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The Size, Socio-Economic Composition and Fiscal Implications of the Irregular Immigration in Spain

Ismael Gálvez-Iniesta*

June 24, 2020

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Abstract

This paper estimates the total number of irregular immigrants residing in Spain from 2002 to 2019 and studies their nationality, sex, gender and sectoral composition. Using the residual method and combining microdata sources from the Spanish Labour Force Survey and Social Security registers I find that by the end of 2019 there was around 390,000-470,000 irregular immigrants in Spain, which account for 11-13% of the total non-EU immigrants. Irregular immigrants are younger than the regular ones, they are predominantly from South and Central America and they are concentrated in the accommodation and food activities and the activities household sector. Using the most updated wave of the EU-SILC data for Spain, I find a positive direct fiscal impact of the non-EU immigration. This impact is 75% higher than for the natives' households, mainly explained by their younger age structure. Once education and health public systems are taken into account, the fiscal impact gap between the two type of households vanishes. I also find large fiscal costs associated to maintaining the irregularity status. Last, my estimates suggest that the potential positive gains from legalising the current status of the irregular immigrants are around 3,300 euros yearly by regularized worker.

Keywords: Immigration, Irregular Immigrants, Fiscal

JEL Codes: J32, J61, E62

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1 Introduction

An irregular immigrant is someone who crosses an international border illegally – either clandestinely or with falsified documents – or who violates the terms of a visa, such as not leaving when a visa expires or an asylum claim is rejected. Unauthorized immigrants are also called unauthorized, illegal, or undocumented immigrants (Orrenius and Zavodny (2016)). To the extent that, by definition, irregular immigrants are not entitled to live in a country, the estimation of its presence in a country is not straightforward. Despite the complexity of the estimation, the importance of the issue had motivated both policy institutions and researchers to design different methodologies that could approximate the stock of irregular immigrants in a country and to make those estimations comparable over countries (Jandl (2008)).

In spite of those research efforts, we still lack an exhaustive analysis attempting to shed light on both the size and specially the socio-economic characteristics of the irregular immigrants. This paper aims to fill that gap and attempts to answer three related questions: how many irregular immigrants are residing in Spain?; where did they come from and what is his age and sex composition?; and, more importantly, where do they work?, To answer those questions, I first apply the residual method to estimate the total number of irregular immigrants (González Ferrer and Cebolla Boado (2008), Clandestino (2009)) residing in Spain from 2002 to 2019. Second, I develop a novel methodology consisting in comparing the microdata from the Spanish Labour Force Survey and the Social Security administrative registers (“Muestra Continua de Vidas Laborales”) to provide an estimation of the sectoral composition of the irregular immigrant workers.

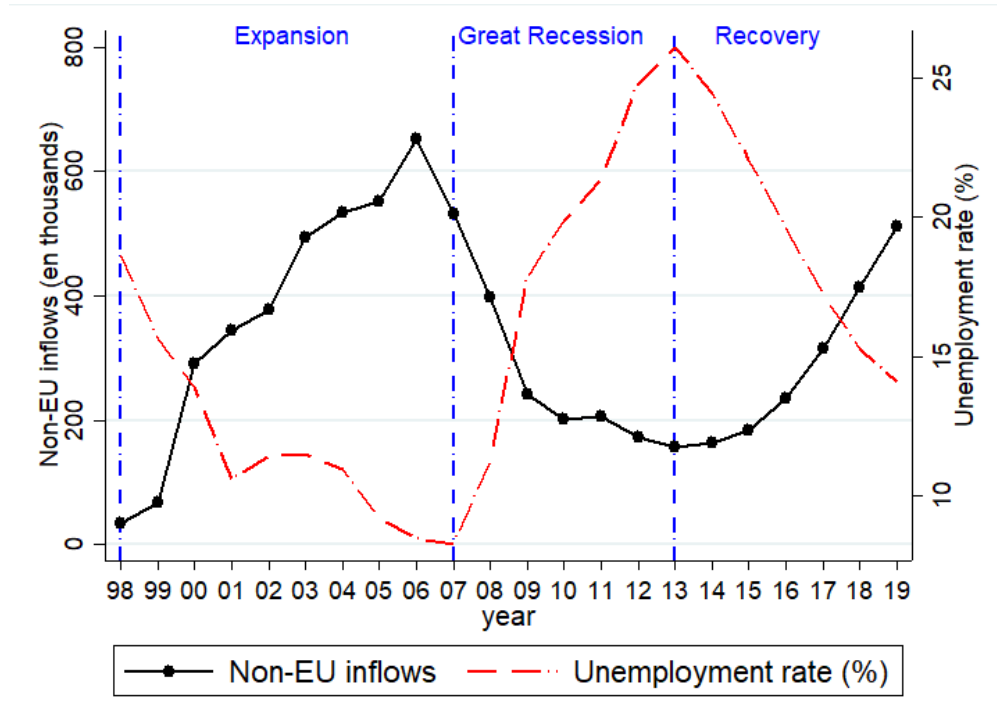
In the second part of the paper I examine the fiscal impact of the non-EU immigration. Using the most recent wave of the EU Statistics on Income and Living Conditions Survey (EU-SILC) for Spain, I carry out a static approach (in the spirit of OECD (2013)) to compare the direct and adjusted (i.e. accounting for health, education and indirect taxes) net fiscal impact of the non-EU immigrant household and the native ones. In the last part of the paper, I use the estimates from the first part to approximate the fiscal cost of the irregularity and to provide an estimation of the potential benefits of a regularisation policy.

The Spanish institutional framework and recent immigration experience make Spain a very interesting case for studying the incidence of irregular immigration. First, the country constitutes a unique case for delivering high-quality estimates of the irregular immigration, as it provides high incentives to all immigrants (regardless of their legal status) to enrol in the municipality registers¹. The reason is that the access to free medical care and public education is conditional on being registered in the Padrón Municipal (Triandafyllidou (2009), González Ferrer and Cebolla Boado (2008)). Second, Spain experienced large foreign inflows in a very short span of time, followed by a dramatic drop when the Great Recession took place in 2008 (see Figure 1), which hit disproportionality harder the immigrant population (Gálvez-Iniesta (2020)). Third, Spain is one of the more active

¹Or Padrón Municipal, in Spanish. Throughout the paper I indistinctively use the term municipality registers and Padrón.

countries regarding the implementation of migration policies addressing the issue of irregular immigration, mainly amnesty or regularization programs (Finotelli and Arango (2011) and bilateral migration policies (Bertoli and Moraga (2013)) and, therefore, providing robust estimates of the evolution of the number of irregular immigrants can be useful as they may be potentially be used to evaluate the effectiveness of such a policies². The first contribution of the paper is to provide

Figure 1: Non-EU foreign inflows and Spanish unemployment rate



Note: Own elaboration based on the Spanish Labour Force Survey and the Migration Statistics.

updated and robust estimations of the stock of irregular immigrants residing in Spain using the residual method. Needless to say, this paper is not the first one to apply the residual method (González Ferrer and Cebolla Boado (2008), Clandestino (2009) in Spain, or the Pew Research Center and the US Census Bureaus’ for the US, Albert (2017), Pinkerton et al. (2004)). In fact, as it will be mention bellow, we borrow from the methodology of González Ferrer and Cebolla Boado (2008). However, we introduce two main novelties with respect to the previous work: first, by up-

²Few papers had tried to estimate the effect of migration amnesties on the evolution of future irregular inflows. An exception is the paper by Orrenius and Zavodny (2003), who found that the U.S. 1986 migration amnesty (“Immigration Reform and Control Act”) did not change the long-term patterns of the irregular immigrant inflows from Mexico. The empirical literature does agree in pointing out that the expenctation of better economic conditions at the country of destiny are quantitatively the most relevant factors driving the migration (Ortega and Peri (2013), Clark et al. (2007)). One of the most comprehensive paper on this topic that focus on the Spanish case is Bertoli and Moraga (2013). They also find that economic factors are the most significant driver of the migration decision. Regarding the effect of the migration policies, they show that bilateral migration policies are were very relevant as well.

dating the figures to the recent migrant flows, we take advantage of the change in the methodology imposed by the municipality register, namely the fact that now foreign workers without permanent residence permit must renew their enrolment every two years (Ley orgánica 14/2003) otherwise they are unsubscribed from the registers (Bertoli et al. (2013)). This partially solves the problem that immigrants leaving Spain do not have incentives to withdraw from the municipality register, which for many years possibly caused an overestimation of the presence of immigrants (both regular and irregular). Second, as it will be explained below, we take into account the asylum applicants and processing time. Given the increase in the number of asylum seekers in Spain during last two years (Bertoli et al. (2020)), accounting for pending applications turns out to be key for providing an accurate estimation of the stock of irregular immigrants.

The second contribution of the paper is to develop a novelty methodology consisting in comparing the microdata from the Spanish Labour Force Survey and the Social Security administrative registers (“Muestra Continua de Vidas Laborales”) to provide an estimation of the sectoral composition of the irregular immigrant workers. A similar approach involving the comparison of the two data sources has been used to analyse the incidence of the informality in difference sectors of activity (de Domingo Sanz (2011)). Shedding light on the sectoral composition of the irregular immigration can be particularly useful to extend the existing literature on the impact of the undocumented immigration on the labour market (Albert (2017)) and to analyse the potential labour market and fiscal effects of migration amnesty programs (Monras et al. (2018)).

Last, this paper contributes to the extensive literature on the fiscal impact of immigration. My main contribution is to use my estimates from the first section in order to develop six representative irregular immigrants’ profiles and focus on the fiscal implications of regularizing the legal status of those. We can divide the literature studying the fiscal impact of immigration in two big groups, depending on a key distinctive feature: the static approach and the dynamic approach³. In short, the static approach compares the net fiscal impact of the immigrant population in a given year, compared with the native population. Most of the studies find a positive net fiscal impact of immigration, with estimates varying around 0.5-1% of the GDP. For example, Dustmann and Frattini (2014), using data from 1995 to 2012 for the UK, find a positive fiscal impact of immigration even in years where the government was running public budget deficits. For Spain, using the EU Statistics on Income and Living Conditions Survey (EU-SILC) of 2005 and the Spanish National Health Survey (2003), Muñoz de Bustillo and Antón (2009) found that immigrants received less public monetary transfers than the native population and they do not find evidence that immigrants use more the public health system. Using more recent waves of the EU-SILC (2007-2009), OECD (2013) performs a cross-country analysis of the immigrant households’ net fiscal contribution, focusing on how it compares with the natives’ ones. For the case of Spain, OECD (2013) shows that the net contribution of the households composed entirely by immigrant members is positive and significantly higher than those formed only by natives. The static approach embeds several

³See Preston (2014) for a detailed comparison of the strengths and limitations of each approach

strengths that make it very useful, mainly its preciseness and robustness to alternative assumptions. However, it has one major limitation: it provides a static picture (for a given moment of time) of the fiscal impact of the immigration and therefore it ignores potential long-term effects ([Economics \(2018\)](#)). To overcome that drawback, other work undertakes what is called the dynamic approach. It consist in expanding the static methodology by projecting the expected future fiscal impact of both the actual immigrant population and their descendent. An example of the dynamic approach is the “Generational Accounting” which calculates, in present value, what the typical member of each generation and sex can expect to pay in net taxes (taxes net of transfer payments received), in his/her remaining lifetime ([Auerbach et al. \(1999\)](#)). Implementing this approach with Spanish data, [Collado et al. \(2004\)](#) found that increasing the number of new immigrants would substantially improve the public budget substantiality and it would reduce the fiscal burden on future natives.

I find that at the end of 2019 there was around 390,000-470,000 irregular immigrants in Spain. That interval account for 11% to 13% of all the non-EU immigrants living in Spain and about 0,8% of the total population. The stock of irregular immigrants grew during the first years of the last decade, when the Spanish economy was booming. Those figures dramatically fell following the Spanish deep recession (2008-2015) and they bounce back slightly after 2015. My estimates suggest that 4 out of 5 irregular immigrants are younger than 40, with the male irregular immigrant population being significantly younger than the female. The age structure of the irregular immigrants are much younger than the regular ones. Regarding the nationality of orogen, the irregular immigration is predominantly from South and Central America: more than 75% of them are from that region. The irregularity rate is very low among the African continent. Two sectors of activity concentrate most of the non-EU informal workers: “Accommodation and Food service activities” and the “Activities of households” sector, employing 80,000 and 70,000 irregular immigrants, respectively. They are followed by the “Manufacturing” sector (almost 40,000 workers), “Human health and social work activities”, “Construction” and the primary sector (around 20,000 irregular workers each of them).

My results on the static method shows that, in 2017, the direct net fiscal impact of households composed entirely by non-EU immigrants is positive of around 4,200 euros yearly. This number is 75% higher than for the native households and it is mainly explained by the age structure: as non-EU immigrants are younger, they receive less pension transfers. Once we take into account health and education transfers (adjusted impact), we find that the non-EU immigrant households receive 400 euros more than the native ones. Last, I find that the cost of the irregularity implies a public fiscal burden of around 2,000 euros yearly per irregular immigrant (as their children go to the public education and they also have free access to the health system). According to my estimates, the average expected benefit (in terms of tax revenues) of regularising the legal status of the immigrants would be around 3,300 euros yearly by irregular worker.

The rest of the paper is organized as follows. Section 2 estimates the evolution of the number of irregular immigrants living in Spain, and studies its nationality, sex, gender and sectoral composition. Section Section 3 examines the fiscal impact of the non-EU immigration and Section

4 develops the most representative irregular immigrants' profiles and studies the potential fiscal impact of their regularization. Finally, Section 5 concludes.

2 Measuring Irregular Migration

Several private and public initiatives had attempted to estimate the incidence of the irregular immigration all around the world. Those studies had usually pointed out to the U.S. as the country with the largest stock of irregular immigrants: according to the Pew Research Center, in 2014 there were as many as 11.1 million unauthorized immigrants on American soil, representing 26% of all immigrants ([Monras et al. \(2018\)](#)). With respect to Europe, a good example of public initiatives for approximating the number of irregular immigrants is the EU-funded Clandestino Research Project ([Clandestino \(2009\)](#)), that estimated that the EU had about 1.9 to 3.8 million unauthorized immigrants in 2008 ([Vogel et al. \(2011\)](#)). More recently, [Connor and Passel \(2019\)](#) provided estimates of Europe's unauthorized immigrant population for the period 2014-2017. According to their estimates, irregular immigration peaked in 2016 with a population of around 4.1-5.3 million, and went down to about 3.9-4.8 in 2017.

As for the documented immigrants, the aggregate figure on the stock of illegal immigrants hides a huge heterogeneity across the EU countries. According to [Connor and Passel \(2019\)](#), in 2017 the largest numbers were in Germany and the United Kingdom, amounting to about half of Europe's total. Substantial shares also lived in Italy and France. Together, these four countries were home to more than two-thirds (70%) of Europe's unauthorized immigrants. For Spain, they estimated 100,000 to 200,000 irregular immigrants in that year⁴. [Clandestino \(2009\)](#) also pointed out to Italy, Germany or UK as the countries with the largest stock of irregular immigrants (370, 317 and 600 thousand, respectively), whereas they found lower figures in the Nordic countries ([Clandestino \(2009\)](#)). Although these projects tried to make the figures comparable across the EU, their estimates are not extent of drawbacks. In particular, the quality of the estimates varies across countries, depending on the method performed in order to provide the estimation⁵. Among these countries, Spain constitutes a unique case for delivering high-quality estimates of the irregular migration. This is because Spain not only allows the foreign-born population to enrol in the municipality registers (Padrón Municipal), but it fosters them to do it. The reason is that Spain offers immigrants (or, more generally, foreign-born population) access to free medical care and public education on the same basis as Spaniards or regular immigrants if they register in the Padrón⁶ ([Triandafyllidou](#)

⁴The Spanish's figures are estimated by using the regularization method. See [Connor and Passel \(2019\)](#) for more details on the methodology.

⁵The most common method used in the Clandestino project were the multiplier methods, according to which estimates are obtained by taking extrapolations from the share of irregular migrants in an observed sample group of the total population (Germany, Austria or Greece). Other methods are the residual method, which compare the work permits with register migrants (Spain or UK), survey-based (Italy) or Capture-recapture methods (Netherlands.) See [Jandl \(2008\)](#) for more details on the different methodologies.

⁶In 2012, the Spanish right party central government passed a law that restricted the access to the basic publicly financed health care to the undocumented immigrants (Real Decreto-Ley 16/2012 (RDL), [Peralta-Gallego et al.](#)

(2009), [González Ferrer and Cebolla Boado \(2008\)](#)).

This peculiarity allows us to perform a very simple method to estimate the stock of irregular immigrants in Spain, which consists in comparing the figure of non-EU immigrants registered in the municipality offices in a given year with the total number of residence permits in that year. This method, usually known as the indirect or residual method, will be explained in more detail in the next section.

Unfortunately, the exercise of comparing the municipality register figures with the residence permits do not shed light on the labour market status or sectoral composition of the estimated irregular foreign-born population. To overcome that limitation, we additionally implement a second indirect method, consisting in comparing the number of non-EU foreign workers affiliated in the Social Security registers with those who identified themselves as employed in the Labour Force Survey. Performing such a comparison aims to fulfil two goals. First, the estimation delivered under this method can be seen as a robustness check⁷. Second, and more importantly, given the availability of microdata for both the Labour Force Survey and the Social Security Registers, it will allow us to perform a sectoral analysis of the irregular immigration⁸.

2.1 Method 1: Estimation based on the Padrón and the residence permits

The stock of irregular immigrants (M^{Irr}) under the residual method is obtained by subtracting the number of valid residence permits held by non-EU immigrants (M^R) to the total number of non-EU immigrants enrolled in the municipality registers (M^T). However, as some authors pointed out ([Jandl \(2008\)](#) or [González Ferrer and Cebolla Boado \(2008\)](#)), to capture the actual number of legal migrants residing in a country we need to add not only the residence permits, but also a category known as the “quasi-legal” immigrants ([Woodbridge \(2005\)](#)). This category includes: (1) students with study permit; (2) immigrants with expired residence permit but in the process of renewing it ([González Ferrer and Cebolla Boado \(2008\)](#))⁹; (3) the asylum seekers pending of the resolution. One last adjustment to be performed is related with the way that the municipal registers treat the

(2018)) which may have lowered their incentives to enrol in the Padrón. Nevertheless, as the health system is decentralized, many regions did not follow or partially avoided the application of the law, and therefore in practice the limitation to the access was not fully implemented. The RDL 12/2012 was abolished in 2018 by the newly elected government and, therefore, the figures on the number of irregular immigrants enrolled in the Padrón may be partially underestimated only from 2013-2017.

⁷That is, the number of illegal immigrants obtained with the two methods should not be completely odd. Moreover, under reasonable assumptions (unemployment rate and labour force participation rate), we could use the estimation results to deliver an approximation of the informal sector among non-EU immigrants, which also can be used to test the accuracy of our estimates.

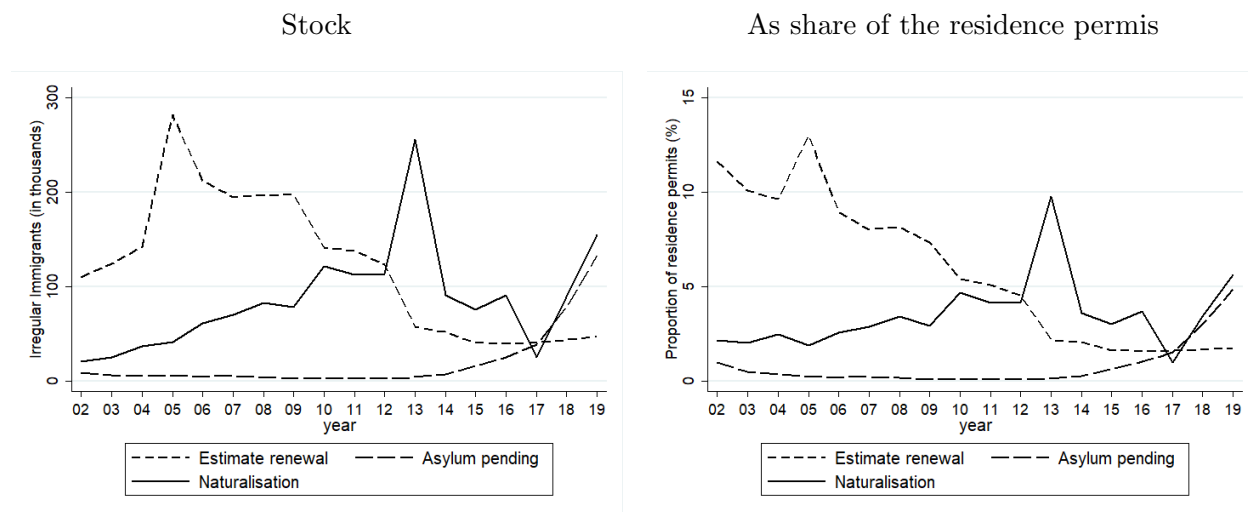
⁸With this method we can not disentangle between the sources of irregular work: the absence of residence permit (illegal immigration) or the Social Security fraud (informal work, or black labour market), which also exists among local workers. See [Farré Olalla and Bosch \(2014\)](#) for a detailed analysis of the size of the informal sector in Spain and its relationship with the immigration boom that took place during the Spanish economic expansion.

⁹This is because a proportion of the total number of immigrants pending of renewing the residence permit will become regular in case of a “positive silence” resolution. I follow the approach by [González Ferrer and Cebolla Boado \(2008\)](#) and approximate the number of non-EU immigrants in this situation as the sum of: 1/4 of the total number of initial residence permits + 1/8 of the total number of first-renewal residence permits + 1/8 of total number of second-renewal residence permits

foreign-born residents that are naturalised in a given year. When this happens, the naturalised immigrant himself must notify it in the registers. Once that occurs, the municipality register updates his figures. Unfortunately, the number of naturalised immigrants who indeed update their nationality status is not reported. To overcome that drawback, in our estimation we consider two scenarios: in the first one (lower-bound) we assume that no foreign that is naturalised update her register in that year. In the second scenario (upper-bound), we will assume that 50% of them do it.

The Table 5 (in the Appendix A) displays the numbers of each the categories commented above: the first column shows the number of non-EU immigrants enrolled in the municipal register at the end of the year, while the second one displays the total number of valid residence permit. Subtracting (2) to (1) will deliver the non-adjusted estimation of irregular immigrants according to the residual method. The columns (3) to (5) displays the “quasi-legal” immigrants: study permits (column (3)), the estimated number of immigrants under a residence permit renewal process (column (4)) and the asylum seekers pending of the resolution (column (5)). Last, the column (6) shows the total number of regularisation that took place in a given year. The Figure 2 plots the

Figure 2: Naturalisations, asylum applications pending and estimated renewals



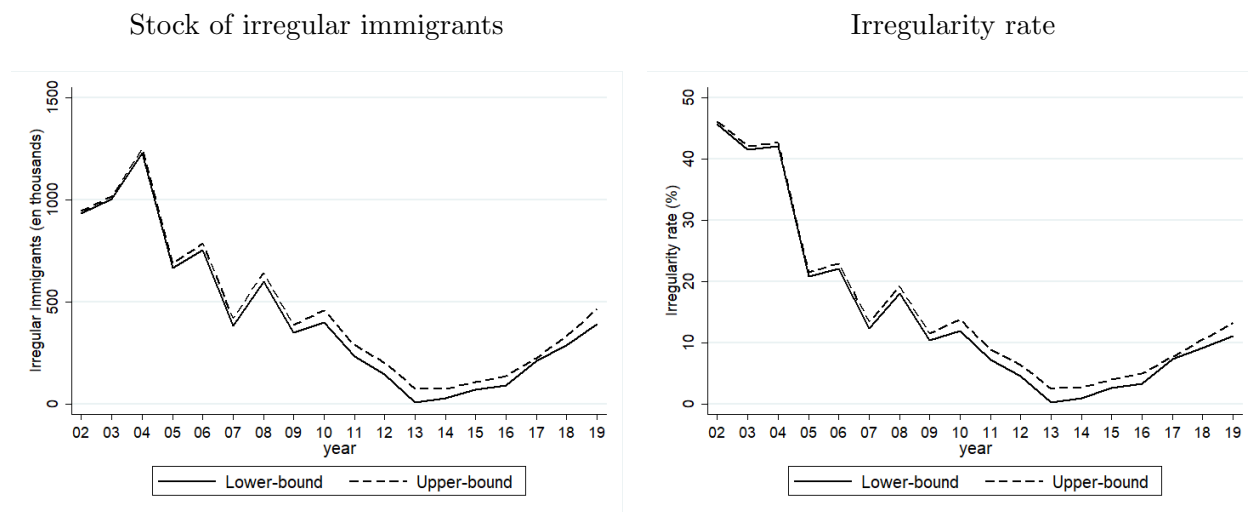
Note: Own elaboration based on the Estadística del Padrón Continuo (INE), Asylum Statistics (Eurostat) and the Statistics of foreign residents, Portal de Inmigración del Ministerio de Inclusión, Seguridad Social y Migraciones.

evolution of the regularisations, asylum seekers and estimate renewal. As we can see, ignoring the immigrants that are renewing their residence permit would significantly upward bias the estimates specially during 2003-2012, where we estimate that there are more than 100.000 immigrants in this situation. In the same figure one can see that naturalisation are also quantitatively relevant, in particular it is very important to account for the large number of regularisation that took place in 2013, where more than 250.000 foreign obtained the Spanish nationality, which account for almost

10% of the residence permits¹⁰. Last, the figure also shows very clearly that accounting for the stock of asylum applicants pending of resolution is not a quantitatively relevant issue until 2018, where they jumped from 38.000 to more than 130.000 (5% of the residence permits).

The Table 1 displays the results of the estimation of the stock of irregular immigrants, obtained after applying the residual method in the two alternative scenarios explained above (lower and upper bound, columns (3) and (4), respectively). According to the estimates, at the end of December 2019 there are around 390,000-470,000 irregular immigrants, which translate into a irregularity rate of 11.1-13.3% (defined as the share of irregular immigrants over the total stock of non-EU immigrants registered in the Padrón). For a more clear examination of the evolution of the irregularity in Spain, the Figure 3 plots the time series of the stock of irregular immigrants (left panel) and the irregularity rate (right panel) from 2002 to 2019 for the two estimation scenarios. We can observed a long-term downward trend in the incidence of irregularity, that can be roughly explained by a combination of two factors: first, the implementation of different migration policies, specially the 2005 migration amnesty, which resulted in the legalization of around 600,000 immigrants already living irregularly in Spain (Monras et al. (2018)); second, the downward trend in the immigration inflows that followed the Great Recession, which hit disproportionality harder the immigrant population (Gálvez-Iniesta (2020)). The figure also shows a recent steady spike in both the stock and the irregularity rate that started in 2013, mainly due to inflows from Colombia and Honduras, as we will discuss in the next Subsection.

Figure 3: Evolution of the irregular immigration in Spain



Note: Own elaboration based on the Estadística del Padrón Continuo (INE), Asylum Statistics (Eurostat) and the Statistics of foreign residents, Portal de Inmigración del Ministerio de Inclusión, Seguridad Social y Migraciones.

¹⁰See de Lizarrondo Artola (2016) for an analysis on the recent evolution of the naturalizations in Spain and Finotelli and La Barbera (2013) for an exhaustive summary of the Spanish legislation with respect to citizenship.

Table 1: Evolution of the stock of irregular immigrants and the irregularity rate

Year	(1) Padrón	(2) Resid. Permit	(3) Irregular 1	(4) Irregular 2	(5) % Irregular 1	(6) % Irregular 2
2002	2,048,913	950,437	935,234	945,504	45,6%	46,1%
2003	2,420,479	1,230,323	1,005,539	1,018,164	41.5%	42.1%
2004	2,927,700	1,477,369	1,231,004	1,249,435	42.0%	42.7%
2005	3,194,775	2,169,134	667,103	687,934	20.9%	21.5%
2006	3,426,991	2,360,421	756,263	786,905	22.1%	23.0%
2007	3,130,248	2,432,382	386,613	421,939	12.4%	13.5%
2008	3,338,053	2,410,795	601,682	643,055	18.0%	19.3%
2009	3,358,882	2,686,042	349,664	388,922	10.4%	11.6%
2010	3,316,706	2,604,064	399,653	460,635	12.0%	13.9%
2011	3,252,240	2,711,856	235,158	291,406	7.2%	9.0%
2012	3,147,863	2,718,595	146,808	203,501	4.7%	6.5%
2013	2,934,492	2,622,701	10,738	77,208	0.4%	2.6%
2014	2,751,745	2,521,962	30,005	75,552	1.1%	2.7%
2015	2,745,546	2,489,782	72,924	110,879	2.7%	4.0%
2016	2,769,681	2,465,217	93,856	139,330	3.4%	5.0%
2017	2,919,119	2,543,451	214,751	227,298	7.4%	7.8%
2018	3,177,999	2,617,946	290,792	335,585	9.2%	10.6%
2019	3,521,226	2,735,620	391,376	468,681	11.1%	13.3%

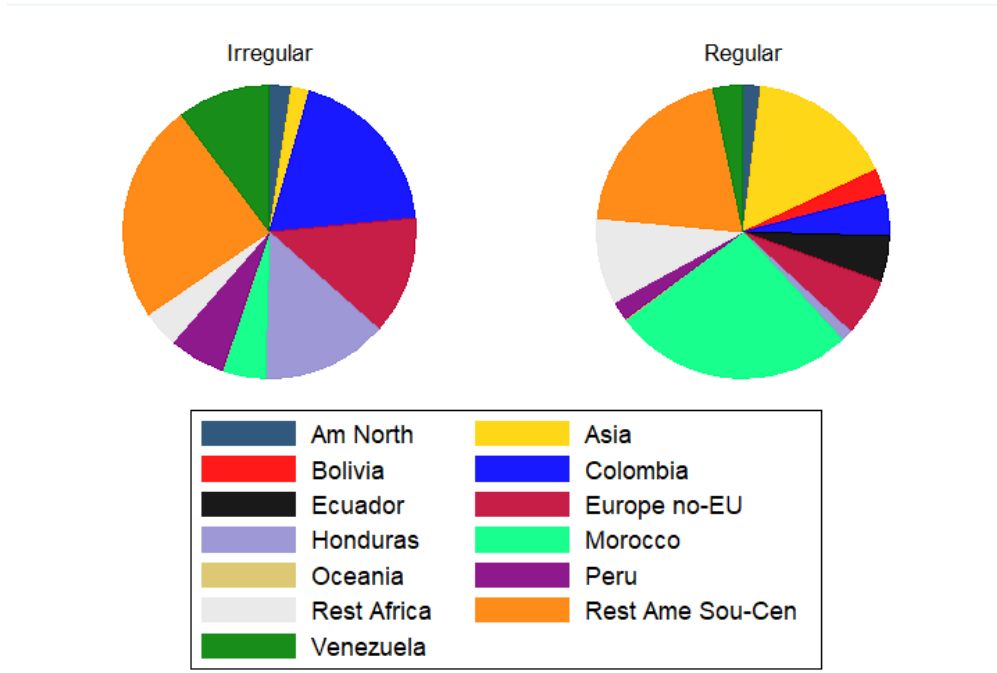
Note: The figures of the non-EU foreign-born population with residence permits are computed at the 31st of December of each year, while the Padrón figures are computed the 1st of January of the following year. That is, in the Table, the number for 2019 refers to the number of non-EU immigrants with a valid residence permit at the end of 2019 and enrolled in the Padrón at the 1st of January of 2020. According to the Padrón register, in January of 2017 the Romania and Bulgaria are considered as EU countries. However during that year, Bulgarian and Romanian immigrants were required to hold a residence permit. Consequently, for 2006 I consider those immigrants as non-EU population. The column (3) and (5) estimates the stock of irregular immigrants based on the assumption that none of the immigrants that are regularised in a given year update that information in the Padrón (scenario 1 or upper bound estimation). The columns (4) and (6) estimates the stock of irregular immigrants based on the assumption that 50% of the immigrants that are regularised in a given year update that information in the Padrón (scenario 2 or lower bound estimation). Own elaboration based on the Estadística del Padrón Continuo (INE), Asylum Statistics (Eurostat) and the Statistics of foreign residents, Portal de Inmigración del Ministerio de Inclusión, Seguridad Social y Migraciones.

2.1.1 Composition by nationality

The Figure 4 displays the composition by nationality of both the estimated irregular immigrant population (left panel) and the regular immigrants (that is, the non-EU immigrant population with residence permits, right panel). As we can see, the vast majority of the irregular immigrants come from South and Central America, with three countries standing out: Colombia, Honduras and Venezuela. The case of Morocco is also particularly interesting, as it concentrates more than 25% of the residence permits, while it only accounts for 5% of the irregular immigration, which shows the low incidence of the irregularity among Moroccan immigrants in Spain. Other nationalities with low irregularity rates include Asia (specially China), Bolivia or Ecuador.

The Table 6 in the Appendix A displays the details on the number of the stock and irregularity rates by nationality: at the end 2019, we estimate that there are around 93,000 and 70,000

Figure 4: Immigrants by nationality and legal status, 2019



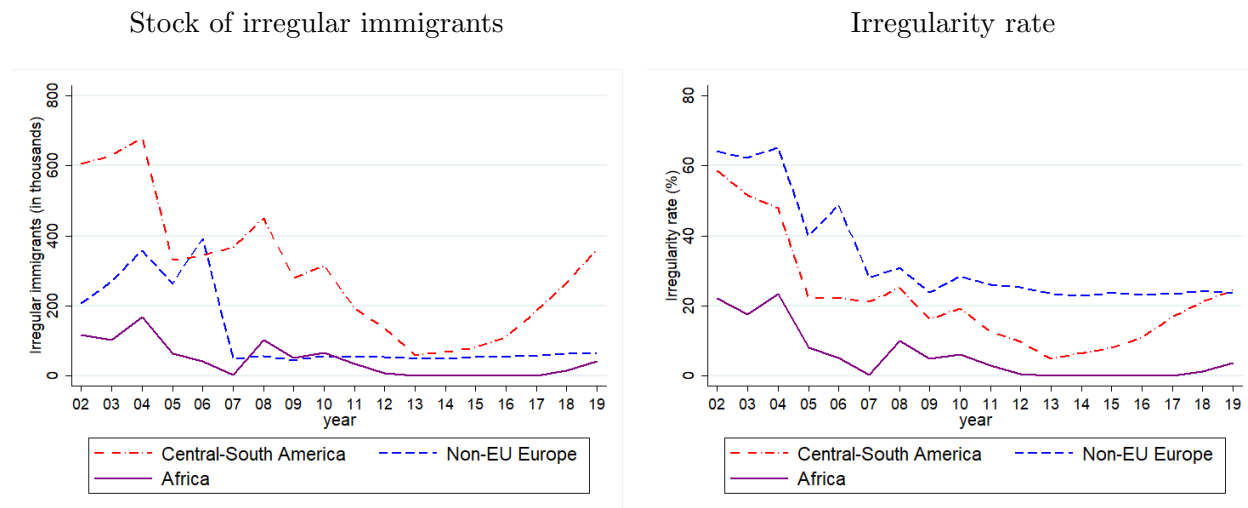
Note: Estimation based on the upper bound estimation scenario. Own elaboration based on the Estadística del Padrón Continuo (INE), Asylum Statistics (Eurostat) and the Statistics of foreign residents, Portal de Inmigración del Ministerio de Inclusión, Seguridad Social y Migraciones.

Colombians and Hondurans irregular immigrants in Spain, which accounts for 20% and 13% if the total irregular immigrants, respectively. Those are therefore the more predominant Latin-American nationalities among the irregular immigrants, followed by Venezuela and Perú (50.000 y 30.000, respectively). The next largest groups are the countries included in the non-EU Europe, (mainly Russia and Ukraine) with 60,000 irregular immigrants, that make up for 13% of the total; and Morocco (20,000 irregular immigrants, 5% of the total).

We next look at the evolution over time of the stock of irregular immigrants (left panel) and the irregularity rate (right panel) by nationality. As we can see in the Figure 3, throughout all the period considered (2002-2019), South America is being the largest region of origin of the irregular immigrants in Spain. The left panel shows that the previously mentioned increase in the number of irregular immigration in Spain from 2013 is mainly explained by the increase in the presence of irregular immigrants from Central and South America, which translated in an spike in its irregularity rate (right panel). The Figure 6 furthers decompose the Central and South American region into their main nationalities: one can observe the fast and large rise in both the stock and the irregularity rate of the Colombian immigrants, that went up in around 90,000 (the number had multiplied by a factor of 7) from 2016. We also observed a recent increase in the Peruvian irregular immigration (around 30,000 irregular immigrants more from 2017 to 2019). The right panel of the

Figure 6 shows that the increase in the total stock of irregular immigrants seems to be explained by an increase in the irregularity rate.

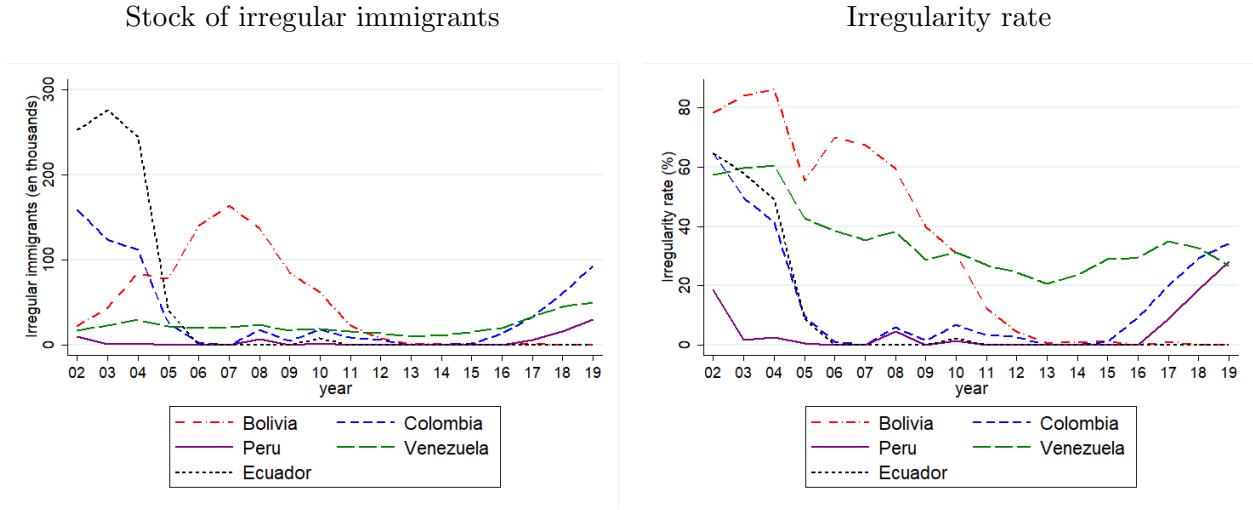
Figure 5: Evolution of the irregular immigration in Spain, by region of countries



Note: Estimation based on the upper bound estimation scenario. Own elaboration based on the *Estadística del Padrón Continuo (INE)*, *Asylum Statistics (Eurostat)* and the *Statistics of foreign residents, Portal de Inmigración del Ministerio de Inclusión, Seguridad Social y Migraciones*.

As the Figure 5 shows, the irregularity rate of the African immigrants residing in Spain has been very low during the period 2002-2019. In fact, from 2013 to 2017 the irregularity rate below 1% (right panel). As expected, the largest country of origin of the African immigrants is Morocco (20,000 out of 43,000 African irregular immigrants, see Table 6). However, they display a much lower irregularity rate than the average (3% vs 13% of average) and, as a consequence, they are highly under-represented among the irregular population: they account for only 5% of the irregular immigrants, while their weight among the total immigrant population is around 25%.

Figure 6: Evolution of the irregular immigration in Spain, South America



Note: Estimation based on the upper bound estimation scenario. Own elaboration based on the *Estadística del Padrón Continuo (INE)*, *Asylum Statistics (Eurostat)* and the *Statistics of foreign residents, Portal de Inmigración del Ministerio de Inclusión, Seguridad Social y Migraciones*.

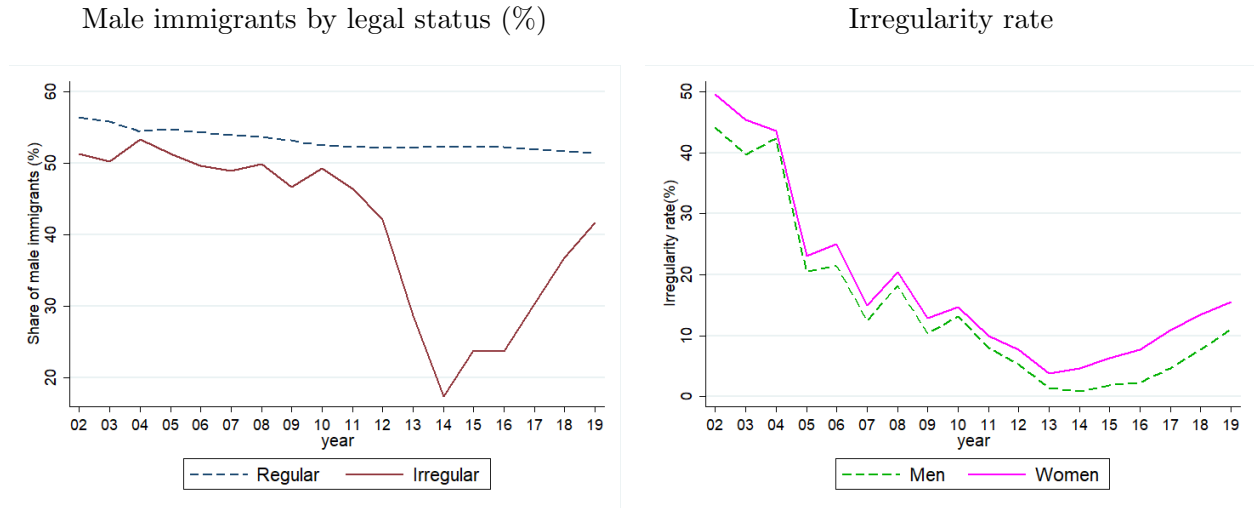
2.1.2 Sex composition

Our estimates suggest that around 55% of the irregular immigrants are women (left panel of the Figure 7). This result is in contrast with the sex composition of the legal immigration, where the share of men and women is close to 50%. As the right panel of the Figure 7 shows, we find a higher irregularity rate for men than for women (21% and 17%, respectively). Looking at the evolution of the irregularity rate by sex, we find evidence that the male immigration was the main driver of the recent observed increase in the incidence of the irregularity. As the left panel of the Figure 7 shows, the share of men on the total irregular immigrants went from less than 20% in 2014 to more than 40% in 2019. During those years, the irregularity rate also grew more for male than for female immigrants (right panel).

2.1.3 Age composition

The Figure 8 summarizes the age composition of both the regular and irregular immigration in Spain at the end of 2019. According to the estimates, more than 50% of the irregular immigrants (around 350,000) are from 20 to 35 years old and around 200,000 of them (more than 20%) are 20 to 29. Comparing the age structure of the regular and the irregular immigration (right panel of the Figure 8) we can see that the share of non-EU immigrants at working ages is very similar among both groups (around 81%) However, the irregular immigrants are young: 30% of them are between 20-30 years old, while that share is only 14% among the regular immigrants. In other words, the irregularity rate is higher among the young immigrants. On the other hand, both the stock

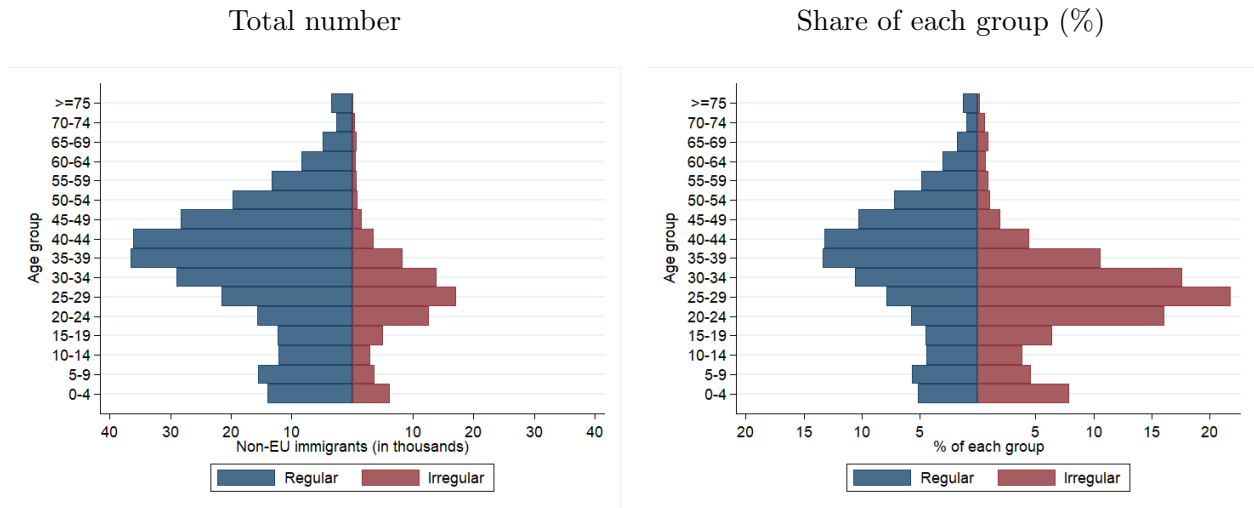
Figure 7: Composición de la inmigración irregular, sexo



Estimation based on the upper bound estimation scenario. Own elaboration based on the Estadística del Padrón Continuo (INE), Asylum Statistics (Eurostat) and the Statistics of foreign residents, Portal de Inmigración del Ministerio de Inclusión, Seguridad Social y Migraciones.

and the irregularity rate is very low among immigrants older than 40: there are around 700,000 immigrants of ages 40 to 54 with valid residence permit (30% of the total number of residence permits), while there are only 40,000 irregular immigrants in that age interval (less than 7% of the total). Interestingly, by pooling both male and female irregular immigrants we are hiding significant

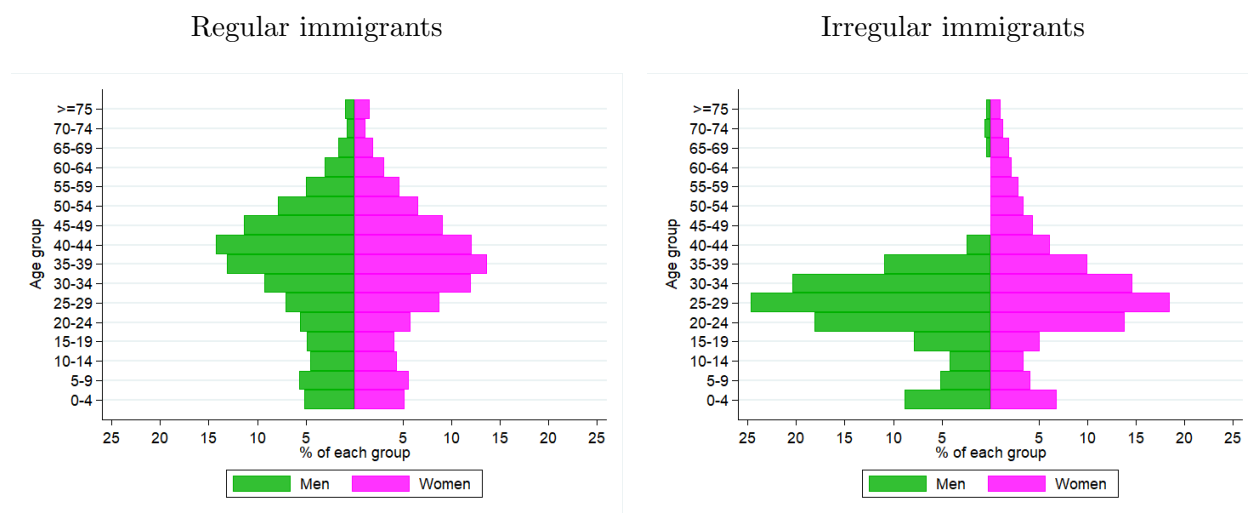
Figure 8: Immigrants by age group and legal status, 2019



Note: Estimation based on the upper bound estimation scenario. Own elaboration based on the Estadística del Padrón Continuo (INE), Asylum Statistics (Eurostat) and the Statistics of foreign residents, Portal de Inmigración del Ministerio de Inclusión, Seguridad Social y Migraciones.

and very relevant differences by gender. The Figure 9 examines that heterogeneity, displaying the male and female age structure of both the regular and irregular immigrant population (left and right panel, respectively). The left panel shows that there are barely no differences in the age structure of the male and female regular immigrants. However, we find large age heterogeneity by gender among the irregular immigration (right panel). Firstly, male irregular immigrants are younger than females: more than 70% of the male irregular immigrants are younger than 30, while that number is below 50% for women. Secondly, there virtually no male irregular immigrants older than 45, while that age interval accounts for around 17% of the total female irregular immigrant population. As we will see in the Section 2.2, these facts are consistent with the evidence that a large share of female immigrant workers are employed in the sector of activities of the household, where the average age is higher than in agriculture, manufacturing or constructions, which are the most predominant sector of activities of the male immigrants.

Figure 9: Immigrants by age-group and sex, 2019



Note: Estimation based on the upper bound estimation scenario. Own elaboration based on the *Estadística del Padrón Continuo (INE)*, *Asylum Statistics (Eurostat)* and the *Statistics of foreign residents, Portal de Inmigración del Ministerio de Inclusión, Seguridad Social y Migraciones*.

2.2 Method 2: Estimation based on the Labour Force Survey data and Social Security Affiliates

The second method for estimating the incidence of the irregular immigration in Spain consists in comparing the number of immigrants paying fees to the Social Security and those detected as employed in the Labour Force Survey ([González-Enríquez \(2009\)](#), [González Ferrer and Cebolla Boado \(2008\)](#)). As we can see in the Table 2, according to the Labour Force Survey, in the first quarter of 2020 there was 1,564,300 non-EU foreign workers employed (column (1)), while according to

the administration data there was 1,264,816 non-EU employed workers paying fees to the Social Security (column (2)). The difference between those two sources implies that there were 299,484 immigrants that were irregularly working. As the column (4) shows, at the first quarter of 2020 we estimate that the irregularity rate (defined share of employed workers that are working irregularly) is around 19%. The estimated irregularity rate displays the same downward long-term trend that we saw in the Figure 3. It is worthy highlighting the effect of the 2005 amnesty on the number of foreign workers paying fees to the Social Security, an effect already documented ([González Ferrer and Cebolla Boado \(2008\)](#), [Monras et al. \(2018\)](#)): this number increased in around 550,000 workers, driving down the irregularity rate from 47.9% in 2005 to 28.1% in 2006. After a slight upturn from 2006 to 2008, the irregularity rate went down to its lowest level in 2014 of 14%. From that year it had fluctuated around that value, always below 20%.

Table 2: Estimation of the stock of immigrants employed irregularly and the irregularity rate

Year	(1) Employed EPA	(2) Employed SS	(3) Irregular	(4) % Irregularity
2005Q1	1,670,700	871,171	799,529	47.86%
2006Q1	1,987,300	1,428,199	559,101	28.13%
2007Q1	1,834,200	1,286,627	547,573	29.85%
2008Q1	2,002,100	1,332,797	669,303	33.43%
2009Q1	1,753,000	1,220,121	532,879	30.40%
2010Q1	1,665,800	1,153,334	512,466	30.76%
2011Q1	1,591,900	1,110,882	481,018	30.22%
2012Q1	1,412,100	1,045,137	366,963	25.99%
2013Q1	1,242,000	993,513	248,487	20.01%
2014Q1	1,074,500	921,926	152,574	14.20%
2015Q1	1,101,800	910,119	191,681	17.40%
2016Q1	1,149,500	944,262	205,238	17.85%
2017Q1	1,221,700	982,788	238,912	19.56%
2018Q1	1,265,600	1,069,109	196,491	15.53%
2019Q1	1,385,100	1,168,994	216,106	15.60%
2020Q1	1,564,300	1,264,816	299,484	19.14%

Note: the data of the Social Security records is provided in a monthly frequency. The numbers displayed in the table, for the first quarter of each year, are the average of the three months of the quarter. Own elaboration based on the Estadística del Padrón Continuo (INE) and Affiliation Statistics (Social Security).

2.2.1 Sectoral Composition

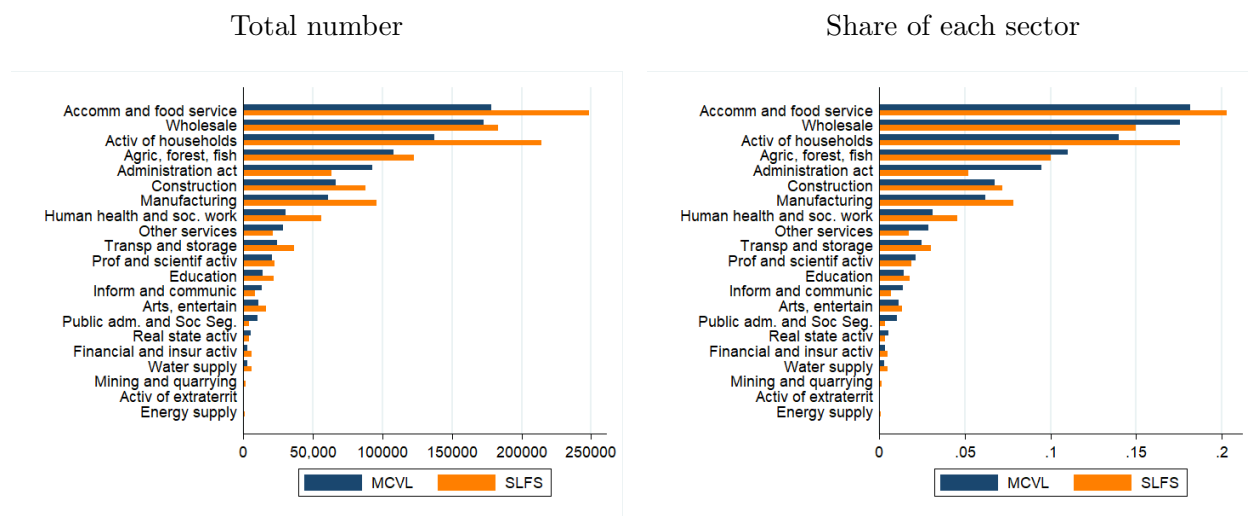
The availability of microdata for both the Spanish Labour Force Survey (aftermath, EPA) and the Social Security registers (“Muestra Continua de Vidas Laborales”, aftermath MCLV) allows us to shed light on the sectoral composition of the irregular immigrant population¹¹. This is precisely one of the main advantages of the second estimation method. The intuition on how the existence

¹¹See [INE \(2019\)](#) for an exhaustive comparison between the two microdata sources.

of those two microdata sources can help us to study the sectoral composition of the irregular immigrants is very simple. First, as the MCVL is a representative sample of the workers enrolled in the Social Security in a given year, it can be used to study the sectoral composition of the non-EU immigrants employed in the formal sector (and, consequently, excluding the irregular immigration). Second, as the EPA is a representative sample of all the workers employed in the Spanish labour market (as it draws its sample from the Padrón), it can be used to study the sectoral composition of the non-EU immigrants employed in both the formal and informal sector. Consequently, the differences in the sectoral composition of the two data sources must be explained by the incidence of the informal economy (de Domingo Sanz (2011)).

The Figure 10 plots both the sectoral composition (right panel) and the absolute number of employed immigrant workers (left panel) according to the two data sources. We can see that the sectors of activity employing more immigrants are “Accommodation and Food service activities” (18-20%), “Wholesale and retail trade” (15-17%), “Activities of households” (15-20%) and “Agriculture, forestry and fishing” (10%). The left panel of the Figure displays the number of non-EU workers employed in each sector according to the EPA (formal and informal sector) and the MCVL (formal sector only). As stated above, the differences in the number of employed according to the EPA and the MCVL are interpreted as the number of workers employed in the informal sector. Since we are specially interested in those differences, they are plotted separately in the Figure 11.

Figure 10: Immigrants by sector, MCVL vs EPA

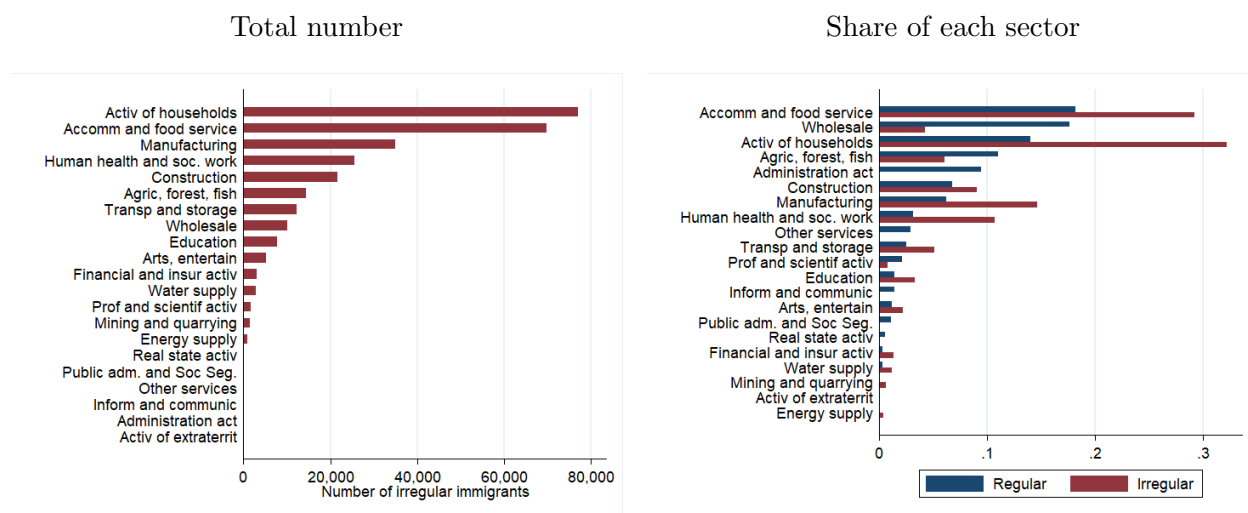


Note: Own elaboration based on the “Muestra Continua de Vidas Laborales” and the Spanish Labour Force Survey, first quarter of 2017.

As we can see, two sectors of activity concentrate most of the non-EU informal workers: “Accommodation and Food service activities” and the “Activities of households” sector, employing 80,000 and 70,000 irregular immigrants, respectively. These results are in line with the work of de Domingo Sanz (2011), that also found the largest discrepancies between the Social Security

affiliates and the EPA employment in those sectors. They are followed by the ‘‘Manufacturing’’ sector (almost 40,000 workers), ‘‘Human health and social work activities’’, ‘‘Construction’’ and the primary sector (around 20,000 irregular workers each of them). The right panel of the same figure compares the sectoral composition (i.e the share of each sector) of the irregular and regular immigrants. My estimates suggest that the ‘‘Activities of households’’ sector employs the largest share of irregular immigrants: more than 30% of the immigrant working irregularly are employed in that sector. It is followed by the ‘‘Accommodation and Food service activities’’ sector, which account for around 28% of all the immigrant irregular employment. We also find that the primary sector employs a very low share of the irregular immigrants. However, given that, by definition the figures are restricted to employed workers, the fact that the unemployment rate in that sector is higher than the average, we could expect that a significant share of the irregular immigrants that are unemployed could be usually working in the primary sector.

Figure 11: Irregular immigrants by sector of activity



Note: Own elaboration based on the ‘‘Muestra Continua de Vidas Laborales’’ and the Spanish Labour Force Survey, first quarter of 2017.

2.3 Occupational composition and the COVID-19 response: non-EU immigrants as key workers

As a last piece of evidence, we try to shed light on the occupational composition of the non-EU immigrant workers, focusing on the so called ‘‘key workers’’ that the Commission¹² and Member states had identified as performing crucial tasks on the front line of Europe’s COVID-19 response (Fasani and Mazza (2020)).

Using the most recent wage of the Spanish Labour Survey, we follow Fasani and Mazza (2020)

¹²Coronavirus: Commission presents practical guidance to ensure the free movement of critical workers

and identify key workers according to the Communication from the Commission on Guidelines concerning the exercise of the free movement of workers during COVID-19 outbreak¹³.

According to our definition and estimates, around 46% of the non-EU immigrant workers are employed in key occupations, while for native workers that share is less than 35% (see the last row of the Table 3). By nationalities, the share of key workers is larger among south-American immigrants (50%), closely followed by the African (47%), while it is 41% for the immigrants from the non-EU Europe. Unfortunately, we cannot neither identify nor using any method in order to

Table 3: Key workers by occupation and nationality

Occupation	Natives	EU immigrants	Non-EU immigrants
Science and Engineering Professi	251,698	9,652	3,712
Health Professionals	629,290	11,910	22,842
Teaching Professionals	953,014	40,435	13,069
ICT Professionals	161,642	8,848	1,157
Science & Eng, Associate Profess	387,261	2,790	5,453
Health associate professionals	148,079	3,325	3,554
ICT Technicians	232,149	11,848	4,940
Personal Service Workers	64,866	3,505	4,037
Personal Care Workers	506,838	9,955	71,751
Market-oriented Skilled Agricult	378,531	22,026	26,625
Market-oriented Skilled Forestry	23,629	771	0
Food Processing, etc,	43,925	7,310	621
Stationary Plant and Machine Ope	42,585	3,670	525
Drivers and Mobile Plant Operato	651,616	60,102	28,116
Cleaners and Helpers	813,037	113,634	236,201
Labourers in Mining, Contruccion	226,042	48,226	115,079
Labourers in Agric, Forestry	241,364	15,229	27,320
Refuse Workers	85,608	1978	6,960
Total key workers	5841,182	375,217	571,966
Total employed	16,732,667	848,179	1,243,940
% Key workers	34.9%	44.2%	46.0%

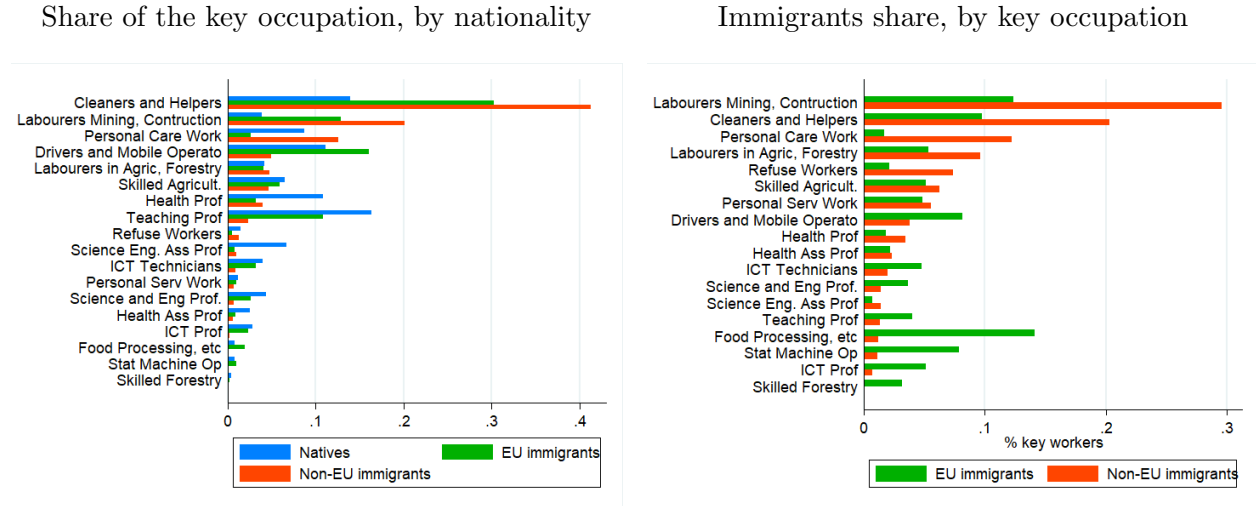
Note: Own elaboration based on the Spanish Labour Force Survey, 2018

estimate how much of the irregular immigrants are employed in key occupations. However, as we found in the Section 2 that the irregularity rate is larger among the South American immigrants, we could expect that many irregular immigrants employed in key occupations are working irregularly.

We also find large heterogeneity in the presence of non-EU immigrants across occupations. As the left panel of the Figure 12 shows, most of them are employed as cleaners and helpers (40%), followed by labourers in mining and construction (20%) and as personal care workers (12%). This large concentration of the non-EU immigrants in few occupation imply that, among those occupations, they account for a very high share of the total work. For example, the non-EU immigrants

¹³As [Fasani and Mazza \(2020\)](#) argue, the most detailed classification of occupation (ISCO-08) available at the Labour Force Survey is at three digit, while the Commission classification of key worker is implemented at four digit, which make our definition slightly broader.

Figure 12: Immigrants by key occupation



Note: Own elaboration based on the Spanish Labour Force Survey, 2018

account for around 30% of all the employment in the occupation of labourers in mining and construction. If we sum up the EU-immigrants, we obtain that immigrants account for more than 40% of the employment of that occupation, which constitutes strong evidence of high specialization pattern of the immigrant labour supply. The non-EU immigrants concentrate around 20% of all cleaners and helper jobs.

3 The fiscal impact of the non-EU immigration

3.1 Data and Methodology

Following [OECD \(2013\)](#), this section estimates the fiscal impact of immigration by comparing immigrants' contributions and transfers, at a specific point of time, through a static accounting (cash-flow) method. Notice that this approach estimates the fiscal impact of the current resident immigrant population (which emerged from the past foreign inflows) and, therefore, it does not drive implications on the fiscal impact of the current inflows ([OECD \(2013\)](#)).

We use data of the last available Spanish wave (2018)¹⁴ of the EU Statistics on Income and Living Conditions Survey. While [OECD \(2013\)](#) divided households between those entirely composed by natives, immigrants and a mixed category, I will split the immigrant households in two: those composed only by UE immigrants and by non-EU immigrants. Notice that the Spanish version of the EU-SILC (also known as "Encuesta de Condiciones de Vida", ECV) draws its sample from the information on the municipality registers. As a consequence, the sample of the survey (which

¹⁴The survey ask respondents about fiscal information regarding the previous fiscal year. Therefore, my estimates will be informative of the net fiscal position in 2017 of households that were residing in Spain in 2018.

is representative at the national level) also includes irregular immigrants, although we can not identify them in the data. We will provide two type of estimations: a direct estimation and one adjusted estimation where we take into account the contribution regarding indirect taxes and the transfer of public expenses in health and education. According to the direct estimation, the net fiscal contribution NFC^D of a given household i is computed as:

$$NFC_i^D = \tau_i^{IT} + \tau_i^{SS} - ST_i \quad (1)$$

where τ_i^{IT} and τ_i^{SS} are the household's income taxes and social security contributions; and ST_i are the social transfers that they received, which includes pensions, survival and sickness allowances, disability transfers, unemployment benefit and family, education and housing allowance. The amounts received and contributed by the household in each of the items included in this estimation is directly provided in the EU-SILC survey.

For the adjusted fiscal impact, we again follow [OECD \(2013\)](#) and computed it as:

$$NFC_i^A = NFC_i^d + \tau_i^C - C_i^E - C_i^H \quad (2)$$

where τ_i^C is the estimation of each household's consumption tax contribution; and C_i^E , C_i^H are the estimates of each household public education and health systems' consumption. To estimate C_i^H , we first compute the per capita public health expenditure by age c_j^H ¹⁵. Then, C_i^H is computed as:

$$C_i^H = \sum_{j=1}^J c_j^H n_{i,j} \quad (3)$$

where $n_{i,j}$ is the number of members in the household i each age j . As c_j^H is increasing with age, the older the average age of the household, the more public health they will consume.

Similarly, to estimate the household public education consumption we first need to compute the public education expenditure by student for each educational level c_e^E . Then, C_i^E is computed as:

$$C_i^E = \sum_{e=1}^J c_e^E n_{i,e} \quad (4)$$

where $n_{i,e}$ is the number of members in the household i in each educational level e ¹⁶. Thus, households with more children are estimated to consume more public education. Also, as c_j^E is increasing with the educational level, households with children studying in collage are also assumed to benefit more from the public educational system.

¹⁵We combine the OECD data on the total public health expenditure for Spain (in 2018) with the health expenditure age-profile estimation provided by [Hagist et al. \(2009\)](#)

¹⁶We identify educational levels by the age of the person: <https://eacea.ec.europa.eu/national-policies/eurydice/content/organisation-education-system-and-its-structure-79es>

Last, the household’s contribution to the consumption tax is given by:

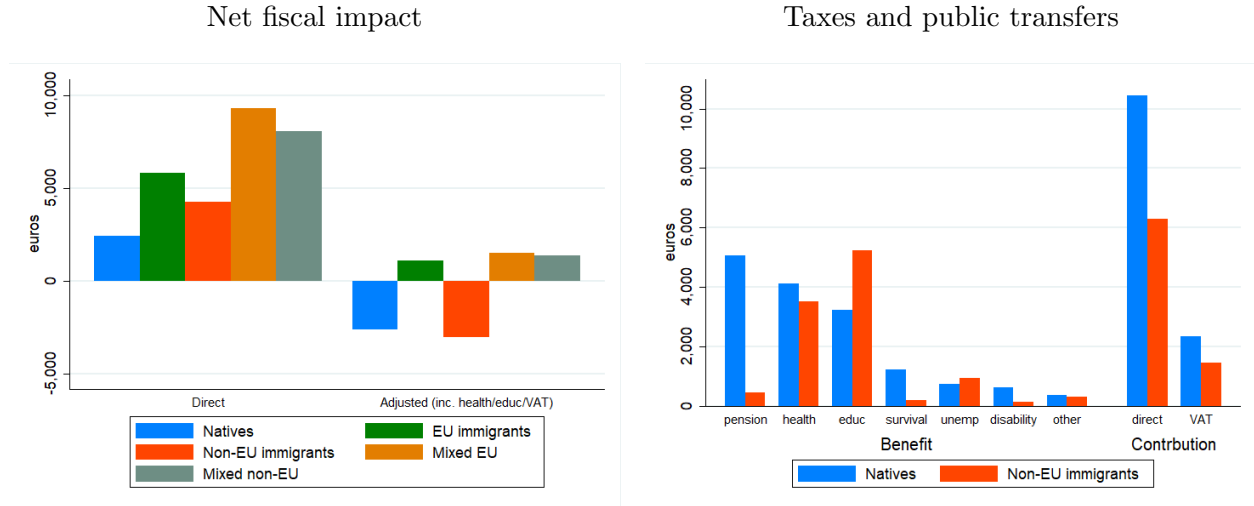
$$\tau_i^C = \tau^{VAT} [(1 - s)w_i^D] \quad (5)$$

where s is the average saving rate in Spain for 2018 (INE), w_i^D is the disposable income of the household, which is directly provided by the EU-SILC, and τ^{VAT} is the effective value-added tax rate (around 8.5%, López-Laborda et al. (2017)). As we can see in the Table 7, my results regarding the estimation contribution of each household type to the consumption tax are consistent to the work by López-Laborda et al. (2017).

3.2 Results

The left panel of the Figure 13 displays the results of the net fiscal impact, direct and adjusted, by household type. We find that in 2017 the net fiscal contribution of the households composed entirely by non-EU immigrants is positive, around 4,300 euros. One can observe that the household composed only by natives has the lowest net direct fiscal contribution (2,400 euros), while our estimation suggest that the EU immigrant household has also a large and positive net fiscal contribution (5,800 euros). We find that the average non-EU immigrant households’ net contribution is 1,800 euros higher than the natives ones. Regarding the mixed households, our estimate suggest that the household composed by a native and a EU immigrant have the higher net positive fiscal contribution (more than 9,000), followed by the household composed by a native and a non-EU immigrant, with about 8,000 euros (more than 3 times higher than the native household). The

Figure 13: Fiscal impact by type of household



Note: Own elaboration based on the Spanish Statistics on Income and Living Conditions Survey, 2018.

Figure 13 also shows the results of the adjusted net fiscal impact (in the right part of the left

panel). As we can see, once education, health and consumption tax is included in the analysis, the net fiscal position of both the native and the non-EU households becomes negative. Quantitatively, the difference between the two type of households is very small, with the native household contributing with around 400 euros more than the non-EU one. As we can see, once the direct fiscal position is adjusted, the non-EU immigrants fiscal contribution is lower than for natives. This can be explained by two main factors, which can be seen in the right panel of the Figure 13. First, since they have more children on average, my estimation suggests that they consume more public education (5,500 vs 3,200 euros for the native households). Second, as they have a lower disposable income, they have on average lower consumption expenses, which implies a lower contribution to the consumption tax. Those two factors are partially compensated by the immigrants lower public health consumption (3.500 vs 4,000 among native households), which is explained by the fact that they are younger than the native population.

The right panel of the Figure 13 also shows that the more positive direct net fiscal position of the non-EU immigrant households is due to the fact that they receive lower social transfers (mainly pensions, but also survival and sickness allowances, since they are younger than the natives) and not because they contribute more with their taxes. As we can see, their direct tax contribution is lower than for among natives households as on average they are less educated and therefore they receive lower wages than natives. Last, as mentioned above, for the estimation of the net fiscal impact of the non-EU immigrant households we are also including irregular immigrants, which, by definition, do not contribute with neither income tax nor social security contributions. Consequently, the potential fiscal position of the irregular immigrants would be higher if some effort is implemented to reduce the incidence of the irregular immigration.

4 The fiscal impact of a regularization: an approximation based on representative irregular immigrants

Using the information displayed in the Section 2 regarding the nationality, sex and sector composition of the estimated irregular immigration, this sections aims to approximate the fiscal cost of the irregularity status and provide an estimation of the potential benefits of regularising their current legal status. For that, we will focus on the most representative socio-economic irregular immigrant profiles, providing three different profile for both men and women. For each of irregular immigrant profile, we will use the available data sources in order to shed light on both the economic and social composition of the worker as well as its expected potential contribution in case of a regularization.

4.1 Constructing the most representative irregular immigrant’s profiles

To define the representative irregular immigrant, for each gender we take two steps:

- First, using the age structure of the irregular immigrants (right panel of the Figure 9), we

pick the three most common age-groups. For instance, in the case of the female irregular immigrants, we will take two prime-age profiles (above 30 years old) and one below 30. For the male immigrants, as they are younger on average, we found that the most common age-profiles are 25-35, 25-40 and 17-25 (see top panel of the Table 4). We also analyse the nationality composition of the irregular immigrants in that age-structure.

- Second, we estimate the sectoral composition of the irregular immigration for each age-groups obtained in the previous step. For doing that, we follow the same approach explained in the Subsection 2.2.1, but in this case restricting to a specific age-group¹⁷.

The three top panels of the Table 4 summarises the socio-economic characteristics of each of the irregular immigrants' representative profiles that we obtained using the approach just explained. For each of them we provide an estimation of its weight over all the irregular immigrant workers. For the female immigration, we found that the most representative profile is a woman aged 20 to 30 years, working in the "Activities of households" sector (around 25% of the female irregular immigrants could fit in this profile, which account for 14% of the total stock of irregular immigrants). Regarding the nationality of origin, the data does not seem to restrict to one specific region, with most of them having both South-Central America nationality, but also a significant share of them are possible from the non-EU Europe¹⁸. The other two representative female profiles are in prime-age (30-55 and 30-40 years old, respectively), both from South America, and they are employed in "Accommodation and food service activities" and the "Activities of households" sector, respectively.

For the male irregular immigration, we found that the average age of the most representative profiles are younger (see right panel of the Table 4). The first profile is found to be 25-35 years old, from South America and mainly employed in two sectors of activity: "Manufacturing" and "Construction". Around 17% of the irregular immigrants are estimated to be included in this profile. The second most representative profile is in a very similar age-group (25-40) but in this case working in "Accommodation and food service activities". Last, according to our estimates, the third age-group with the highest share among the male irregular immigrants is the one of ages 17 to 25 (around 4% of the total). We found that most of the workers in this age-group are employed in the "Agriculture, forestry and fishing" industry (primary sector) or the "Construction" sector.

4.1.1 The fiscal cost of the status quo of irregularity

In general, irregular immigrants are a significant fiscal burden in the receipt country. This is particularly relevant in Spain where, as mentioned above, regardless to their legal status, immigrants have access to free medical care and public education on the same basis as Spaniards if they are

¹⁷As in the Subsection 2.2.1, we use data from the first quarter of 2017 for both the Spanish Labour Force Survey and the "Muestra Continua de Vidas Laborales".

¹⁸The Spanish Labour Force Survey data does not provide the detailed information on the nationality of the immigrant (it only provides that information in group of regions). However, as the 6, we expect that most of the non-EU irregular immigrants are from Ukraine and Russia.

Table 4: Characteristics, cost and potential benefit of the regularization, by profile

	Female			Male		
	Profile 1	Profile 2	Profile 3	Profile 1	Profile 2	Profile 3
Age	20-30	30-55	30-40	25-35	25-40	17-25
Nationality	S-C. Am. /Europ	South Am.	South Am.	South Am.	S-C. Am.	South Am.
Sector	Act. household.	Acc. food serv.	Act. household.	Manuf./Const.	Acc. food serv.	Prim/Const.
Share (%)	15%	9%	8%	17%	13%	4%
Number of children	0,17	0,93	0,77	0,93	0,57	0,22
Living partner (%)	38%	63%	77%	80%	55%	28%
Health	975	1.405	1.355	1.344	1.239	903
Education	373	2.674	2.448	1.344	1.239	222
VAT	602	791	718	1.230	856	664
Irregularity cost	750	3.288	3.084	2.432	2.022	460
Gross wage	7.626	10.019	9.417	15.453	10.771	8.395
SS contrib.	2.151	2.826	2.656	4.358	3.037	2367
IT Contrib.	290	381	358	587	409	319
Contribution	2.441	3.206	3.013	4.945	3.447	2.686

Note: Own elaboration based on the Spanish Statistics on Income and Living Conditions Survey and the Spanish Labour Force Survey, 2017.

registered in the Padrón. Therefore, the simplest estimation of the cost of the irregular immigration requires to calculate the irregular immigrants consumption of the public health and education system. Precisely, the goal of this Section is to estimate, for each of the representative irregular immigrants' profiles found above, the cost incurred by the public finance by allowing their access (and their children) to both the public medical care and the public education.

For estimating each representative irregular immigrants' profile health system and public education consumption we follow the approach of the Section 3. In particular, we assume that the amount of public health consumed by an immigrant in age-group a is given by:

$$C_a^H = c_a^H + \sum_{j=1}^J c_j n_j \quad (6)$$

where c_a^H is the per capita public health expenditure associated to that age-group a ; c_j^H is the per capita public health expenditure associated to the age j ¹⁹ and n_j is the number of below-18 years old children of the irregular immigrant in age-group a and living with her²⁰.

The amount of education consumed by the immigrant of age-group a is given by:

$$C_a^E = \sum_{j=1}^J c_j^E n_j \quad (7)$$

¹⁹See Section 3 for details on how I estimated that cost.

²⁰That fiscal cost is divided by two if the immigrant lives with his partner. By doing that, we are implicitly assuming that the children are from both and, therefore, they should share the health and education fiscal cost.

where c_j^E is the per student public education cost associated with age j (computed in the previous section); and n_j is the number of below-18 years old children of the irregular immigrant in the education level e and living with her.

To compute Equations 6 and 7 we need information about the household composition (number of children and whether they live alone or share with their partner) where each of the irregular immigrant’s profile lives. We use the Spanish Labour Force Survey, which allows us to identify each of the irregular immigrant profiles²¹. The Table 4 displays the results. As we can see, all of the most representative irregular immigrants profiles have on average less than one children²² As expected, the average number of children is particularly low among the youngest profiles (profile 1 for women and 3 for men). The highest average number of children is found in women at ages 30-55 employed in “Accommodation and food service activities” (profile 2) and in the profile 1 of males, both with an average of 0.93 children.

Last, similar to the previous section, we estimate each irregular immigrant’s profile contribution to the consumption tax as:

$$C_a^{VAT} = \tau^{VAT} \left[(1 - s)w_a^G - g_a^h \right] \quad (8)$$

where τ^{VAT} is the effective value-added tax rate; s is the average saving rate in Spain for 2018 (4.8% according to the INE); w_a^G is the estimated average gross wage of an irregular immigrant in the profile a and g_a^h is the average housing expenses associated with the household where the immigrant lives²³.

Notice that the Equation 8 is very similar to Equation 5. However, the data we use in this Section (the Spanish Labour Force Survey and the MCVL) does not provide information on the disposable income of the worker. We then use the MCVL to compute w_a^B , which is the expected gross wage received by a worker with age a (and a given gender)²⁴, in the sector of activity where the that immigrant profile is employed²⁵. The net fiscal cost of the irregular immigration of each irregular immigrant profile a is therefore the following:

$$\text{Cost of irregularity} = C_a^H + C_a^E - C_a^{VAT} \quad (9)$$

²¹That is, we have information on both the nationality, age and the sector of activity. Notice that, as we can not identify irregular immigrants in the data, we are actually estimating the household structure of both the regular and irregular immigrants that enter in that specific age-sector-nationality profile.

²²This could be explained, first, by the fact that none of the profiles have African or Asian nationality, which are the nationalities with the higher natality rate among the immigrant population. For example, in my sample the African immigrants have 1.3 children on average, while the average among Spanish workers is 0.71. Second, notice that we restrict the sample to employed workers and those have lower average children for most of their adult age.

²³That cost is estimated for each profile using the EU-SILC data

²⁴Notice that since we are using administrative data, we are actually estimating the expected gross wage that an immigrant worker with those characteristics would obtain in the formal sector. By doing that, first, we are ignoring a potential selection of the workers that are employed in the informal sector (which may have a different unobserved ability with respect to those employed in the formal sector); and second, we ignore the fact that the same worker is very likely to receive a different wage if employed in the formal or the informal sector.

²⁵Due to its particular contribution regime, the MCVL does not provide information on the gross salary for most of the workers employed in the sector of “Activities of the household”. We estimate those wages using the EU-SILC under the same approach applied in the MCVL.

The middle panel of the Table 4 displays the result of the estimation. We find that the net fiscal cost of the irregularity varies from 460 euros yearly for the youngest male profile (profile 3) to more than 3,288 euros yearly for the oldest female profile (profile 2). As expected, the cost is higher for the older workers, as not only they are assigned a higher public health consumption but also they have more children on average. The results evidences the importance of taking into account the contribution of the irregular immigrants to the consumption tax, as including them to the analysis partially compensate the cost of the irregularity. This is specially relevant for those workers with higher wages, as the male profile 1, who is estimated to pay around 1,200 euros yearly in value-added tax.

4.1.2 The fiscal impact of the regularization: a simple approximation

Using the estimated gross wage and applying a very simple formula, we now try to estimate the expected contribution to direct taxes (income-tax and social security contributions) of each irregular immigrant’s profile as follows:

$$\text{Potential contribution} = \left(\tau_a^{IT} + \tau_a^{CCSS^T} + \tau_a^{CCSS^E} \right) w_a^B \quad (10)$$

where τ_a^{IT} , $\tau_a^{CCSS^W}$ are, respectively, the effective income tax and the employers’ social contributions rates associated to the estimated gross wage of the irregular immigrant profile a ; and $\tau_a^{CCSS^E}$ is the employee social security contribution rate²⁶.

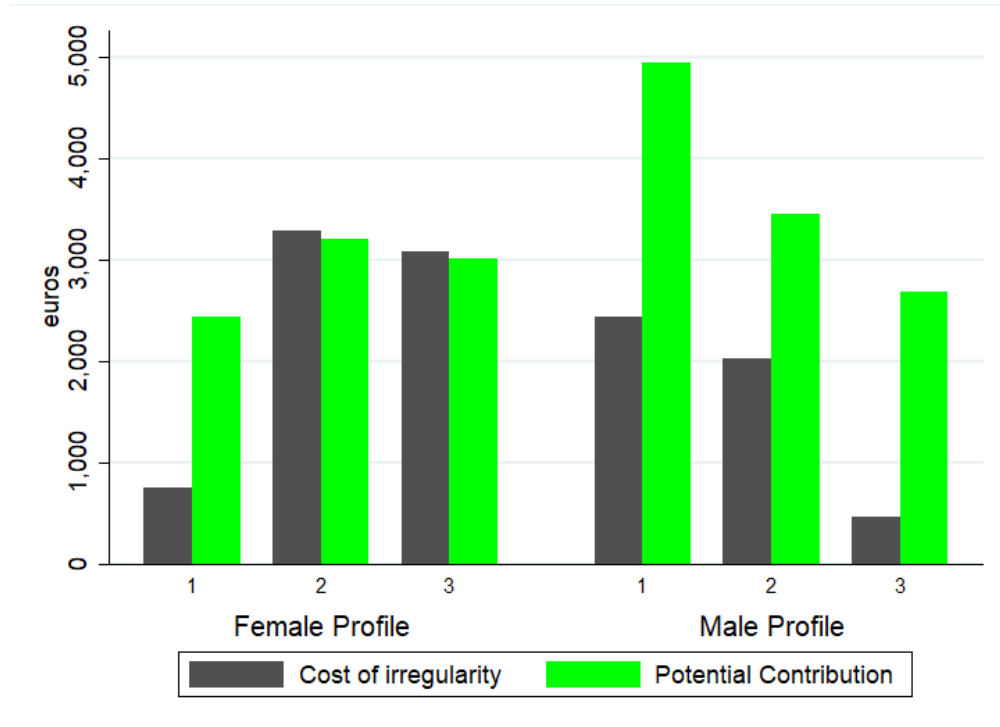
The Figure 14 shows the results of the estimation of both the fiscal cost of the irregularity of each profile (grey bars) and the potential benefit from regularizing them (green bars)²⁷. We find a higher heterogeneity in the potential contribution among the male profiles (right panel of the Figure 14): the contribution varies from around 5,000 euros yearly for the profile 1 (25-35 worker employed in the Manufacturing or Construction sector) to 2,500 of the youngest male profile (profile 3). This is simply due to the fact that we estimate larger wage differences among the male irregular immigrants’ profiles. We find that the increase in the fiscal contribution of the female irregular immigrants’ profile is around 2,500-3,000 euros year. Again, the lower variability of the estimate is simply explained by higher homogeneity in their wages. In the Table 7 we can see that among the male profiles, the top wage is 80% higher than the lowest one, while that difference is only 30% for the women profiles.

Last, it is worth highlighting that for some profiles, the potential contribution that we estimate from a regularization would significantly overcome the cost of the irregularity. This occurs in the youngest irregular immigrant profiles for both male (profile 1) and female (profile 3). As we can

²⁶For τ_a^{IT} and $\tau_a^{CCSS^W}$ we use the estimates obtained by López-Laborda et al. (2017), that approximate the effective rate applied to different gross wage intervals. The information on the rate applied to the employee social security contributions and more details on the Spanish tax system can be found here: <http://www.seg-social.es/wps/portal/wss/internet/Trabajadores/CotizacionRecaudacionTrabajadores/36537>.

²⁷Within the potential contribution, the social contributions have the largest weight, as their effective rate is higher among low incomes. See the bottom panel of the Table 7 for details.

Figure 14: Yearly cost of the irregularity and potential contribution, by profile



Note: Own elaboration based on the Spanish Statistics on Income and Living Conditions Survey and the Spanish Labour Force Survey, 2017.

see, for both profiles the potential benefits from the regularisation are around 2,500 euros yearly, while their net public consumption is barely 500-700 euros.

My results suggest that the average expected benefit of the regularization could be around 3,300-3,500 euros yearly for each regularized worker²⁸. My estimates are close but slightly inferior to those obtained by [Monras et al. \(2018\)](#), that studied the fiscal impact of the last amnesty that took place in Spain in 2005. According to their estimates, each newly legalized immigrant increased payroll-tax revenues by 4,189 euros on average. The fact that my estimates are lower is not surprising, given that the 2005 regularization was implemented during an economic expansion. This could be particularly relevant given that sector such as construction or manufacturing, with a high irregularity rate, were also key sectors for understanding the 2000-2007 Spanish economic expansion.

²⁸That estimate is obtained by computing the simple (3,300 euros) or the weighted (3,500) average of the contribution for all the profiles. Notice that the weighted average is higher because the male profile 1 accounts for the largest share of the irregular immigrants and is estimated to have the biggest potential contribution.

5 Conclusion

This paper estimates the total number of irregular immigrants residing in Spain from 2002 to 2019 and studies its nationality, sex, gender and sectoral composition. I find that at the end of 2019 there was around 390,000-470,000 irregular immigrants in Spain. That interval accounts for 11% to 13% of all the non-EU immigrants living in Spain and about 0,8% of the total population. The stock of irregular immigrants grew during the first years of the last decade, when the Spanish economy was booming. Those figures dramatically fell following the Spanish deep recession (2008-2015) and they bounce back slightly after 2015. Irregular immigrants are younger than the regular ones and they are predominantly from South and Central America. The irregularity rate is very low among the African continent. Two sectors of activity concentrate most of the non-EU informal workers: accommodation and food service activities and the activities of households sector. They are followed by the manufacturing, human health and social work activities, construction and the primary sector. I also find a large positive direct fiscal impact from non-EU immigration and large potential benefits from regularising the legal status of immigrant workers currently working in the informal sector: according to my estimates, the average expected benefit (in terms of tax revenues) of regularising the legal status of the immigrants would be around 3,300 euros yearly by irregular worker.

The empirical evidence provided in this paper might be useful for policymakers to design targeted policies aimed at mitigating the incidence of irregular immigration. The finding of large costs associated to the irregular status quo and the potential positive gains from legalising can be interpreted as starting point for a public debate on the suitability of implementing policies aiming to legalise the irregular work such as regularizations. Further research is needed to assess and identify the potential implications of these policies on the natives and regular immigrant labour market outcomes. This paper also provides empirical evidence of a significant sectorial and occupation specialization pattern in the non-EU immigrants labour force supply, which may be taken into account when studying the labour market implications of immigration and its potential distributional effects.

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Appendix

Table 5: Figures on the foreign-born resident population

Year	(1) Padrón	(2) Resid. Permit	(3) Students	(4) Estim. renewal	(5) Asylum Pend.	(6) Naturalisation
2002	2,048,913	950,437	22,787	110,424	9,490	20,541
2003	2,420,479	1,230,323	29,043	124,014	6,310	25,250
2004	2,927,700	1,477,369	34,720	142,169	5,575	36,863
2005	3,194,775	2,169,134	29,900	281,611	5,365	41,662
2006	3,426,991	2,360,421	32,488	211,485	5,050	61,284
2007	3,130,248	2,432,382	39,974	195,026	5,600	70,653
2008	3,338,053	2,410,795	41,829	196,731	4,270	82,746
2009	3,358,882	2,686,042	44,465	196,920	3,275	78,516
2010	3,316,706	2,604,064	46,914	141,401	2,710	121,964
2011	3,252,240	2,711,856	51,804	138,256	2,670	112,496
2012	3,147,863	2,718,595	42,864	123,420	2,790	113,386
2013	2,934,492	2,622,701	44,519	57,773	4,345	255,892
2014	2,751,745	2,521,962	49,053	52,106	7,525	91,094
2015	2,745,546	2,489,782	49,669	40,832	16,430	75,909
2016	2,769,681	2,465,217	54,739	39,421	25,500	90,948
2017	2,919,119	2,543,451	55,953	40,990	38,880	25,094
2018	3,177,999	2,617,946	56,951	44,019	78,705	89,586
2019	3,521,226	2,735,620	59,275	47,330	133,015	154,610

Note: The figures of the non-EU foreign-born population with residence permits are computed at the 31st of December of each year, while the Padrón figures are computed the 1st of January of the following year. That is, in the Table, the number for 2019 refers to the number of non-EU immigrants with a valid residence permit at the end of 2019 and enrolled in the Padrón at the 1st of January of 2020. According to the Padrón register, in January of 2017 the Romania and Bulgaria are considered as EU countries. However during that year, Bulgarian and Romanian immigrants were required to hold a residence permit. Consequently, for 2006 I consider those immigrants as non-EU population. Own elaboration based on the Estadística del Padrón Continuo (INE), Asylum Statistics (Eurostat) and the Statistics of foreign residents, Portal de Inmigración del Ministerio de Inclusión, Seguridad Social y Migraciones.

Table 6: Composition by nationality of the irregular immigration in Spain, 2019

Nacionality	Total	Irregulars	Irregularity Rate	% s. Total	% s. Irregulars	% irr. Region
Algeria	66,778	6,539	9.8%	1.9%	1.4%	15.2%
Morocco	864,546	22,858	2.6%	24.6%	4.9%	53.1%
Nigeria	39,280	340	0.9%	1.1%	0.1%	0.8%
Senegal	76,844	7,730	10.1%	2.2%	1.6%	17.9%
Africa	1,191,378	43,083	3.6%	33.8%	9.2%	
Argentina	88,894	19,194	21.6%	2.5%	4.1%	5.3%
Bolivia	92,500	396	0.4%	2.6%	0.1%	0.1%
Colombia	272,596	93,304	34.2%	7.7%	19.9%	25.8%
Ecuador	130,795	.	.	3.7%	.	.
Honduras	121,695	71,064	58.4%	3.5%	15.2%	19.7%
Peru	106,588	30,119	28.3%	3.0%	6.4%	8.3%
Venezuela	188,735	50,449	26.7%	5.4%	10.8%	14.0%
South-Cent Amer.	1,477,201	361,009	24.4%	42.0%	77.0%	
Asia	499,553	11,664	2,3%	14.2%	2.5%	
Ukraine	82,630	12,366	15.0%	2.3%	2.6%	19.3%
Russia	115,023	12,776	11.1%	3.3%	2.7%	20,0%
Non-EU Europe	272,156	63,979	23.5%	7.7%	13.7%	
North America	74,309	11,732	15.8%	2.1%	2.5%	
Oceania	3,827	533	13.9%	0.1%	0.1%	
Unknown	2,802	1256	44.8%	0.1%	0.3%	
Total	3,521,226	468,681	13.3%	100%	100%	

Note: The figures of the non-EU foreign-born population with residence permits are computed at the 31st of December of each year, while the Padrón figures are computed the 1st of January of the following year. That is, in the Table, the number for 2019 refers to the number of non-EU immigrants with a valid residence permit at the end of 2019 and enrolled in the Padrón at the 1st of January of 2020. According to the Padrón register, in January of 2017 the Romania and Bulgaria are considered as EU countries. However during that year, Bulgarian and Romanian immigrants were required to hold a residence permit. Consequently, for 2006 I consider those immigrants as non-EU population. Estimation based on the upper bound estimation scenario. The numbers are negative for Ecuador. Own elaboration based on the Estadística del Padrón Continuo (INE), Asylum Statistics (Eurostat) and the Statistics of foreign residents, Portal de Inmigración del Ministerio de Inclusión, Seguridad Social y Migraciones.

Table 7: Contributions and public benefits, by type of household

	Natives	EU immigrants	Non-EU immigrants	Mixed EU	Mixed non-EU
Contribution					
Direct taxes	10,455	8,258	6,306	13,943	13,219
VAT	2,335	1,709	1,456	2,463	2,500
Total Contribution	12,790	9,968	7,762	16,406	15,719
Benefits					
Family	53	9	21	2	99
Social Assistance	154	120	195	115	64
Housing	23	11	9	10	8
Unemployment	749	637	932	1,123	1,010
Retirement pension	5,059	1,039	460	2,051	2,817
Survival	1,242	123	204	260	465
Sickness	130	111	71	143	121
Disability	640	388	132	938	531
Studies	7	19	13	10	30
Total Direct Benefits	8,058	2,458	2,038	4,652	5,144
Health	4,110	3,232	3,510	4,142	4,003
Education	3,244	3,206	5,250	6,110	5,203
Total Benefits	15,412	8,896	10,798	14,904	14,349
Direct Fiscal Position	2,397	5,800	4,184	9,119	8,075
Adjusted Fiscal Position	-2,622	1,072	-3,036	1,330	1,353

Note: Own elaboration based on the Spanish Statistics on Income and Living Conditions Survey, 2017