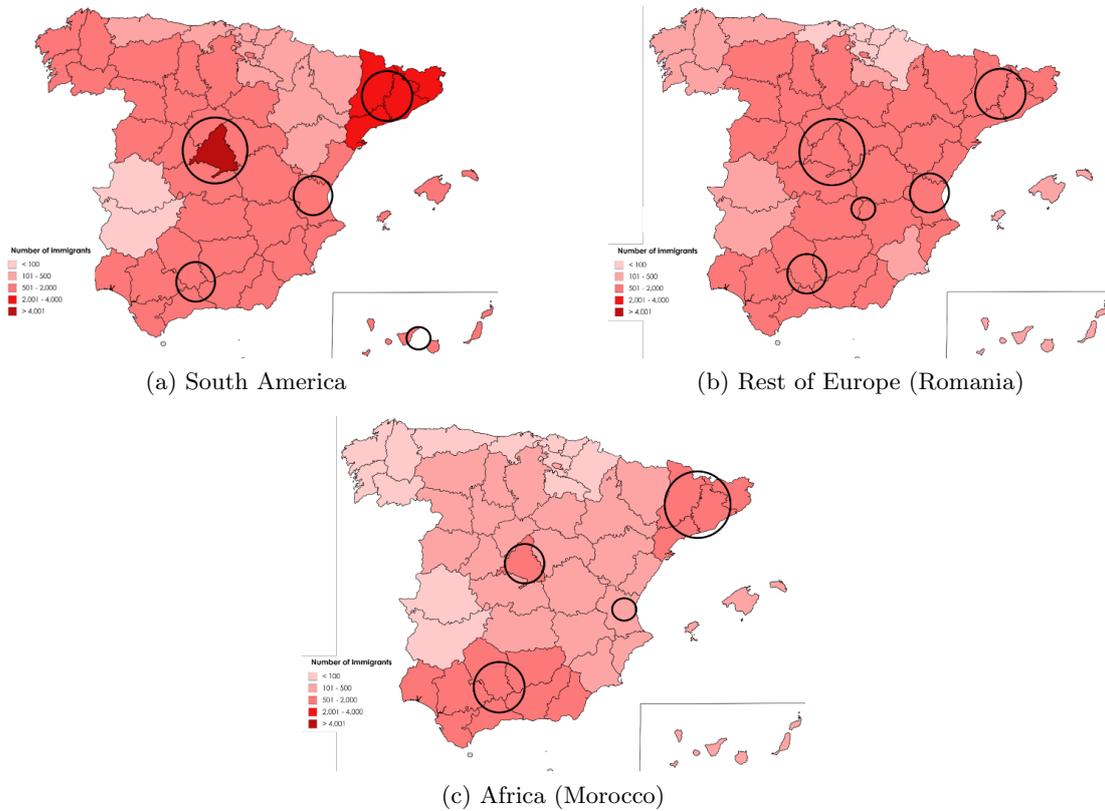
On the other hand, the evidence reveals some differences in the geographical concentration of immigrants from South America, Romania and Morocco, as illustrated in Figure 4 and Table 3. Firstly, Latin Americans entering the Spanish labour market are mainly concentrated in the regions with the largest metropolitan areas in the country, such as the Community of Madrid (27%) and Catalonia (23%). This is in line with previous research that suggests that immigrants from South America are concentrated in these regions due to their participation in urban deconcentration and suburbanization processes (Pozo and García Palomares, 2011; Sabater, Bayona-i-Carrasco, and Domingo, 2012; Bayona-i-Carrasco et al., 2013). Additionally, we observe an important percentage of Latin Americans concentrated in Mediterranean regions, such as Valencian Community and Andalusia (around 8% in both cases).

Regarding the immigrants coming from non-EU15 countries, especially from Romania, their geographical distribution is similar to that of the South America group. Community of Madrid continues to be the main pole of concentration of immigrants (18%), followed by Catalonia (16%). The large regions together with the Mediterranean coast are the places of entry for a high flow of Romanian immigrants as a result of the better and more diverse employment opportunities they offer (construction work, domestic services, manufacturing, intensive agriculture, tourism industry, etc), as underlined Viruela (2011). Specifically, the percentage of Romanians entering the labour market in the Valencian Community reaches 15% and in Andalusia 14%. We must emphasize that this immigrant group has also increased its presence in regions close to the Community of Madrid, such as Castilla La Mancha (10%). This is mainly due to factors related to the labour market and housing as a result of difficulties in establishing in regions with the largest metropolitan areas (Viruela, 2008). However, this concentration in regions such as Castilla La Mancha serves as a springboard to reach other destinations, such as Andalusia or the Valencian

Community (Aparicio et al., 2006; Ibañez, 2006).

The geographical concentration of immigrants from African countries is somewhat different. Specifically, Catalonia becomes the main pole of concentration of these immigrants (29%). Furthermore, around 19% of African immigrants are concentrated in Andalusia, followed by the Community of Madrid (11%) and the Valencian Community (8%). Previous research indicates that this group has settled in areas that needed agricultural and service-oriented labour, such as Catalonia, Community of Madrid and Andalusia (de Haas, 2014; Ennaji, 2014; Gabrielli, 2015).

Figure 4: Geographical distribution of immigrants entering the labour market during 2007-2015



Notes: Own elaboration based on data from the CSWH.

Table 3: Geographical concentration of foreigners by region of origin during 2007-2015 (%)

Region	South America	r_Europe	Africa	EU-15	Asia	U.S. and Canada
Andalusia	7.96	14.25	19.46	12.41	7.68	15.60
Aragon	2.72	6.18	4.49	1.22	3.53	5.28
Asturias	1.55	1.11	0.62	0.68	0.62	2.06
The Balearic Islands	4.34	3.06	4.21	8.33	3.50	2.75
Canary Islands	6.01	2.23	3.67	11.31	4.55	1.83
Cantabria	1.25	0.80	0.42	0.40	0.36	1.38
Castilla La Mancha	3.30	10.04	4.69	1.02	2.22	3.21
Castile and Leon	3.55	5.26	3.20	2.35	2.00	5.28
Catalonia	22.57	15.51	28.88	29.51	39.04	17.66
Extremadura	0.56	1.49	1.31	0.65	0.66	0.23
Galicia	4.23	2.11	1.60	4.79	1.49	5.05
Community of Madrid	27.34	18.36	11.26	12.84	19.12	18.12
Murcia	3.70	2.39	5.90	1.81	2.04	3.21
Navarre	0.70	0.43	0.35	0.45	0.40	0.92
Basque Country	1.10	0.52	1.18	0.85	2.00	4.59
La Rioja	0.84	1.13	0.89	0.60	1.31	0.46
Valencian Community	8.27	15.12	7.88	10.77	9.47	12.39
TOTAL	100	100	100	100	100	100

4.3 Nationality of new entrants

As to the nationality of workers, it is worth checking whether our sample comprises workers who were born outside Spain but have Spanish nationality. In fact, 7.86% of individuals in our sample meet this condition. Table 4 displays the proportion of young workers whose region of origin and nationality differ at the time of entry into the labour market. As we can see, most of immigrants with Spanish nationality come from countries belonging to South America (82%). Additionally, Table 4 displays the proportion of immigrants from each region of origin who have Spanish nationality. In particular, 41% of immigrants who come from South America have Spanish nationality.

Table 4: Percentage of workers whose region of origin and nationality differ (%)

	Spanish nationality / Total immigrants with Spanish nationality	Spanish nationality / Total immigrants who come from each country	Foreign nationality / Total natives with Foreign nationality
EU15	4.70	11.26	-
r_Europe	4.81	4.00	-
South America	81.65	40.85	-
U.S. and Canada	1.11	21.66	-
Asia	2.02	6.23	-
Africa	5.70	8.77	-
TOTAL	100	-	-
Spain	-	-	0.24

4.4 Trends of cohorts' size over the entry period 2007-2015

Since we carry out our analysis since a *fictitious cohort* approach, it is important to analyse the impact that the bust phase in the business cycle had on cohort's size, both of natives and immigrants, and to examine its trend over time.

The evolution of new immigrant entrants has changed over the different entry cohorts we analyse. We define entry cohorts as the set of individuals entering the labour market in the same year. For example, cohort 2007 includes all workers who started their professional career in 2007. Cohort 2008 encompasses all workers entering the labour market in 2008. Hence, as we consider the period 2007-2015 as a period of entering the labour market, we analyse 9 different cohorts in this study.

Table 5 displays in detail the size of our baseline sample by entry cohorts (2007-2015) at the moment of entry. We distinguish between natives and immigrants in order to analyse the differences between them. Particularly, in both cases we note that there is an impact in terms of employment following the Great Recession that started in 2008. Our data shows that the new entrants' cohort size was drastically reduced starting in 2008, especially in the case of natives. The fall was around 54% in 2009, compared to 2007. The interannual variation rate also shows the fall in the number of native entrants in the first two years of the crisis (falls by 30% in 2008 and 34% in 2009). In the next 3 years, the number of native entrants stabilizes and, it is from 2012, when it begins to increase consecutively. Finally, in 2015, the number of new participants returned to similar levels as before the beginning of the crisis.

In the case of immigrants, however, the trend is different. The number of entrants fall by 27% between 2007 and 2009. Unlike the natives, the number of new immigrant participants progressively decreased until 2013, with the years 2011 and 2012 being the most harmful, as shown in the interannual variation rate of Table 5 (falls by 13% and 27%, respectively). Yet, the trend was reversed in 2013, when the number of new entries started to recover. The evidence shows that the number of immigrant entrants grows 45% between 2013 and 2014.

Summing up, we observe that the crisis causes a negative impact in terms of cohort size for natives during the first two years, but these effects are short-lived. However, the negative effect on cohort size for immigrants is long-lived.

Figure 5a brings a graphical view of this issue. In fact, we observe a disparity between natives and foreigners in the evolution of the number of incoming workers. As mentioned earlier, the number of new entrants was reduced considerably in the first 2 years after the crisis. From then on, the evidence shows that it began to recover, especially since 2012. On the other hand, in the case of immigrants, the reduction in the number of new entrants was not so drastic initially, but

it prolonged for longer. Then, it started to recover from 2013.

By region of origin, the number of immigrants entering the Spanish labour market during the period 2007-2015 is also quite different, as seen in Figure 5b. As we mentioned above, the main inflow of immigrants in Spain arrives from South America and from non-EU15 countries, especially from Romania. Consequently, the most noticeable fall in the number of foreign entrants into the labour market with the onset of the economic crisis corresponds to these immigrants. In particular, the number of immigrants from South America and non-EU15 countries reduced by around 37% and 57%, respectively, between 2007 and 2011. In contrast, the number of new immigrant workers from other countries of origin has remained approximately similar during the period analysed.

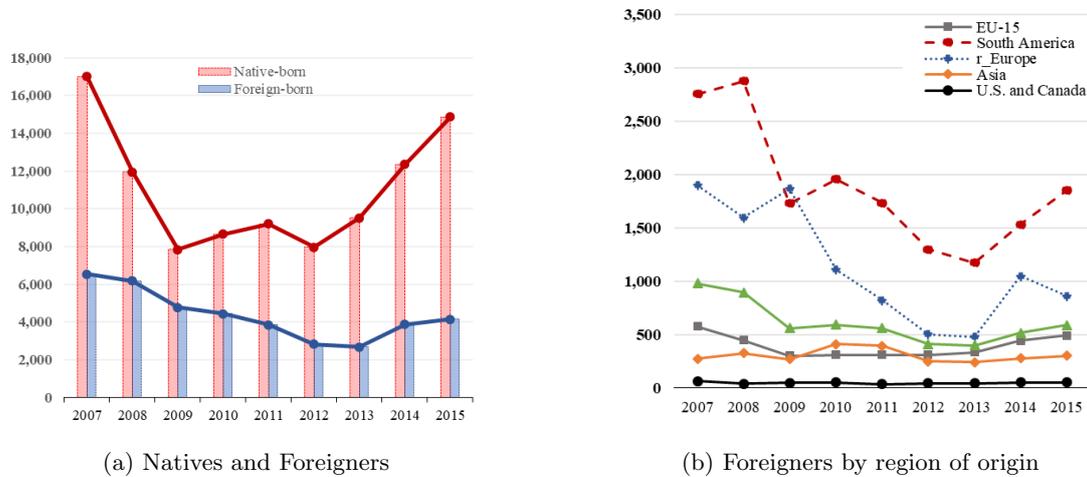
This evidence reinforces the idea that the Great Recession negatively affected migration dynamics, reducing the number of immigrants entering the labour market. Hence, this evidence on the sharp drop in new entrants' cohort size should be taken into account when interpreting the results in terms of wages and employment, which we will look into them further below.

Table 5: Sample size for native and immigrant workers in Spain over the entry period 2007-2015

Number of individuals	Cohort 2007	Cohort 2008	Cohort 2009	Cohort 2010	Cohort 2011	Cohort 2012	Cohort 2013	Cohort 2014	Cohort 2015	All Cohorts
Native-born	16,999	11,939	7,827	8,664	9,200	7,954	9,522	12,337	14,871	99,313
Interannual variation rate (%)		-29.77	-34.44	10.69	6.19	-13.54	19.71	29.56	20.54	
Foreign-born	6,544	6,184	4,780	4,432	3,858	2,817	2,671	3,873	4,154	39,313
Interannual variation rate (%)		-5.50	-22.70	-7.28	-12.95	-26.98	-5.18	45.00	7.26	
All workers	23,543	18,123	12,607	13,096	13,058	10,771	12,193	16,210	19,025	138,626
Interannual variation rate (%)		-23.02	-30.44	3.88	-0.29	-17.51	13.20	32.95	17.37	

Notes: This table shows the sample size for native and immigrant workers at the time of entry into the labour market i.e. when they have no any professional experience in the Spanish labour market. In addition, the table includes the whole sample size by entry cohorts up to 2017, when our observation window finishes.

Figure 5: Evolution of the number of young workers entering the Spanish labour market between 2007 and 2015.



Notes: These graphics show the number of young workers who entered into the labour market by region of origin and by entry cohorts. Hence, it draws the evolution of new entrants with no professional experience.

5 Immigration, wages and employment: an overview

In this section, we summarize an overview relative to wages and employment of immigrants, comparing them with native population. Moreover, we examine the income and employment trajectories of natives and non-natives over time.

5.1 Wage distribution

A first overview in terms of earnings is given by a detailed examination of the wage distribution of young workers. In particular, Figure 6 presents the kernel density estimate of real annual earnings (on a logarithmic scale) for immigrant and non-immigrant workers for the period 2007-2017. The figure shows that a significant proportion of workers, especially natives, is concentrated in the lowest end of the wage distribution. This implies that a significant share of labour participants in our sample receive lower earnings. In addition, the wage distribution of immigrants is more compressed compared to the wage distribution of natives.

More descriptive evidence is displayed in Table 6, which describes the distribution of earnings in our sample between natives and foreigners for the period 2007-2017. As shown in the table, the average wage of native workers is 2.7% less than mean wage of foreign-born workers. This finding is in line with the evidence illustrated in the Kernel density graph for income distribution. Additionally, median wages follow the same pattern as the mean. In turn, wage dispersion—whether

measured by the variance of wages or by percentile ratios—is much higher among native workers. Interestingly, we observe differences in the wage gap between natives and foreign-born workers along the wage distribution, as illustrated Figure 7. In particular, the evidence shows that immigrants receive a higher salary than native workers in a large part of the wage distribution, except in the highest percentiles, where the trend reverses. In other words, the wages of non-immigrant workers only exceed those of immigrants in the highest portion of the wage distribution.

Figure 6: Kernel density for income distribution over the period 2007-2017

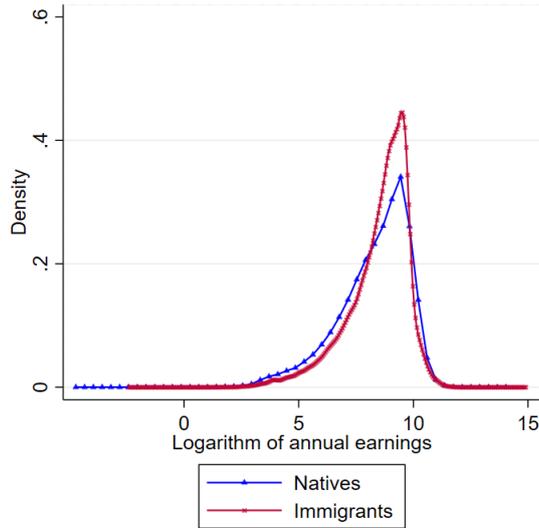
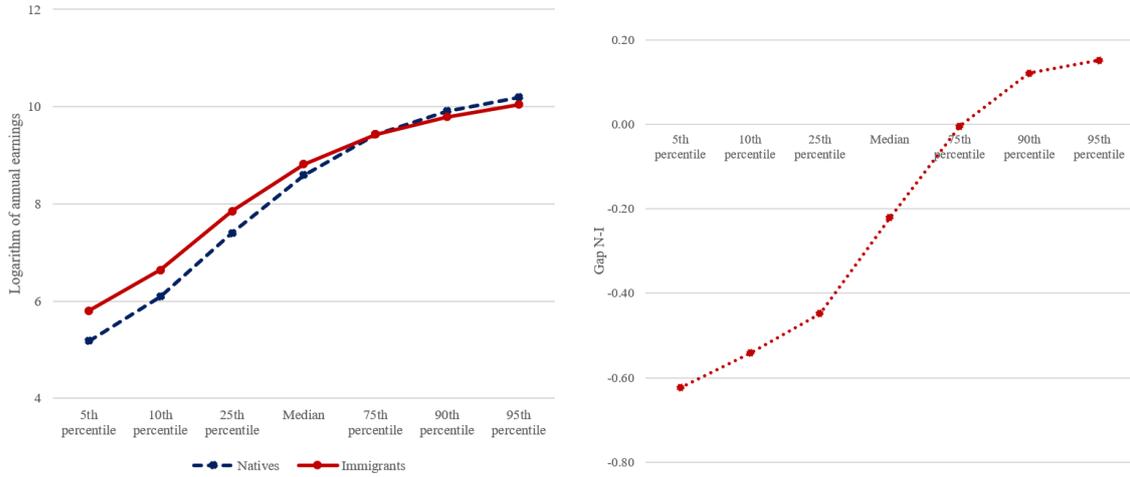


Table 6: Wage distribution for natives-born and foreign-born workers during the period 2007-2017

	Natives	Immigrants	GapN-I
<i>Mean and selected percentiles</i>			
Mean	8.26	8.49	-0.23
5th percentile (P5)	5.18	5.80	-0.62
10th percentile (P10)	6.10	6.64	-0.54
25th percentile (P25)	7.41	7.85	-0.45
Median (P50)	8.59	8.81	-0.22
75th percentile (P75)	9.43	9.43	-0.01
90th percentile (P90)	9.91	9.79	0.12
95th percentile (P95)	10.19	10.04	0.15
<i>Measures of dispersion and inequality</i>			
Standard deviation	1.55	1.34	
P90/P10 ratio	1.63	1.47	
P50/P10 ratio	1.41	1.33	
P90/P50 ratio	1.15	1.11	

Figure 7: Wage distribution for natives-born and foreign-born workers



5.2 Wage trajectories over time

In Figure 8 we show graphical evidence on the evolution of annual earnings of workers in our sample by entry cohort and potential experience accumulated over time. We follow the same analysis by Oreopoulos et al. (2012), Brunner and Kuhn (2014) and Liu et al. (2016). The observation unit is the cohort, so each line corresponds to an entry cohort and its potential experience.

For a better understanding of Figure 8, we explain what the different lines and curves illustrated in the figure represent. Specifically, the black triangles represent the entry wages by entry cohorts. We have to take into account that entry can take place in any moment of the years (at the beginning or at the end). Therefore, to avoid bias in our analysis, we will exclude this observation from the analysis.

The green line represents the evolution of the average annual earnings by entry cohorts when they accumulate 1 year of experience. Note that we define as entry cohorts the set of individuals entering the labour market in the same year. For example, the first green point captures the average earnings after 1 year since the entry of the cohort 2007. In other words, this reflects the average salary of all workers after 1 year working since the beginning of their professional career in 2007. Hence, each point of this green line captures the average wage of each entry cohort when they accumulate 1 year of experience.

The coloured curves capture the evolution of the annual earnings of each entry cohort as they gain more professional experience in the labour market. For example, and following with the cohort 2007, the blue curve illustrates the average evolution of the annual salary of workers entering the labour market in 2007 as they accumulate experience each year later. The first point of the

curve, which coincides with the green line mentioned above, corresponds to the moment they have been working in the labour market for 1 year, that is, when the cohort accumulate 1 year of professional experience. The second point along the blue curve, on the other hand, corresponds to the second year of professional experience; the third point to the third year of professional experience; and so on. Therefore, each point reflects the average annual earnings of the cohort in each year of professional experience.

Finally, the black line corresponds to the evolution of the average annual earnings of each entry cohort when they have a professional experience in the labour market equal to 5 years. This line arises after joining the point of the curve of each cohort where it accumulates 5 years of professional experience with that of the other cohorts.

Regarding natives, we observe that the cohorts that began their professional career during the Great Recession received lower earnings than the cohort 2007, as the green line shows. However, data shows that cohort earnings tend to match as they have more professional experience. As the black line shows, cohorts earn similar salaries when they accumulate 5 years of professional experience. Therefore, the initial wage gap between cohorts converges to zero.

This wage convergence of cohorts, regardless of their year of entry, suggests that cohorts are reducing their chances of promotion throughout their professional career when facing the recession. Thus, cohorts entering during an economic downturn can catch-up their peers in earnings terms in the long run.

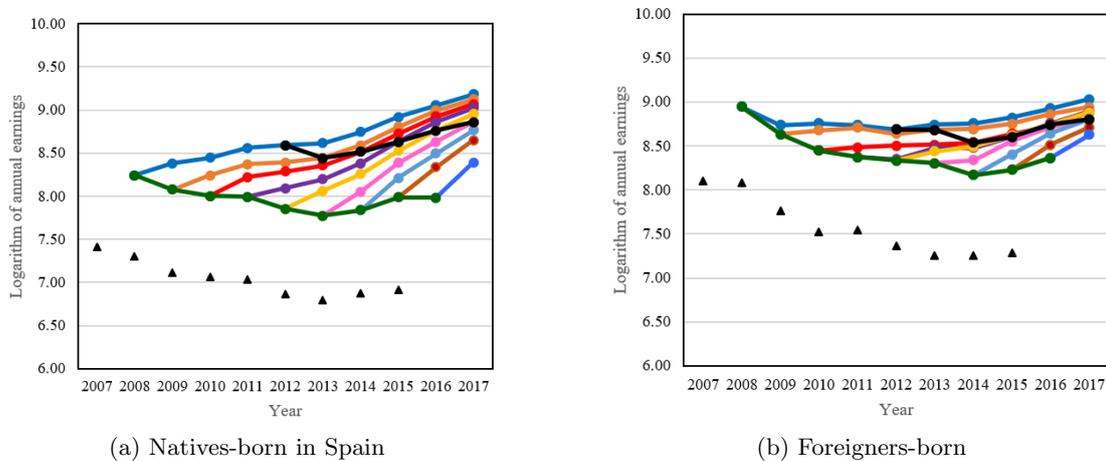
We analyse data distinguishing by natives-born and non-natives. There are several aspects to highlight in Figure 8. Overall, we observe there are significant differences between both groups. In particular, we observe that immigrants receive higher annual wages when they accumulate 1 year of experience than natives, regardless of the time of entry into the labour market. This is in line with the evidence illustrated previously. Taking into account the region of origin, instead, the evidence shows that those workers beginning their professional career at the end of the economic expansion (2007-2008) receive higher entry earnings than their peers entering into the labour market during a business cycle slump. In particular, between 2008 and 2013 wages of natives fall by 7% and by 10.2% in the case of foreign-born workers. In both cases, however, at the end of our observation window, there is convergence among all cohorts suggesting that the initial earnings gap reduces over time.

Previous evidence shows relevant differences in terms of earnings between natives and immigrants. Concretely, it reveals that immigrants receive higher wages than natives in the first year of experience, regardless of the time of entry into the labour market. Moreover, immigrants receive a higher salary than native workers. This evidence suggests that if there are wage differences it

could be as a result of differences in terms of employment. We are going to look into this issue next.

On the other hand, we observe that the native cohorts that begin their professional career under favourable economic conditions and face the crisis within the labour market, do not increase their progress or promotion options as they accumulate experience. However, those cohorts that enter the labour market despite the recession, do progress over time. Hence, the wage convergence that we find in the long-term between the entry cohorts. Unlike the pattern of natives, immigrant cohorts do not progress throughout their professional career, but rather stagnate, regardless of the year of entry into the labour market.

Figure 8: Annual labour income experience profile by entry cohorts into labour market.



5.3 Employment trajectories over time

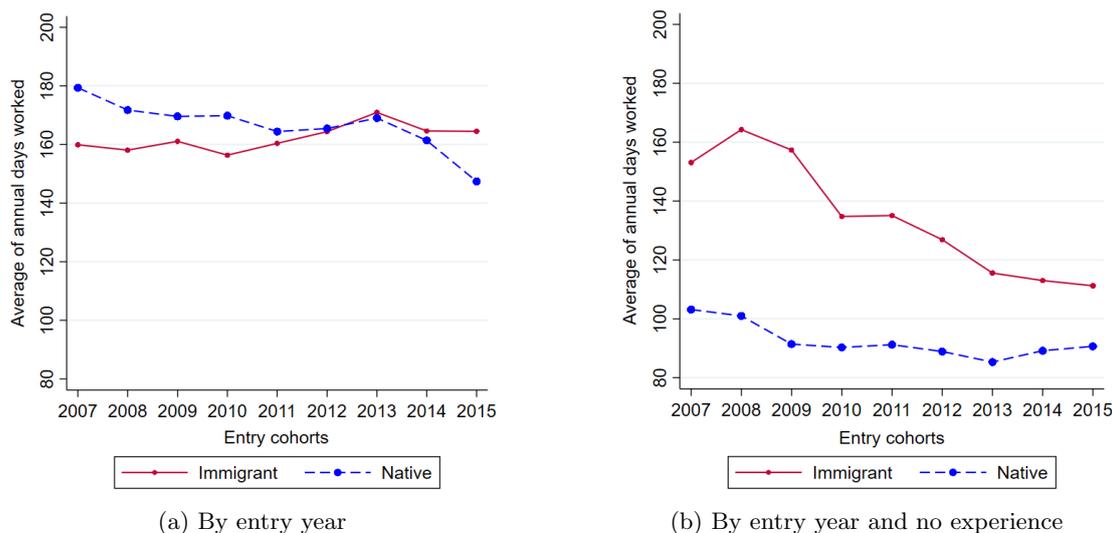
So far, we have analysed the earnings trajectory of native and immigrant young workers, as well as the impact the economic crisis had on it. In fact, we observe that there are wage differences between natives and immigrants, possibly linked to differences in employment. To verify whether such differences do occur, we analyse the evolution of the days worked of both groups.

First of all, Figure 9a displays descriptive evidence on the evolution of the average of days worked by entry cohorts. As we can see in Figure 9a, native cohorts who enter into the labour market between 2007 and 2012 work more days per year than immigrants, but the trend reverses after 2012. Then, the number of days worked by those born in Spain tends to decrease. However, the days worked tend to increase in the case of immigrants. The evidence, instead, changes considerably when we do not consider all labour market trajectories, but only the entry moment i.e. when cohorts have no professional experience. In this case, as seen in Figure 9b, although

the trend is decreasing, immigrants who begin their professional career work more days than natives.

This descriptive evidence, therefore, suggests that immigrants work more days than natives at the beginning of their professional career. However, this could also suggest that as workers accumulate professional experience, the number of days worked by natives increases, exceeding that of immigrants and, hence in Figure 9a, days worked by natives are higher.

Figure 9: The evolution of the average of days worked by entry cohorts

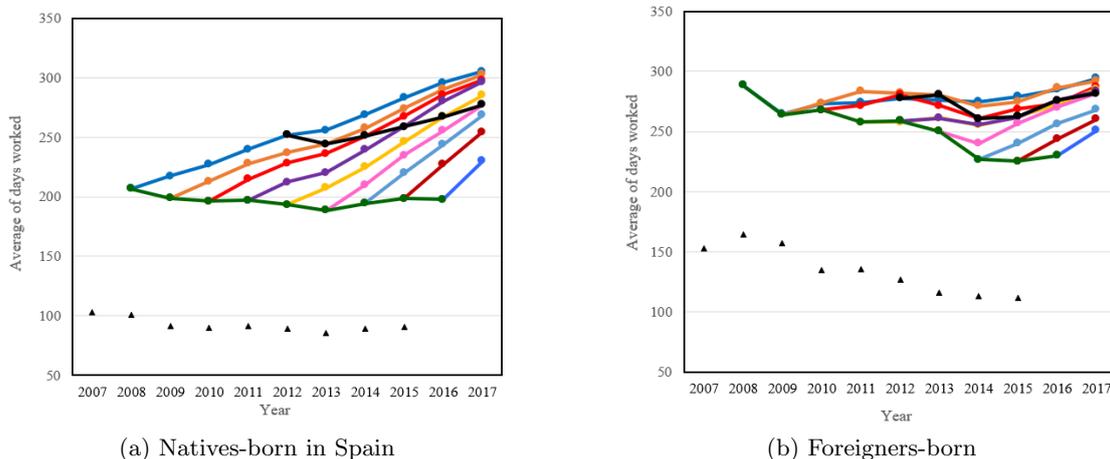


To look further into this issue, Figure 10 plots the average annual days worked by entry cohorts as they accumulate experience for the period 2007-2017. The idea behind the graph is the same as we saw in the case of earnings, but in this case, we analyse the average days worked. The black triangles reflect the average number of days worked at the time of entry. The green line represents the evolution of the average days worked by entry cohorts when they have been working 1 year within the labour market. The coloured curves capture the evolution of the days worked of each entry cohort as they gain professional experience into the labour market. The black line corresponds to the evolution of the average days worked by the different entry cohorts when they have a professional experience within the labour market equal to 5 years.

As we mentioned before, immigrants who began their professional career during the period analysed worked more days than natives in spite of the fact that the number of days worked by immigrants decreases significantly since 2008. In particular, they were reduced by around 29.6% between 2008 and 2013. The trend changes as cohorts accumulate professional experience. While the days worked by immigrants tended to fall once the crisis began, even if they had professional experience, the opposite happened in the case of the natives. In this case, the number of days

worked increased with professional experience. When cohorts accumulate 5 years of experience, the number of days worked is higher in the case of natives. Therefore, this is in line with the previous evidence and reinforces the idea that initially immigrants work more days, but as cohorts gain experience, the number of days worked become higher in the case of natives.

Figure 10: Average annual days worked by entry cohorts over the experience



Therefore, the results reinforce the idea that there is a negative and significant impact in terms of wages and employment as a result of the economic crisis at the end of 2008. Moreover, the results differ between natives and immigrants. In terms of wages, immigrants receive initially, on average, a higher salary than natives. However, there is a salary convergence between natives and immigrants as cohorts accumulate professional experience. As we have seen, this may be due to the limited chances of promotion of cohorts entering under favourable economic conditions. Likewise, this also is due to the evidence found in terms of employment patterns. More specifically, although initially immigrants work longer days compared to natives, the same does not happen over time. Specifically, the days worked by natives increase as they accumulate professional experience, exceeding those of immigrants.

5.4 Employment rate' trajectories over time

Let us now focus on the variations that suffer the employment rate over time. As discussed in Section 3, this data allows us to create a variable referred to employment probability, understood as a rate of continuing to work once the individual entering the labor market. If there is an impact in terms of wages and employment, as seen earlier, it is likely that there will also be an impact on employment rate.

To do so, Figure 11 plots the average employment rate by entry cohorts as they accumulate

experience for the period 2007-2017. The idea behind the graph is the same as we saw in the case of earnings and the number of days worked, but in this case, we analyse the average employment rate. The green line represents the evolution of the average employment rate by entry cohorts when they have been working 1 year within the labour market. The coloured curves capture the evolution of the employment rate of each entry cohort as they gain professional experience into the labour market. The black line corresponds to the evolution of the average employment rate by the different entry cohorts when they have a professional experience within the labour market equal to 5 years.¹

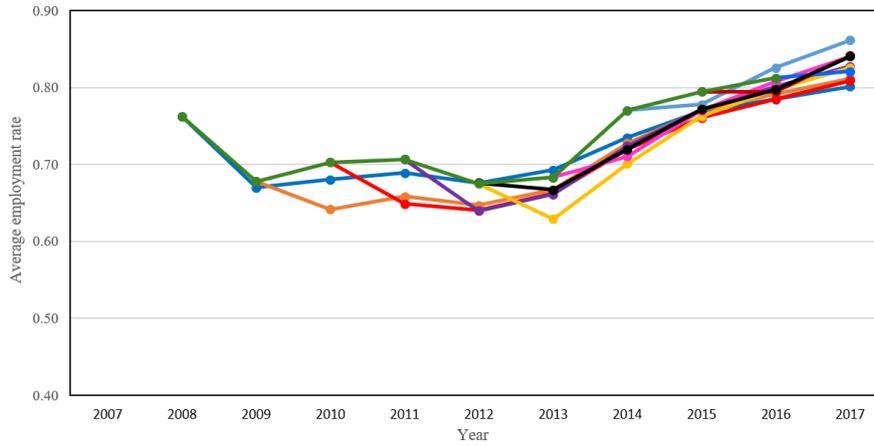
The data shows that immigrant cohorts entering the labour market during a recession have a lower employment rate when they accumulate 1 year of professional experience than their native peers (around 70% for immigrants versus 80% for natives). However, the employment rate seems to be similar at that time both in natives and immigrants when the cohorts begin their professional career after the Great Recession.

As the cohorts accumulate more potential experience, significant differences are observed between the native and non-native population. The data shows that, although the employment rate of cohorts facing the crisis falls in the following years for both natives and immigrants, the impact seems to be of greater magnitude in the case of non-natives. In particular, while the employment rate remains at around 70% in the case of native cohorts who entered the labour market before or at the beginning of the crisis, the employment rate is reduced to 50% in the case of immigrants. After 10 years working, the data shows that the employment rate of natives is around 80% -90%, regardless of their entry year. In contrast, the employment rate of immigrants differs depending on the year of entry. In particular, the employment rate for those immigrants entering post-crisis into the labour market does not seem to be negatively affected.

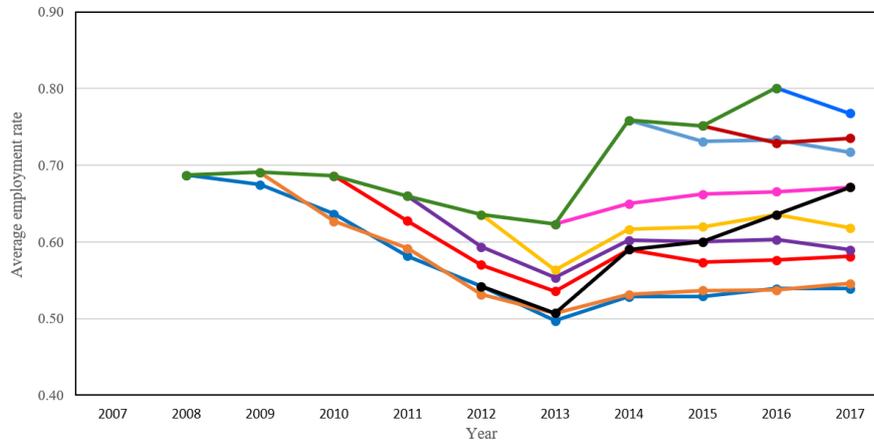
In the next section, we focus our analysis on examining possible differences between immigrants, distinguishing them according to their region of origin.

¹Here, we do not indicate the average employment rate in the year of entry with a triangle, as in the case of wages and employment. This is because the employment rate is a binary variable. More specifically, in the year of entry all workers work so that the average is equal to 1.

Figure 11: Average employment rate by entry cohorts over the experience



(a) Natives-born in Spain



(b) Foreigners-born

6 Wages and employment of immigrants by area of origin

In the previous section, we found evidence of differences in terms of wages and employment between the young native workers and the young immigrant workers, which vary over time. In what follows, we analyse whether there are differences depending on the region of origin of immigrants.

6.1 Wage distribution

Firstly, we take a look into the wage distribution by foreigners' birth country. In particular, Figure 12 presents the kernel density estimate of real annual earnings (on a logarithmic scale) for young immigrant workers arriving from different countries: countries of the EU15; countries

of Europe outside the EU15; South America; U.S. and Canada; Asia; and Africa. As seen in the figure, we observe differences by region of origin. In fact, the most dispersed wage distribution corresponds to immigrants from the U.S. and Canada. Conversely, immigrants from Asian countries have the least dispersed wage distribution. Moreover, the figure shows that the wage distribution shifts to the right, in the case of those immigrants born in EU15 countries. This implies, therefore, that they receive a higher average wages compared to the other groups.

Figure 12: Kernel density for income distribution over the period 2007-2017

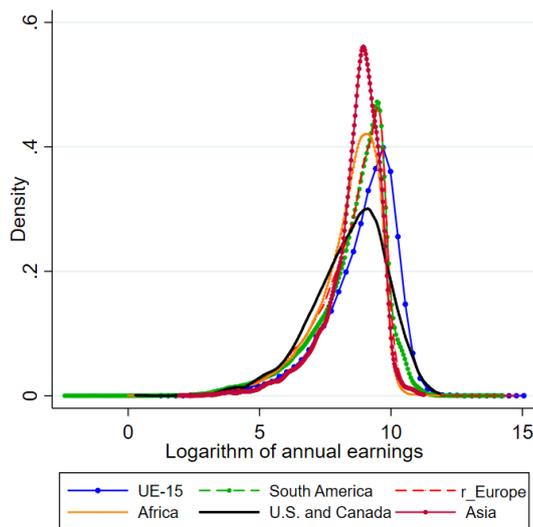


Table 7 displays more descriptive evidence. In particular, it contains information on the wage distribution of foreigners for the period 2007-2017. Similar evidence to that found previously among natives and immigrants is found by region of origin of immigrants. Specifically, non-immigrant workers receive lower wages than immigrants do, especially for immigrants who come from EU15 countries. In this case, the average wage of immigrants is 6.8% higher than mean wage of natives.

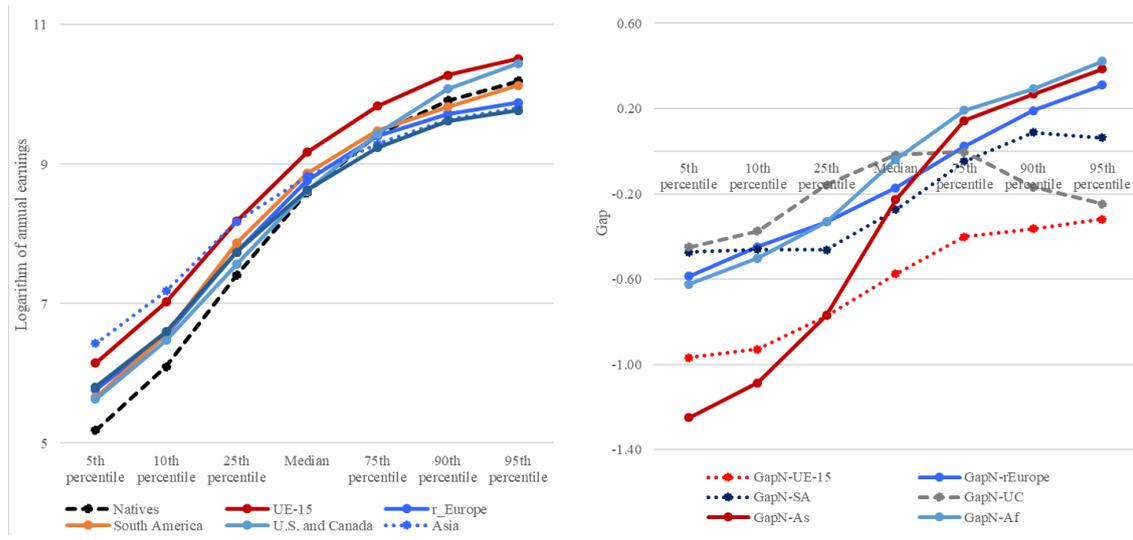
Likewise, we observe differences in the wage gap between natives and foreign-born workers along the wage distribution by region of origin, as illustrated Figure 13. Immigrant workers from countries in South America, non-EU15, Asia and Africa receive a wage that exceeds that received by natives only in the lower-middle part of the wage distribution because the trend reverses in the highest percentiles. In other words, the wages of native workers only exceed those of immigrants in the upper part of the wage distribution. Consequently, the wage gap narrows along the salary distribution and goes from being negative to being positive, as we seen in Table 7 and Figure 13. In the case of immigrants arriving from EU15 countries and U.S. or Canada, instead, they earn higher wages compared to native in the whole wage distribution. Hence, the wage gap remains negative over the distribution, as seen in Figure 13.

Table 7: Wage distribution statistics for natives-born in Spain and foreign-born workers during 2007-2017

	Natives	EU15	GapN-EU15	r.Europe	GapN-rEurope	South America	GapN-SA	U.S. and Canada	GapN-UC	Asia	GapN-As	Africa	GapN-Af
Mean and selected percentiles													
Mean	8.26	8.86	-0.60	8.42	-0.15	8.50	-0.24	8.39	-0.13	8.59	-0.32	8.33	-0.06
5th percentile	5.18	6.15	-0.97	5.77	-0.59	5.65	-0.47	5.63	-0.45	6.43	-1.25	5.80	-0.62
10th percentile	6.10	7.03	-0.93	6.54	-0.45	6.56	-0.46	6.47	-0.37	7.18	-1.09	6.60	-0.50
25th percentile	7.41	8.18	-0.77	7.74	-0.33	7.87	-0.46	7.56	-0.16	8.17	-0.77	7.74	-0.33
Median	8.59	9.17	-0.58	8.77	-0.17	8.87	-0.27	8.61	-0.02	8.82	-0.23	8.63	-0.04
75th percentile	9.43	9.83	-0.40	9.40	0.02	9.48	-0.05	9.43	0.00	9.29	0.14	9.24	0.19
90th percentile	9.91	10.27	-0.36	9.72	0.19	9.82	0.09	10.08	-0.17	9.64	0.27	9.62	0.29
95th percentile	10.19	10.51	-0.32	9.88	0.31	10.13	0.06	10.44	-0.25	9.81	0.39	9.77	0.42
Measures of dispersion and inequality													
Standard deviation	1.55	1.37		1.32		1.40		1.47		1.07		1.27	
P90/P10 ratio	1.63	1.46		1.49		1.50		1.56		1.34		1.46	
P50/P10 ratio	1.41	1.31		1.34		1.35		1.33		1.23		1.31	
P90/P50 ratio	1.15	1.12		1.11		1.11		1.17		1.09		1.11	

Notes: The table displays the earnings of natives and immigrants along the wage distribution for the period 2007-2017. Also, we distinguish by region of origin of immigrants.

Figure 13: Wage distribution for natives-born and foreign-born workers by region of origin



6.2 Wage trajectories over time

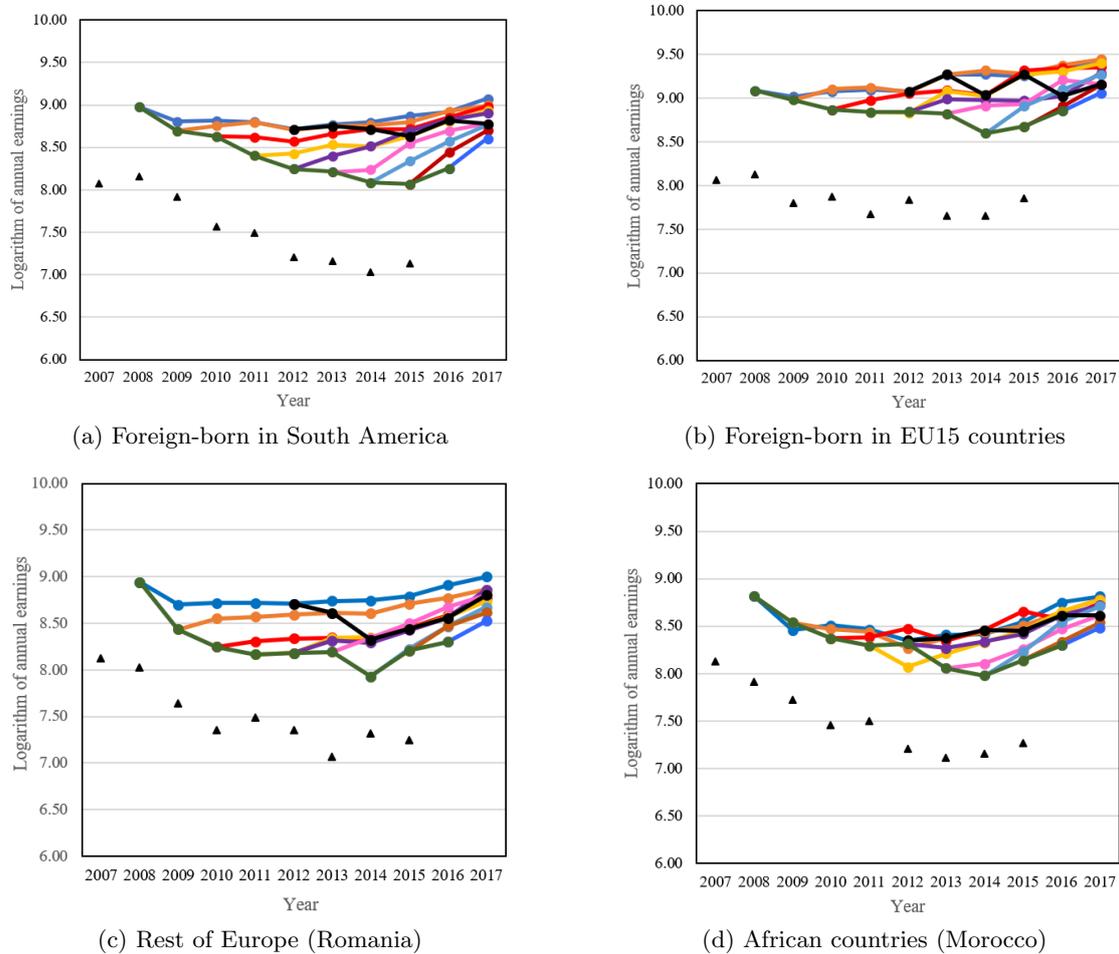
Figure 14 shows evidence of the differences in the evolution of annual earnings based on the year of entry into the labour market, as well as on the accumulated potential experience. For simplicity, we only examine the case of immigrants coming from Latin America, from EU15 countries, from countries in the rest of Europe not belonging to EU15 and from African countries.

First, the evidence shows that, in all cases, immigrants received similar wages in the first year of experience if they enter during the economic expansion period. However, the Great Recession caused a reduction in earnings that was more pronounced in the case of those born in South

America and in non-EU15 countries (a fall by 12.3% and 12% between 2008 and 2013, respectively). Earnings of immigrants arriving from African countries were also negatively affected by the economic crisis. In particular, their earnings when cohorts accumulate 1 year of experience declined up to 10% between 2008 and 2013. As for workers born in EU15, instead, wages reduced by half than their peers in South America or Romania (around 6% during 2008-2013). Hence, this group of immigrants receive a higher wage facing the crisis, compared to their immigrant peers.

Second, despite this initial wage gap, there is convergence among all cohorts, which reduces the initial earnings gap over time. Third, when workers accumulate 5 years of professional experience, we continue to observe that immigrants who come from EU15 countries earn a higher salary than the rest.

Figure 14: Annual labour income experience profile by entry cohorts over the experience



Again, we find that there is a negative impact of the Great Recession on the earnings of young workers, which reduces over time. Moreover, we observe differences among the immigrants who

begin their professional career in the period examined. As in the previous section, the evidence found here suggests that the existence of wage differences could be the result of differences in terms of employment, which we analyse below.

6.3 Employment trajectories over time

Figure 15a shows graphic evidence on the evolution of days worked by entry cohorts. In particular, we note that immigrants from countries such as Romania or Africa, who entered the labour market in 2007, still at a time of economic expansion, are those who worked the most days on average. However, the number of days worked is reduced for the following entry cohorts of both groups. The same does not happen in the case of immigrants from South America and EU15. Specifically, immigrants from Latin America who entered the labour market in 2007 are those who work less days. However, the trend is growing throughout the entry cohorts, that is, the cohorts that entered the following years worked more days on average. In the case of EU15 immigrants, the trend is similar. The average number of days worked grows throughout the entry cohorts, being those immigrants who began their professional stage in 2013, 2014 and 2015 who work the most days.

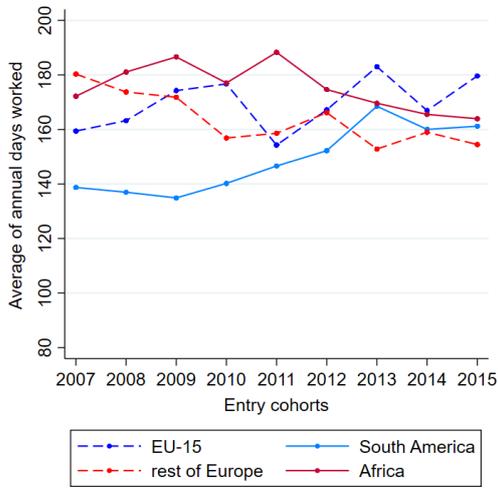
On the other hand, we find differences when we analyse the evolution of the days worked by entry cohorts at the time of entry i.e., they have no professional experience. In particular, although the trend is decreasing, immigrants coming from Africa and beginning their professional career between 2007-2012 work, on average, more days than immigrants from other countries, as seen in Figure 15b. However, new immigrant entrants from EU15 countries are those who work less days on average between 2007 and 2012. Although these are the ones who work more days since 2012, this is due to the significant decline in the number of days worked of the rest of immigrants. Hence, the results show that despite working fewer days at the time of entry, EU15 immigrants receive a higher income than other immigrants.

To dig deeply into this issue, Figure 16 shows the average annual days worked by entry cohorts over labour market experience. As in the previous section, the idea behind the graph is the same as in the case of wages, but now we analyse the average days worked.

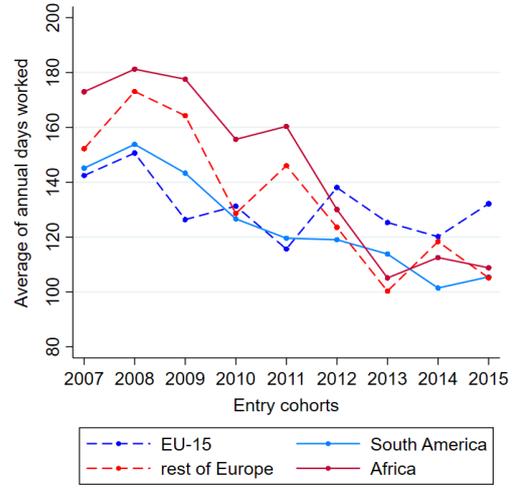
There are several aspects to highlight in Figure 16. First, between 2007 and 2012 the immigrant group from African countries works more days on average than the rest of the immigrants. This evidence was already illustrated previously in Figure 15.

Second, we observe that both immigrants from European countries inside and outside the EU15, as well as from South American countries, increase their average days worked as they gain professional experience in the labour market. The employment gap by entry cohorts persists

Figure 15: The evolution of the average of days worked by immigrants

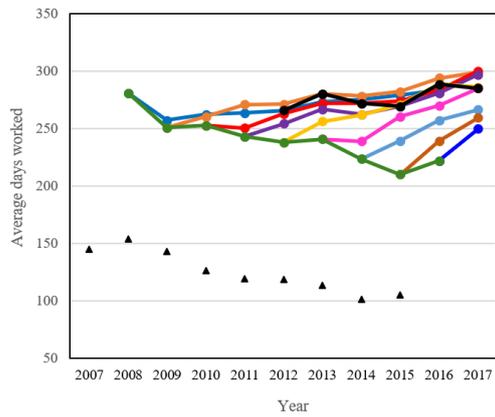


(a) By entry year

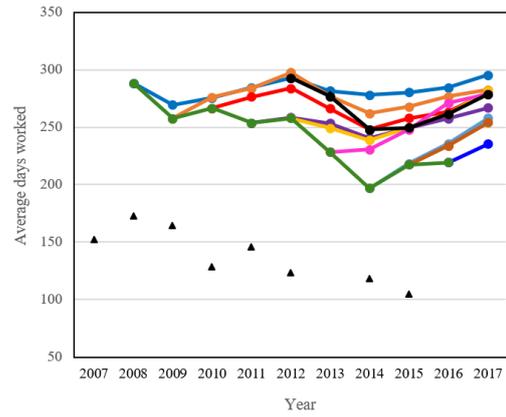


(b) By entry year and no experience

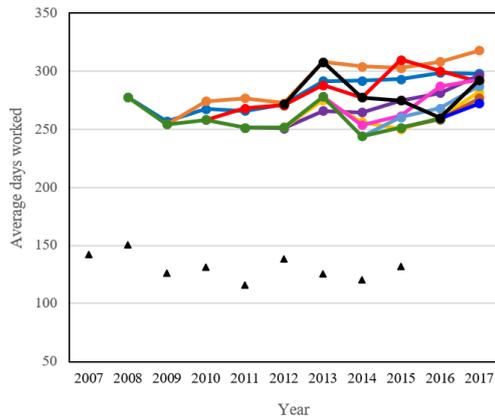
Figure 16: Average annual days worked by entry cohorts over the experience



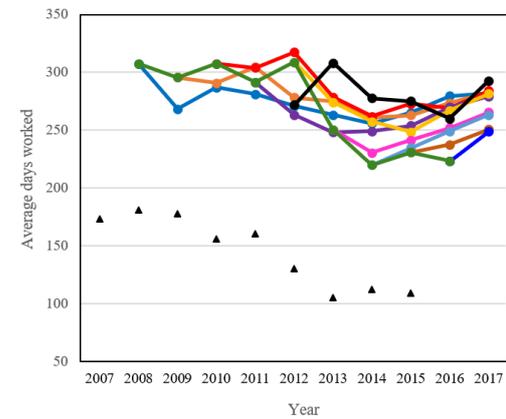
(a) Foreign-born in South America



(b) Foreign-born in EU15 countries



(c) Rest of Europe (Romania)



(d) African countries (Morocco)

over time in the case of immigrants from countries inside and outside the EU15. In the case of South America, instead, the evidence shows that the initial gap converges to zero.

However, the pattern is not similar in the case of those from African countries. More specifically, the days worked are significantly reduced after the cohorts reach their first year of professional experience. In this case, the cohorts that are most negatively affected by the reduction in the number of days worked are those entering the labour market between 2007 and 2009. This negative impact in terms of employment does not remain over time. In general, this stabilizes or even begins to increase as of the sixth year working.

Therefore, the results found reinforce the idea that there is a negative and significant impact in terms of wages and employment as a result of Great Recession at the end of 2008. Likewise, there are important differences among immigrants depending on their region of origin. In terms of earnings, the crisis has had a negative impact on immigrants' entry wages, except in the case of those coming from EU15 countries, which have negatively affected to a lesser extent. This negative impact on wages is due to the impact that the crisis has on employment, translated into a smaller number of days worked. However, once the economy recovers, the negative effect on employment is reduced until it disappears. Future research will focus on analysing this evidence by educational levels and gender.

7 Empirical Strategy

In this section, we describe our estimation strategy to identify the short- and long-term effects of labor market conditions on different labour market outcomes of natives and immigrants. More specifically, our main goal is to analyse the impact of the economic conditions faced by new entrants on wages and employment, as well as paying attention to their evolution over time. As a proxy for economic conditions, we use the unemployment rate at the regional level during the period analysed. Following Oreopoulos et al. (2012), we exploit variation in the rate of unemployment at the regional level over the period 2007-2017. Since the rate of unemployment varies across regions and cohorts, individual level data were collapsed by entry cohort (c), entry region (r) and calendar year (t), and we work with group-specific means of the variables, weighted by the corresponding cell sizes.

Yet, workers' professional career is affected not only by initial economic conditions, but also by economic conditions in every moment. Then, as in Oreopoulos et al. (2012), we estimate a dynamic model that controls not only for the initial regional unemployment rate, but also for regional unemployment rates faced by the cohort throughout their professional career. This

allows us to distinguish between the effect of entry conditions into the labour market and the impact of labour market conditions during their professional career. The dynamic model can be written as follows (Oreopoulos et al. 2012):

$$\begin{aligned} \ln y_{crt} = & \alpha + \beta_1 \cdot Exp_1 \cdot UR_{r_{e=1}} + \beta_2 \cdot Exp_2 \cdot UR_{r_{e=2}} + \dots + \\ & + \beta_{10} \cdot Exp_{10} \cdot UR_{r_{e=10}} + \rho_c + \delta_e + \gamma_t + \theta_r + e_{crt} \end{aligned} \quad (1)$$

where y_{crt} is the group-specific mean of our outcome variables (annual labour income, monthly wages, days worked and probability of employment) for entry cohort (c) in entry region (r) in calendar year (t); Exp_e is a dummy variable that takes value 1 if the cohort experience in a given year is equal to e . UR_{r_e} denotes the regional unemployment rate to which a cohort was exposed in each year of experience (e) in the corresponding region (r_e). Once the data were collapsed, we have 918 cells.

Fixed effects related to potential experience δ_e , entry cohort ρ_c , entry region θ_r and calendar year γ_t are also included in the empirical specification. Potential experience fixed effects δ_e capture time-invariant differences among all cohorts with the same amount of (potential) work experience. Entry cohort fixed effects ρ_c capture time-invariant differences between the characteristics of the different entry cohorts. Calendar year fixed effects γ_t capture the component of regional business cycle variation that is common to all regions. Entry region fixed effects θ_r , capture time-invariant differences across regions. Finally, α is the constant term and e_{crt} is the error term.

Our coefficients of interest are $\beta_1, \beta_2, \beta_3, \dots, \beta_{10}$ which capture changes in experience profiles on wages and employment that are attributable to entering the labour market during an economic crisis or during periods of economic growth, net of the effect of the future sequence of unemployment rates (that are correlated with the initial conditions).

The model is estimated using Weighted Least Squares (WLS) where weights are group sizes.² To account for group specific error-components, we cluster standard errors at the entry cohort-region (cr) level.³

²When collapsing the data at the cohort-region-year level, the resulting variable referred to the rate of remaining working once the worker enters the labour market is transformed from a binary variable to a variable that is greater than or equal to 0 and less than or equal to 1. In this case, we estimate a probit model for the conditional mean.

³As highlighted by (Angrist and Pischke 2008, pp. 318-319), this is the simplest and most widely used way of addressing serial correlation in studies using group-structured panel data.

8 Results

In this section we present the results obtained by using the methodology previously explained. In particular, our aim is to assess the impact of a crisis on our outcomes variables: annual income, days worked and probability of continuing working once the worker entering the labour market. Further, we are interesting in analyzing this effect over time.

8.1 Earnings

We report the coefficients estimated from the empirical strategy in Table 8. All regressions are estimated separately by natives and non-natives. Furthermore, we distinguish by the different educational levels. The coefficients presented in the table are estimates of $\beta_1, \beta_2, \beta_3, \dots, \beta_{10}$ from (1), with standard errors clustered at the region-cohort level provided in parentheses. All estimates include entry cohort, region, experience and calendar year fixed effects.

Focusing first on immigrants as a whole, the results show a non-significant effect on the annual earnings (Column 5). This evidence contrasts with that found by Aslund and Rooth (2007), who find a wage penalty of around 13-17 percentage points for more than 7 years given an increase in the unemployment rate.

Regarding native cohorts, however, it is important to note significant differences with respect to immigrants. In particular, we consistently find a large and significant negative impact on cohorts' earnings (Column 1). More specifically, 1 percentage point increase in unemployment rate when cohorts have 1 year of professional experience reduces the annual earnings by around 1.4 percentage points. This negative impact increases over the potential experience of the cohorts, reaching a salary loss of around 3 percentage points after 10 years working. Thus, a rise by 8 points percentage in unemployment rate translates into a loss in salaries of about 11 percentage points in the first year within the labour market. If the unemployment rate remains constant for the following working years, cohorts' earnings would be reduced by around 24 percentage points nine years later.

As the sensitiveness of immigrants to business cycles is larger for those with lower education attainment (Orrenius and Zavodny, 2009; Hoynes, 2000; Hoynes et al., 2012), it is likely that the impact of the Great Recession differs by their educational attainment. Thus, we distinguish 3 educational groups: (a) Compulsory education; (b) Vocational or Post-Compulsory education; (c) University education.

First, we find a non-significant impact on earnings of immigrants with lower educational level (Column 6). Although a crisis harmfully affects all population groups, immigrants tend to be

among the workers most hit by recessions in comparison with natives (Bratsberg et al., 2018; Orrenius and Zavodni, 2010; Xu, 2018). Based on this evidence, the results we find and the fact that 60% of immigrants included in the sample have a low educational level lead us to claim that the recession does not affect the wages of less qualified non-natives but does their employment. In other words, it is possible that the adjustment to the recession for this population group has taken place largely via employment rather than in terms of earnings. We will look into this issue further below.

Table 8: Impact of a 1-pp increase in unemployment rate on annual earnings

	All Natives	Compulsory education	Post-Compulsory education	University education	Global Immigrants	Compulsory education	Post-Compulsory education	University education
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>rUR · exp1</i>	-0.014 *** (0.004)	-0.003 (0.005)	-0.007* (0.004)	-0.023*** (0.006)	-0.001 (0.005)	0.004 (0.008)	-0.0024 (0.007)	-0.012* (0.007)
<i>rUR · exp2</i>	-0.017 *** (0.003)	-0.007 (0.004)	-0.010 *** (0.004)	-0.023*** (0.006)	-0.005 (0.005)	0.000 (0.007)	-0.004 (0.007)	-0.015** (0.007)
<i>rUR · exp3</i>	-0.019 *** (0.003)	-0.006 (0.004)	-0.013 *** (0.004)	-0.026*** (0.006)	-0.004 (0.005)	0.001 (0.007)	-0.006 (0.006)	-0.013* (0.007)
<i>rUR · exp4</i>	-0.022 *** (0.003)	-0.008 * (0.004)	-0.015 *** (0.004)	-0.027*** (0.006)	-0.007 (0.005)	-0.004 (0.006)	-0.007 (0.006)	-0.014** (0.007)
<i>rUR · exp5</i>	-0.022 *** (0.003)	-0.004 (0.004)	-0.018 *** (0.004)	-0.028*** (0.006)	-0.004 (0.005)	0.002 (0.006)	-0.005 (0.007)	-0.014* (0.007)
<i>rUR · exp6</i>	-0.023 *** (0.004)	-0.005 (0.004)	-0.019 *** (0.004)	-0.028*** (0.006)	-0.004 (0.006)	0.003 (0.008)	-0.005 (0.007)	-0.015* (0.008)
<i>rUR · exp7</i>	-0.024 *** (0.004)	-0.003 (0.005)	-0.019 *** (0.005)	-0.029*** (0.007)	-0.003 (0.007)	0.007 (0.009)	-0.005 (0.007)	-0.018* (0.010)
<i>rUR · exp8</i>	-0.026 *** (0.004)	-0.001 (0.005)	-0.020 *** (0.005)	-0.033*** (0.007)	0.003 (0.010)	0.014 (0.013)	-0.001 (0.007)	-0.012 (0.010)
<i>rUR · exp9</i>	-0.029 *** (0.005)	-0.000 (0.005)	-0.024 *** (0.005)	-0.037*** (0.008)	0.007 (0.009)	0.016 (0.011)	-0.001 (0.009)	-0.010 (0.010)
<i>rUR · exp10</i>	-0.034 *** (0.006)	-0.006 (0.004)	-0.024 *** (0.006)	-0.043*** (0.009)	-0.000 (0.006)	0.006 (0.006)	-0.006 (0.013)	-0.014 (0.011)
Constant	8.996 *** (0.046)	8.933*** (0.073)	8.783 *** (0.054)	9.326*** (0.076)	9.064 *** (0.080)	9.011 *** (0.112)	9.141*** (0.111)	9.711*** (0.174)
Observations	918	918	918	918	918	918	909	867
R^2	0.958	0.890	0.887	0.907	0.865	0.773	0.682	0.584
Region and Exp FE	YES	YES	YES	YES	YES	YES	YES	YES
Year and Entry year FE	YES	YES	YES	YES	YES	YES	YES	YES

Standard errors (in parentheses) are clustered at the entry year-entry region: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Similarly, we neither find a significant effect on the earnings of less qualified native cohorts due to an increase in the unemployment rate (Column 2). This evidence is in line with the results found in in Belgium (Cocks and Ghirelli, 2016) and in France (Gaini et al., 2012). Concretely, the authors analyse workers with a lower educational level and find a non-significant effect in the face of an increase in the unemployment rate. These results may be explained by the existence of a statutory minimum wage that affects mainly young cohorts with lower qualifications. Motivated

by this evidence, we suspect that less-educated cohorts are not significantly affected by the Great Recession in terms of income because their earnings are already low and close to the legal minimum wage. Likewise, the rigid system of collective bargaining in Spain plays a key factor for the delay in wage adjustment during the recession. Labor market imperfections such as wage rigidities, unions, or other institutional characteristics may prevent wages to adjust (Angrist and Kugler, 2003; Edo, 2016; Glitz, 2012).

As a result of the sharp drop in new entrants' cohort size due to the recession, as we discussed in the case of the immigrants, it is likely that the adjustment to the recession has taken place largely via employment rather than in terms of earnings, especially for the less educated cohorts. We will look into this issue further below.

Second, the earnings of cohorts with medium education i.e. vocational training or post-compulsory education are not significantly affected in the case of immigrant population (Column 7). Different results are found for native cohorts. Concretely, there is a wage penalty given an increase of the unemployment rate. Although the earnings fall 0.7% the first year in the labour market, the results show that this wage scar increases and persists in the long-term (Column 3). More specifically, the negative impact on wages is around 2.5 percentage points after 8 years whether the unemployment rate rise 1 percentage point.

Third, the earnings of highly-qualified immigrant cohorts, however, are negatively affected during a recession time. More specifically, annual earnings fall by 1.2 percentage points in the first year of potential experience given an increase in the unemployment rate of 1 percentage point (Column 8). This wage penalty persists the next 7 years of working history although its magnitude remains more or less constant. These estimates are statistically significant at 5 or 10 percentage points. In the case of natives, the wage penalty is relatively large for cohorts with university education. One year after entering the labour market, earnings are reduced by 2.3 percentage points, persisting over time (Column 4). The wage scar reaches by 3% during the following years, even 4% after a decade working.

Unlike those with lower education, who are in the bottom of the job ladder, cohorts with tertiary education, instead, can move down over job ladder, accepting lower-qualified jobs (Devereux, 2004; Valleta, 2016). These jobs are mainly characterized by offering temporary contracts as well as few opportunities of promotion. Thus, workers, especially non-natives, may be prompted to take jobs below their skills and qualifications, suggesting a 'trade-off' between unemployment and over-qualification (Khattab and Fox, 2016). This job-downgrading translates into a wage penalty for the most qualified cohorts, according to our results.

Additionally, the findings are largely consistent with the theory of labour market segmentation

(Doeringer and Pior, 1972). Younger workers usually begin their professional career working in the secondary sector, especially immigrants. It is well-documented that immigrants as a vulnerable population group cluster in secondary labour market jobs, under temporary contracts and low-paid jobs (Bailey and Waldinger, 1991, Gordon, 1995). In a crisis context with high unemployment rates, job vacancies in the primary sector are limited. This causes that workers with tertiary education do not find a suitable job for their skills and, instead of being unemployed, decide to perform lower quality jobs, concentrated in the secondary sector. This has a negative impact on the earnings of young people whose high education is not compensated in income terms once they enter the labour market.

The problem that derives from this is that many of these workers are unable to move to the primary labour market later (Fernández-Kranz and Rodríguez-Planas, 2018). As a result, this group is trapped in this sector, spending much of their professional career in it, with turnover between temporary and precarious jobs. These sticky floors affecting the most qualified youth translates into wage penalties in the long run.

To sum up, this first set of results indicate that natives are harshly affected rather than non-natives in terms of earnings. Although we do not observe a significant effect on the earnings of less qualified natives, the evidence leads us to claim that the impact of the Great Recession could have an impact on their employment. Regarding immigrants, on the other hand, we observe a wage penalty in the case of immigrants with university education, which persists over time. However, the evidence found shows non-significant effect for less qualified foreign-born. Based on the vulnerability of this group to business cycles, it is likely that the adjustment to the recession has taken place largely via employment.

8.2 Days worked

Let us now focus on the impact of the Great Recession on the total days worked per year. As highlighted in Section 4, at the beginning of the recession, the number of new entrants in our sample into the labour market fell sharply. In particular, the number of new workers members of cohorts entering the labour market in 2009 fell by 30.5%, relative to those entering 2008. The fall is more severe for cohorts entering in 2012, where the number of workers reduces by 40.5%, relative to those entering 2008. Furthermore, if we compare the number of entrants in 2007 with those who entered in 2012 to the Spanish labour market, we see an important fall by 54.24%. This pattern of losses in the number of entrants is similar for both natives and non-natives, being harmful in the case of immigrants, where the cohort' size is reduced by approximately 57% between 2007 and 2012 (53% in the case of natives).

Therefore, the first impact of the Great Recession on employment of workers we observe is that access to the labour market has been more complicated for the youngest generations. Many of those searching a job for the first time did not succeed, even in low-paid jobs. Thus, entering the labour market seems to have been blocked for young workers.

Based on this evidence, we follow the same empirical strategy as we use in the case of earnings to assess the impact of the recession on employment of cohorts, conditional on entering the labour market. The coefficients estimates are displayed in Table 9. As in the case of earnings, all regressions are estimated separately by natives and immigrants.

Immigrants as a whole seem to be negatively affected in terms of long-term employment due to an increase in the unemployment rate. Specifically, the evidence shows a non-significant effect during the first years of working life of immigrant cohorts. However, we observe that a negative and statistically significant at 10% impact appears when the cohorts accumulate 4 years of professional experience (Column 5). This is in line with the evidence found by Aslund and Rooth (2007), who find that 1 percentage point higher unemployment increase by 3-5 percentage points the employment penalty, lasting more than 6 years.

On the other hand, the evidence for natives as a whole shows an employment scar that persists over time. In particular, cohorts born in Spain suffer a negative and significant impact throughout their professional career in terms of days worked per year due to the increase in the unemployment rate. More specifically, 1 percentage point increase in unemployment rate when cohorts accumulate 1 year of potential experience reduces the total days worked by around 3 days (Column 1). We observe that this negative impact increases over the potential experience of cohorts, reaching a day worked losses of around 5 days after 10 years working. The estimated coefficients are statistically significant at 1%. For example, a rise by 8 points percentage in unemployment rate translates into a loss in days worked of about 21 days in the first year within the labour market. If the unemployment rate remains constant for the following working years, cohorts' days worked would be reduced by around 40 days 9 years later.

By educational levels, we observe differences between immigrant and native population. Among the three educational levels analyzed in this research, immigrants with the lowest educational level are the most affected in terms of employment, as seen in Table 9. In particular, although in the first year in the labour market we do not observe any significant effect, we do find it when the cohorts have been working within the labor market for 2 years (Column 6). More specifically, an increase of 1 percentage point in the unemployment rate reduces the number of days worked by 2.4 days. This employment penalty persists over time, reaching a reduction in the number of days of 4 days from the 6 years of accumulated experience.

Table 9: Impact of a 1-pp increase in unemployment rate on the number of days worked in the year

	All Natives (1)	Compulsory education (2)	Post-Compulsory education (3)	University education (4)	Global Immigrants (5)	Compulsory education (6)	Post-Compulsory education (7)	University education (8)
<i>rUR · exp1</i>	-2.629 *** (0.578)	-2.411*** (0.669)	-2.147*** (0.616)	-3.352*** (0.828)	-0.846 (1.043)	-1.719 (1.295)	1.518 (0.986)	-0.294 (1.191)
<i>rUR · exp2</i>	-2.932 *** (0.543)	-2.697*** (0.667)	-2.459 *** (0.589)	-3.351*** (0.794)	-1.495 (0.939)	-2.493** (1.148)	1.232 (0.969)	-0.651 (1.220)
<i>rUR · exp3</i>	-2.962 *** (0.521)	-2.383*** (0.647)	-2.582 *** (0.594)	-3.566*** (0.767)	-1.212 (0.881)	-2.147* (1.116)	1.279 (0.888)	-0.443 (1.193)
<i>rUR · exp4</i>	-2.940 *** (0.513)	-2.114*** (0.635)	-2.549 *** (0.588)	-3.795*** (0.769)	-1.579* (0.803)	-2.505** (0.998)	1.279 (0.959)	-1.199 (1.165)
<i>rUR · exp5</i>	-3.269 *** (0.531)	-2.160*** (0.681)	-3.146 *** (0.584)	-4.051*** (0.776)	-1.731* (0.896)	-2.700** (1.069)	1.246 (0.928)	-0.907 (1.114)
<i>rUR · exp6</i>	-3.500 *** (0.546)	-2.634*** (0.585)	-3.237 *** (0.671)	-4.005*** (0.817)	-2.423*** (0.904)	-3.518*** (1.065)	1.012 (0.933)	-1.496 (1.088)
<i>rUR · exp7</i>	-3.821 *** (0.565)	-2.861*** (0.621)	-3.309 *** (0.680)	-4.284*** (0.810)	-2.653** (1.121)	-3.617*** (1.375)	0.380 (0.951)	-1.347 (1.200)
<i>rUR · exp8</i>	-4.151 *** (0.626)	-3.016*** (0.675)	-3.556 *** (0.654)	-4.693*** (0.929)	-2.438** (1.080)	-3.483*** (1.288)	0.664 (1.100)	-1.242 (1.283)
<i>rUR · exp9</i>	-4.405 *** (0.720)	-3.030*** (0.764)	-4.042 *** (0.745)	-4.911*** (1.056)	-2.302** (1.165)	-3.395*** (1.325)	0.345 (1.282)	-0.378 (1.446)
<i>rUR · exp10</i>	-4.817 *** (0.721)	-3.461*** (0.738)	-4.391 *** (0.750)	-5.040*** (1.150)	-2.132* (1.180)	-3.247** (1.306)	0.917 (1.995)	-0.212 (1.629)
Constant	235.492 *** (7.426)	252.155*** (10.992)	224.483 *** (7.810)	231.706*** (10.614)	321.998 *** (14.908)	348.717 *** (17.954)	263.507*** (15.935)	281.871*** (22.074)
Observations	918	918	918	918	918	918	909	867
<i>R</i> ²	0.935	0.803	0.894	0.903	0.605	0.568	0.473	0.376
Region and Exp FE	YES	YES	YES	YES	YES	YES	YES	YES
Year and Entry year FE	YES	YES	YES	YES	YES	YES	YES	YES

Standard errors (in parentheses) are clustered at the entry year-entry region: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

In the case of natives, we find a similar employment penalty for the least-qualified cohorts, although of smaller magnitude. Specifically, a 1 percentage point increase in the unemployment rate means a reduction in the number of days worked by less qualified cohorts around 2.4 days in the first year of potential experience (Column 2). This harshly effect in terms of employment persists throughout the professional career of cohorts.

Immigrants face a greater risk of social exclusion than the native population, especially with respect to accessing employment. They are often the last to be hired and the first to be fired and their employment relationships are frequently non-standard, and in poorly regulated sectors or activities (ILO, 2011).

In a crisis context, the economic conditions harm employment prospects and raise unemployment. This occurs among both immigrants and natives, but the effect tends to be larger among immigrants, particularly the least educated (Barrett and Kelly 2012; Dustmann et al., 2010; Or-

renius and Zavodny, 2010). These authors point out that immigrants experience more frequently job losses due, among other factors, to their higher sensitiveness to the business cycle, especially for those with lower educational levels. One probable explanation is that upon job loss, the lack of general skills, including fluency in the native language, forms a barrier in the search for new employment (Bratsberg et al., 2018).

Moreover, immigrants can be more exposed to job loss, either because they happen to work in firms, industries and occupations that are prone to closure and downsizing, or because they are more likely than their native co-workers to be selected for layoff during downsizing processes, for example, because they hold marginal jobs or have short tenure. Likewise, job displacement may have particularly severe consequences for immigrants, as they typically possess less general human capital directly applicable in the host-country labour market and have inferior majority language skills, social capital and networks when compared to native workers (Dustmann et al. 2016). These factors may explain the negative impact on employment prospects of less educated immigrants in the short- and long-term.

The results found for natives are consistent with those found in in Belgium (Cocks and Ghirelli, 2016) and in France (Gaini et al., 2012). In particular, the authors analyse workers with a lower educational level and find a non-significant effect in terms of earnings but does in terms of employment when workers facing an increase in the unemployment rate.

It should be noted that entering the labour market seems to have been blocked for young workers, especially for the least qualified. For this group, the size of the cohort entering in 2012 is 62% lower than that of those entering in 2007. In this way, conditional on having been able to enter the labour market, the hypotheses raised when we previously analyzed the impact of a crisis on earnings are met. The evidence shows that less-skilled workers may be displaced of their jobs by high-skilled workers who move down the skill chain during a recession, as pointed out Devereux (2004). Hence, there is a negative impact on the days worked of cohorts during a period of tough economic conditions, which prolongs over time.

There is a wide literature that suggests that immigration negatively hurts the labour market outcomes of natives into the host country (Angrist and Kugler, 2003; Hunt, 1992; Brucker and Jahn, 2010). More specifically, some studies consider possible employment displacement effects for natives by immigration (Zimmermann, 1995). However, no consensus has been reached on the net effect of immigration because some authors find little evidence about it (Longhi et al., 2005; Mühleisen and Zimmermann, 1994; Gang and Rivera-Batiz, 1994). In this context, it could be possible that the negative effect in terms of employment for the natives is due to a displacement effect caused by the immigrant population. We will look back into this issue below.

Yet, comparing the evidence of less educated immigrants with that of their native peers, we note that the negative effect in terms of employment is greater in the case of immigrants. This contrasts with the literature that points out to immigration as an employment displacement factor for natives. Therefore, we discard this hypothesis as a possible explanation of the negative effects of the number of days worked by the natives.

Interestingly, we do not observe a significant effect for immigrant cohorts with post-compulsory or university studies (Columns 7 and 8). The evidence suggests that the adjustment to the recession for this population group has taken place largely via earnings rather than in terms of employment. However, we find an employment scar in the case of natives with post-compulsory studies as well as university education, being the impact more severe in the case of natives highly educated (Columns 3 and 4). In particular, an increase in the unemployment rate in 8 percentage points i.e. a typical recession in Spain, reduces the number of days worked of cohorts with a high educational level by approximately 27 days when they accumulate 1 year of experience. This employment penalty increases and persists over the labour history of the cohorts, reaching a decrease in the number of days worked up to 32 days after 5 years and 40 days after a decade working.

Therefore, these findings are consistent with our previous hypothesis. First, as discussed before, cohorts highly educated facing periods of unemployment in a tough labour market, have an alternative option to be unemployed, which is being overqualified. Unlike those with lower education, who are in the bottom of the job ladder, cohorts with tertiary education, instead, can move down over job ladder, accepting lower-qualified jobs (Devereux, 2004; Valleta, 2016). Second, in a crisis context with high unemployment rates, job vacancies in the primary sector are limited. This causes that workers with tertiary education do not find a suitable job for their skills and, instead of being unemployed, decide to perform lower quality jobs, concentrated in the secondary sector. This has a negative impact on the earnings of young people whose high education is not compensated in income terms once they enter the labour market.

Due to these tough economic conditions, many of these workers are unable to find a suitable job i.e. a high-paid job. In other words, it becomes more difficult for these cohorts to move to the primary labour market later, getting trapped in this sector, spending much of their professional career in it (Fernández-Kranz and Rodríguez-Planas, 2018). As a result, there is a negative impact on employment of cohorts in the long run.

Summing up, this second set of results indicate that there is an initial impact at the time of entry into the labour market. The first impact of the Great Recession on employment of workers we observe is that access to the labour market has been more complicated for the youngest generations. In other words, entering the labour market seems to have been blocked for young

workers. Additionally, the evidence shows employment scars in both natives and immigrants. Regarding the natives, all educational groups are negatively affected both in the short and long term. The higher the educational level, the greater the effect on the number of days worked of cohorts. This evidence is in line with our hypothesis about the job-downgrading of highly qualified workers, who displace less qualified of low-paid and temporary jobs. In the case of immigrants, however, there is only a harmful effect in the short and long term of the Great Recession on employment for cohorts with a lower educational level.

8.3 Employment rate

Now, we focus our analysis on the results found if our dependent variable is the employment rate i.e. a rate of being working in any moment during the year once the individual entering the labor market. We compute employment rates for natives and immigrants to capture their employment opportunities (Glitz, 2012; Smith, 2012 and Edo and Rapoport, 2019).

Interestingly, the evidence found for immigrant population shows a non-significant impact of an increase of the unemployment rate on the employment rate for immigrant population as a whole as well as for those immigrants with a compulsory or university education (Columns 5, 6 and 8 in Table 10). However, we find a positive and significant effect in the case of immigrants with post-compulsory education (Column 7). A 1-percentage point increase of unemployment rate when cohorts accumulate 1 year of experience reduces the employment rate over 0.9 percentage points. The persistence of this positive effect remains over time.

As seen previously, the number of new entrants in our sample into the labour market falls sharply during the Great Recession. Consequently, entering the labour market seems to have been blocked for young workers, especially for immigrant population. As discussed in Section 4, the reduction in the number of immigrant entrants was not so drastic initially, but it prolonged for longer. Despite it started to recover from 2013, the number of participants has not yet reached pre-crisis levels. Based on this evidence, our results may suggest that many immigrant workers are negatively affected at the time of entering the labour market, leaving them locked out. However, those who are able to enter the labour market are more self-selected, so they are more likely to continue working.

Yet, the evidence for native population differs from that of immigrant. More specifically, the results show that native population is negatively affected by an increase of unemployment rate, as shown Table 10. The employment rate of natives-born as a whole decrease by 0.6 percentage points facing a 1-percentage point increase of unemployment rate when cohorts accumulate 1 year of professional experience (Column 1). This negative impact persist over the later labour

trajectory of cohorts.

Table 10: Average marginal effects of the impact of a 1-pp increase in unemployment rate on the rate of continuing working once the worker entering the labour market.

	All Natives (1)	Compulsory education (2)	Post-Compulsory education (3)	University education (4)	Global Immigrants (5)	Compulsory education (6)	Post-Compulsory education (7)	University education (8)
<i>rUR · exp1</i>	-0.006 *** (0.001)	-0.005*** (0.002)	-0.004*** (0.001)	-0.008*** (0.002)	0.002 (0.002)	0.001 (0.002)	0.009*** (0.003)	-0.001 (0.004)
<i>rUR · exp2</i>	-0.007 *** (0.001)	-0.006*** (0.002)	-0.005*** (0.001)	-0.009*** (0.002)	0.001 (0.002)	0.000 (0.002)	0.007** (0.003)	-0.001 (0.004)
<i>rUR · exp3</i>	-0.007 *** (0.001)	-0.006*** (0.002)	-0.005*** (0.001)	-0.009*** (0.001)	0.001 (0.002)	0.000 (0.002)	0.007** (0.003)	-0.001 (0.004)
<i>rUR · exp4</i>	-0.007 *** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)	-0.009*** (0.001)	0.002 (0.002)	0.001 (0.002)	0.007*** (0.003)	-0.001 (0.003)
<i>rUR · exp5</i>	-0.007 *** (0.001)	-0.006*** (0.001)	-0.004*** (0.002)	-0.008*** (0.001)	0.001 (0.002)	0.001 (0.002)	0.007** (0.003)	-0.005 (0.004)
<i>rUR · exp6</i>	-0.007 *** (0.001)	-0.005*** (0.002)	-0.004*** (0.001)	-0.008*** (0.001)	0.002 (0.002)	0.002 (0.002)	0.006** (0.003)	-0.002 (0.004)
<i>rUR · exp7</i>	-0.007 *** (0.001)	-0.005*** (0.001)	-0.004*** (0.001)	-0.009*** (0.001)	0.003 (0.002)	0.003 (0.002)	0.007*** (0.003)	-0.003 (0.004)
<i>rUR · exp8</i>	-0.008 *** (0.001)	-0.006*** (0.001)	-0.004*** (0.001)	-0.009*** (0.001)	0.003* (0.002)	0.004* (0.002)	0.008*** (0.003)	-0.005 (0.005)
<i>rUR · exp9</i>	-0.009 *** (0.001)	-0.009*** (0.001)	-0.004*** (0.001)	-0.010*** (0.002)	0.002 (0.002)	0.002 (0.002)	0.008*** (0.003)	-0.003 (0.005)
<i>rUR · exp10</i>	-0.009 *** (0.001)	-0.010*** (0.002)	-0.005*** (0.002)	-0.010*** (0.002)	0.002 (0.002)	0.001 (0.002)	0.009*** (0.004)	-0.003 (0.005)
Region and Exp FE	YES	YES	YES	YES	YES	YES	YES	YES
Year and Entry year FE	YES	YES	YES	YES	YES	YES	YES	YES

Standard errors (in parentheses) are clustered at the entry year-entry region: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

By educational levels, the pattern of this employment scar is similar although the magnitude differs. The higher the educational level, the greater the impact on employment likelihood. In particular, an increase by 8 percentage points of unemployment rate leads to a decrease by 4 percentage points of the employment rate of less-educated natives (Column 2). The persistence of this negative effect remains over time. Similar results are found for natives with post-compulsory education (Column 3). Concretely, the employment rate falls by 3.2 percentage points whether cohorts face an increase of unemployment rate by 8 percentage points and accumulate 1 year of potential experience. Greater magnitude is found for the results of native population with university education (Column 4). In particular, an increase by 8 percentage points of unemployment rate leads to a decrease by 6.4 percentage points of the employment rate. This negative impact in terms of employment opportunities lasts up 10 years.

Although the fall in the size of the native cohort was significant in the first 2 years of the crisis, as we saw in Section 4, the number of native entrants to the labour market quickly recovered to pre-crisis levels as of 2013. In this context, our results may suggest that, given a greater access

of workers to the labour market, there is a lower selection of workers and, therefore, there may be a lower probability of continuing to work.

9 Concluding remarks

In this research, we analyse the long-term effects of entering the labour market under tough economic conditions on young immigrant earnings and employment outcomes. Previous studies only focus on analysing the impact of the initial economic conditions that immigrants face at the time of entry the labour market and its persistence over time (Aslund and Rooth, 2007). However, not only initial economic conditions matter, but also contemporaneous economic conditions that workers facing over their professional experience, as discussed Oreopoulos et al. (2012). In this context, this paper contributes to the literature to assess the long-term impact of entering the labour market under tough economic conditions controlling for all contemporaneous unemployment rates.

Using a *fictitious cohort* approach, we analyse the Spanish case, where the effect of the Great Recession has been particularly significant among the youngest cohorts, facing unemployment rates above 40% and 50%, not only during the crisis but also when the economy started to recover.

Our results suggest that the Great Recession has initially led to a blockage at the entrance of labour market, reducing the number of participants. While the number of native entrants falls sharply in the first 2 years of the crisis and from 2013 returns to recover at previous levels of the crisis, in the case of immigrants, however, the number of participants falls progressively until 2013. From then on, it grows again but without reaching pre-crisis levels. Then, the first direct impact of the recession is in terms of cohort's size.

Additionally, we find an employment scar on less-educated immigrants and a wage penalty on immigrants with high education. The persistence of these impacts lasts more than nine years. However, we do not find a significant effect on immigrant employment rate, regardless their educational attainment. Comparing these results with those of natives, we observe significant differences. More specifically, we find that natives are negatively and persistently affected in terms of earnings and employment during a recession context, regardless their educational attainment. Based on this evidence, our results suggests that the negative impacts of a recession may be explained by factors such as job losses, occupational downgrading, segmented labour market and the rigid system of collective bargaining.

Further research will focus on analysing the long-term effects of entering the labour market under

tough economic conditions on young immigrant earnings and employment outcomes, distinguishing them by region of origin.

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