UNIVERSITÀ POLITECNICA DELLE MARCHE
Dipartimento di Scienze Economiche e Sociali

Health spending in Italy: the impact of immigrants

Giulia Bettin Agnese Sacchi

QUADERNI DI RICERCA n. 433

ISSN: 2279–9575

Gennaio 2019

Abstract

The welfare impact of immigration is a hot topic especially for countries at the external borders of the European Union. This paper studies how immigrants affect public health expenditure across Italian regions during the period 2003-2015. Identification strategy is based on shift–share instruments, which are also robust to pull factors that might attract immigrants in Italy and to internal migration of natives. We find that a 1 percentage point increase in immigrants over total population leads to a decrease in public health expenditure per capita by about 3.9% (i.e. around 70 euro per capita). This evidence is confirmed when focusing on needy immigrants from low income countries with less developed welfare systems. Among possible channels, we find no support for any crowding out effects from public to private health services by natives due to increasing immigration neither for the effect of entry barriers limiting the immigrants' reliance on public healthcare. Our results are driven by immigrants' demographic structure: foreigners are mostly males and younger workers that call for less health spending, according to a positive selection mechanism.

JEL Class.: F22, H51, H41, I10, J61
Keywords: Keywords: immigration, public health expenditure, demographic structure, positive selection

Indirizzo: Giulia Bettin: Department of Economics and Social Sciences, Università Politecnica delle Marche, P.le Martelli, 8, 60121, Ancona, Italy. E- mail: g.bettin@univpm.it

Agnese Sacchi: Department of Economics and Law, Sapienza University, Via del Castro Laurenziano 9, 00161 Rome, Italy. E-mail: agnese.sacchi@uniroma1.it.

Health spending in Italy: the impact of immigrants

Giulia Bettin *Agnese Sacchi*

1 Introduction

Immigration is a structural phenomenon in Europe and the debate on its socio–economic consequences, especially on the labour market (e.g., D'Amuri et al., 2010; Docquier et al., 2018), has intensified in recent years due to the increasing pressure on countries at the external borders of the European Union (EU). The migratory crisis in the Mediterranean translated also into a growing public perception that immigrants are a fiscal burden in Europe and abuse generous welfare states (Razin and Wahba, 2015; Alesina et al., 2018).

Actually, the related empirical evidence is mixed. Immigrants are more likely to receive welfare benefits than the native population in the United States (Borjas and Hilton, 1996; Borjas, 2011) whereas a substantial dispersion in immigrants' participation in the welfare state is observed across EU countries (Boeri et al., 2002; Boeri, 2010). A negative net effect on welfare systems is not supported by existing studies (Preston, 2014); on the contrary, immigrants often result as net contributors to public finances (Dustmann et al., 2010; Dustmann and Frattini, 2014; OECD, 2013). The effects of immigration on education expenditure and redistribution have been widely analyzed. Speciale (2012) shows that an increase in foreign population in EU-15 countries had a negative effect on public education expenditure in years 1987–1999 due to more heterogeneous societies calling for less redistribution (Alesina et al., 1999). The same happened for public school spending per student in California due to immigration in years 1970–2000 as documented by Coen-Pirani (2011). In a similar fashion, Razin et al. (2002) find that a higher share of (low-educated) migrants led to less generous social transfers rather than more redistribution in European countries in years 1974–1992, while Jofre-Monseny et al. (2016) document that social spending increases less in Spanish municipalities that recorded the largest increases in immigrant density over the period 1998–2006.

Less explored until recent years is the impact of immigrants on healthcare in host countries. Existing studies have mostly dealt with immigrants' access to health services and their utilization. Norredam and Krasnik (2011) point out that migrants' access to health care differs from that of non–migrants, while Antón and Muñoz de Bustillo (2010) find no significant difference in hospital stays and visits to general practitioners between immigrants and natives in Spain. At the same time, however, they show that immigrants have lower access to specialist care services and make more frequent use of emergency rooms. Evidence in this direction has been provided also for Italy, where access to specialist doctors and preventive care is lower among non-EU citizens, while their likelihood to contact emergency services is higher (Devillanova and Frattini, 2016). Finally, Giuntella et al. (2018) choose a different perspective looking at the impact of

immigrants on the UK national health service efficiency. They show that immigration negatively affects outpatient waiting times while having no effect on emergency department and elective care waiting times.

So far, to the best of our knowledge, no specific evidence has been provided on the direct impact of immigration on public health spending in European host countries, with possible implications for their welfare systems and public finances. In order to fill this gap, this paper analyses how immigrants affect public health spending during the period 2003–2015 in Italian regions. Italy is a prominent case for several reasons. Concerning immigration, the share of legal immigrants over total population passed from about 2% at the beginning of 2000s to more than 8% in 2015 (i.e. over 5 million people), denoting an increasing trend of the phenomenon with high variability across regions. In this framework, more than 90% come from countries with strong migration pressure (e.g., Central and Eastern Europe, North Africa, East Asia), which suffer from a large economic divide and offer lower social protection to their citizens.

Concerning health spending, it has become an undisputed regional government responsibility in Italy (Costa-Font and Turati, 2017) and each region is autonomous in its management, which currently absorbs nearly three quarters of the regional budget.[1] To this respect, it is essential performing a NUTS II level of analysis in order to capture significant differences in health spending across regions.

To investigate the causal impact of immigrants on public health spending, endogeneity concerns have to be taken into account. First, according to the "welfare magnet" hypothesis (Borjas, 1999; Razin and Wahba, 2015), immigrants normally locate into areas where welfare benefits – including health – are higher; reverse causality could therefore bias the estimated effect of immigrants on public health expenditure. Second, unobserved pull factors might cause a spurious correlation between the two variables. To address these issues, we adopt an instrumental variable approach that is based on shift–share instruments a la Card (2001), which take into account the role of "migration networks" (Munshi, 2003; McKenzie and Rapoport, 2010) in determining the geographical distribution of migrants from the same origin into destination areas. In particular, to improve the quality of instruments we consider immigration data by country of origin into EU-15 countries other than Italy (Bianchi et al., 2012). In this way, all pull factors linked to the attractiveness of Italian regions are removed and push factors related to the countries of origin better isolated. As a further refinement of the identification strategy, we compute the predicted immigration share not over the actual total population – which may be affected by pull factors as well –, but over the predicted total population according to the shift–share approach (see Bratti and Conti, 2018). In this way, instruments' exogeneity with respect to natives' internal migration is strenghtened.

We find a robust negative relationship between the share of immigrants over total population

[1]Since the constitutional reform in 2001, decentralization also involved the health management sector (Caroppo and Turati, 2007; Ferrario and Zanardi, 2011). In this context, regions have been assigned more responsibilities and are allowed to define local characteristics of the health system (e.g., the structure of the hospital network, the share of private providers, etc.) whereas a small number of policy tasks are left to the central government such as drug price setting, international health as well as the definition of the essential healthcare levels being guaranteed in all regions. This translates into twenty different health systems – one for each different Italian region –, with Emilia-Romagna and Lombardy often quoted as extreme virtuous cases (Bordignon and Turati, 2009).

and public health expenditure. In terms of magnitude, a 1 percentage point increase in the migrant population over total population leads to a decrease in public health expenditure per capita by about 3.9% (i.e. about 70 euro per capita). The negative relationship is confirmed also when: *i)* we focus on specific entry groups, more welfare needy, such as immigrants from low income countries with strong migration pressure; *ii)* we check for any bias in the results due to the presence of refugees and asylum seekers in recent years; *iii)* we take into account the occurance of economic crisis and fiscal consolidation measures affecting aggregate public spending, including the health sector.

In light of these findings, we investigate the mechanisms that might drive the negative relationship between immigration and public health spending. We first rule out any possible crowding out effect from public to private health services by showing that immigrants do not affect natives' private health expenditure. Moreover, we exclude that heterogeneous levels of health system efficiency across Italian regions (Piacenza and Turati, 2014) might determine our results as higher shares of immigrants are associated with lower health spending even when controlling for healthcare efficiency. Additionally, the existence of entry barriers (e.g., language, cultural habits) might also limit the reliance of immigrants on public healthcare and determine the negative effect on health spending in our sample. To explore this channel, we exploit hetereogeneity across Italian regions in terms of the use of cultural mediators. However, no significant evidence emerges on the role of those entry barriers in determining our main findings.

The main driver of our results is the immigrants' demographic structure: the negative effect on public health expenditure is mostly due to the male component and the working age group. Put differently, male and working–age immigrants (i.e. 15-64 years old) call for less health spending. Both results suggest the existence of a positive selection mechanism (Chiswick et al., 2008; Constant et al., 2018) when immigration takes place. Actually, this effect is common to many European destination countries but it is more relevant in Italy rather than, for instance, in Belgium, France and Spain (Moullan and Jusot, 2014).

We finally show that a positive correlation emerges only between immigration and emergency healthcare services such as medical on-call services and emergency doctors. This additional evidence is in line with previous studies showing that, compared to natives, immigrants seek for medical assistance only in serious conditions (Norredam et al., 2004; Antón and Muñoz de Bustillo, 2010; De Luca et al., 2013; Devillanova and Frattini, 2016).

The remainder of the paper is organized as follows. Section 2 provides some background information on immigrants across Italian regions. Section 3 describes the data and presents the identification strategy. Section 4 reports the baseline results and Section 5 provides some robustness checks. Sections 6 and 7 explore and discuss the mechanisms behind the relationship between immigrants and health public spending in Italy. Section 8 briefly concludes.

2 Immigrants in Italy

Immigrants can be defined on the basis of either their country of origin/birth (i.e. foreign-born) or their citizenship/nationality (i.e. foreign nationals). The country of birth criterion would be

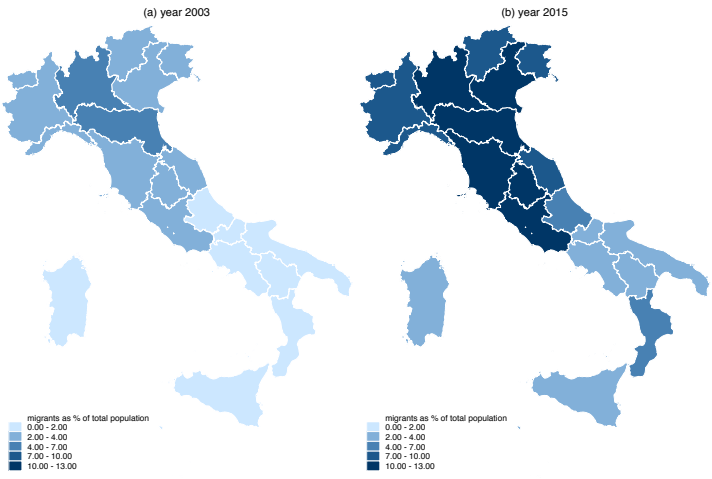
more appropriate in international comparisons as a person's nationality can change over time, and the conditions under which nationality is granted vary widely across destination countries (OECD, 2013). However, there are also cross–country analyses that look at foreign nationals rather than the foreign-born (Boeri, 2010).

We follow the definition of immigrants provided by the Italian National Institute of Statistics (hereafter Istat) as "legally resident foreign population" on the basis of the citizenship/nationality criterion. Thus, we exclude foreign-born individuals that already got Italian citizenship, while we include foreigners born in Italy (i.e. second generations without Italian citizenship). It is worth noticing that in Italy most immigrants keep their own citizenship for a long time due to a complex procedure for naturalization (OECD, 2011). Data collected and made available by Istat can therefore be considered a good proxy for the stock of legal migrant population.

As other Southern European countries, Italy experienced the transition from an emigration to an immigration country quite recently. At the beginning of the 2000s, legal immigrants accounted for less than 3% of total population. A steep upward trend has been observed afterwards; in 2015, immigrants were 8.3% of total population, thus increasing almost three times over a decade In absolute terms, the number of foreigners increased from about 1.5 million in 2003 to more than 5 million in 2015.

Despite such a general trend, the distribution of foreign residents and their recent growth are highly heterogeneous across Italian regions as reported in Figure 1. The share of immigrants over total population is much larger in the North, likely as a consequence of the economic divide between Northern and Southern regions in Italy. In 2003, the incidence was lower than 2% in all Southern regions, while being almost three times larger in Lombardy and Emilia Romagna. In 2015, immigrants accounted for at least 7% of total resident population in Northern and Central regions, while the average share in the South was still less than 4%.

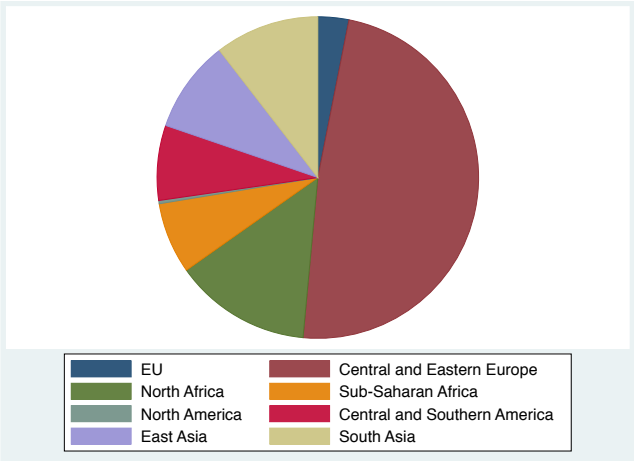
Figure 1: Share of immigrants in the total population by region, 2003-2015



More than 90% of foreign residents come from "countries with strong migration pressure".

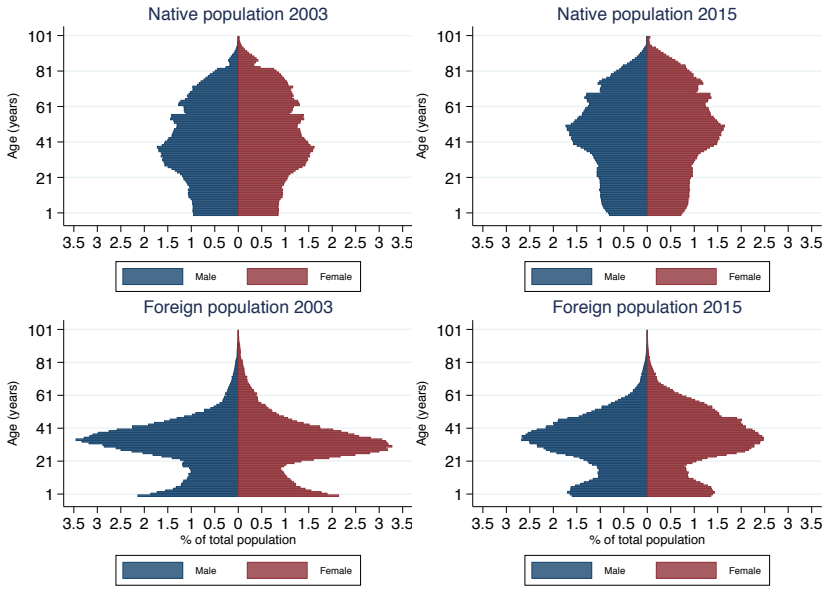
With such a definition, Istat labelled countries of origin in Central and Eastern Europe (including recent EU Member States such as Romania), Africa, Latin America and Asia (with the esclusion of Israel and Japan). Eastern Europe is the area of origin of nearly half of the immigrants (see Figure 2). Romanians and Albanians are the two major immigrant communities in Italy since mid 2000s, followed by Moroccans and Chinese.

Figure 2: Immigrants by area of origin,2015



On average, females accounted for more than 52% of immigrants in 2015, while representing 51% of the Italian population. Striking differences emerge when comparing the age structure of immigrants with respect to natives as shown in Figure 3.

Figure 3: Gender and age structure of immigrant and native population, 2015



On average, the foreign population is younger with the working–age group being widely over–

represented compared to the native population. The highest share among immigrants is recorded around 35 years, both among males and females (2.5-2.61% of the total population). For the native population, instead, the highest share corresponds to 50 years, both among females and among males (1.6%-1.7%). The bottom of the pyramid is wider due to higher fertility rates compared to Italian women, and their dependency ratio is half than the natives' one (29.2% and 59.6%, respectively).

3 The empirical analysis

3.1 Model and variables

The baseline model we estimated is the following:

$$HEXP_{i,t} = \alpha + \beta IMMIG_{i,t} + \gamma X_{i,t} + \mu_i + \tau_t + \epsilon_{i,t} \quad (1)$$

$HEXP_{i,t}$ is public health expenditure per capita in region i in year t. $IMMIG_{i,t}$ is our variable of interest and represents legally resident immigrants in region i as a share of total resident population at the beginning of year t. $X_{i,t}$ is a set of control variables discussed below. Finally, μ_i and τ_t capture region and time fixed effects, respectively; $\epsilon_{i,t}$ is the error term. The period of analysis is 2003–2015.

Our dependent variable $HEXP_{i,t}$ is (the log) of public health expenditure per capita. This definition includes services provided directly, pharmaceutical assistance, general medical assistance, medical-specialist assistance, nursing homes, rehabilitative, integrative assistance and other services. In Italy, most expenditure in healthcare is mediated and provided by the public sector and it allows for patients' mobility: costs are covered independently of the region that is actually providing the service. This means that health spending in each region also reflects how many patients it might attract from other parts of the country, including immigrants.[2] Accordingly, the presence of immigrants might translate into an increased demand – and possible overcrowding – of health assistance in some regions, which in turn might induce natives' mobility towards more efficient services. In order to address this issue, our dependent variable is adjusted for inter-regional mobility of patients and refers to health expenditure attributable to residents only.[3]

Looking at aggregate data, public health expenditure per capita in Italy increased, on average, from 1,471 euro in 2003 to 1,874 euro in 2015. In recent years some reductions in public spending have been undertaken through the implementation of fiscal adjustment measures, also affecting the healthcare sector (Vicarelli and Pavolini, 2015; Carney, 2017). Comparing to regional data, it emerges that higher levels of spending remain in some Central and Northern regions over the whole period.

[2] In general, we observe movements of patients resident in the South to the Centre and North for medical care.

[3] The correction is applied by the Istat through a matrix of correction coefficients, calculated on the basis of the expenditure flows of inter-regional mobility recorded by the Ministry of Health. Actually, we run estimations using also the unadjusted measure for public health spending – i.e. addressed to resident and non-resident patients – and results are confirmed.

The set of control variables in $\mathbf{X_{i,t}}$ refers to regional characteristics following the empirical literature on the standard determinants of health spending in Italy (Giannoni and Hitiris, 2002; Franzini and Giannoni, 2010; Francese and Romanelli, 2011) and in other advanced economies (Gerdtham et al., 2000; Herwartz and Theilen, 2003; Baltagi and Moscone, 2010; Martin et al., 2011; Prieto and Lago-Peñas, 2012; Herrero-Alcalde and Tránchez-Martín, 2017). It basically includes socio-economic and demographic variables capturing the demand factors for healthcare services, including the labour market conditions and the education level. In detail, we add: GDP per capita (in log) as a measure for regional development ($GDPpc$); the logarithm of resident population (Pop)[4] to capture the demand size; the dependency ratio, calculated as the share of population below 15 and above 65 years over the working age population ($Depratio$)[5]; the percentage of population with tertiary education ($Educ$); the female life (in years) expectancy ($Life\_exp$) as a proxy for the health status of the population; the female employment rate ($Empl\_rate$). We also control for the revenues collected through regional taxes as a share of regional GDP ($Taxes$) and include a dummy equal to 1 if the region runs budget deficits in the health sector in that year, then requiring the central government's intervention to restore regional public finances ($Deficit$). The latter controls help to capture specific characteristics of the Italian health system concerning the financing mechanism.[6].

Another element possibly affecting decentralized health expenditure are government's preferences for public spending. Indeed, left political parties are normally more prone to redistributive and welfare spending programs – including health, education, and social assistance – than the right ones. Hence, one could expect a different impact of the incumbent regional government's ideology on health services provision (Potrafke, 2010). We do not include this control in Equation 1 as it is almost time–invariant within each region over the whole period and thus already captured by regional fixed–effects.[7]

A detailed definition of variables, with data sources and summary statistics, is provided in Table 1.

3.2 Identification issues

Our aim is to identify the causal impact of immigrants on public health expenditure, that is getting an unbiased estimation of the β coefficient in Equation 1. However, endogeneity concerns are likely to arise in such a context. Omitted unobservable factors might drive both immigrants

[4]We use the native population in the baseline specifications. Alternatively, we also considered the logarithm of total resident population (i.e. including immigrants), with no appreciable differences in estimation results. The pairwise correlation between the two variables is very high (about 0.90) and statistically significant at 1% level.

[5]We included also the regional fertility rate expressed as average number of births per woman, which turned out to be sistematically insignificant and did not affect the size and the significance of other coefficients.

[6]Indeed, taxes such as the regional income tax surcharge (*'Addizionale Regionale Irpef'*) and the regional tax on productive activities (*'Irap'*), which are extremely sizeable in the regional budget, are used to finance health spending locally provided (Lagravinese et al., 2018). Moreover, the central government can define automatic procedures for the appointment of special administrators and impose the maximum tax rate for both those taxes in any region in the case of health deficits as occured, for instance, in Lazio, Liguria, Campania, Abruzzi and Molise in various years. Finally, we run regressions also using other indirect taxes and social contributions collected at the regional level and results are confirmed.

[7]For instance, in Marche, Tuscany and Emilia-Romagna, among others, there are left-wing parties from 2003 to 2015, while in Lombardy and Veneto right-wing ones.

distribution across Italian regions and differences in public health expenditure. Moreover, the generosity of the welfare state might have a key role in attracting larger flows of international immigrants (Razin and Wahba, 2015), thus generating a reverse causality bias. A FE estimator is able to control for unobserved heterogeneity across regions that is fixed over time. In addition, we address endogeneity issues by relying on an instrumental variable approach based on different sets of instruments.

The common ground of our strategy is the role of migration networks in explaining that newcomers tend to locate where previuos immigrants from the same country or area of origin already live (Munshi, 2003; McKenzie and Rapoport, 2010).

We first consider the second and third lag of $IMMIG_{i,t}$ as instruments. $IMMIG_{i,t-2}$ and $IMMIG_{i,t-3}$ are good instruments as along as they are good predictors of $IMMIG_{i,t}$ (Piopiunik and Ruhose, 2017) and at the same time they do not exert any additional independent effect on public health expenditure at time t.

Alternatively, we follow the approach that was pioneered by Card (2001) and has become rather popular in the migration literature by building a shift–share instrument which exploits the past composition of the immigrant population by nationality across Italian regions. [8]

Our instrument for region i at time t is computed as

$$\widehat{IMMIG}_{i,t} = (\sum_j \omega^j_{i,1994} IMMIG^j_t)/\widehat{POP_{i,t}}; \qquad \omega^j_{i,1994} = \frac{IMMIG^j_{i,1994}}{IMMIG^j_{1994}} \tag{2}$$

where $IMMIG^j_t$ represents the overall stock of immigrants from country j in year t and $\omega^j_{i,1994}$ is the share of immigrants from country j living in region i in 1994, that is a decade before the beginning of our sample period allowing to avoid potential correlation between the instrument and the error term (Goldsmith-Pinkham et al., 2018). $\widehat{POP_{i,t}}$ is the predicted native population in year t computed as the share of region i population over national population according to the 1994 distribution (Bratti and Conti, 2018). As it does not include the stock of immigrants, it avoids the denominator of the instrument being endogenous. Moreover, it is not affected by the internal migration of natives possibly due to the arrival of immigrants.

Starting from the shift–share approach, we also follow Bianchi et al. (2012) by refining this IV strategy. In detail, we remove all local pull factors related to the attractiveness of Italian regions (e.g., welfare benefits, low crime, development, quality of life) or elements simply reflecting regional pro- or anti-immigration policies that might affect the immigrants' location decisions (Bracco et al., 2018) and we consider only immigration to destination countries other than Italy. This allows to focus on migration push factors only, which are related to the countries of origin. Thus, the third alternative instrument we implemented is the following:

$$\widehat{IMMIG}_{i,t} = (\sum_j \omega^j_{i,1994} IMMIG^{j,EU15_{(-IT)}}_t)/\widehat{POP_{i,t}} \tag{3}$$

[8] A similar approach is also adopted by Moreno-Galbis and Tritah (2016) who employ historical settlement patterns across host countries and occupations by origin country in order to identify the impact of immigrants on natives' employment rate. Among the others, Sá (2015) and Giuntella et al. (2018) use the same shift–share instrument approach to impute the supply-driven increase in immigrants in each local authority.

where $\omega^{j}_{i,1994}$ is defined as in Equation 2 while $IMMIG^{j}_{t}$ is replaced by $IMMIG^{j,EU15_{(-IT)}}_{t}$, that is the yearly stock of migrants from country j residing in all EU–15 countries other than Italy using data from the OECD International Migration database.[9]. The EU–15 is the most reasonable area to capture immigrants' composition and strong network effects (Speciale, 2012) suitable also for the Italian case. In fact, our results remain stable if we consider other OECD countries beyond EU–15 to build the instrument in Equation 3.

In both the shift–share strategies adopted here, the composition by nationality of the migrant population in 1994 is used to build a prediction of actual immigrant stocks at the regional level, which can be reasonably thought as exogenous with respect to public health expenditure: immigrant stocks in 1994 have no direct effect on current regional health expenditure, apart from their influence on current migration inflows.

In the 1990s, the size of the foreign population in Italy was much lower compared to our sample period. According to 1994 data immigrants were less than 700 thousands but figures sharply rose afterwards, up to 1.5 million by 2003, our first sampling year. In 2015, more than 5 million immigrant were legally resident in the country. It is unlikely that their initial distribution in 1994, which predates this substantial increase, could have any impact on the dynamics of health spending ten years later.

A further element to be taken into account is the fact that each nationality has its own geographical distribution across Italian districts and clustering patterns are therefore highly heterogeneous over the countries' of origin spectrum. In this sense, regions with a similar share of immigrants over total resident population might display very different values for our instrument due to the different mix of immigrants' nationalities.

Finally, the spectrum of countries of origins changed substantially in the last decades (Bratti and Conti, 2018), due to factors that are mostly related to push factors (Bianchi et al., 2012) and therefore not correlated with economic conditions and other pull factors at the Italian regional level, such as health public spending. Immigrants from Eastern Europe were less than 20% of the total migrant population in 1994, and accounted for 47% of it in 2015 while the incidence of immigrants from Northern Africa and the Middle East decreased from 22% to 13% over the same period. In terms of nationalities, apart from Morocco the ranking of the five most represented nationalities changed entirely between 1995 (Morocco, US, Jugoslavia (Serbia and Montenegro), Philippines and Tunisia) and 2015 (Romania, Albania, Morocco, China, Ukraine).

Some recent empirical research disputes the validity of shift–share instruments (Jaeger et al., 2018). The main idea is that such instruments are vulnerable to identification issues in the presence of dynamic adjustments to immigration supply shocks in the labor market, whose outcomes have been extensively analysed in the literature (Borjas, 2014; Card and Peri, 2016). This is especially true when the mix of immigrants' countries of origin is highly persistent over time, such as for the United States over the last decades (Jaeger et al., 2018).[10] In such a

[9]We follow the nationality criterion. Alternatively, OECD collects also the stock of foreign–born population by country of birth. Results remain substantially unchanged by adopting this alternative criterion in building our instrument.

[10]In terms of dynamic adjustments to immigration supply shocks, Monras et al. (2015) find a rapid response of the US labor market to low-skilled immigrants from Mexico after the 1995 peso crisis.

context, the estimates of immigrants' impact on natives' wages could be biased.

In our case, those shorthcomings are less relevant. Our aim is to analyse the effect of immigration on health spending and labour market adjustments may not be a relevant source of bias in such context.[11] Most importantly, unlike the US scenario, migration inflows to Europe, and Italy, have been more unstable and heterogeneous over time. Since 1990 Europe experienced an increase in immigration that can be attributed partly to flows from Northern Africa and partly to intra–European migration, following the collapse of communist regimes and the opening of Eastern European countries. East–West European migration was pushed further by the 1990s Balkan wars and by the 2004/2007 EU Enlargement. The Arab Sping in 2011 was followed by an upswing in the number of migrants that crossed the Mediterranean to enter the EU, not only due to the Syrian civil war but also to other conflicts, climate change consequences and extreme poverty in African countries. As discussed above, the increase in foreign residents in Italy was substantial in the last decades and the countries of origin changed over time as well as the reasons for migrating to Italy (e.g., work purposes in the 1990s; family reunification afterwards).

In short, the high degree of concentration and persistence in immigrants' countries of origin and locations, which could undermine shift–share instruments' validity in the US case (Jaeger et al., 2018), does not appear as a serious concern in our case.[12]

4 Baseline results

Table 2 shows results from the baseline specification reported in Equation 1. We use different strategies, starting from the FE estimator in columns (1)-(2). Then, we move to more reliable estimates using different instrumental variable approaches (columns (3)-(8)) following, respectively, Piopiunik and Ruhose (2017), Card (2001) and Bianchi et al. (2012). For each strategy, we present both the parsimonious model with the variable $IMMIG$ only (together with region and time fixed-effects) and the most comprehensive specification, which includes also all the control variables, beyond region and time fixed-effects.

We find a persistent and robust effect of $IMMIG$ on $HEXP$. The coefficients on $IMMIG$ is negative and statistically significant across specifications and identification strategies.

The soundness of the IV estimates is confirmed by the first–stage regressions. Indeed, the F-statistic, which is normally used to test the hypothesis that the coefficient of the excluded instrument is equal to zero in the first–stage, is always above the threshold of 10 (see the bottom of Table 2) as suggested by the literature on weak instruments (Staiger and Stock, 1997; Stock and Yogo, 2002; Stock et al., 2002). Hence, we reject the hypothesis of weak instruments for

[11] As explained in Section 3.1, we do control for annual female employment rate in our baseline specification. Alternatively, we also tried to include the total (female plus male) employment rate without any appreciable difference in our results.

[12] For the sake of completeness, we also implemented the methodology proposed by Jaeger et al. (2018), including a lagged endogenous regressor instrumented with a lagged shift–share instrument to address possibile identification problems. However, it is worth noticing that our time span could be inadequate to get unbiased results when adopting this approach, compared to the estimates in Jaeger et al. (2018) that have been run on ten–years data from the 1970s to the 2000s. Our main results (not reported in the paper but available upon requests) are basically confirmed.

our IV estimates. Moreover, looking at the Kleibergen-Paap rk LM statistic we can also reject the null hypothesis of underidentification at the 1% level of significance.[13]

In terms of magnitude, the IV coefficients suggest that a 1 percentage point increase in migrants over total population leads to a decrease in public health expenditure per capita between 1.2% (column (3)) and 3.9% (column (8)). This corresponds, on average, to a decrease of about 22 and 70 euro per capita.

Different concurrent factors are likely to contribute to this result. First, congestion due to the increased presence of immigrants might translate into a crowding out effect from public (free) to private (paid) healthcare services by natives. Second, the lower impact on health spending might be driven by higher efficiency of healthcare services in some regions that attract larger shares of immigrants in line with a positive scale effect. Third, the immigrant population might differ substantially from the native one in terms of gender composition and age structure, as shown in Section 2, thus determining a lower demand for healthcare services. In this fashion, the recent empirical literature provides evidence of a "healthy immigrant effect" (Kennedy et al., 2006; Chiswick et al., 2008; Constant et al., 2018) according to which migrants are, on average, healthier compared to the native–born population at the moment of arrival.

In addition, immigrants often make a limited use of healthcare service compared to natives, by relying mostly on emergency services and less on screening and preventive practices (De Luca et al., 2013; Devillanova and Frattini, 2016). This happens either because of language barriers that might prevent communication with health practitioners, or because of the lack of knowledge about the host country's healthcare system, or because of cultural differences and habits in approaching health services (e.g. the use of emergency care only instead of preventive care).

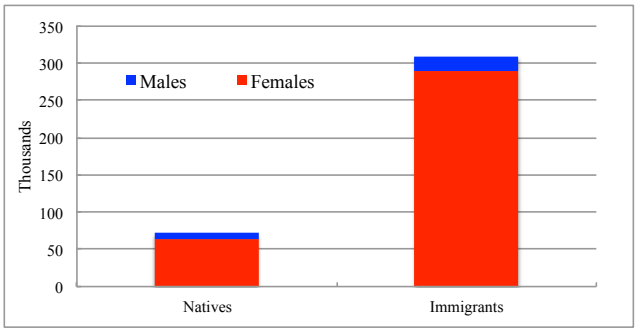
Finally, a negative impact of immigration on health spending may be also partly ascribed to the role of female migrants in the elderly care sector, which largely substitute for publicly provided healthcare services in Southern European countries (King and Zontini, 2000). According to administrative data (Italian Social Security Institute – 'Osservatorio sul lavoro domestico'), in 2015 out of the 380 thousands workers employed as caregivers by Italian households, almost 76% were female immigrants (Figure 4). We try to better explore those channels in Section 6, conditional on data availability.

Turning attention to the control variables, some regularities emerge across specifications. *Ceteris paribus*, health expenditure per capita decreases as Pop increases. The positive and statistically significant coefficients on $Depratio$ confirms the importance of the age structure for the demand of healthcare, which is normally higher for younger and older age cohorts (Meier and Werding, 2010).[14] Likewise, public health expenditure per capita is positively correlated with female life expectancy ($Life\_exp$). On the other hand, the female employment rate, $Empl\_rate$, turns out to have no significant effects suggesting that the demand for healthcare is not affected

[13] We do not report the Hansen J statistic of overidentification test of all instruments for columns (5)–(8) as in those regressions the number of instruments equals the number of endogenous variable, so the equation is exactly identified. As argued by Murray (2006), having at least as many instruments as troublesome variables is only a necessary condition for identification but, in most applications, the condition proves sufficient.

[14] In addition, results are confirmed if we consider $Depratio$ based on native population only instead of the index computed for the total resident population. The pairwise correlation between the two variables is more than 0.90 and statistically significant at 1% level.

Figure 4: Caregivers in Italy by nationality and gender, 2015



by more intense female labour force participation and, implicitly, lower provision of informal care inside the household. This result sounds quite consistent with findings by Franzini and Giannoni (2010) on individual determinants of self-rated health in Italy according to which individuals who are working, either men or women, reported better health than those who are not working and might therefore have lower needs of healthcare services.

The coefficient on GDP per capita, $GDPpc$, is statistically significant and negative, indicating that public health expenditure per capita decreases with regional economic development: richer regions are usually more efficient in providing health services. Similarly, Crivelli et al. (2006) find a negative income elasticity of demand for healthcare services in Swiss cantons over years 1996–2002 probably due to the high degree of territorial decentralization of healthcare in Switzerland. Along the same line, Herrero-Alcalde and Tránchez-Martín (2017) show that the growth of social spending is slower than the growth rate of regional economic activity in Spain, reflecting that some regions could be close to the so-called "saturation point" of social protection.

The dummy $Deficit$ has a negative and significant coefficient across specifications as expected. Indeed, if the regional government is running a deficit in the health sector, automatic procedures and repayment plans defined by the central government are implemented to reduce health spending and consolidate the regional budgets. The negative sign on $Taxes$ is consistent with the fiscal federalism literature, according to which when using revenue from own local taxes the size of local spending is lower than when financing it with intergovernmental transfers (Liberati and Sacchi, 2013). Concerning the health sector, regions might have the incentive to set their own taxes at the minimum level if they believe that the central government will cover the remaining costs – via intergovernmental grants – in order to guarantee the provision of essential healthcare services (Francese and Romanelli, 2011). Moreover, given the economic and demographic differences across Italian regions, local taxes might not be sufficient to finance the health system (Lagravinese et al., 2018) and equalization funds (based on VAT revenue-sharing) are required to compensate for different regional fiscal capacities (Cavalieri and Ferrante, 2016).

5 Robustness checks

5.1 Irregular immigrants, refugees and asylum seekers

A first concern about the estimated relationship is the increased presence of irregular immigrants, who are not captured by our variable of interest and might exert additional pressure on public health expenditure compared to the legal resident foreign population. We try to take into account this potential bias by adding among the controls in Equation 1 a proxy for the irregular employment rate in each region measured by the share of illegal work units – which can include illegal immigrants – on total work units. Results are confirmed: this additional regressor is barely statistically significant and, more importantly, its inclusion does not affect the magnitude and statistical significance of our coefficient of interest, $IMMIG$ (Table 3, panel A).[15]

A further source of bias might derive from the presence of refugees and asylum seekers that became noticeably higher in recent years due to a dramatic increase in sea arrivals via the Mediterranean central route since 2014. As documented by Edo et al. (2018), in 2015 over 1.3 million asylum claims were registered in the EU, with the vast majority of refugees coming from the Middle East. Mediterranean countries like Greece and Italy were heavily affected by the influx of refugees. In the first phase of such emergency, asylum seekers were mainly hosted either in the First Aid and Reception Centres (CPSA) or governmental centres for accommodation of asylum seekers (CARA/CDA) in Southern Italy. Thanks to the SPRAR project (Protection System for Refugees and Asylum Seekers), asylum seekers were subsequently redistributed across Italian regions.

In order to focus on the impact of structural (legal) immigration and to avoid any bias in health spending related to the increased presence of asylum seekers, we re-estimate Equation 1 by excluding, one at a time: *i)* only year 2015 (Table 3, panel B); *ii)* both years 2014 and 2015 (Table 3, panel C); *iii)* Sicily, Puglia, Calabria (Table 3, panel D). In all cases, the $IMMIG$ variable has negative and significant coefficients which are very similar in size to those reported in Table 2.

5.2 Immigrants from countries with strong migration pressure

In Italy, more than 90% of immigrants come from countries with strong migration pressure, which is a category used by Istat that include Eastern European and less developed countries (see Section 2). According to the "welfare magnet" hypothesis (Borjas, 1999; Razin and Wahba, 2015), immigrants coming from such countries might choose Italy as their destination due to the welfare benefits provided to its resident population, such as universal access to healthcare services, and this might ultimately translate into an increasing burden for public spending.

To test whether our baseline results could be affected by this more welfare needy entry group, we provide additional estimates by adopting a different definition of the key explanatory

[15] It is worth noting that even in the case of a significant coefficient on illegal employment, we could not conclude that the effect is driven by illegal migrants as the illegal work units considered in the index include both the native and the foreign population and refer also to occasional activities carried out by people who declare themselves officially unemployed as students, housewives or pensioners.

variable. We substitute $IMMIG$ with $IMMIG\_SMP$, that includes legally resident immigrants from Central and Eastern Europe, Africa, Latin America and Asia (excluding Israel and Japan) as a share of total population in each region.

Results are reported in Table 4. The coefficient on $IMMIG\_SMP$ remains negative and significant across all specifications. Moreover, the coefficients are very similar to Table 2 also in terms of magnitude.[16] Hence, the negative relationship between foreign population and public health expenditure holds even when focusing on immigrants from less developed countries where welfare protection is arguably lower with respect to Italy.

5.3 Economic crisis and fiscal adjustments

Another potential concern is that our results may be driven by the period of adverse economic conditions after the Great Recession started in 2008 and the subsequent fiscal consolidation programme aimed at reducing budget deficits and public spending by the Italian government. In this framework, the National Health System (NHS) spending decreased in 2013 (Carney, 2017) and all regions, being responsible of health budgetary aspects, subsequently cut their health spending following such adjustment (Vicarelli and Pavolini, 2015) as documented in Section 3. Hence, our negative relationship between immigrants and public health expenditure could be affected by such events.

To deal with this issue, we re-run estimations in Equation 1 by adding a dummy variable equal to 1 for years between 2009 and 2013 (both included) as a proxy for the economic crisis among the controls. In a similar fashion, we replicate estimations in Equation 1 focusing only on the period before the fiscal adjustment packages designed during the Monti's government in 2011 by restricting the sample up to 2010 (included). The main results (available upon request) remain unchanged and the negative relationship between $IMMIG$ and $HEXP$ is confirmed across specifications.

5.4 Public health expenditure over GDP

As a final robustness check, we re-estimated Equation 1 considering public health expenditure over GDP as dependent variable ($HEXP\_GDP$). Results are reported in Table 5 and are consistent with those in Table 2. In detail, the coefficient on $IMMIG$ is negative and statistically significant across specifications, confirming that an increase in the share of immigrants over total population decreases the share of public health expenditure over GDP. In terms of magnitude, our estimates suggest that an increase of migrants over total population by 1% causes a reduction in public health expenditures between 0.227% (column (3)) and 0.443% of GDP (column (8)), everything else equal. Therefore, the effect estimated employing health spending as a percentage of GDP can be considered quantitatively consistent with the effect obtained by using public health expenditure per capita.

[16] As a matter of fact, the pairwise correlation between $IMMIG$ and $IMMIG\_SMP$ is about 0.95 and statistically significant at 1% level.

6 What are the mechanisms behind?

This section aims to deeply investigate the possible mechanisms, anticipated in Section 4, behind the relationship of interest, conditional on data availability.

6.1 Crowding–out effects and health sector efficiency

We start by checking whether the negative effect of $IMMIG$ on $HEXP$ might be due to a crowding out from public to private health services as a consequence of increasing immigration (Giuntella et al., 2018). To this purpose, we re–estimated Equation 1 considering natives' private health expenditure per capita as dependent variable. Results (availabe upon requests) indicate that the increase in the share of foreign population in Italy did not raise households' private health expenditure and exclude therefore that regional spending on the health function decreases due to a crowding out effect towards the use of public healthcare services by natives. This result sounds quite familiar to that by Betts and Fairlie (2003), even though they focus on the education sector in the US. Indeed, using 1980 and 1990 microdata, they find no evidence of "native flight" into private primary schools from public ones in response to inflows of immigrant children.[17]

The second aspect we explore is whether heterogeneous efficiency levels of the public health system across Italian regions might affect our results. For instance, some regions could be able to cut down the inefficiencies in healthcare services and exploit economies of scale, regardless of the immigration phenomenon. In this respect, we use the inefficiency indicator proposed by Piacenza and Turati (2014) for the 15 Ordinary Statute Regions. The index is built by separating efficient health spending from inefficiencies after estimating an input requirement frontier.[18] Based on this index, we classify regions into two groups according to their level of inefficiency being above or below the overall mean and include the related time–invariant dummy variable among the controls by using the Hausman and Taylor (1981) estimator.[19] The negative relationship between $IMMIG$ and $HEXP$ is confirmed: a larger share of immigrants is associated with lower public health spending per capita, even when controlling for the regional level of (in)efficiency.

6.2 Demographic structure of immigrant population

As documented in Section 2, the age structure of foreign residents is different with respect to natives, with a larger share of young individuals. Given this fact, the negative impact on health spending might be related to the specific composition of the immigrant population in our case.

[17] Actually, they find that some native students switch to private schools in the case of secondary education when immigrants arrive in public high schools. Immigrant and native students are in closer contact in high school compared to primary school where pupils can be also channelled into special classes based on their Limited English Proficiency (LEP).

[18] Inefficiency in public health spending is assessed using several proxies for health status of regional populations (e.g., the average life expectancy at different ages and the infant mortality rate).

[19] Regions with the inefficiency index higher than the overall mean are: Abruzzi, Molise, Campania, Apulia, Basilicata and Calabria.

Broadly speaking, empirical studies usually show that women use more healthcare services than men. At the same time, population ageing have proved to be a major determinant of healthcare expenditure (Storesletten, 2003; Martin et al., 2011).

In this section, we investigate whether the negative impact of immigrants on health spending would become heterogeneous once we account for their demographic structure. To explore this channel, we focus on immigrants' composition, all other things being equal: *i)* by gender; *ii)* by age, taking into account child, young and old migrants. In both case, we re-estimated Equation 1 by adding among regressors, one at a time, the share of male migrants over total migrant population ($MALE\_share$) and the share of working–age migrants (i.e. 15–64 years old) over total migrant population ($WORKAGE\_share$).

The IV strategy is the same presented in Section 3.2. With an additional (possibly) endogenous variable, we defined a second instrument according to the different approaches followed in each column of previous tables. Results are reported in Tables 6 and 7. In columns (3)–(4), we used the second and third lag of $MALE\_share$ and $WORKAGE\_share$, respectively. In columns (5)–(6), the second instrument was built by applying Equation 2 to either male immigrants or to the working age population only. The strategy put forward in columns (7)–(8) was implemented only to instrument the gender composition since no detailed information on the stock of migrants by age and country of origin in the EU–15 was available for the whole period.

Looking at the tables, we observe a negative and significant coefficient on, respectively, $MALE\_share$ and $WORKAGE\_share$, which is also robust across specifications. Female immigrants may have stronger needs of healthcare assistance compared to their male counterparts due to child birth and induce abortion and because of higher fertility rates their use of healthcare services may also be larger compared to native women.

At the same time, almost 80% of immigrants in Italy belong to the working–age group, confirming the prevalence of active population over the dependent counterpart. Hence, immigrants are usually underrepresented among the elderly, where health expenditures tend to be highest (Hagist et al., 2009). In addition, the average length of stay of the migrant population is supposed to be lower compared to other countries with a longer tradition as destination countries. This implies that the "healthy migrant effect" (Kennedy et al., 2006; Fennelly, 2007; Chiswick et al., 2008; Constant et al., 2018) might still be at work and the process of convergence to the natives' health status is not yet evident in Italy. As a matter of fact, evidence provided on the heterogeneity of such effect across European countries showed that in Italy immigrants reported a better health status compared to natives, after controlling for their socio–economic characteristics (Moullan and Jusot, 2014).

Overall, we can conclude that the negative effect of immigrants on public health spending is driven by the male component and the working age group.

6.3 Entry barriers

A further question arising from our baseline results is whether different cultural habits and, mostly, entry barriers (e.g., language) might limit immigrants' reliance on healthcare services

and, hence, determine the negative effect on health spending in our sample. Previous evidence has been provided on the difficulties by female and undocumented migrants in accessing specific health services, such as preventive care (McCormack et al., 2008; Wolff et al., 2008; Rechel et al., 2013).

In order to explore this channel, we tried to exploit hetereogeneity across Italian regions in terms of the existence of cultural mediators to favour social, cultural and economic integration. Based on regional legislation and official documents, we built a dummy variable equals to 1 if a region allows for the presence of those cultural mediators to be used for specific public functions such as social assistance and health. Accordingly, we included this new dummy in our baseline specification for the entire sample by means of the Hausman and Taylor (1981) estimator. If the mechanism is at work, one might expect that the negative coefficient of $IMMIG$ might become either positive or null when the dummy is equal to 1. The main results (not reported in the paper but available on request) remain unchanged.[20]

Hence, the negative impact of immigrants on health spending would not be conditional on the lack of regional services promoting integration policies aimed at removing entry barriers (mostly language) that might prevent immigrants' access to healthcare services.

7 Shifts in the health sector supply

Thus far, we focused on the effects of immigration on the demand side of health spending finding a negative impact. Such lower level of health expenditure based on demand factors might also be related to a lower supply of healthcare services (Giuntella et al., 2018) such as the number of healthcare personnel (e.g., doctors and nurses).

To explore this possibility, we start by analyzing how immigrants affect the supply of health services by focusing on the proportion of general practitioners in the population as a dependent variable. According to the Italian national legislation, a full-time general practitioner should attend to a maximum number of 1,500 patients. We use the most parsimonious model (i.e. without controls) as in Giuntella et al. (2018)[21] and show results in Table 8.[22] Consistently with previous outcomes, we find a significant and negative relationship between immigrants ($IMMIG$) and the share of general practitioners over population in columns (1) and (2).

However, when we consider the share of general practitioners with more than 1,500 patients (columns (3)-(4)) and the medical on-call services and the emergency doctors (columns (5)-(6)) as proxies for health services' supply, the picture becomes slightly different. Indeed, the $IMMIG$ variable has positive and statistically significant coefficients across those specifications.

[20] Alternatively, we splitted the whole sample into two sub-samples: the former includes regions that employ the cultural mediator, while the latter without this professional figure. When re-running regression of Equation 1 for each sub-sample, we find that the coefficients on $IMMIG$ are significant and negative in both sub-samples and very similar in magnitude. Even in this case, we rule out the effect of linguistic entry barriers to explain our results.

[21] Indeed, our baseline model with controls refers to the standard determinants of health spending based on the demand factors and could be inappropriate to explain the supply of health services.

[22] We replicated regressions using different techniques but, for the sake of space, we report only the IV approach based on Card (2001) and Bianchi et al. (2012) strategies.

Intuitively, this result is not so surprising and it is consistent with evidence provided in the first two columns. Immigrants do not usually consult general practitioners and make a limited use of ordinary medical examinations, prevention screenings and early detection programs, as discussed in Section 4.[23] They are likely to call for medical assistance only in the case of serious conditions and diseases. This attitude might explain the positive sign on $IMMIG$ when health supply is proxied by emergency services such as medical on-call services and emergency doctors. Likewise, recently arrived immigrants, that register for the NHS for the first time, might have a direct (positive) impact on the share of general practitioners exceeding the 1,500 patients threshold as proved by our results.

8 Concluding remarks

"Much of the developed world is now increasingly composed of nations of immigrants" (Borjas, 2014). Starting from this stylized fact, one of the major concerns put forward by public opinion is that immigrants could steal natives' jobs, reduce their wages and negatively contribute to public finances. In this context, it becomes crucial to study the economic effects of immigration in host countries in order to debunk false myths whenever necessary and promote an evidence–based objective approach.

Compared to the huge literature on the labour market impact of immigration, studies looking at the relationship between immigration and welfare systems are more recent – basically due to the lack of reliable data –, especially for European countries where this topic goes hand-in-hand with the challenges posed by demographic ageing more than in the US (Borjas and Hilton, 1996; Boeri et al., 2002; Fehr et al., 2004; Carone et al., 2005; Shelton, 2008).

Based on our evidence, we can assert that no detrimental effects of immigration on public health spending emerge across Italian regions over the last decade. These findings are mainly explained by the fact that immigrants in Italy mostly belong to the working–age group, and their demand for healthcare services is lower compared to ageing natives. Accordingly, they could also alleviate the fiscal burden induced by population ageing in Italy as well as in other advanced economies (Razin and Sadka, 1999; Storesletten, 2000; Chojnicki and Ragot, 2016; Edo et al., 2018).

Since our study focuses, however, on a relatively short time period, future research should be devoted to analyze the long–run effects of structural immigration on the demand for health services as well as for other social services. Indeed, even though immigrants are often healthier compared with the native population at their arrival in the host country, available data suggest that they tend to be more vulnerable to certain sickness (Rechel et al., 2013). Moreover, their health status could deteriorate quickly over time due to a negative acculturation process encompassing the adoption of risky behaviours (e.g., alcohol consumption, smoking, sedentary life) and due to their exposure at risk factors such as poverty, material deprivation, employment in low–quality jobs. In this way, their health status tends to converge to the natives' one or

[23] Due to different cultural backgrounds and to the absence of universal health coverage in several countries of origin, immigrants are likely to resort to traditional remedies such as herbal treatments even in case of sickness.

become even worse (Jasso et al., 2004; Dustmann et al., 2015; Constant, 2017), with possibly negative outcomes in terms of aggregate public spending.

Given the non–negligible economic contribution of immigration in advanced economies (Borjas, 1995; Battisti et al., 2018), migrant-specific health policies should be required (e.g., training workers, adapting organizational culture, providing information on health problems and services), in order to adapt existing health systems to increasingly diverse populations, especially in European countries (Mladovsky et al., 2012).

Acknowledgements

We would like to thank participants at the: Economic Research Seminar at the University of Leipzig; 4^{th} Workshop on the Economics of Migration in Nuremberg; XXX Annual Conference of the Italian Society of Public Economics in Padua; XXXIII National Conference of Labour Economics in Ancona; 59^{th} Annual Meeting of the Italian Economic Association in Bologna; "Migration, Health, and Health Care" Workshop in Rome for their helpful comments and suggestions.

We are also grateful to Luciana Aimone (Bank of Italy) and Lucia Martina (Istat) for providing us essential information on health spending measures. Special thanks are due to Simone Bertoli, Davide Dottori, Tommaso Frattini, David Jaeger, Matteo Lanzafame, Catia Nicodemo, Paolo Pertile, Massimiliano Piacenza, Michele Tuccio and Gilberto Turati for fruitful discussion and suggestions on preliminary drafts. We are indebted to Massimiliano Piacenza and Gilberto Turati also for providing data on health system efficiency at the regional level.

References

Alesina, A., R. Baqir, and W. Easterly (1999): "Public goods and ethnic divisions," *The Quarterly Journal of Economics*, 114, 1243–1284.

Alesina, A., A. Miano, and S. Stantcheva (2018): "Immigration and redistribution," Tech. rep., National Bureau of Economic Research.

Antón, J. I. and R. Muñoz de Bustillo (2010): "Health care utilisation and immigration in Spain," *The European Journal of Health Economics*, 11, 487–498.

Baltagi, B. H. and F. Moscone (2010): "Health care expenditure and income in the OECD reconsidered: Evidence from panel data," *Economic Modelling*, 27, 804–811.

Battisti, M., G. Felbermayr, G. Peri, and P. Poutvaara (2018): "Immigration, Search and Redistribution: A Quantitative Assessment of Native Welfare," *Journal of the European Economic Association*, 16, 1137–1188.

Betts, J. R. and R. W. Fairlie (2003): "Does immigration induce 'native flight' from public schools into private schools?" *Journal of Public Economics*, 87, 987–1012.

Bianchi, M., P. Buonanno, and P. Pinotti (2012): "Do immigrants cause crime?" *Journal of the European Economic Association*, 10, 1318–1347.

Boeri, T. (2010): "Immigration to the Land of Redistribution," *Economica*, 77, 651–687.

Boeri, T., G. H. Hanson, and B. McCormick (2002): *Immigration policy and the welfare system*, Oxford University Press.

Bordignon, M. and G. Turati (2009): "Bailing out expectations and public health expenditure," *Journal of Health Economics*, 28, 305–321.

Borjas, G. J. (1995): "The Economic Benefits from Immigration," *The Journal of Economic Perspectives*, 9, 3–22.

——— (1999): "Immigration and welfare magnets," *Journal of Labor Economics*, 17, 607–637.

——— (2011): *Heaven's door: Immigration policy and the American economy*, Princeton University Press.

——— (2014): *Immigration economics*, Harvard University Press.

Borjas, G. J. and L. Hilton (1996): "Immigration and the welfare state: Immigrant participation in means-tested entitlement programs," *The Quarterly Journal of Economics*, 111, 575–604.

Bracco, E., M. De Paola, C. P. Green, and V. Scoppa (2018): "The effect of far right parties on the location choice of immigrants: Evidence from Lega Nord Mayors," *Journal of Public Economics*, 166, 12–26.

Bratti, M. and C. Conti (2018): "The effect of immigration on innovation in Italy," *Regional Studies*, 52, 934–947.

Card, D. (2001): "Immigrant inflows, native outflows, and the local labor market impacts of higher immigration," *Journal of Labor Economics*, 19, 22–64.

Card, D. and G. Peri (2016): "Immigration economics by George J. Borjas: a review essay," *Journal of Economic Literature*, 54, 1333–49.

Carney, M. A. (2017): ""Sharing One's Destiny": Effects of austerity on migrant health provisioning in the Mediterranean borderlands," *Social Science & Medicine*, 187, 251–258.

Carone, G., D. Costello, N. D. Guardia, G. Mourre, B. Przywara, and A. Salomaki (2005): "The economic impact of ageing populations in the EU25 Member States," Tech. rep., Directorate General Economic and Financial Affairs (DG ECFIN), European Commission.

Caroppo, M. S. and G. Turati (2007): *I sistemi sanitari regionali in Italia: riflessioni in una prospettiva di lungo periodo*, Vita e pensiero.

Cavalieri, M. and L. Ferrante (2016): "Does fiscal decentralization improve health outcomes? Evidence from infant mortality in Italy," *Social Science & Medicine*, 164, 74–88.

Chiswick, B., Y. L. Lee, and P. Miller (2008): "IMMIGRANT SELECTION SYSTEMS AND IMMIGRANT HEALTH," *Contemporary Economic Policy*, 26, 555–578.

Chojnicki, X. and L. Ragot (2016): "Impacts of immigration on an ageing welfare state: An applied general equilibrium model for France," *Fiscal Studies*, 37, 258–284.

Coen-Pirani, D. (2011): "Immigration and spending on public education: California, 1970–2000," *Journal of Public Economics*, 95, 1386–1396.

Constant, A. F. (2017): "The Healthy Immigrant Paradox and Health Convergence," *DICE Report*, 15, 20–25.

Constant, A. F., T. García-Muñoz, S. Neuman, and T. Neuman (2018): "A "healthy immigrant effect" or a "sick immigrant effect"? Selection and policies matter," *The European Journal of Health Economics*, 19, 103–121.

Costa-Font, J. and G. Turati (2017): "Regional healthcare decentralization in unitary states: equal spending, equal satisfaction?" *Regional Studies*, 1–12.

Crivelli, L., M. Filippini, and I. Mosca (2006): "Federalism and regional health care expenditures: an empirical analysis for the Swiss cantons," *Health Economics*, 15, 535–541.

D'Amuri, F., G. I. Ottaviano, and G. Peri (2010): "The labor market impact of immigration in Western Germany in the 1990s," *European Economic Review*, 54, 550 – 570.

De Luca, G., M. Ponzo, and A. R. Andrés (2013): "Health care utilization by immigrants in Italy," *International Journal of Health Care Finance and Economics*, 13, 1–31.

Devillanova, C. and T. Frattini (2016): "Inequities in immigrants' access to health care services: disentangling potential barriers," *International Journal of Manpower*, 37, 1191–1208.

Docquier, F., Z. L. Kone, A. Mattoo, and C. Ozden (2018): "Labor Market Effects of Demographic Shifts and Migration in OECD Countries," *European Economic Review*.

Dustmann, C., G. Facchini, and C. Signorotto (2015): "Population, Migration, Ageing and Health: A Survey," CReAM Discussion Paper Series 1518, Centre for Research and Analysis of Migration (CReAM), Department of Economics, University College London.

Dustmann, C. and T. Frattini (2014): "The fiscal effects of immigration to the UK," *The Economic Journal*, 124.

Dustmann, C., T. Frattini, and C. Halls (2010): "Assessing the Fiscal Costs and Benefits of A8 Migration to the UK," *Fiscal Studies*, 31, 1–41.

Edo, A., L. Ragot, H. Rapoport, S. Sardoschau, A. Steinmayr, et al. (2018): "The Effects of Immigration in Developed Countries: Insights from Recent Economic Research," Tech. rep., CEPII research center.

Fehr, H., S. Jokisch, and L. J. Kotlikoff (2004): "The role of immigration in dealing with the developed world's demographic transition," *FinanzArchiv: Public Finance Analysis*, 60, 296–324.

Fennelly, K. (2007): "The "healthy migrant" effect," *Minnesota Medicine*, 90, 51–53.

Ferrario, C. and A. Zanardi (2011): "Fiscal decentralization in the Italian NHS: What happens to interregional redistribution?" *Health Policy*, 100, 71–80.

Francese, M. and M. Romanelli (2011): "Healthcare in Italy: expenditure determinants and regional differentials," Temi di discussione (Economic working papers) 828, Bank of Italy, Economic Research and International Relations Area.

Franzini, L. and M. Giannoni (2010): "Determinants of health disparities between Italian regions," *BMC Public Health*, 10, 296.

Gerdtham, U.-G., B. Jonsson, et al. (2000): "International comparisons of health expenditure: Theory, data and econometric analysis," *Handbook of Health Economics*, 1, 11–53.

Giannoni, M. and T. Hitiris (2002): "The regional impact of health care expenditure: the case of Italy," *Applied Economics*, 34, 1829–1836.

Giuntella, O., C. Nicodemo, and C. Vargas-Silva (2018): "The effects of immigration on NHS waiting times," *Journal of Health Economics*, 58, 123–143.

Goldsmith-Pinkham, P., I. Sorkin, and H. Swift (2018): "Bartik Instruments: What, When, Why, and How," Tech. rep., National Bureau of Economic Research.

Hagist, C., L. Kotlikoff, et al. (2009): "Who's going broke? Comparing growth in Public Healthcare Expenditure in ten OECD countries," *Hacienda Publica Espanola/Revista de Economia Publica*, 188, 55–72.

Hausman, J. A. and W. E. Taylor (1981): "Panel Data and Unobservable Individual Effects," *Econometrica*, 49, 1377–1398.

Herrero-Alcalde, A. and J. M. Tránchez-Martín (2017): "Demographic, political, institutional and financial determinants of regional social expenditure: the case of Spain," *Regional Studies*, 51, 920–932.

Herwartz, H. and B. Theilen (2003): "The determinants of health care expenditure: testing pooling restrictions in small samples," *Health Economics*, 12, 113–124.

Jaeger, D. A., J. Ruist, J. Stuhler, et al. (2018): "Shift-Share Instruments and the Impact of Immigration," Tech. rep., National Bureau of Economic Research, Inc.

Jasso, G., D. S. Massey, M. R. Rosenzweig, and J. Smith (2004): "Immigrant health: Selectivity and acculturation," in *Critical Perspectives on Racial and Ethnic Differences in Health in Late Life*, ed. by N. B. Anderson, R. A. Bulatao, and B. Cohen, The National Academies Press, National Research Council, 227 – 266.

Jofre-Monseny, J., P. Sorribas-Navarro, and J. Vázquez-Grenno (2016): "Immigration and local spending in social services: evidence from a massive immigration wave," *International Tax and Public Finance*, 23, 1004–1029.

Kennedy, S., J. T. McDonald, and N. Biddle (2006): "The Healthy Immigrant Effect and Immigrant Selection: Evidence from Four Countries," Social and Economic Dimensions of an Aging Population Research Papers 164, McMaster University.

King, R. and E. Zontini (2000): "The role of gender in the South European immigration model," *Papers. Revista de Sociologia*, 60, 35–52.

Lagravinese, R., P. Liberati, and A. Sacchi (2018): "The growth and variability of regional taxes: an application to Italy," *Regional Studies*, 52, 416–429.

Liberati, P. and A. Sacchi (2013): "Tax decentralization and local government size," *Public Choice*, 157, 183–205.

Martin, J. J. M., M. Puerto Lopez del Amo Gonzalez, and M. Dolores Cano Garcia (2011): "Review of the literature on the determinants of healthcare expenditure," *Applied Economics*, 43, 19–46.

McCormack, V., N. Perry, S. Vinnicombe, and I. dos Santos Silva (2008): "Ethnic variations in mammographic density: a British multiethnic longitudinal study," *American Journal of Epidemiology*, 168, 412–421.

McKenzie, D. and H. Rapoport (2010): "Self-selection patterns in Mexico-US migration: the role of migration networks," *The Review of Economics and Statistics*, 92, 811–821.

Meier, V. and M. Werding (2010): "Ageing and the welfare state: securing sustainability," *Oxford Review of Economic Policy*, 26, 655–673.

Mladovsky, P., B. Rechel, D. Ingleby, and M. McKee (2012): "Responding to diversity: an exploratory study of migrant health policies in Europe," *Health Policy*, 105, 1–9.

Monras, J. et al. (2015): "Immigration and Wage Dynamics: Evidence from the Mexican Peso Crisis," Tech. rep., Institute for the Study of Labor (IZA).

Moreno-Galbis, E. and A. Tritah (2016): "The effects of immigration in frictional labor markets: Theory and empirical evidence from EU countries," *European Economic Review*, 84, 76–98.

Moullan, Y. and F. Jusot (2014): "Why is the "healthy immigrant effect" different between European countries," *European Journal of Public Health*, 24, 80–86.

Munshi, K. (2003): "Networks in the modern economy: Mexican migrants in the US labor market," *The Quarterly Journal of Economics*, 118, 549–599.

Murray, M. P. (2006): "Avoiding invalid instruments and coping with weak instruments," *The Journal of Economic Perspectives*, 20, 111–132.

Norredam, M. and A. Krasnik (2011): *Migration and health in the European Union*, Open University Press, chap. Migrants' access to health services, 67–80.

Norredam, M., A. Krasnik, T. M. Sorensen, N. Keiding, J. J. Michaelsen, and A. S. Nielsen (2004): "Emergency room utilization in Copenhagen: a comparison of immigrant groups and Danish-born residents," *Scandinavian Journal of Public Health*, 32, 53–59.

OECD (2011): "Naturalisation: A Passport for the Better Integration of Immigrants?" Tech. rep., OECD Publishing, Paris.

——— (2013): "International Migration Outlook 2013," Tech. rep., OECD Publishing, Paris.

Piacenza, M. and G. Turati (2014): "Does Fiscal Discipline Towards Subnational Governments Affect Citizens' Well–Being? Evidence On Health," *Health Economics*, 23, 199–224.

Piopiunik, M. and J. Ruhose (2017): "Immigration, regional conditions, and crime: Evidence from an allocation policy in Germany," *European Economic Review*, 92, 258–282.

Potrafke, N. (2010): "The growth of public health expenditures in OECD countries: do government ideology and electoral motives matter?" *Journal of Health Economics*, 29, 797–810.

Preston, I. (2014): "The effect of immigration on public finances," *The Economic Journal*, 124.

Prieto, D. C. and S. Lago-Peñas (2012): "Decomposing the determinants of health care expenditure: the case of Spain," *The European Journal of Health Economics*, 13, 19–27.

Razin, A. and E. Sadka (1999): "Migration and pension with international capital mobility," *Journal of Public Economics*, 74, 141–150.

Razin, A., E. Sadka, and P. Swagel (2002): "Tax burden and migration: a political economy theory and evidence," *Journal of Public Economics*, 85, 167–190.

Razin, A. and J. Wahba (2015): "Welfare magnet hypothesis, fiscal burden, and immigration skill selectivity," *The Scandinavian Journal of Economics*, 117, 369–402.

Rechel, B., P. Mladovsky, D. Ingleby, J. P. Mackenbach, and M. McKee (2013): "Migration and health in an increasingly diverse Europe," *The Lancet*, 381, 1235–1245.

Sá, F. (2015): "Immigration and House Prices in the UK," *The Economic Journal*, 125, 1393–1424.

Shelton, C. A. (2008): "The aging population and the size of the welfare state: Is there a puzzle?" *Journal of Public Economics*, 92, 647–651.

Speciale, B. (2012): "Does immigration affect public education expenditures? Quasi-experimental evidence," *Journal of Public Economics*, 96, 773–783.

Staiger, D. and J. H. Stock (1997): "Instrumental Variables Regression with Weak Instruments," *Econometrica*, 65, 557–586.

Stock, J. H., J. H. Wright, and M. Yogo (2002): "A survey of weak instruments and weak identification in generalized method of moments," *Journal of Business & Economic Statistics*, 20, 518–529.

Stock, J. H. and M. Yogo (2002): "Testing for Weak Instruments in Linear IV Regression," Tech. rep., National Bureau of Economic Research, Inc.

Storesletten, K. (2000): "Sustaining fiscal policy through immigration," *Journal of Political Economy*, 108, 300–323.

——— (2003): "Fiscal implications of immigration. A net present value calculation," *Scandinavian Journal of Economics*, 105, 487–506.

Vicarelli, G. and E. Pavolini (2015): "Health workforce governance in Italy," *Health Policy*, 119, 1606–1612.

Wolff, H., M. Epiney, A. P. Lourenco, M. C. Costanza, J. Delieutraz-Marchand, N. Andreoli, J.-B. Dubuisson, J.-M. Gaspoz, and O. Irion (2008): "Undocumented migrants lack access to pregnancy care and prevention," *BMC Public Health*, 8.

Tables

Table 1: Variables: definition, sources and summary statistics

Variable	Definition	Source	Mean	St. Dev.	Min	Max
$HEXP$	Log of public health expenditure per capita by region	Istat	7.49	0.11	7.17	7.76
$HEXP\_GDP$	Public health expenditure over regional GDP (%)	Istat	7.74	2.02	4.36	12.54
$IMMIG$	Foreign population over resident population by region (%)	Istat	5.41	3.17	0.60	12.06
$IMMIG\_SMP$	Foreign population from countries with strong migration pressure over resident population by region (%)	Istat	5.04	3.01	0.54	11.72
$MALE\_share$	Foreign males over total foreign population by region (%)	Istat	47.62	2.98	41.49	55.12
$WORKAGE\_share$	Foreign individuals between 15 and 64 years over total foreign population by region (%)	Istat	79.49	2.39	75.59	86.38
$Depratio$	Sum of population 0-14y and population over 65y on 15-64y population by region (%)	Istat	53.16	3.92	42.89	65.58
$GDPpc$	Log of regional Gross Domestic Product per capita	Istat	10.08	0.27	9.59	10.54
Pop	Log of regional native population	Istat	14.42	1.06	11.68	16.00
$Empl\_rate$	Employed female over 15y population on population over 15y by region (%)	Istat	34.59	7.98	18.95	47.02
$Life\_exp$	Number of years of female life expectancy at age 0 by region	Istat	84.22	0.83	81.37	85.83
$Educ$	Share of population with university degree over total population (%) by region	Istat	10.41	2.31	5.02	18.17
$Taxes$	Regional direct taxes over regional GDP (%)	Istat	14.83	2.10	9.66	20.97
$Deficit$	Dummy equal to 1 in year with regional budget deficit due to health spending	Istat	0.18	0.39	0.00	1.00
$Generalpractitioners$	Number of general practitioners per 10,000 inhabitants by region	Istat	7.97	0.66	6.17	9.37
$Generalpractitioners > 1,500$	Number of general practitioners with more than 1,500 patients by region (%)	Istat	18.87	9.60	4.50	49.77
$Emergencydoctors$	Log of on-call services and emergency doctors by region	Istat	4.66	0.93	2.08	6.24

Table 2: Baseline results

Dep Var:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log Health Exp pc	OLS	OLS	IV (lag)	IV (lag)	IV (Card, 2001)	IV (Card, 2001)	IV (Bianchi et al., 2012)	IV (Bianchi et al., 2012)
$IMMIG$	-0.014*	-0.024***	-0.012***	-0.025***	-0.021***	-0.029***	-0.024***	-0.039***
	[0.007]	[0.005]	[0.003]	[0.003]	[0.005]	[0.005]	[0.005]	[0.008]
Pop		-1.075***		-1.070***		-1.057***		-1.012***
		[0.363]		[0.180]		[0.180]		[0.184]
$Depratio$		0.008**		0.008***		0.009***		0.012***
		[0.003]		[0.002]		[0.002]		[0.002]
$Life\_exp$		0.026***		0.026***		0.025***		0.024**
		[0.008]		[0.009]		[0.009]		[0.010]
$Educ$		0.004		0.005		0.007		0.011**
		[0.004]		[0.004]		[0.004]		[0.005]
$Empl\_rate$		0.002		0.002		0.001		0.000
		[0.004]		[0.003]		[0.003]		[0.003]
$GDPpc$		-0.219**		-0.220***		-0.224***		-0.234***
		[0.100]		[0.071]		[0.071]		[0.073]
$Taxes$		-0.008***		-0.008***		-0.009***		-0.011***
		[0.002]		[0.003]		[0.003]		[0.003]
$Deficit$		-0.022**		-0.022***		-0.024***		-0.028***
		[0.009]		[0.006]		[0.007]		[0.007]
Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Region FE	yes	yes	yes	yes	yes	yes	yes	yes
First-stage instruments								
$IMMIG_{t-2}$			0.669***	0.682***				
$IMMIG_{t-3}$			0.082	0.044				
$\widehat{IMMIG}_{i,t}$					32.791***	26.99***	11.545***	7.620***
Observations	260	260	260	260	260	260	260	260
Number of regions	20	20	20	20	20	20	20	20
F test (first stage)			392.7	167.7	91.92	50.47	47.98	22.28
Kleibergen-Paap LM statistic (p-value)			0.00	0.00	0.00	0.00	0.00	0.00
Hansen J statistic (p-value)			0.12	0.20				

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1. Constant included but not reported in the table.
Columns (3)-(4): IV strategy based on the use of the second and the third lag of the $IMMIG$ variable (Piopiunik and Ruhose, 2017).
Columns (5)-(6): IV strategy based on Card (2001). Columns (7)-(8): IV strategy based on Bianchi et al. (2012).

Table 3: Robustness: irregular immigrants, refugees and asylum seekers

Dep Var: Log Health Exp pc	OLS	OLS	IV (lag)	IV (lag)	IV (Card, 2001)	IV (Card, 2001)	IV (Bianchi et al., 2012)	IV (Bianchi et al., 2012)
Panel A								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
IMMIG	-0.014*	-0.024***	-0.012***	-0.025***	-0.021***	-0.023***	-0.024***	-0.029***
	[0.007]	[0.004]	[0.003]	[0.003]	[0.005]	[0.006]	[0.005]	[0.006]
Controls	yes	yes	yes	yes	yes	yes	yes	yes
Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Region FE	yes	yes	yes	yes	yes	yes	yes	yes
Observations	240	240	240	240	240	240	240	240
F test (first stage)			392.7	140.5	91.92	21.18	47.98	25.56
Panel B								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
IMMIG	-0.015*	-0.024***	-0.013***	-0.025***	-0.022***	-0.028***	-0.023***	-0.035***
	[0.007]	[0.005]	[0.003]	[0.003]	[0.005]	[0.005]	[0.005]	[0.007]
Controls	yes	yes	yes	yes	yes	yes	yes	yes
Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Region FE	yes	yes	yes	yes	yes	yes	yes	yes
Observations	240	240	240	240	240	240	240	240
F test (first stage)			351.9	160.4	68.27	36.72	43.51	22.99
Panel C								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
IMMIG	-0.015**	-0.025***	-0.014***	-0.026***	-0.023***	-0.028***	-0.024***	-0.032***
	[0.007]	[0.004]	[0.004]	[0.003]	[0.005]	[0.006]	[0.005]	[0.006]
Controls	yes	yes	yes	yes	yes	yes	yes	yes
Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Region FE	yes	yes	yes	yes	yes	yes	yes	yes
Observations	220	220	220	220	220	220	220	220
F test (first stage)			308.5	130.5	46.66	24.83	40.25	25.29
Panel D								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
IMMIG	-0.012	-0.023***	-0.010**	-0.024***	-0.019***	-0.031***	-0.021***	-0.037***
	[0.009]	[0.006]	[0.004]	[0.004]	[0.006]	[0.006]	[0.007]	[0.009]
Controls	yes	yes	yes	yes	yes	yes	yes	yes
Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Region FE	yes	yes	yes	yes	yes	yes	yes	yes
Observations	221	221	221	221	221	221	221	221
F test (first stage)			222.4	137.5	61.30	32.62	29.89	14.75

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1. Constant included but not reported in the table.
Columns (3)-(4): IV strategy based on the use of the second and the third lag of the *IMMIG* variable (Piopiunik and Ruhose, 2017).
Columns (5)-(6): IV strategy based on Card (2001). Columns (7)-(8): IV strategy based on Bianchi et al. (2012).

Table 4: Robustness: Immigrants from countries with strong migration pressure (SMP)

Dep Var:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log Health Exp pc	OLS	OLS	IV (lag)	IV (lag)	IV (Card, 2001)	IV (Card, 2001)	IV (Bianchi et al., 2012)	IV (Bianchi et al., 2012)
IMMIG_SMP	-0.014*	-0.023***	-0.012***	-0.025***	-0.023***	-0.031***	-0.026***	-0.043***
	[0.007]	[0.005]	[0.003]	[0.003]	[0.005]	[0.006]	[0.006]	[0.010]
Pop		-1.093***		-1.084***		-1.066***		-1.023***
		[0.350]		[0.179]		[0.179]		[0.189]
Depratio		0.007**		0.008***		0.009***		0.012***
		[0.003]		[0.002]		[0.002]		[0.002]
Life_exp		0.025***		0.024***		0.023***		0.022**
		[0.008]		[0.009]		[0.009]		[0.010]
Educ		0.004		0.005		0.008*		0.013**
		[0.004]		[0.004]		[0.005]		[0.006]
Empl_rate		0.002		0.002		0.001		-0.000
		[0.004]		[0.003]		[0.003]		[0.003]
GDPpc		-0.225**		-0.228***		-0.237***		-0.252***
		[0.093]		[0.072]		[0.073]		[0.078]
Taxes		-0.008***		-0.009***		-0.010***		-0.013***
		[0.002]		[0.003]		[0.003]		[0.004]
Deficit		-0.020**		-0.021***		-0.023***		-0.027***
		[0.009]		[0.006]		[0.007]		[0.007]
Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Region FE	yes	yes	yes	yes	yes	yes	yes	yes
Observations	260	260	260	260	260	260	260	260
Number of regions	20	20	20	20	20	20	20	20
F test (first stage)			375	165.7	80.75	33.60	45.48	18.48
Kleibergen-Paap LM (p-value)			0.00	0.00	0.00	0.00	0.00	0.00
Hansen J (p-value)			0.11	0.20				

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1. Constant included but not reported.
Columns (3)-(4): IV strategy based on the use of the second and the third lag of the *IMMIG_SMP* variable (Piopiunik and Ruhose, 2017).
Columns (5)-(6): IV strategy based on Card (2001). Columns (7)-(8): IV strategy based on Bianchi et al. (2012).

Table 5: Robustness: Public health expenditure as a share of GDP

Dep Var:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Health Exp/GDP	OLS	OLS	IV (lag)	IV (lag)	IV (Card, 2001)	IV (Card, 2001)	IV (Bianchi et al., 2012)	IV (Bianchi et al., 2012)
IMMIG	-0.236**	-0.297***	-0.227***	-0.287***	-0.328***	-0.292***	-0.308***	-0.443***
	[0.083]	[0.055]	[0.039]	[0.035]	[0.049]	[0.043]	[0.055]	[0.077]
Pop		-8.216**		-8.253***		-8.238***		-7.634***
		[3.375]		[1.626]		[1.649]		[1.738]
Depratio		0.053		0.051***		0.052***		0.087***
		[0.033]		[0.018]		[0.019]		[0.023]
Life_exp		0.259***		0.260***		0.260***		0.246**
		[0.070]		[0.090]		[0.090]		[0.098]
Educ		0.069*		0.065**		0.067*		0.133***
		[0.035]		[0.033]		[0.037]		[0.048]
Empl_rate		0.027		0.028		0.028		0.012
		[0.038]		[0.026]		[0.025]		[0.032]
GDPpc		-9.306***		-9.296***		-9.301***		-9.450***
		[0.930]		[0.631]		[0.629]		[0.666]
Taxes		-0.067**		-0.065***		-0.066**		-0.095***
		[0.029]		[0.025]		[0.026]		[0.031]
Deficit		-0.169		-0.165***		-0.167**		-0.224***
		[0.102]		[0.064]		[0.067]		[0.072]
Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Region FE	yes	yes	yes	yes	yes	yes	yes	yes
Observations	260	260	260	260	260	260	260	260
Number of regions	20	20	20	20	20	20	20	20
F test (first stage)			392.7	167.7	91.92	50.47	47.98	22.28
Kleibergen-Paap LM (p-value)			0.00	0.00	0.00	0.00	0.00	0.00
Hansen J (p-value)			0.51	0.29				

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1. Constant included but not reported in the table.
Columns (3)-(4): IV strategy based on the use of the second and the third lag of the *IMMIG* variable (Piopiunik and Ruhose, 2017).
Columns (5)-(6): IV strategy based on Card (2001). Columns (7)-(8): IV strategy based on Bianchi et al. (2012).

Table 6: Immigrants' composition: gender

Dep Var: Log Health Exp pc	(1) OLS	(2) OLS	(3) IV (lag)	(4) IV (lag)	(5) IV (Card, 2001)	(6) IV (Card, 2001)	(7) IV (Bianchi et al., 2012)	(8) IV (Bianchi et al., 2012)
IMMIG	-0.010*	-0.017***	-0.011***	-0.021***	-0.004	-0.019**	0.000	-0.008
	[0.005]	[0.005]	[0.003]	[0.003]	[0.005]	[0.010]	[0.005]	[0.012]
MALE_share	-0.010***	-0.007***	-0.011***	-0.008***	-0.015***	-0.003	-0.018***	-0.010**
	[0.002]	[0.002]	[0.002]	[0.002]	[0.004]	[0.004]	[0.004]	[0.004]
Pop		-0.981***		-0.940***		-1.033***		-0.950***
		[0.241]		[0.159]		[0.176]		[0.157]
Depratio		0.005*		0.006***		0.006*		0.003
		[0.003]		[0.002]		[0.003]		[0.004]
Life_exp		0.024**		0.023**		0.025***		0.023**
		[0.009]		[0.009]		[0.009]		[0.009]
Educ		0.002		0.004		0.003		-0.002
		[0.005]		[0.004]		[0.005]		[0.006]
Empl_rate		0.003		0.002		0.002		0.004
		[0.004]		[0.003]		[0.002]		[0.003]
GDPpc		-0.188**		-0.187***		-0.202***		-0.166**
		[0.073]		[0.068]		[0.077]		[0.076]
Taxes		-0.007***		-0.008***		-0.007**		-0.005
		[0.002]		[0.003]		[0.003]		[0.004]
Deficit		-0.018**		-0.020***		-0.020***		-0.015*
		[0.009]		[0.006]		[0.007]		[0.008]
Time FE	yes	yes	yes	yes	yes	yes	yes	yes
Region FE	yes	yes	yes	yes	yes	yes	yes	yes
Observations	260	260	260	260	260	260	260	260
Number of regions	20	20	20	20	20	20	20	20
F test *IMMIG*			214.54	108.02	54.22	22.03	31.26	9.76
F test *MALE_share*			30.01	39.04	80.99	52.72	25.77	48.53
Kleibergen-Paap LM (p-value)			0.00	0.00	0.01	0.01	0.00	0.00

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1. Constant included but not reported in the table.
Columns (3)-(4): IV strategy based on the use of the second and the third lag of the *IMMIG* and *MALE_share* variables (Piopiunik and Ruhose, 2017).
Columns (5)-(6): IV strategy based on Card (2001). Columns (7)-(8): IV strategy based on Bianchi et al. (2012).

Table 7: Immigrants' composition: age

Dep Var: Log Health Exp pc	(1) OLS	(2) OLS	(3) IV (lag)	(4) IV (lag)	(5) IV (Card, 2001)	(6) IV (Card, 2001)
$IMMIG$	-0.018**	-0.021***	-0.040**	-0.051**	-0.025***	-0.023***
	[0.008]	[0.006]	[0.018]	[0.025]	[0.004]	[0.005]
$WORKAGE\_share$	-0.013*	-0.007	-0.075**	-0.075	-0.039***	-0.022**
	[0.006]	[0.005]	[0.038]	[0.048]	[0.010]	[0.011]
Pop		-0.896**		0.390		-0.703***
		[0.335]		[0.753]		[0.232]
$Life\_exp$		0.026***		0.013		0.020**
		[0.008]		[0.020]		[0.009]
$Educ$		0.003		0.004		0.002
		[0.004]		[0.005]		[0.004]
$Empl\_rate$		0.004		0.014		0.005*
		[0.004]		[0.008]		[0.003]
$GDPpc$		-0.311**		-0.496***		-0.304***
		[0.115]		[0.155]		[0.077]
$Taxes$		-0.011***		-0.011***		-0.009***
		[0.003]		[0.004]		[0.003]
$Deficit$		-0.026**		-0.038***		-0.025***
		[0.011]		[0.015]		[0.007]
Observations	260	260	220	220	260	260
Number of regions	20	20	20	20	20	20
F test $IMMIG$			242.14	121.79	184.24	169.48
F test $WORKAGE\_share$			14.06	16.85	19.95	16.29
Kleibergen-Paap LM (p-value)			0.00	0.02	0.00	0.00

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1. Constant included but not reported in the table. Columns (3)-(4): IV strategy based on the use of second and third lag of the $IMMIG$ and $WORKAGE\_share$ variables (Piopiunik and Ruhose, 2017). Columns (5)-(6): IV strategy based on Card (2001).

Table 8: Immigrants and the health sector supply

Dep Var:	General practitioners per 10,000 inhabit.		General practitioners > 1,500 patients		Emergency doctors	
	(1)	(2)	(3)	(4)	(5)	(6)
$IMMIG$	-0.130***	-0.108***	2.595***	2.230***	0.033**	0.037***
	[0.031]	[0.028]	[0.441]	[0.418]	[0.014]	[0.014]
Time FE	yes	yes	yes	yes	yes	yes
Region FE	yes	yes	yes	yes	yes	yes
Observations	220	220	220	220	220	220
Number of regions	20	20	20	20	20	20
F test	46.66	40.25	46.66	40.25	46.66	40.25
Kl.-Paap LM statistic (p-val)	0.00	0.00	0.00	0.00	0.00	0.00

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1. Constant included but not reported in the table. Dependent variables are available only for the period 2003–2013 . Columns (1),(3),(5): IV strategy based on Card (2001). Columns (2),(4),(6): IV strategy based on Bianchi et al. (2012).