Migrants' access to welfare services: evidence from emergency care

Matteo Lippi Bruni[a], Irene Mammi[b] and Cristina Ugolini[a]

[a] Department of Economics, University of Bologna

[b] Department of Economics, Ca' Foscari University of Venice

Correspondence to:

Irene Mammi, Department of Economics, Ca' Foscari University of Venice.

Cannaregio 873, Fondamenta San Giobbe, 30121 Venezia

irene.mammi@unive.it

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Abstract

Intense migration flows in Western countries have raised the interest to deepen our understanding of migrants' use of a wide range of welfare services. While the economic literature has mostly focused on the labor market, the effects on the health care sector are relatively unexplored. We study the use of emergency care focusing on the differences between natives and migrants in Italy, and distinguishing between appropriate and inappropriate Emergency Department (ED) admissions. By doing so, we single out differences in utilisation due to different underlying health needs, from those that could have been avoided through a more appropriate use of alternative settings. We model a two-stage process using a bivariate probit specification with sample selection, where the first stage decision consists of attending the ED or not, while in the second stage each visit is classified as clinically inappropriate or not. We find that migrants have a significantly higher probability of attending the ED, and we also highlight a large variability in utilisation according to the area of origin of the migrant. However, once the selection into ED admission is accounted for, the differences between natives and migrants in the probability of being classified as an inappropriate attender become in general smaller and not significant for most ethnic groups.

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Introduction

Massive migration inflows in Western Countries have inspired a large body of research that evaluates their impact on receiving countries and have generated an intense debate in the public opinions with immigrants often blamed for overusing welfare services. One of the main concerns is that migrants may crowd natives out of the welfare system, imposing a heavy burden on destination countries. Counterarguments contend that migrants contribute to financing the system and match up to - or even exceed- the benefits they receive, due to favourable age and health profiles and to their willingness to take up jobs natives are no longer keen to accept.

Whereas the consequences of migration on the labour market have attracted a great deal of attention, the effects on the health care sector have been explored relatively less. To fill this gap, some recent studies have investigated to what extent the presence of immigrants affect natives' health and access to care, while others have assessed the differences in health services utilisation between natives and immigrants. The available evidence points to different patterns across countries and types of care. Immigrants often struggle to get access to preventive and specialist care, but they generally display a higher propensity to use the Emergency Departments (EDs), while mixed results emerge for hospital and GP services.

Our study focuses on the differences in the use of emergency services between natives and immigrants in Italy. Since the Eighties, the country has experienced considerable inflows from ex-socialist countries and migration further increased in the following decades, in particular from Mediterranean African countries. This has raised the pressure on the NHS and has called for policies capable to meet migrants' health needs by channeling properly their demand for care. Our data cover the population of Emilia-Romagna for the year 2012. This region is characterised by one of the highest prevalence of immigrants in the country, reaching 10.7% in 2015 (8.2% in Italy) most from low-income countries (Caritas and Migrantes, 2016). The paper investigates whether, after controlling for patient, GP and practice characteristics, immigrant status and the area of origin account for variations in ED admissions. In doing so, we explicitly consider a key feature of emergency care such as the distinction between appropriate and inappropriate ED attenders. The latter group consists of

those patients who visit the ED even though affected by minor conditions that could be treated effectively in less intensive settings.

Previous literature has documented a higher utilisation of emergency care by immigrants compared to natives (Jiménez-Rubio and Hernandez-Quevedo, 2011, De Luca et al 2013). However, to the best of our knowledge, no previous study has investigated the differences in ED utilisation between natives and migrants disentangling appropriate from inappropriate visits. This distinction bears relevant implications as the former reflect the "true" need of emergency care, whereas the latter are potentially avoidable through the improvement of the organisation of the health care system and the promotion of more informed decisions by patients. High rates of inappropriate ED admissions have serious consequences since they cause avoidable congestion in ED wards, with negative spillovers on the response time for more severe cases and increase the pressure for (costly) diagnostic and specialist treatments provided within the hospital (Berchet, 2015). Because of that, preventing inappropriate ED visits has become a policy priority in many institutional settings to hinder inefficient use of resources. Furthermore, different types of ED admissions require alternative policy responses and assessing possibly heterogeneous behaviour across different ethnic groups can help better target health policies. High utilisation rates due to truly severe cases can be addressed mitigating the health divide across groups, through initiatives that promote better lifestyles, living and working conditions. Conversely, inappropriate ED admissions can be targeted mainly by increasing the health literacy and knowledge of the health system among the groups that more frequently experience admissions for non-urgent conditions, together with improved accessibility to primary and community care (Dolton and Pathania 2016; Lippi Bruni et al. 2016).

In the Italian NHS, ED visits are classified according to a 4-level triage coding (I-4L) based on (colour label) categories: red, yellow, green and white codes. *White codes* correspond to the lowest urgency category and are classified as inappropriate ED attendances deferrable to primary care according to the evaluation of the medical staff.[1]

[1] The I-4L system has been shown to perform well in terms of reliability and validity (Parenti et al. 2010) *Reliability* measures consistency in evaluation across different raters and across time for the same raters, whereas *validity* measures the capacity to correctly predict reference outcomes such as hospitalisation, mortality or in-hospital length of stay.

In the empirical analysis, we exploit the triage coding to separate appropriate from inappropriate ED visits based on clinical standards. As the decision to attend the hospital is taken by the patient, while the appropriateness /inappropriateness of attendance is assessed by the ED staff at a later moment, we model the decision process in two stages. In the first stage, patient's decision consists on whether to attend the ED in response to a health shock, while in the second stage those who have chosen to visit the ED are assigned a triage code following physicians' clinical assessment. The empirical strategy is based on a bivariate probit model with sample selection, where we estimate the probability of attending the ED in the first stage, and the probability of receiving a *white code* conditional on attendance in the second stage. We control for the migrant status and for a set of relevant covariates that capture patient, primary care and area characteristics. To gain further insights on the groups that experience higher utilisation rates, we then unpack the migrant status according to the area of origin of the individual.

We improve upon the existing literature on three dimensions. First, we single out inappropriate attendances defined by the triage code, whereas extant studies typically concentrate on total visits to the emergency department. Unlike previous works on ED use, we are therefore able to separate the influence of different health conditions from behavioural attitudes and accessibility to services that contribute to the type of access to the ED. Second, controlling for a large set of characteristics of primary care, that represent a viable substitute to the ED, we explicitly account for the possible role of ambulatory care in preventing inappropriate use of emergency services. Third, we exploit a large administrative dataset covering over 3.5 million patients, whereas most existing contributions comparing the use of health services between natives and migrants are based on self-reported survey data where the immigrant population is often underrepresented and measurement error due to self-reporting may vary across ethnic groups. On the contrary, in our study the information on patients' health conditions for those admitted to the ED is the result of an accurate clinical evaluation.

2. Background

The impact of migration on economic growth, the labour market, and the fiscal and welfare system has received considerable attention in recent years in the economic literature (e.g. Docquier et al., 2014; Bratsberg et al., 2014; Dustmann and Frattini, 2014), while the consequences on the health care system have been explored to a lesser extent. Two still small strands of studies have addressed empirically how migration flows have affected the health care sector. The first one focuses on the consequences on the health conditions of natives and on their access to care. Giuntella and Mazzonna (2015) study to what extent the increased share of foreign-born individuals affects natives' health through the labour market channel. The main hypothesis is that increased availability of migrant workforce helps shift natives into jobs characterised by better working conditions. Because of this complementarity in labour tasks, occupational risk and on-the-job physical intensity of natives decreases, with possible beneficial effects on their health status. Turning to the consequences of migration on accessibility to care, both demand- and supply-side effects have been considered. From the demand side, Giuntella, Nicodemo, Vargas-Silva (2018) assess the possible adverse consequences of the growing presence of migrants on waiting times in the face of capacity constraints. From the supply side, migrants' involvement as workforce for nursing and long-term care may instead improve service availability with potential beneficial effects on population health.

A second stream of contributions has analysed the determinants of the differential use of health services by immigrants and natives.[2] The influence of migrant status on health care utilisation results from a complex relationship. Since migration is physically challenging, immigrants are usually healthier than their counterparts who remain at home ("healthy immigrant" effect), pointing to relatively low utilisation rates of health services by first generation migrants (Razum et al., 2000, Kennedy et al. 2015, Farré 2016). In addition to that, disadvantaged socio-economic conditions, poor health literacy and lack of knowledge of the health care system may act as further restraints in the access to public health services. However, the health gap usually drops sharply with time. Health deterioration is typically due to migrants' lifestyles and living conditions at destination that include: poverty, living in

[2] Richer streams of works can be found in the sociological and public health literature, albeit they mainly provide descriptive evidence and focus on epidemiological indicators. Most empirical economic analyses have been conducted at the national level, with only limited evidence based on cross country comparisons (Solé-Auró et al., 2012). Attention has been devoted also to the role of ethnic networks in affecting individual health care utilisation (Deri, 2005; Devillanova, 2008).

substandard housing, lack of access to regular medical care, adoption of a Western diet, smoking, and substance abuse (Fennelly, 2006). Together with increased assimilation and improved knowledge of the health system, this may soon lift up immigrants' demand for care (Fernandes and Miguel, 2009).

As first discussed by Winkelmann (2002), economic theory provides little backing for justifying different patterns of use of health services across ethnic groups. In fact, in a Grossman (1972) framework where health, age and education are the main drivers of health care demand, different use of health services can be predicted because of self-selection of immigrants according to these characteristics. However, once these factors are controlled for, the model does not provide additional hypotheses. Antòn and Muñoz de Bustillo (2010) point out that characteristics other than observable socio-economic ones may further contribute to different patterns in health care use, such as different perceptions of illness and health. They may be related to preferences heterogeneity, due to cultural factors or to different degrees of risk-aversion between groups, but also to the existence of barriers to access to basic services, such as language difficulty affecting the communication with health professionals (Malmusi et al, 2010).

Mediterranean countries display many similarities in terms of migration patterns and of consequent challenges for the health care systems. The available studies find fairly robust evidence of the healthy immigrant effect, although the advantages in terms of better health conditions decrease quickly with the time spent in the hosting country, mostly because of heavy working conditions, poor living standards and the assimilation of lifestyles. In addition, migrants typically experience lower access to preventive and specialist care, whereas mixed evidence emerges for primary and hospital care. Conversely, there is some consensus on the propensity of immigrants' to use ED services more than natives (Antòn and Muñoz de Bustillo, 2010 for Spain, Devillanova and Frattini, 2016 and De Luca et al., 2013 for Italy, but also Nolan, 2011 for Ireland), despite some contrasting evidence (Barros and Pereira, 2010 for Portugal and Wadsworth, 2013 for Germany and UK).

Focusing on emergency services, to the extent that immigrants have more probability to be employed in high-risk jobs and face worse living conditions, differences in the use of EDs

may be due to a higher incidence of accidents and more frequent need of urgent care. However, overuse of emergency care as recorded by avoidable ED visits may be affected by a number of factors: perception that emergency services respond more rapidly; lack of knowledge about the functioning of the different layers of the system; cultural and language difficulties in contacting GP.

In a survey on migrants' utilization of health care services in European countries, Nørredam et al. (2009) included six studies that covered ED visits. Four of them confirm the higher utilization rates of first-generation immigrants in comparison with natives although they fail to adjust for patients' health status, whereas the other two find evidence of a lower utilization of ED services among immigrants from less developed countries. The factors associated to a higher probability of ED attendances, mostly refer to patients' socio-demographic characteristics and to the organisation of the health system. Immigrant status and the degree of assimilation of foreigners often play a relevant role, suggesting that cultural factors, health literacy and previous experiences with the health system affect demand of ED care. As for the organisational features, improved quality and access to primary care has been shown to exert a potential restraint for the demand of emergency care services thus highlighting the importance of controlling for General Practitioners' (GPs) activity.

3. Conceptual framework

We introduce here a basic theoretical framework to illustrate the nature of the decision process related to the main outcome of interest: inappropriate attendances at the ED.

The utility function for the individual *i* can be expressed as:

$$U_i = U_i(X_i, h_i;\ k\ )$$

where the subscript *i* represents the individual; X_i is a vector of individual characteristics. h_i the health status of agent *i*, and k the care setting.

At time t_0, the health of the representative individual can be normalised at $h_{it_0} = 0$ that represents a baseline condition where no acute treatment is required. From t_0 onwards, in

any successive period, the health status of agent *i* is subject to random shocks, that can be either positive or negative. Therefore, the health status at time *t* corresponds to:

$$h_{it} = \sum_{t=t_0}^{t} \Delta h_{it} \qquad with \;\; h_{it_0} = 0 \tag{1}$$

Given the nature of our problem, we are interested in the consequences of negative shocks. Most of them have a minor impact on patient health and do not arise any need of urgent treatment. However, in those (few) circumstances in which the negative shock is sufficiently large, the patient considers the possibility of seeing a doctor. In response to these non-negligible negative health shocks, individual *i* can choose among the following alternatives: seeking emergency care $(k = A)$; seeking primary care $(k = B)$; opting for no formal care, including self-medication $(k = C)$. As we have no information on the choices over care settings other than the ED, in the remaining of the analysis we consider patient's choice as dichotomous: $k = E$ when emergency care is chosen $(k = A)$; $k = NE$ when the patients opts for care settings different from the ED or for no care $(K = B \; or \; K = C)$.

For a given health status h_{it}, agent *i* chooses the ED, if and only if:

$$U_{it}(X_i, h_{it};\; E\;) \geq U_i(X_i, h_{it};\; NE\;). \tag{2}$$

In this context, it is reasonable to assume the individual prefers to attend the emergency department (E) for low level of h_i , since the ED enables a quicker access to intensive and highly specialised hospital care. It is reasonable to expect that the propensity to use the ED increases the larger magnitude of the negative shock and the lower the level of h_{it}. Hence, it can be assumed that the difference $U_i(X_i, h_{it};\; E\;) - U_i(X_i, h_{it};\; NE\;)$ is monotonically decreasing in h_{it}. Under this assumption, for any individual *i* there exists a unique threshold $\widetilde{h_i}$ such that:

$$U_i\big(X_i, \widetilde{h_i};\; E\;\big) = U_i\big(X_i, \widetilde{h_i};\; NE\;\big). \tag{3}$$

This implies that, for any h_i such that $h_{it} \leq \tilde{h}_i$, the patient chooses to visit the ED; whereas, for any h_i such that $h_{it} > \tilde{h}_i$ the patient opts for a less intensive care setting.

We can expect the threshold to vary with individual characteristics, such as socio-demographic ones, frailty, risk attitude, knowledge of the health system and relative cost of access across settings (e.g. relative distance, waiting times, monetary costs). Thus, the same individual may take different decisions in response to health shocks of different magnitudes,

and different individuals may choose different care settings when experiencing the same health status.

We label t' the switching point corresponding to time period at which $h_{it'}$ exceeds the critical threshold $\widetilde{h_i}$ and , consequently, the patient decides to go the ED. Let $h_i' = h_{it'}$ be the health status at the moment the patient takes the decision to attend the ED. In the time interval between $t'$and the moment the patient receives the clinical assessment by the ED clinical staff (labelled t''), new health shocks may occur potentially leading either to an improvement or to a further deterioration of the health status. Let $h_i'' = h_{it'+1}$ be the health status of the patient that is assessed when he is visited at the ED. Against this background, using the triage scheme, the health regulator sets a severity threshold h_R that separates appropriate from inappropriate ED visits. If, following the on-site clinical assessment, patient's health is found to be above the regulatory threshold $(h_i'' > h_R)$, the episode is classified as inappropriate.

To sum up, two conditions are required for recording an inappropriate ED attendance. First, the patient observes a worsening in his health conditions such that $h_i' \leq \tilde{h}_i$ and therefore he chooses to visit the ED. Second, once the patient reaches the hospital, the health status must be such that $h_i'' > h_R$, indicating that he could have been treated in a less intensive setting according to the triage criteria. The larger the individual threshold $\tilde{h}_i$, the more likely the patient opts for visiting the ED inappropriately, other things equal. The estimation strategy will be designed consistently with the framework illustrated above according to which inappropriate ED visits arise from the interplay of two sequential processes.

4. Data and estimation issues

4.1 The data

The empirical analysis is performed for episode of admission. For the year 2012, we have gained access to the list of residents (natives and foreigners) registered with the NHS, together with the records of their ED admissions. These records include a patient identifier and for each ED admission track the date, the triage code and whether the visit is followed

by hospitalisation. Thanks to the triage information, we are able to single out inappropriate ED admissions identifying those classified as *white codes*.

Patients are registered with the around 3,000 GPs active in the Region in 2012 and we restrict the estimating sample to regional residents aged between 14 and 50. The upper age threshold is introduced to keep balanced the age profiles of natives and migrants. In fact, as the country has experienced intense migration flows only in the last two decades, foreigners aged 50 or more are almost absent in older cohorts. We exclude children from our analysis as paediatric emergency services follow different channels. Each patient is characterised by a unique encrypted identification code consistent across datasets. Such code is used to link patient information with the GP and with the records for emergency services. The citizens covered in our estimating sample account for a total 555,765 ED visits, 19% of which are white codes.

Patient-level Information include age, gender, hospitalisation in previous years (2011 and 2010) and the number of years each citizen has been registered with the same GP. The latter variable captures in the first place whether the relationship between the patient and his primary care physician is a long-term one. However, since changes of the GP are very limited unless the patient changes area of residence, it can also be taken as a proxy the time spent in the same social context in Italy.

In the policy debate it is frequently argued that improvements in the organization of primary care (professional networks, extended accessibility etc…) may reduce emergency admissions, especially inappropriate ones. To account for this, we also consider a set of controls referred to the GP, to list and practice characteristics. They comprise GP gender and seniority; size, average age, gender composition and share of foreigners in the list; extended opening of the practice, type of practice (group vs. single handed), availability of nursing staff, distance to the closest ED. To account for the local characteristics of ED services we include a dummy for residents in districts that have a hub centre for emergency care. Finally, we include district dummies to control for local conditions.

Using information on citizenship, we classify patients according to macro-areas of origin that largely reflect the international classification adopted by the Italian National Statistical Office (ISTAT). For Europe, we consider four groups. The first group is composed by citizens of the

EU-15 Countries of the European Union other than the Italians.[3]. The remaining (eastern) EU countries of more recent admission to the EU form the group labelled *EU-28*. Finally, we distinguish between *Eastern extra UE*, and *Western extra UE* citizens.[4]

For Africa, we consider four groups: *North Africa*, *West Africa* and *East Africa Central-South Africa*. For Asia, we aggregate immigrants in three groups: C*entre-South Asia, West Asia and East Asia*. Migrants from the Americas were divided between those from *North America* and those from *Centre-South America.* Finally we aggregate the few citizens from *Oceania* in a unique group.

4.2 Empirical strategy

As previously discussed, the final outcome of interest (i.e. being assigned a white code or not) results from a two-stage process. The ED visit is initiated by the patient, while, conditional on admission, a triage code is assigned to attenders by the medical staff following the regulatory guidelines. According to our theoretical framework, the decision to go to the ED results from the comparison between patient's health status $h_i$and the individual critical threshold $\tilde{h}_i$. ED attendance occurs if the health status falls below the threshold $h_i < \tilde{h}_i$, leading to the necessary and sufficient condition ($\tilde{h}_i - h_i \geq 0$) for an ED admission. In line with the literature, we define this as the *selection* stage, expressed as follows:

$$y_i^{Sel} = \tilde{h}_i - h_i'' = \boldsymbol{Z}'\boldsymbol{\gamma} + v \quad (4)$$

However, what is observed is not the actual realisation of y_i^{Sel}, but only whether the variable takes a positive value or not.

In terms of the estimating model, we define the dependent variable ED of the first stage as:

$$ED = \begin{cases} 1, & \text{in case of ED admission ;} \\ 0, & \text{in case of no ED admission in 2012.} \end{cases}$$

The probability for the patient to go the ED can then be expressed as:

[3] Countries included in the *EU-15* group are: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Luxembourg, Netherlands, Portugal, Spain, Sweden and United Kingdom.

[4] The *Eastern extra EU* comprise Albania, Belarus, Bosnia-Herzegovina, Croatia, Kosovo, Moldova, Republic of Macedonia, Montenegro, Serbia, Turkey, Ukraine; *the Western extra-EU* comprise Andorra, Iceland, Liechtenstein, Monaco, Norway, Switzerland.

$$\Pr(ED = 1|\boldsymbol{Z}) = Pr\left(y_i^{Sel} = \boldsymbol{Z}'\boldsymbol{\gamma} + v \geq 0\right). \quad (5)$$

In the second stage, the observation of the triage is conditional on having visited the ED In the first stage. In this case, the outcome separates the episodes that truly require urgent care from those that could have been properly treated in less intensive settings. The latent process for the outcome of interest can be represented as follows:

$$y_i^{Out} = h_i'' - h_R = \boldsymbol{X}'\boldsymbol{\beta} + u \quad (6)$$

where h_i'' is the health status of the patient checked by the ED staff and h_R is the severity threshold set by the regulator through the triage. We do not observe the outcome y_i^{Out} but only a dichotomous realisation of the latent variable. The admission is classified as a *white code* $(WC = 1)$ if the health status of the patient by the time he is visited by the ED staff is found to be better or equal than the threshold set by the regulator $(h_i'' \geq h_R)$.

For the second stage, the observed outcome is a dummy variable WC defined as follows:

$$\text{WC} = \begin{cases} 1, & if \text{ admission is a } White\ Code\ ; \\ 0, & \text{if admission is not a } White\ Code \\ missing & \text{if the patient is not admitted to the ED} \end{cases}$$

The probability of receiving a *White Code* is:

$$\Pr(WC = 1|\boldsymbol{X}) = Pr\left(y_i^{Out} = \boldsymbol{X}'\boldsymbol{\beta} + u \geq 0|\boldsymbol{X};\ y_i^{Sel} \geq 0\right). \quad (7)$$

Under proper distributional assumptions on the error terms, the process can be modelled as a bivariate probit with sample selection (Van de Ven and Van Praag, 1981) and we obtain our estimating equations from (5) and (7).

In the first stage, the probability of attending the ED is estimated against a set of relevant controls using the full sample of observations, while, in the second stage, the probability of being assigned a white code is estimated on the subsample of ED attenders only.

In the first stage, the parameter vector $\boldsymbol{\gamma}$ for the probability of ED admission is estimated from the following equation:

$$\phi(\boldsymbol{Z}'\boldsymbol{\gamma}) + v = \phi\left(\gamma_0 + \gamma_1\, migrant + \cdots + \gamma_p z_p\ \right) + v \quad (8)$$

where $\phi(.)$ corresponds to the Probit link function, the vector of controls $\boldsymbol{Z}$ includes the variables previously discussed and presented in detail in Table 2. The main parameter of interest is the one associated to immigrant status with the dummy for *migrant* taking value 1 for foreigners and 0 for natives. Alternatively, we unpack the previous variable according to the area of origin of the patient by including the set of geographical dummies described in the previous section, with natives as reference group.

In the second stage, the estimating equation for the probability of $WC = 1$ conditional on attendance $\left(y_i^{Sel} \geq 0\right)$ is:

$$\phi(\boldsymbol{X'\beta}) + u = \phi\left(\beta_0 + \beta_1\, migrant + \cdots + \beta_p x_p\right) + u \qquad (9)$$

Following Greene (2011), we assume that the disturbances u and v are jointly normally distributed $(u, v) \sim N(0, 0, 1, 1, \rho)$ where ρ is the correlation coefficient. A Wald test on ρ allows to test whether the two equations can be safely estimated separately: a statistically significant coefficient ρ provides evidence that individuals are self-selected in the second stage and that the estimates of the final outcome model would be biased in case selection is not accounted for.

Although two-stage non-linear models can be identified by exploiting the functional form, exclusion restrictions are recommended as instruments to reinforce identification (Monfardini and Radice, 2009). For this purpose, it is necessary to identify variables that affect the first stage decision (here, ED attendance) but that can be safely excluded from the second stage (here, assignment of the triage code). In our context, good candidates are those variables related to the composition of the list of the GP , namely average age of patients in the list, share of male patients, share of foreigners. Since these variables may affect the patient-GP interaction, they can be expected to influence the relative propensity of a patient to seek a response from the GP as a substitute for the ED (*relevance*). In our framework, they can be expected to affect the individual severity threshold $\tilde{h}_i$ at which the patient switches from primary to emergency care. At the same time, once the patient has chosen to attend the ED, these features are not expected to exert a direct role on the assignment of the triage (*validity*), since they merely reflect characteristics of the individuals enrolled in the same list of the patient of interest, who are not involved in any aspect of emergency care. The identification assumption of the model is that the only channel through

which these controls affect the probability of a white code is through the first stage decisions, while it is ruled out the possibility that they exert a direct effect on the triage.

5. Results

In this section, we discuss the main empirical findings of the analysis. Table 1 displays the descriptive statistics. In the left hand side of Table 1 we present the data for the full sample, while in the middle and right hand side, natives and immigrants are displayed separately.

TABLE 1

Overall, immigrants display higher frequency of total ED attendances (0.353 vs 0.272) and of white codes (0.077 vs 0.052). Immigrants are slightly younger (34.3 years old compared to 35.6 of natives). The sample is reasonably well balanced in terms of gender, with migrants displaying a lower share of females (46% vs. 50% of natives). As expected, the number of years that patients spend with the same GP differs markedly, amounting on average to 10.8 years for natives and to 3 years for foreigners. Physicians have maximum allowed list size of 1500 registered patients which is more likely reached by physicians with longer seniority. Not surprisingly, given their more recent enrolment, migrants are registered with a GP characterised by a shorter seniority on average and the average age of patients in the list is lower as well.

TABLE 2

In Table 2 we present the distribution of foreigners according to their areas of origin in our estimating sample. The largest group comes from Mediterranean Africa (Morocco and Tunisia in particular) followed by Eastern Europe, divided between countries of more recent admission to the EU (Romanians in particular) and countries not part of the EU, such as

Albania, Ukraine and Moldova. Finally, considerable migration flows are recorded also from continental Africa and Centre Asia, in this former case mostly from Pakistan.

TABLE 3

In the left-hand side of Table 3, we present the estimates of the first stage equation as specified in (8), where the dependent variable is binary and takes value 1 for each ED attendance, and 0 if the patient never used the ED in 2012. All regressors are included in linear form, except for list size which is log transformed. The main variable of interest is the dichotomous indicator “migrant” and shows that, even after controlling for a set of relevant covariates, foreigners display a significantly higher probability of attending the ED compared to natives, a result consonant with most of the related literature.

Patient age and gender significantly affect the probability of ED admissions, with males and older patients being less likely to use the ED. Having been hospitalised in the two years before is a significant predictor of later ED attendance. Interestingly, a longer enrolment with the same GP negatively affect the outcome, suggesting that, other things equal, a stable relationship with a specific physician contribute to contain ED use, whereas GP seniority has no significant effect. The influence of practice characteristics is significant as well. The adoption innovative organisational models in the practice, as proxied by the presence of a nurse and being part of a formally established professional network, reduces ED attendance probability, other things equal, while extended opening hours do not exert any effect.

List size and the average age of patients registered in the list come out as not significant. On the contrary, the share of foreigners and gender composition of the list positively and significantly affect the probability of using emergency services. This result points to a significant impact of list composition on the relative propensity of using the ED, as in several circumstances primary care may act as a substitute for emergency services. This findings support the relevance of the first stage instruments.

The right-hand side of Table 3 displays the estimated coefficients for the second stage equation of the heckprobit specification, as defined in (9). The dependent variable is the

probability of recording a white code conditional on ED admissions. The results show that migrants are more likely to be coded as inappropriate attenders than natives, but the magnitude of the coefficients is much smaller than the one recorded in the first stage. In terms of relative size of the effect, while the probability of attending the ED was 4.77% larger for migrants than for natives, the difference in the probability of receiving a white code conditional on admission drops to 2.75% (average marginal effects).

List characteristics are omitted from the second stage as exclusion restrictions. The estimated ρ coefficient is significantly different from zero and equal to -0.456. Such evidence outlines the importance of jointly estimating the two equations, since neglecting the impact of the selection process would lead to biased estimated coefficients.

The impact of the regressors differs from the first stage. Males are now significantly less likely to be coded as inappropriate attenders, while the opposite holds for the probability of attendance. In the same vein, also previous hospitalisations reduce the probability of receiving a white code, while it increased the probability of attendance. This evidence is consistent with the conjecture that previous hospital admissions can be taken as a proxy of poor health status, and such patients are more likely to meet the criteria for appropriateness. Interestingly, the only organisational variable affecting a reduction in white codes, after accounting for selection, is the GP participation in programs for coordinated extension of the practice opening hours. All other indicators that capture organisational innovations in primary care (nurse, association etc.) are no longer significant, once selection is accounted for. This evidence consistently points out that controlling for the process of endogenous selection into ED admission is important for properly assessing the probability of receiving a white code. Similarly, to the first stage, the role of economic incentives in the remuneration scheme for GPs appears negligible.

TABLE 4

Table 4 displays the results of a more general specification of the model described in equations (8)-(9). In particular, we include here quadratic terms for the most relevant controls that are entered as continuous variables, namely patient's age, years in the GP list

and average age of the list. The square of distance is omitted since the associated coefficient comes out not significant all specifications. In addition to that, the model is also augmented by interaction terms between the *migrant* indicator and key variables such as patient gender, years in list and distance to the closest ED. By doing so, our purpose is to test the robustness of our empirical findings concerning the migrant effect once we account for possible non-linearities and composition effects. The correlation coefficient ρ is negative and significant also under the new, more general specification, although of a smaller magnitude (-0.388). As for the fist stage equation, the coefficients for the quadratic terms are significant in all cases. In particular, once we account for non-linearities, the relevance of the average age of the list as instrument for the first stage is reinforced. The interactions between the migrant indicator and the set of controls for which one might expect additional cross-effects do not come out as especially important, and the baseline coefficient for migrant is little affected compared to the previous case.

Moving to the second stage equation, the most striking result is the drop of the coefficient of the main effect of migrant, which is no longer significant. In this specification the difference between natives and migrants is largely absorbed by the interaction between migrant status and gender, a result suggesting that, once we condition on attenders, the larger probability of recoding inappropriate ED in group of migrants concentrates among males in particular. The differences between natives and migrants measured by the average marginal effects amounts to 5.1% for the probability of ED attendance, and to 2.09% for the probability of inappropriate visits conditional on admissions.

TABLE 5

In table 5 we replicate the analysis previously reported in Table 3, except for the fact that the immigrant status has been unpacked according to the macro-area of origin of the patient. As for the covariates, previous results are by and large confirmed. In addition, we find that the different ethnic groups display a very heterogeneous patterns in terms of use of ED services. This evidence is consistent with the conjecture according to which cultural differences and socio-economic conditions, here summoned by the macro-area of origin of the patient, affect

the way in which individuals interact with the welfare and health care system. Consistently with this interpretation, we can see that, immigrants from EU-15 and North America, two groups that in Italy have in most cases a medium-high socio-economic status, use emergency services less frequently than natives. On the contrary, immigrants from Africa, in particular from the North, show the largest probability of using emergency services, followed by citizens from Centre-South Asia and Centre-South America.

Moving to the second stage outcome, notably we fail to find any difference between natives and migrants from most of the areas of the world considered. In particular, patients from none of the four African areas have a significantly higher probability of being admitted for minor conditions compared to natives. Similarly, no difference in white codes probability recorded for people from Centre- South America. Contrarywise, for some groups the difference recorded in overall attendance rates pass through also for inappropriate admissions. This is the case of migrants from Centre-South Asia and from Centre-East Europe that have higher probability for both overall admissions and white codes. If we include non-linear effects and interaction terms in the specification with area dummies (Table 6), the main effects are no longer significant for any areas of origin of the patients, similarly to the previous findings using the aggregate migrant indicator.

6. Conclusions

The access of the migrant population to welfare services has become an increasingly sensible issue in Western countries as consequence of large migration flows. Even if the implications on the labour market have attracted most of the attention, some recent contributions have investigated the effects on the health care sector. We contribute to such literature focusing in particular on the use of emergency services, that represent a highly sensible area of intervention for various reasons. Intense use of emergency care may be the consequence of exposure to high health risk (e.g. on-the-job risk or poor living conditions) but it may also signal poor access to alternative treatment channels, such as primary care. These problems often translate into a relatively high share of ED attendances for minor conditions, which hinder timely responses to severe patients and reduce overall efficiency.

We use Italian data from the Emilia Romagna region for the year 2012 and we take advantage of the four level triage system of the Italian NHS to separate appropriate from inappropriate visits (white codes), investigating the differences between natives and immigrants in total and inappropriate use of emergency services.

We model the problem as a two-stage process. First, the patient decides whether to visit the ED or not, based on self-assessment of health conditions and on the expected utility gains from the different care settings. Then, at the moment of the ED admission, the medical staff evaluates patient health and establishes whether the visit is appropriate or not. Consistently with such framework, our empirical strategy is based on the estimate of a bivariate probit model with sample selection, where GP list characteristics act as exclusion restrictions.

When migrants are grouped in a unique category, our results show that they have a significantly higher probability of visiting the ED compared to natives, a finding in line with previous evidence. Yet, conditional on being admitted to the ED, the difference compared to natives in the probability of being an inappropriate attender drops substantially. More precisely, the probability of visiting the ED for migrants is twice as larger than the difference in the probability of receiving a white code conditional on admissions.

If we unpack the migrant status, introducing dummies for the macro areas of origins of the foreigners, we find a remarkable heterogeneity in sign and magnitude of the associated coefficients. Migrants from different parts of Africa, from Central Asia and Eastern Europe display a significantly higher probability of using the ED than natives. At the opposite, EU-15, North America and East Asia are the areas whose citizens use the ED less. Most notably, for most areas the differences are no longer significant when we consider the probability of inappropriate admission conditional on attending the ED.

Overall, our findings suggest that the problems associated to the “excessive” use of the emergency services among migrants might be smaller than they appear when looking at raw data concerning total admission. Much of the difference recorded in average use of the services seems to refer to patterns of admissions for truly severe cases, likely due to different underlying health conditions and higher exposure to risk in the case of migrants. As for the concerns of possible high rates of avoidable ED visits concentrated on the migrants group, this emerges in general as minor problem in terms of magnitude of the estimated

effects. Yet, we identify a few groups that display significantly higher probability of inappropriate admissions, such as citizens from Central-South Asia and East Europe. These groups are promising targets for policy initiative promoting better information on the possibility to use alternative channels for treating minor problems.

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