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Ciclo XXVIII  
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# Health systems and inequality: the case of migrants in Europe

settore scientifico-disciplinare: SECS-P/01

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Anno Accademico 2016/2017

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**To my Grandma Natalina, “*ovunque sei, ci sei*”.**

**To my parents, Cristina and Vinicio for what they know, for what they have done.**

## **ACKNOWLEDGMENTS**

I would not have been able to write this dissertation without the guidance of Dr. Silvia Ferrini. I am indebted for her priceless scientific, professional and human contribution, and for the support and patience she has granted me. I am grateful for the help and encouragement that Prof. Samuel Bowles and Prof. Alessandro Petretto provided me. I am truly indebted to the former, “*a human being that was given to fly*”, and whose help has been invaluable to me, while the latter has trusted and supported me the most during these years. I consider it a privilege to see myself as a scholar following their steps, and to have had both of them as mentors.

Further thanks are due to Prof. Giorgia Giovannetti, who pushed to take that long, arduous, but fruitful road, and to Drs. Paolo Brunori and Fabio Boncinelli for their kindness, and their unwaveringly brilliant and inspiring recommendations, suggestions and general support. Last but not least, I would like to thank my colleagues from the University of Siena, the *Fanfas Cariocas*, for their support and friendship, and in particular Luca Ferrari and Pietro Guarnieri.

My entire work has benefited from a visiting period at the *Agència de Salut Pública de Barcelona*, where I collaborated to the 7th Framework Programme (grant 278173) SOPHIE, namely *Evaluating the Impact of Structural Policies on Health Inequalities*. I am deeply grateful for the support of Drs. Laia Palencia and Davide Malmusi in Barcelona: this work was enhanced and enriched by this multi-disciplinary collaboration.

My deep gratitude goes to Dr. Gaby Umbach, my supervisor at the *European University Institute*, for giving me the unique opportunity to work in the *Global Governance Programme*. Being part of the *GlobalStat* team has been a great experience: the weaker the EU, the more I feel European. Thanks to Laura Bartolini, Dr. Ruby Groupas, Prof. Orit Kamir, Dr. Debora Valentina Malito, Prof. Sabrina Marchetti, Dr. Alexandra Ricard-Guay, Prof. Anna Tryandafillidou for having shared concerns,

encouragements and suggestions with me and, in particular, to Laura for our stimulating capacity to grow together. I consider all of you friends more than colleagues.

Thanks to all the incredible people involved in the *EUI Refugee Initiative* for their efforts in fighting bureaucracy and realizing daily changes to themselves and so to the world: our collective actions have inspired deeply my last year of research. In particular, thanks to Diarra and Jallow for our mutual sharing of feelings and friendship.

\*\*\*\*\*

And now for the sentimental part. Thanks to my family, my whole tribe: you are the rock of my life, thanks for being always where you are, and thanks to Alessia and Elena for being part of that loving tribe.

Thanks to Maria, for having helped me to become a more authentic version of myself; to Rita, for being the irreplaceable *Spring* of my life, always at my side; to Stefano, for being a social 7 as my soul brother; to Sanja, for being *moja sestra*: our mutual confidences changed my existence forever. Thanks, then, to Sara and Bebbi: home is whenever I am with you. Thanks to Alfredo and his encouragement to be always proudly radical, with the necessary mix of *jugonostalgija*, *locura* and pop culture.

Thanks to Ilaria, when I watch her eyes, I see mine; and to Giulia, simply as immensely g.d.e. I am grateful to you both, because we have transformed our home in a timeless promise of presence. Thanks also to Cristina, for having taught and demonstrated me that I am never alone. Further thanks are due to Agnese and Sara, for being hands on which I know I can rely on; to Fiorella and Valentina, my luxury friends, for being the laugh in which I know I can lose myself; and to Marta, who first told me "I always thought of you doing a Ph.D.": here we are, my friend.

Thanks to Claude and Giamba for having exactly the same invaluable capacity of putting smiles on my face, even if it is raining outside. To Raian, for his big Persian shoulders and for his hugs: never asked, always happily received. Thanks to those – in particular Chiara, Daniela and Hugo - who have

reminded my “institutionalized soul” that since institutions are made by human beings, then people really have the power to change institutions; yet change is only real when discussed and shared collectively. And there is not such a thing as the world-community.

Thanks to the *Ciocis* and *Kung-fu* crews – in particular to Caterina and Alessandro: spending time, making the revolution and dancing with you, wherever we are, are among the things which make my time great; to the *Cattivi Maestri*, for being so critical, Marxist and passionate at the same time, to Francesca, with whom friendship is as beautiful as a concert tour; to Casa Bassi - in particular to Alba, Alessandra, Claudia, Gian and Matteo who have been my family along these years.

Thanks to all of you for being part of my life, of my adventures, of my pain, of my travels, of my struggles, of my fun, of my melancholy, of my research, of my dreams, of my reality, of my anger against injustice and of my hunger for freedom and equality. Thanks for accepting me as I am and letting me feel your constant love.

It very well known that doing a Ph.D. is mainly a journey inside ourselves. Thanks for being the port to which I know I can come back when in trouble, thanks for being the wind blowing on through my sails.

## OVERALL SUMMARY

The European continent is composed by 54 countries, 28 of which are Member States of the European Union (EU): the whole EU population amounts to almost 510 million and 6.72% are legal migrants, which corresponds approximately to 34.3 million of foreign-born residents (Eurostat, 2016). In addition, the intra-EU migrants result 18.5 million - 3.62% of the European population - and the irregular migrants are estimated in between 1.9 million to 3.8 million. Moreover, according to the latest statistics released by the United Nations (2016), nowadays the European continent hosts the largest number of migrants worldwide, almost 76 million of migrants.

As a consequence, migration is one of the key issues in the international as well as in the European political and public debate. It represents a key challenge for the modern societies and, together with the adaptation of welfare and more specifically of the health system to its new needs, has been extensively investigated in social sciences. This thesis is a study of the health discrimination suffered by migrants in Europe, through a quantitative analysis of the health inequalities suffered and some health indicators contained in the *European Union Statistics on Income and Living Conditions* (EU-SILC) dataset, years 2007-2013.

Introduction Chapter: **THE HEALTH INEQUALITIES SUFFERED BY MIGRANTS IN THE EUROPEAN HEALTH SYSTEMS** (pp. 16-49)

The whole chapter investigates **health** as a good: from the supply side the two managerial aspects are the provision model and prices-quantity of healthcare treatments available in the market, on the demand side the three very important characteristics that we aim to investigate are access, utilization and quality of final outcome.

These determinants of health are studied for European countries towards vulnerable groups, in particular migrants, with the intent to depict the confounding factors – such as policies of integration,

mechanisms of contribution to health systems or welfare systems – that may influence the provision of health cares.

1<sup>st</sup> Chapter: **EQUALITY OF OPPORTUNITIES IN HEALTH: HOW EUROPE TREATS MIGRANTS**

(pp.50-72)

This chapter is focused on the role played by **migration** as possible determinant of health inequalities, as factor beyond the individual control and embedded in her own nature. Moving away from epidemiological and socioeconomic perspective, this study has a pure political economy focus and analyses the role played by the *equity in health* principle in describing the migrant health. The concept of equity in health remains always linked to the sphere of redistribution of resources, which does not fully capture the migration phenomenon affected by wider health inequalities. For this main reason in this chapter the preference is using the concept of **equality of opportunity** (EOp) to better describe the migrants' health in Europe, assuming that migration itself results being the original bottleneck, which does not allow people to access the same set of options in terms of health access, quality and utilization.

The concept of the EOp, combined with the explanation of health inequalities, as the **equality of opportunity in health** results to have a growing attention in the recent literature and plays a vital role in understanding the psychosocial wellbeing and integration of migrants, considering the set of opportunities enjoyed regardless of circumstances.

2<sup>nd</sup> Chapter: **INEQUALITIES BY IMMIGRANT STATUS IN UNMET NEEDS FOR HEALTHCARE**

(pp.73-104)

The aim of the research is to assess whether there are inequalities in **unmet needs** (UNs) for healthcare between natives and migrants within Europe. We used cross-sectional data from the *European Statistics on Income and Living Conditions* (EU-SILC) 2012 for a set of 17 countries. Our

dependent variables were perceived unmet needs for medical and dental examination or treatment. Our main independent variable is **immigrant status**, defined using a combination of country of birth and citizenship (nationals born in the country of residence, reference; European Union-born nationals; non-EU born nationals; EU-born foreigners; non EU-born foreigners). The prevalence ratios of unmet needs according to immigrant status are obtained through gender-stratified robust Poisson regression models, sequentially adjusted by age, health status and socio-economic characteristics.

The prevalence of medical unmet needs, adjusted by age and health status, is higher in foreign women, both EU-born and non-EU born, but it is no longer significant after the socioeconomic adjustment. For dental unmet needs, the risk is significantly higher for all foreigners, EU and non EU-born, men and women. Once adjusted for socioeconomic variables significant inequalities persist, although diminished, for both EU-born and non-EU-born foreign men and EU-born foreign women. This study contributes to the discussion of adequate access to healthcare systems and adaptation of services for migrants. While inequalities cannot be detected for naturalised immigrants, the higher risk of unmet need affecting foreigners, even within the EU, deserves further attention.

### 3<sup>rd</sup> Chapter: **EU ECONOMIC CRISIS, SAH AND UNS OF MIGRANTS IN A LONGITUDINAL PERSPECTIVE** (pp. 105-136)

The objective of the chapter is to disentangle the differences in the **self-assessment of health** (SAH) and **UNs**, medical and dental, between natives and migrants from outside the EU and across the European countries in the period of the global **economic crisis**. If the crisis produced disparities in health levels between native and migrants, due to their level of occupation or for other socio-economic characteristics, this could reflect in a worsening of the health perceptions by migrants. The main research questions tested on EU-SILC data are whether in seven years, from 2007 to 2013, the economic crisis affected the SAH and UNs in 9 European countries and to what extent the crisis effect were perceived by migrants. The average marginal effects of SAH e UNs according to immigrant

status are obtained through logit regression models per general effects according to the country of residence, then per mechanism and policies of integration.

Results suggest to investigate the discrimination suffered by EU-migrants compared to locals and third-country nationals since being EU citizen who reside in another country of the Union, different from the locals, implies an increase in the probability of declaring bad SAH or having medical/dental UNs. Focusing on general effects of the most vulnerable groups, the health inequalities suffered by EU-migrants become more evident at group level: and that might be related to their higher expectations towards European health systems. Considering country characteristics, mechanism of contributions and policies of integration the crisis seems to not have played an important effect with the exception of dental UNs, and also for medical UNs in case of policies. Indeed, being third country national seem to confirm the *healthy migrant effect* illustrated in the Introductory Chapter, only if the needs are not taking into consideration the socio-economic position.

## LIST OF ABBREVIATIONS

Assimilationist countries: ASS  
Average marginal effects: AMEs  
Austria: AT  
Belgium: BE  
Black minority ethnic: BME  
Body Mass Index: BMI  
Bulgaria: BG  
Commission on Social Determinants of Health: CSDH  
Confidence Intervals: CI  
Croatia: HR  
Cyprus: CY  
Czech Republic: CZ  
Denmark: DK  
Equality of opportunity in health: EOpH  
Equality of opportunity: EOp  
Estonia: EE  
EU-migrants/Intra-EU migrants: EU-migr  
European Central Bank: ECB  
European Commission: EC  
European Social Survey: ESS  
European Union Statistics on Income and Living Conditions: EU-SILC  
European Union: EU  
Exclusionist countries: EXC  
Finland: FI  
France: FR  
French Health, Health Care and Insurance Survey: ESPS  
General practitioner (s): GP(s)  
Germany: DE  
Greece: EL  
Gross Domestic Product: GDP  
Horizontal Iniquity Index:  $HI_{wv}$   
Hungary: HU

Inequality of opportunities in health: IOpH  
Inequality of opportunity: IOp  
International Monetary Fund: IMF  
International Standard Classification of Education: ISCED  
International Standard Classification of Occupation: ISCO  
Italy: IT  
Latvia: LV  
Lithuania: LT  
Luxembourg: LU  
Malta: MT  
Member States of the European Union: MS  
Migrant Integration Policy Index: MIPEX  
Migration Policy Group: MPG  
Multicultural countries: MULT  
National Health System: NHS  
Nationals/Natives: NAT  
Netherlands: NL  
Non-communicable diseases: NCDs  
Norway: NO  
Organization for Economic Cooperation and Development: OECD  
Out-of-pocket: OOP  
Poland: PL  
Portugal: PT  
Romania: RO  
Self-health assessment: SAH  
Self-health rated or reported: SRH  
Slovakia: SK  
Slovenia: SL  
Social Health Insurance: SHI  
Socioeconomic position: SEP  
Spain: ES  
Survey of Health, Ageing and Retirement in Europe: SHARE  
Sustainable Development Goals: SDGs  
Sweden: SE

Third-Country Nationals: TCN

Total Health Expenditure: THE

UK National Child Development Study: NCDS

United Kingdom: UK

United Nations International Children's Emergency Fund: UNICEF

United States of America: USA

Unmet Need(s): UN(s)

World Bank: WB

World Health Organization: WHO

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### THE HEALTH INEQUALITIES SUFFERED BY MIGRANTS IN THE EUROPEAN HEALTH SYSTEMS

#### 1. What is health?

One of the most fascinating aspects of *health* as a good is the different perspectives from which it can be studied and the spill-over effects having by its own nature in the life of individuals: guaranteeing its coverage and furniture is a question of equity and humanity at the same time. According to the consolidate literature of the *Public Choice Theory* (Samuelson, 1954), *health* is a *merit good* (Musgrave, 1959) with certain characteristics (Arrow, 1963) present in both, demand and supply sides - such as externalities, information asymmetry, experience good, doctor-patient relationship, moral hazard and adverse selection phenomenon (linked to the uncertainty) and paternalistic public supply. Given those economic characteristics, health should be provided on the ground of individuals' needs, concept more related to the sphere of equity, rather than their ability or willingness to pay, which are the principle animating the *efficiency* dimension. By its own nature healthcare is an input into a productive process: medical treatment has a consumption effect – individuals feel better when are healthier – as an investment one – the healthier you are, the more active in the labour market you are (Grossman, 1972).

The whole chapter investigates *health* as a good: from the supply side the two magisterial aspects are the provision model and prices-quantity of healthcare treatments available in the market, on the demand side the three very important characteristics that we aim to investigate are **access**, **utilization** and **quality** of final outcome. These determinants of health are studied for European welfare systems towards vulnerable groups, in particular migrants.

As stated in a famous editorial of Lancet (2009), we might consider health not purely as well-being - such as the absence of illness or diseases – but as a more complex, dynamic and not fixed concept. For the human being health is more likely to be the ability to adapt to the surrounding environment, in a biological interdependence with the totality of the living and inanimate world. It varies for every individual, depending on her circumstances and according to her needs. Therefore, the more relevant goal of the analysis is to evaluate in which ways *equity* – instead of *efficiency* – is guaranteed in the allocation of health treatments within the population. Three different perspectives are available to assess the equity within the distribution:

1. equality of access;
2. according to own needs;
3. equality of health (Giannoni, 2007).

For some authors (Culyer and Wagstaff, 1993) that the concept of needs is secondary in defining the *equity in health* as the capacity to benefit healthcare services is limited and not allowed to be expressed, while access and utilization in healthcare appear crucial concepts for defining equity which might be particularly relevant for migrants. It is worth clarifying that for several authors access and utilization are synonymous, while we can explain that:

➤ for some authors (e.g. Le Grand, 1982; Mooney, 1983) the access to healthcare and the received healthcare treatment are two different concepts, as the former gives the entitlement to receive a treatment, while the latter is the effective care. On this ground, equity is respected only if the access is granted;

➤ for some others (e.g. Culyer and Wagstaff, 1993) equity in access requires only equity in the treatment effectively received and not in the entitlement granted by law, since according to them the equity is valued only through the equality of health levels of different individuals;

➤ for others (e.g. Goddard and Smith, 2001) the only way to observe if the access is granted is to measure, through indicators, the utilization of healthcare services.

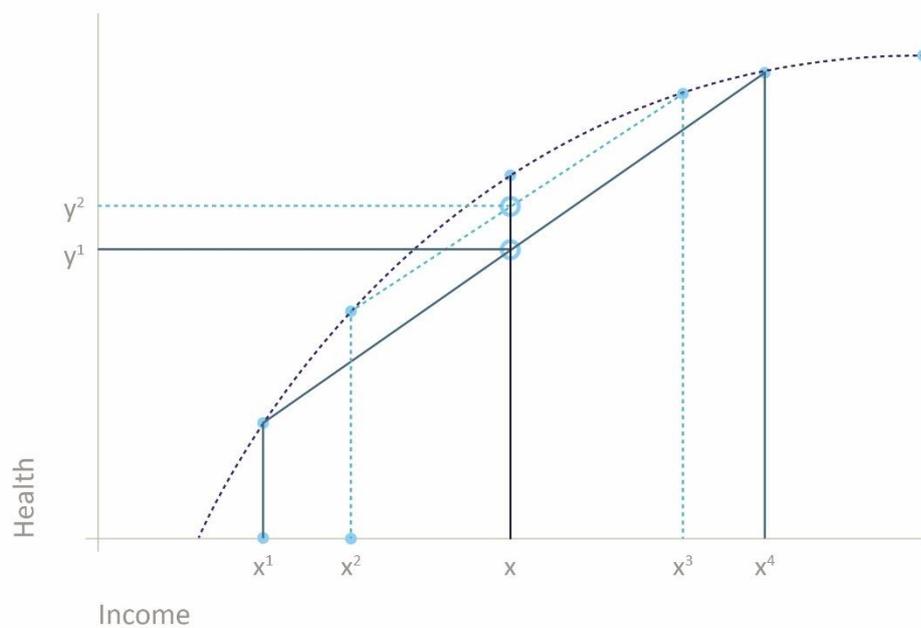
In this theoretical framework the role played by the inequalities in guaranteeing the equality of opportunities in accessing the health good plays, therefore, a central role. In the Western world, more precisely in Europe, the issue of equity remains central in structuring healthcare services, especially for the most vulnerable groups of the population, such as migrants. In this Chapter, we offer an overview on health inequalities and their social determinants, in order to better underline the magisterial importance that they have in guaranteeing health coverage for migrants in the European societies. A broad literature review is presented to shed light on the determinants of health inequalities in the migrant's population for better managing and designing health policies.

In this study we analyse the migration [Chapter 2] and the country [Chapter 3] effects in the definition of self-health assessment and unmet needs, as proxies of access to healthcare services, and the principles which might regulate the provision of European healthcare services [Chapter 1].

## 2. Different economic perspective on complexity

As consolidated, the relationship between health and income is curvilinear: the beneficial health effects of an increase of income seem to have a greater impact at lower income levels than higher, with decreasing marginal health returns in higher income ranges (World Bank, 1993); although the indirect effects of lower income have been demonstrated on the behavioural and psychosocial factors (Mackenbach *et al.*, 2005). Indeed, as illustrated in **Figure 1**, it has been widely studied the concavity of the relationship between individual income levels and health provision (O'Donnell *et al.*, 2015; Deaton, 2003).

**Figure 1. The individual level relationship between income and health**



Source: Author's elaboration based on Subramanian and Kawachi (2004).

Recalling the evidence on material deprivation - which reveals that ethnic inequalities are caused by a positional disadvantage of migratory economic position in the lowest income quintiles (Kawachi *et al.*, 2005; Isaacs *et al.*, 2004), and so with a limited access to material resources – we can easily

adapt the example to our case. Suppose that in a hypothetical society consisting of just two individuals, there is a rich one with income  $x_4$  and the poor with income  $x_1$ . Transferring a given amount of money - such as the amount  $x_4$  minus the amount  $x_3$ , from the rich to the poor, will result in an improvement of average health - from  $y_1$  to  $y_2$  – given that an improvement in health levels of the poor more than offsets the loss in health of the rich. By transferring incomes from the relatively flat part of the income-health curve, there may be no loss in health for the wealthy but an important societal better off. In case that the rich one is also a native and the poor individual is a migrant, some additive components poorly studied and understood play a further role in the income-health worsening relationship.

As shown, an aggregate relationship between the average health status of a society and the level of income inequality in a society could be observed if the individual-level income and health present a concave relationship (Subramanian and Kawachi, 2004). This concavity is also known as the “*inequality of inefficiency*” (Wilkinson, 1996; Wilkinson and Pickett, 2008), and in the case of migrants is given by personal characteristics determining the health outcome  $y$  by:

$$y = \beta_0 + \beta_1x + \beta_2z + \varepsilon \quad (1)$$

where  $x$  equals to the individual personal characteristics – such as age, gender, migration status, etc. – while  $z$  composed by country level determinants – such as the treatment provision, cost, ect. – plus  $\varepsilon$  as disturbance term (residual factor). Therefore, in the European case of study, we can describe the access to healthcare services  $a$  of an individual  $i$  in a country  $k$  as described by (2):

$$a_k^i = \delta_k, \delta_m, \delta_{k * m} \quad (2)$$

where  $\delta_k$  is the dummy variable describing the country,  $\delta_m$  the dummy variable for being migrated and  $\delta_{k * m}$  the interaction dummy for being migrated in a determined country. In other words, the link between the economic well-being on a nation and the improved health status is not automatic or universal (Sen, 1999; Subramanian *et al.*, 2002). It seems likely that other factors, such as the degree of equality in the distribution of the national product - especially with government policies supporting the living standards of poor - matter in their own right for health and human development. Overall, the improved population health, both in terms of increased averages as reduced inequalities, and the investment in public health should be the goals for poverty and marginalisation reduction of a country. Indeed, if migrants/poorer are integrated as healthy citizens they can easily earn an income, and so seeking for medical care, nutrition, and have the freedom to lead healthier lives (Sen, 1999).

The classical economics of migration has been focused on the neoclassical models (Todaro, 1969; Harris and Todaro, 1970; Bencivenga-Smith, 1997), based on the maximisation of von-Neumann-Morgenstern utility function (1944), and on the New Economics of Labour (Stark, 1991; Mincer, 1978). The drivers of migration – such as expected wage, income, social and human capital investments – have been analysed accurately (Massey *et al.*, 1993, 1998) in the famous push-pull framework theory. Further, the diversification of the risk in choosing the destination countries (Simon, 1983; Katz and Stark, 1978) and motives as the different investment in capitals – cultural, financial, symbolic and social (Bourdieu, 1986) – have been tried to give an exhausted portrait of the migration economics, describing what is happening mostly from the demand side of migration.

Moreover, the recent behavioural contributions in a ‘migrant prospect theory’ (Kahneman and Tversky, 1979, 1982; Mankiw, 1998; Czaika, 2015) have been enriched the theoretical framework, considering also the individual or groups beliefs of migrants towards the destination countries, defining the type of investment projects for gaining a status quo with deep loss-aversion.

Scant is the attention on the impact of migrant inflows on the welfare systems of destination countries, especially in Europe. Nonetheless, in health economics it is becoming everyday more evident that migrants' health represents a great challenge. That is why we have been dedicated the whole study to picture the European health situation and to suggest some possible political economic advices to prevent future emergencies from the supply side. Health poses a serious question of inequality and social exclusion; understanding variables, founders and cofounders of health and social inclusion is crucial for studying the determinant of access, use and quality of health services.

### 3. What are the health inequalities and social determinants?

The **health inequalities** are considered as the outcome of health-related chances, unequally distributed in the population, mainly due to belonging to different social classes, gender, ethnicity or nationality. These inequalities are defined as “the differences in health, which are not only unnecessary and avoidable but, in addition, are considered unfair and unjust” (Whitehead, 1990, p.6) “socially, economically, demographically and geographically” (Solar and Irwin, 2010, p.12), and “systematic, socially produced and unfair” (Whitehead and Dalgren, 2006, p.2).

According to the *World Health Organization* (WHO) Glossary, the health inequalities can be defined as differences in health status or in the distribution of health determinants between different population groups. Some of the health inequalities are determined due to biological variations or free choice while others are attributable to circumstances and conditions out of individual control. In the first case it may be ethically or ideologically impossible to change health determinants and, so, health inequalities are unavoidable. On the contrary, in the second case, the uneven distribution of health determinants may be unnecessary and avoidable as well as unjust and unfair, so that the resulting health inequalities also lead to inequity in health. To sum up, health inequalities are differences in health, while the **health inequities** correspond to the subset of ethical problem related to the first (Asada *et al.*, 2015).

Historically, the study of the health inequalities started for the initiative of Marc Lalonde, Canadian Minister of Health, with the Lalonde Report (1974), which revealed the importance of the society structure in improving population health condition more than health systems. In 1980 the famous Black Report was published in the United Kingdom (UK), it presented an in-depth analysis of the role played by the universalistic system in reducing the inequalities. Further, thanks to the two Whitehall studies (*I* in 1967 and *II* in the 1980s in Marmot *et al.*, 1987, 1991) and to the Atchenson Report (1998), both conducted in UK, it has been revealed the inverse relationship between levels of

mortality and morbidity with the level of social class. Starting from these inquiries, the study of the social determinants applied to the health inequalities and referred to a sub-group of population became popular in Western countries. In the Atkinson Report (2002) on indicators for social inclusion in the European Union (EU), it is highly recommended a less unequal distribution of health by income quintiles as part of the wider EU goal of social inclusion and cohesion.

The literature on the **socioeconomic determinants** of health has been largely extended and tries to combine health economics, epidemiology and sociology. Graham (2004) has distinguished between *social determinants* and *social determinants of health inequities* in order to better identify social factors that determine the health status of individuals and the social process that influences the unequal health distribution. The concept of health inequities regroups determinants into two types: *distal* that defines segments in which the society is organized – such as welfare, economy, work, culture – and *proximal* that refers to factors that bear directly on health – such as physiological and behavioural aspects (Tognetti, 2015).

The common inequities observed in health are influenced by social determinants which, as stated by the *WHO Commission on Social Determinants of Health (CSDH)* in 2008, “are recognized as the conditions in which people are born, grow up, live, working and age” (WHO, 2008, p.1). These characteristics are further shaped by the **socioeconomic position (SEP)**, rather than the social and economic factors that influence the position that individuals or groups hold within a society (Galombardes *et al.*, 2006). Marmot *et al.* (2010) establish the holistic list of the health social determinants with the famous *Marmot Review* in which the fundamental drivers - such as inequities in power, money and resources - give a new connotation into social determinants, further updated in Marmot *et al.* (2012) and European Commission (2013).

The presence of the socioeconomic gradient has been largely investigated by economists and scientists to explain health inequalities suffered by individuals, in terms of absolute or relative

poverty (Wilkinson, 1997), material deprivation (Marmot, 2005) and, nonetheless, especially between the association of health and education (Hernandez-Quevedo *et al.*, 2006; Kunst *et al.*, 2005; Grossman, 1999), income (Hernandez-Quevedo *et al.*, 2010; Van Doorslaer and Koolman, 2004, Mackenbach *et al.*, 2005; Black *et al.*, 1988), wealth (Deaton, 2002, 2003, 2013), gender (Palencia, 2014, Raine *et al.*, 2000, 2002), geographical location or ethnicity belonging (Giannoni *et al.*, 2016, 2010; Malmusi D., 2014; Szczepura A., 2005). In particular, the income-health inequalities in access to healthcare services – such as general practitioners (GPs), medical specialists, preventive medicine, hospitals and dental care – has been deepened in several studies (Van Doorslaer *et al.*, 2003; 2004; Bago d’Uva *et al.*, 2008a, 2009; Giannoni, 2007; Carrieri and Wübker, 2012). Indeed, the concept of income might not reflect the SEP, while other measures that take into account wealth or education might stand out as better alternatives (Costa-Font and Hernandez-Quevedo, 2012). Not all the inequalities are due to the SEP, for example the ones provoked by the depreciation of health capital over time or the biological or genetic features (O’Donnell *et al.*, 2015; Costa-Font and Hernandez-Quevedo, 2012; Wagstaff *et al.*, 1991).

As largely proved, health inequalities are present between nations and within countries (Marmot, 2005; Marmot and Wilkinson, 1999) and, even if the disparities are reduced in absolute terms in comparison to the previous century, it is still under debate whether the decrease might or might not be confirmed in relative terms (Mackenbach, 2012; *et al.*, 2002). Unfortunately, the riskier behaviours are concentrated in the more marginalized components of the societies (Marmot and Wilkinson, 1999; Doyal, 1983) and this diversity in risks is a great challenge (Kunst *et al.*, 2011), particularly in considering the differences due to SEP (Mackenbach *et al.*, 2008).

It has been demonstrated that differences in health behaviours are one possible determinant of the health status and life expectancy (Cutler and Lleras Muney, 2010; Adler *et al.*, 1994; Marmot M. G., 1978, 1991). At the European level, Majer *et al.* (2010) report that nations with lower SEP present

an increased risk of unhealthy behaviours with a large degree of socioeconomic inequality in health and life expectancy.

Most of the literature on inequalities in health and her determinants is focused on the circumstances out of individual control such as gender, family background and environment settings. Few studies are concentrated on the residual component of these inequalities, like the inequities suffered due to adopted health behaviours— such as smoking, drinking alcohol, poor diets and sedentary lifestyles (Helasoja *et al.*, 2006; Huisman *et al.*, 2005; Martinez-Gonzalez *et al.*, 1999).

There is a flourishing literature on risky health behaviours that considers health habits as the major source of preventable diseases and deaths (Cawley and Rhum, 2011; Zaninotto *et al.*, 2007), which are not less important (Bhopal, 2009) than the contagious diseases - often taken as a serious risk due to migration. It has been analysed the role played by the territory due to the economic development (Goryakin and Suhrcke, 2014) and urbanization in determining the incidence of non-communicable diseases (NCDs) and the influence of the living era in adopting certain health behaviours (Bartoll *et al.*, 2015).

It is well known that in different societies, health habits are highly influenced by the social gradient which continues to reproduce the health inequities (Kunst *et al.*, 1998) due to the educational and income individual differences (Cookson *et al.*, 2016). Therefore, our aim is to identify the factors, mediators and cofounders, which contribute of being the social determinants of the **inequality of opportunities in health** (IOpH) suffered by individuals, especially **migrants** who present unique and distinct characteristics from the rest of the population.

Despite the evidence on the role that economic and social hierarchies play on individual's health status - the wealthier people enjoy a better level of health, most of this relationship is influenced by unobserved factors (Costa-Font and Hernandez-Quevedo, 2012). According to the mainstream

literature, the health inequalities have been studied through methods based on Lorenz concentration curves and indexes (Wagstaff *et al.*, 1991, 2000 a/b, 2003; Wagstaff, 2002; Jones and López Nicolás, 2004; Koolman and Van Doorslaer, 2004; O'Donnel *et al.*, 2008; Erreygers, 2009) in order to capture the relative dispersion expressed by inequality distribution over time and space (Costa-Font and Hernandez-Quevedo, 2012). Contrary to the common approaches, in this work, we adopt the reflection of Fleurbaey and Schokkaert (2009), according to whom, a link is needed between the literature on socioeconomic inequalities in health/health care and the social choice on equity, responsibility and compensation (Roemer, 1998, 2002; Fleurbaey, 2008). As it will be extensively explained in Chapter 1, the IOpH approach results more valid for studying health inequalities, since they cannot be disentangled by the inequalities suffered in other domains. Given that the social objective is to minimize unfair inequalities in welfare, health becomes crucial in contributing to a higher welfare level and to let individuals enjoy the set of opportunities offered by societies.

#### **4. The health of migrants in Europe: why is important?**

The European continent is composed by 54 countries, 28 of which are Member States (MS) of the EU: the whole EU population amounts to almost 510 million and 6.72% are legal migrants, which corresponds approximately to 34.3 million of foreign-born residents (Eurostat, 2016). In addition, the intra-EU migrants result 18.5 million, 3.62% of the European population, and the irregular migrants are estimated in between 1.9 million to 3.8 million in the EU-27 (Kraler and Rechel, 2011; Morehouse, Blomfield, 2011; Clandestino, 2009) – rather than around 1% of the whole EU population, contrary to the popular perception (Düvell, 2009). It is very hard to give the exact portrait of the phenomenon given that includes persons who have entered illegally the countries, the over-stayers who have prolonged the time of their staying despite the expiration of their visas as the asylum seekers of whom the applications have been refused (Cimas *et al.*, 2016). Moreover, according to the latest statistics released by the *United Nations* (2016), nowadays the European continent hosts the largest number of migrants worldwide, almost 76 million of migrants. In the Western world, an increasing proportion of new-borns have parents or relatives with a migratory history or they are part of an ethnic minority (Grosser *et al.*, 2016).

As a consequence, migration is one of the key issues in the international as well as in the European political and public debate. It represents a key challenge for the modern societies and, together with the adaptation of welfare and more specifically of the health system to its new needs, has been extensively investigated in social sciences.

The health status of migrants and their health conditions are getting a prominent role in the public and global health debates. According to their specific framing, countries provide several level of health care coverage for different groups of migrants and the decision of what constitutes a medical emergency if patients cannot afford to pay are usually left to the provider (FRA, 2011; PICUM, 2010; Stanciole and Huber, 2009; Romero-Ortuno, 2004). The literature on ethnic and social health inequalities research is getting popular and investigates different aspects of this theme: the higher

risk of illness of minorities (Hadjar and Backes, 2013; Smith Nielsen and Krasnik, 2010), the health behaviours adopted (Dourgnon and Moullan, 2015), the difference in healthcare consumption (Essink-Bot *et al.*, 2012) as the role played by healthcare systems (Blom *et al.*, 2016), including asylum seekers (Norredam *et al.*, 2009) or irregular migrants (Suess *et al.*, 2014).

Historically the hypothesis of *healthy migrant effect* (HME) affirms that migrants have better health status than non-emigrants in the country of origin (Razum, 2000; Abraído-Lanza *et al.*, 2000) with a sort of “immigrant health advantage” (Acevedo-Garcia *et al.*, 2007, 2010), given that those with better health status migrate. Migrants from low-income countries have been described as sort of time travellers, coming from a past stage of the health transition and, so, exposed to fewer health risk factors, especially for NCDs (Razum and Twardella, 2002). However, it has been recently demonstrated that being a migrant can be a negative social determinant of migrant’s health (Rechel *et al.*, 2011) from the arrival to the permanence in the destination countries (Giuntella and Stella, 2016; Malmusi, 2014; Dominich *et al.*, 2012; Davies *et al.*, 2009; Antecol and Bedard, 2006; Marmot, 2005). Due to several factors such as poverty, deprivation, working conditions and discrimination in the labour market, the journey and then the living conditions in the receiving countries affect the opportunities of migrants in terms of received healthcare, suffered diseases and, therefore, the deterioration of their good health over time (Acevedo-Garcia *et al.*, 2010; Rechel *et al.*, 2013). It is also known as *exhausted migrant effect* (Tognetti, 2015; Bollini and Siem, 1995), having a dubious effect on the health of migrant second generation (Devillanova and Frattini, 2016).

Recently Moullan and Jusot (2014) pointed out that the difference in the health gap between migrants and natives in Europe can also be attributed to the large variation in the health status of nationals in European countries. Moreover, it has been demonstrated that in times of illness and economic crisis – with high rates of unemployment and retirement – migrants return to their home countries in *salmon bias effect* (Razum, 2006; Wallace and Kulu, 2014). Basically, it can be defined as “unhealthy re-migration effect” in which socially successful migrants with a lower mortality risk stay

in the host country, while less successful ones return home even before becoming manifestly ill (Razum *et al.*, 1998).

Further, social adversity and exclusion may be the causes for having higher incidence of mental disorders – such as schizophrenia (Ingleby, 2009), anxiety and depression (Lindert *et al.*, 2009) - among migrants. Indeed, the social exclusion and the marginality lived by the second generations seem to have devastating effects to a certain extent in some European countries.

As stated by Razum (2006), an ideal prospective migrant study would have to follow individuals before they migrate, in the country of destination and, in case of return migration, again in the country of origin in order to better understand the directions of these effects. Only, under these circumstances the actual effect of migration on health can be measured and assessed.

#### *4.1 The history of the legislative protection of equity in health*

As a consequence, the protection of health and of the principle of *equity in health* according to health needs become fundamental to the success of migratory projects: for migrants, for countries of destination and countries of origin. Following several international agreements, the destination country has to ensure the protection of health through the welfare system which should be an efficient health system for migrants and natives. As stated clearly in the WHO Constitution (1946):

*“The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition.”*

In 1978 at Alma Ata, in Kazakhstan (formerly part of the Union of Soviet Socialist Republics, URSS). during the International Conference on Primary Health Care, the *Alma Ata Declaration* was adopted: WHO, together with the *United Nations International Children's Emergency Fund* (UNICEF), reaffirmed the fundamental concept that health can be reached only overcoming the assistance disparities between North and South of the globe, but also within the same country. The Alma Ata

sanctioned, so explicit, equity as a principle of primary health care guide, and that is remembered as the first conference at international level during which this aspect was investigated (Materia, 2008).

Subsequently, at European level, in 1998 the WHO Regional Office for Europe has approved and spread "*Health 21: health for all in the 21st century*", a document that aimed to reach 21 health objectives for all the MS of the European Region by the year 2020 between and within MS, also among different socioeconomic groups. Contemporarily the *Millennium Development Goals* meeting held in New York, in 2000 the *Charter of Fundamental Rights of the European Union* has been established in Nice and the article n. 35 dedicated to Health, under the Title IV called Solidarity, reports that:

*"Everyone has the right of access to preventive health care and the right to benefit from medical treatment under the conditions established by national laws and practices. A high level of human health protection shall be ensured in the definition and implementation of all the Union's policies and activities".*

It is not casual that this article is under the theme of solidarity since highlights that the EU does not define the minimum level of standards in the organization and provision of health services, but the exclusive jurisdiction is left to MS (Jorio, 2008). Thanks to the articles n. 136 and 137 of the Amsterdam Treaty (1999), in the further Lisbon Treaty (2009) was highlighted the importance of removing any obstacles to the social inclusion in access to resources by all, of which health becomes fundamental. Then, with the Resolution n. 2010/2089 *Reducing health inequalities in the EU*, the European Parliament has remembered that ensuring equitable access to health care is a primary goal of the policy agenda in Europe, where:

*"Universality, access to high-quality care, equity and solidarity are common values and principles underpinning the health systems in the EU Member States."*

Moreover, the WHO (2000) aims at achieving health equity through the reduction of health inequalities among the measures of health system performance. To reinforce the European perspective on equity in health and social cohesion, the *Council of Europe Recommendation n.1755 Irregular Migrants Rights* (2006) and the *WHO Migrant Health Resolution n. WHA 61.17* (2008) have

been made more explicit the importance of migrants' health across Europe. In addition, given the refugee crisis, the amount of WHO and WHO Europe communications and initiatives for promoting equitable access and disentangling stereotypes on migrants' health is growing, in particular remembering that:

*“a health system is the ensemble of all public and private organizations, institutions and resources mandated to improve, maintain or restore health. Health systems encompass both personal and population services, as well as activities to influence the policies and actions of other sectors to address the social, environmental and economic determinants of health.*

(Tallin Charter, WHO Regional Office for Europe, 2008)”

In the *2030 Agenda for Sustainable Development*, following the Sustainable Development Goals (SDGs) declared in 2015, the singular MS as the EU as part of the international community agreed on the importance of individual health needs as the universalistic access and coverage to healthcare service, without however mentioning explicitly the migrant health relevance.

#### *4.2 Race, ethnicity and migration status: the paradigmatic UK case of study*

As already shown, of different nature might be the social determinants among which family background and ethnic culture can influence health habits and migrants might present higher prevalence of unhealthy behaviours and lower level of health. Historically in the Western societies, especially in the United States of America (USA) and in the UK, the international literature has been heavily investigated health inequalities suffered at race and ethnicity level, racializing and ethicizing these inequities (Tognetti, 2015; Kawachi *et al.*, 2005).

The USA are the example of family background and migrant health: the evidence collected demonstrates that black population shows a higher rate of mortality and morbidity for nearly all diseases, shorter life expectancy, a limited access to health care – diminished with time (Janes and Williams, 1989) - and very low use of modern technology in therapy due to high insurance costs (Dressler, 1993). In further studies (Heymsfield *et al.*, 1977; Ford and Cooper, 1991) it has been

shown a higher incidence of coronary disease among Afro-American women living in the USA than in women native to the continent. Clearly, we must pay caution while using the word “race” in an epidemiological context, but there is a lacking evidence on how structural policies, such as migration policies, influence health inequalities affecting migrants (Viruell-Fuentes *et al.*, 2012).

For the latter process, UK represents a paradigmatic case. In particular, the UK Government and National Health System (NHS) have only targeted individuals based on ethnic groups, disregarding the status of migrants, to investigate the social inequalities problem (Marmot, 2010). This is due to a lack of information on the status of migrants in ordinary administrative protocols such as hospital and primary care data (Care Quality Commission, 2010). Jayaweera (2014) points out that, apart for birth and death registrations, the “country of birth” and “year of arrival in UK” variables are not included in the majority of the administrative health related documents.

The UK population amounts to more than 64 million (Office for National Statistics, 2016) of whom almost 8 are foreign-born: the size of the foreign-born population increased dramatically from 3.8 million in 1993 to over 7.9 million in 2013, representing the 12.5% of the whole UK population (Rienzo and Vargas Silva, 2014). While it is internationally recognized the definition of who is a migrant, it still not very clear after how many years we may start to consider migrants as part of the local population and their health risks are as similar as those of local population (Grosser *et al.*, 2016; Gruer *et al.*, 2016). In some countries the second generation acquires the citizenship of the host county at birth – *jus soli*, while other remain “foreigners” or “aliens” until the major age – *jus sanguinis* (WHO, 2010).

Further, in the USA and UK the common practice is to consider race or ethnicity as the discriminated factor of locals versus migrants. However, the *theory of acculturation* – rather than the adoption of norms, values and behaviour prevalent in the receiving countries – has been used to explain changes in health behaviours among migrants such as higher levels of smoking, lower levels of breast feeding and diets with high fat content on rates of diabetes, cardio-vascular disease and

cancer (Hawkins *et al.*, 2008; Jayaweera and Quigley, 2010). If that theory is true, second or third generations of migrants could present health habits similar to the local-born population. The inflow of migrants might greatly increase the diversity in the health of populations and challenges the ability of national governments to forecast medical costs sustained by the national health systems.

Rechel *et al.* (2013) and Davies *et al.* (2010), using European dataset, report that health discrepancies between migrants and non-migrants disappear after controlling for their SEP. Contrary, Jayaweera (2013) reports that country of birth and ethnic differences in NCDs are present in the UK case study. Higher rates of hospitalization and mortality due to heart attack among men and women of South Asian, in Scotland; a higher prevalence of doctor-diagnosed type II diabetes among African-Caribbean, Indian, Bangladeshi, and Pakistani men and women in England; as a lower risk of getting cancer when all cancers are combined, for Asians, Chinese and Mixed ethnic groups in England compared to Whites. In a further study the Department of Health (2013) reports that among some ethnic minority groups there is a higher demand for primary health care than among similar White groups. The use of specialist outpatient and inpatient care appears lower among ethnic minority groups than equivalent White groups but it is still not consistent across gender, age or specialism. As reported by Jayaweera and Quigley (2010), in the first wave of the *Millennium Cohort Study* (2001-2002) emerges that 7.1% of mothers born abroad – particularly Pakistani and Bangladeshi- who gave birth in the UK, had no antenatal care compared to 2.4% of mothers born in UK. The *Confidential Enquiry into Maternal Deaths* (2006-2008) has revealed that Black African mothers, including refugees and asylum seekers, had a mortality rate four times higher than the White women (Lewis, 2011), due to lack of antenatal care, not adequate interpretation support from maternity services or late booking, particularly high among mothers of African-Caribbean and Pakistani ethnicity (Jayaweera, 2014). Additional evidence from the *Millennium Cohort Study* showed that Black Minority Ethnic groups (BME) women were less likely to access antenatal care services, although this effect has disappeared after SEP adjustments (Department of Health, 2013; Jayaweera and Quigley,

2010). Moreover, the study by Jayaweera and Quigley (2010) revealed that, nine months after giving birth, in young mothers the ethnicity variable seems more important than length of residence or improving socio-economic conditions as a predictor of cigarette smoking and alcohol consumption. The risk of particular chronic diseases is higher in some BME groups (Atkinson *et al.*, 2001). People from South East Asia have a higher incidence of cardiovascular disease and diabetes as Afro-Caribbean, who also have a higher incidence of stroke than the UK White population. All cancer mortality is lower amongst first generation BME migrants in Europe than host populations (Rechel *et al.*, 2013). Robinson and Reeve (2006) suggest that in case of infectious diseases the poor nutrition, the lower socio-economic conditions suffered as sub-standard and overcrowded housing in areas of deprivation are possible contributing factors. As an example the higher rates of tuberculosis and HIV are registered among non-UK born people (Health Protection Services, 2011), and in case of tuberculosis less than a half result diagnosed within five years of arrival (Health Protection Agency, 2013; Public Health of England, 2013).

What is missing again is the quantitative evidence that the length of stay might change the health status of migrants, given that in this study we define migrants as “persons residing outside their country of birth” instead of the ethnic minorities which are defined as “groups regarded by themselves or others as distinct from the majority population in terms of their origin, ancestry, culture, language, religion or collective identity” (WHO, 2010). Often the two definitions can overlap, but, as seen in the Western countries, some ethnic minority groups may be indigenous and made by descents of migrants.

For UK, it has been demonstrated that the migration produces a positive effect on the economic growth with a net fiscal benefits (Boeri, 2009; Dustmann and Frattini, 2014). Between 1994 and 2001 UK immigrants were less likely than natives to receive fiscal benefits or tax credits or also to live in social housing (Dustmann and Frattini, 2014). In-migration into the UK enriches the internal culture and is, also, associated with a range of benefits to the economy as migrants are often employed in

profitable industries and spends their earnings in the hosting country. On the other hand, it has been demonstrated that the effect of migration flows is mitigated by the following characteristics (Rowthorn, 2008) – such as the age-structure and the ageing rising; the spell of time spent in the receiving country; the implication at fertility and mortality levels and the degree of integration in the labour market. In conclusion the immigrants' effect on medical costs, sustained by the NHS, varies due to a number of factors not well studied and predictable yet (Jayaweera, 2014; Rowthorn, 2008). This uncertainty on the effect of migration on health services implies that future costs sustained by NHS remain unknown: therefore, it seems relevant to study the principle which drives the demand for health services caused by factors, which influence access, needs and utilization of healthcare services but are still not well studied and predicted (Jayaweera, 2014; Rowthorn, 2008).

The burden of the health inequalities among migrants suffered mainly due to their citizenship or migration status, instead of ethnicity belonging or race, is hard to be captured but it deserves to be researched. For instance, differentiating the length of staying, fractioning the years of permanence in the destination countries, as done in some studies (Hajdar and Backes, 2013), might help to understand social conditions, health states and integration of migrants.

In this study particularly attention is dedicated to different models of welfare regimes, health contribution systems and integration policies adopted by MS. The health states of immigrants can depend on MS welfare regimes, policy of integration and health contribution systems however individuals' behaviours are another relevant determinant that is strictly linked to the time spent in destination countries as the migration status acquired.

According to Berry *et al.* (2006), the integration process is composed by four different profiles, such as the *integration* with a strong identification in the hosting culture, the *ethnic* with a complete identification with culture of origin, the *national* with strong orientation with the culture of the destination society and the *diffuse* which presents a weak identification with both, original and hosting cultures. The migration such a movement brings a culture shock, once arrived in the

destination country, which has four phases: after the honeymoon, the crisis/frustration, the adjustment/resettlement and, eventually, the adaptation/bi-culturalism. These phases, together with the profiles of the individual integration process, play a central role in the health inequalities perceived and suffered as in the use of migrant networks (De Villanova, 2009; Portes *et al.*, 2009) and their social capital (Bourdieu, 1977; Gallina, 2007) in accessing the healthcare services.

## 5. The conceptual model to analyse the social determinants of health measures

As reported by Costa-Font and Hernandez-Quevedo (2012), the health indicators available in the European health datasets and surveys, such as *the European Health Interview (EHI)*, the *European Social Survey (ESS)*, the *European Union Statistics on Income and Living Conditions (EU-SILC)*, the *Survey of Health, Ageing and Retirement in Europe (SHARE)*, are various. In this work, the choice is on individual self-health assessment (SAH)<sup>1</sup> which constitutes an ordinal measure of individual health, incorporating both physical and mental health factors. Indeed, it provides an ordinal ranking of perceived status and, together with other measures of self-reported health included in the survey, gives a complete overview of the personal health status (Costa-Font and Hernandez-Quevedo, 2012). However, there is a flourishing debate on its validity and inevitably heterogeneity in the reporting of health correlated to individual characteristics (Lindeboom and Van Doorslaer, 2004; Van Doorslaer and Jones, 2003) – such as expectations, education, income – and country differences – such as welfare systems (Bago d’Uva *et al.*, 2008b).

The SAH has been utilized to better describe the relationship between health and socioeconomic status and between health and lifestyles, as the best predictor of the medical care received. This measure is highly available in national surveys rather than physical (e.g. height, weight, blood pressure) and biological (e.g. blood glucose levels) objective or quasi-objective (e.g. activities of daily living) measures of health. To complete the picture, in the epidemiological literature also the Body Mass Index (BMI) and biomarkers are becoming popular as health indicators, together with the mortality and morbidity measures (Costa-Font and Hernandez-Quevedo, 2012).

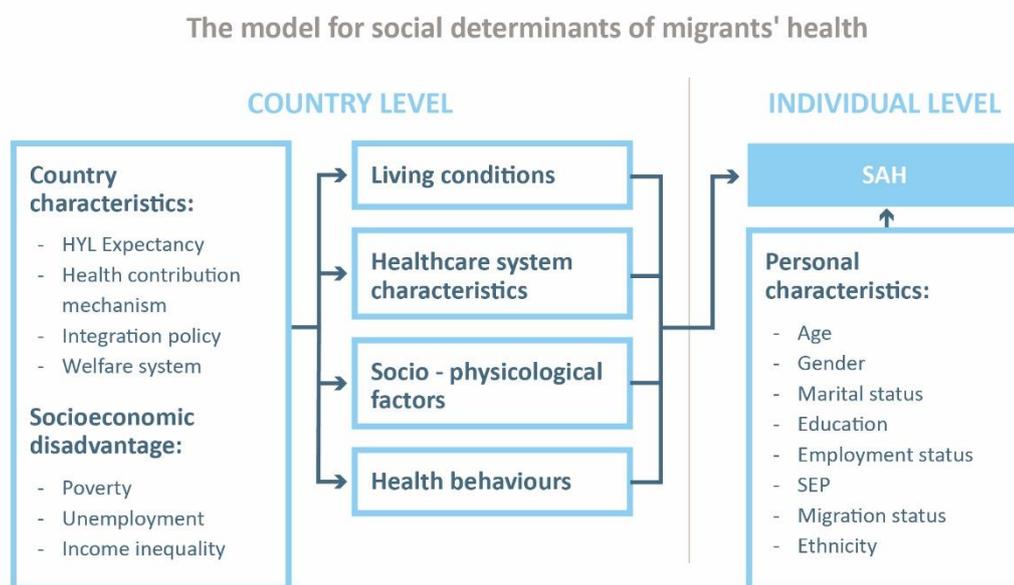
In order to better describe how the social determinants influence individual health, measured through SAH, some models have been developed (Dahlgren and Whitehead, 1990; Evans and Stoddard, 1990; Diderichsen, 1998; Brunner and Marmot, 1999; Hertzman, 1999; Najman, 2001). Given a different style and complexity, in the health literature all of them represent health as the

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<sup>1</sup> It is also reported as self-rated health or self-reported health (both SRH) in the prominent literature.

outcome of a web of social influence (Graham, 2004). The literature depicts health as the product of casual processes generated by the social structures, such as the environment, the living conditions, etc. in which the individual characteristics, like the SEP, the employment status, etc., are embedded. The other, such as the socio-physiological and behavioural factors, are identified as intermediate elements, influenced by the country level to the individual one.

**Figure 2. Conceptual model for determinants of SAH in migrants' health**



Source: Author's elaboration from Franzini and Giannoni (2010) and Giannoni *et al.* (2016).

The socio-ecological model proposed in **Figure 2** is an author's re-adaptation of a theoretical framework of exogenous and endogenous factors influencing individual health outcome, presented in two recent works (Franzini and Giannoni, 2010; Giannoni *et al.*, 2016). The basic idea is reporting the social determinants which influence migrants' health at multiple levels: country and individual are the macro ones. As well-known (Kawachi, 2007), the most relevant are socio-economic and environmental factors, as healthcare access, use and behaviours.

According to the most prominent literature (Zavras *et al.*, 2013; Kaleta *et al.*, 2008; Mc Fadden *et al.*, 2008; Huisman *et al.*, 2005; Molarius *et al.*, 2002, 2006; Kennedy *et al.*, 1998), SAH is positively correlated with income and education levels and negatively with unemployment, chronic disease and age. Correlations of various natures are registered with gender and working position: men, students and soldiers are more likely to declare a very good or good health status, while the opposite applies to pensioners and housewives. Older people are more likely to declare bad health status since age is one the main determinant of SAH.

It will be deepened in Chapter 3, during the years of financial crisis as the ones we are living in, individuals are more likely to report bad SAH (Marmot and Bell, 2009; Stuckler *et al.*, 2009; Mackenbach *et al.*, 2008; Musgrove, 2004 and 1987). Indeed, the lack or decreasing of income, together with a reduced government spending, may cause a loss of individual well-being. The unemployment rate and reduced salary push individuals to adopt less healthy lifestyles resulting in greater morbidity and less utilization of private health care services, while the public cuts imply a parallel decreasing of public healthcare facilities deteriorating the population health status. In particular, the International *Monetary Fund* (IMF) economic adjustment programmes result strongly associated with negative effects on health status, as recently seen also in Greece (Zavras *et al.*, 2013) where despite a decrease due to worsening of the health conditions, the percentage of people declaring good SAH remain high – still 68.8% in 2011.

## 6. The European healthcare systems: disentangling the European puzzle effect

Even though the major variability of SAH is related to individual factors, the country of residence determines the amount and the provision of healthcare services: indeed, in some European countries populations are healthier than others for the extent of coverage or levels of decommodification of key welfare services (Eikimo *et al.*, 2008; Bambra, 2006; Mackenbach, 2006). Therefore, the famous distinction among countries based on the welfare system adopted (Ferrera M., 1996; Esping-Andersen G., 1990) is central and differentiates countries in five groups, with an *Anglo-Saxon*, a *Bismarckian*, an *Eastern*, a *Scandinavian* and a *Southern* system – literally liberal, conservative, post-socialist, social democratic and family-oriented welfare regimes. Within Europe, we can regroup countries as it follows:

- *Anglo-Saxon*: Ireland (IE) and United Kingdom (UK);
- *Bismarckian*: Austria (AT), Belgium (BE), France (FR), Germany (DE), Luxembourg (LU), Netherland (NL) and Switzerland (CH);
- *Eastern*: Bulgaria (BG), Czech Republic (CZ), Croatia (HR), Estonia (EE), Hungary (HU), Latvia (LV),  
Lithuania (LT), Poland (PL), Romania (RO), Slovakia (SK), Slovenia (SL);
- *Scandinavian*: Denmark (DK), Finland (FI), Norway (NO) and Sweden (SE);
- *Southern*: Cyprus (CY), Greece (EL), Italy (IT), Malta (MT), Portugal (PT) and Spain (ES).

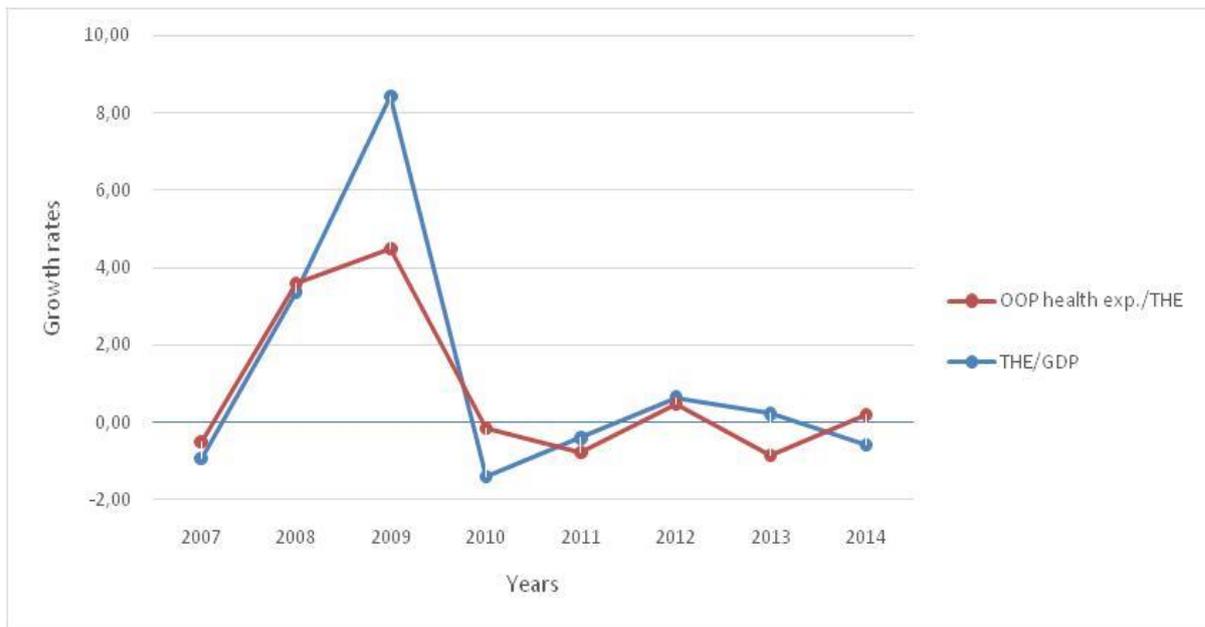
In particular, the social-democratic regimes try to guarantee living conditions of citizens by a redistribution of wealth via tax laws and social security institutions, while the conservative presents a lower redistribution level, a lower social welfare level and the principle of subsidiarity by the state. Contrarily, the liberal welfare regimes support a free market economy with occasional interventions by the state, with the average welfare level guaranteed by the market. Welfare in family-oriented regimes depends entirely on the families' network, presenting a small support by the state and patronage, while the post-socialist regimes present several mechanisms to produce welfare due to

their transition economies. The idea is that the welfare system is determining the success or the failure of integration of migrants in terms of placement or resources (Esser, 2004; Hadjar and Backes, 2013). Moreover, the European healthcare systems differ among countries in several aspects and one of these is the contribution mechanism, which influences the medical care grant to citizens and migrants. In summary:

- *National Health System (NHS)*, the healthcare sector is financed mainly through taxation. Ten countries provide this health system as DK, ES, FI, IE, IT, MT, NO, PT, SE and UK;
- *Social Health Insurance (SHI)*, social insurance contributions are the main finance system. The majority of the EU countries belong to this category as AT, BE, CH, CZ, DE, EE, FR, HR, HU, LT, LU, NL, PO, RO, SK and SL;
- *Out-Of-Pocket Payment (OOP)* which relies on private payments and only BG, CY, EL, LV offer this health system (Thomson *et al.*, 2009).

In order to better understand the differences in EU MS, **Figure 3** presents, for the period 2007 to 2014, the growth rates of total health expenditure (THE) respect to Gross Domestic Product (GDP) and of out-of-pocket (OOP) contribution as by the *World Bank Development Indicators* (2016).

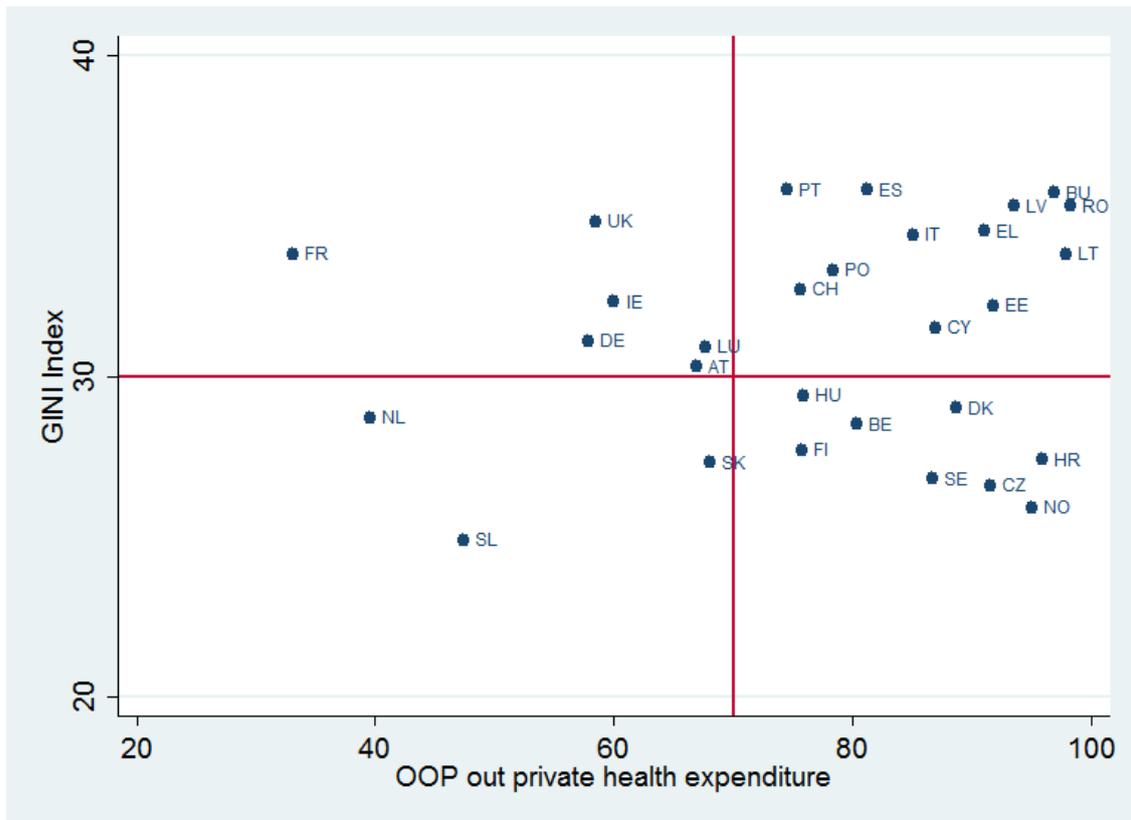
**Figure 3. Trends health expenditures in European Union, 2007-2014**



Source: Author's elaboration on World Bank Development Indicators data (2016).

The total health expenditure, as a proportion of GDP, has increased over the past decades in most EU countries: for the whole EU has risen from the 7.30% in 2000 to 9% in 2009 (OECD, 2012), while the share of OOP has substantially decreased in some countries and increased in others (Cylus *et al.*, 2012). As it can be easily seen from **Figure 4**, taking 2010 as the worse year in the panel of time crisis, in countries where the proportion of OOP expenditure out of the private health expenditure increases, the Gini Index follows the same path determining a higher effect of health inequalities, however it is not easy to determine its final effect on health (European Commission, 2013). The portion of individual covered by a private insurance widely varies among MS (Thomson *et al.*, 2009): close to zero in CZ, ES, IC, LT, RO, SV while FR, BE, LU, SI and NL present half of the population with access to private insurance, given that it can be complementary, supplementary or duplicative to their health systems (Chaupain-Guillot and Guillot, 2015). Indeed, in more than 1/3 of EU countries, the healthcare systems result financed by a mix of taxation and social contributions.

**Figure 4. Distribution of health inequality in 2010**



Source: Author's elaboration on World Bank Development Indicators data (2016).

It has been proven (Franzini and Giannoni, 2010) that, at regional level in the Italian case, the private healthcare expenditure mediates socioeconomic disparities in the SAH among regions. Given that the welfare state is a compromise between the interest of labour and middle classes, employers and employees (Hicks, 1999), its redistributive effects are modest but nonetheless important for natives and migrants. The healthcare expenditure has often been linked to the theme of social inequalities (Mackenbach, 2012; Fiscella *et al.*, 2000). Mackenbach (2012) calls this effect the paradoxical existence and widening of health inequalities in the Western countries.

Moreover, the socioeconomic inequalities in mortality and morbidity are not smaller in countries with Scandinavian and NHS, universal and generous coverage for welfare policies than in other

countries, such as the Anglo-Saxon liberal countries as the Southern European countries with their more family-oriented measures (Eikimo *et al.*, 2008; Mackenbach *et al.*, 2008 and 1997).

Certainly the educational gradient plays a central role, since countries with lowest average years of education - such as the Southern and Eastern European countries - present the largest overall prevalence rates of illness, while the Anglo-Saxon countries have the lowest ones (Eikimo *et al.*, 2008b). In general, first Scandinavian and then Anglo-Saxon regimes were observed to have better SAH than Bismarckian, Southern and East European welfare regimes given that the variety of cultural factors may influence the rational expectations of citizens (Bergqvist *et al.*, 2013; Bambra and Eikemo, 2009; Eikimo *et al.*, 2008a; Borrell, 2007; Bambra, 2006; Navarro *et al.*, 2003, 2006).

In particular, studying the effect of healthcare expenditure on reducing ethnic inequalities has recently received more attention since it might amplify differences between migrants and natives, especially first-generation of immigrants (Blom *et al.*, 2016). Taken for granted the hypothesis of the material deprivation and intersectionality of different disadvantages affecting migrants, it has been proved that language and cultural barriers obstacle the access and use of services despite the percentage of health expenditure dedicated (Ingleby, 2012). Therefore, often policies on socioeconomic deprivation may reach lower quintiles of income but mostly natives than migrants (Palencia, 2014), while specific policy measures targeted to migrants' health may really reduce these disadvantages (Mladovsky, 2011).

A further element of difference among countries is the model applied to immigrants' integration policy model based on the *Migrant Integration Policy Index* (MIPEX) scores (Meuleman and Reeskens, 2008). The main categories are:

- *Assimilationist* countries, as FR, DE, IE and LU, based on the premise that migrants can be socially and culturally absorbed into the societies through a process of adaptation;
- *Exclusionist* countries, as AT, BG, CY, CZ, DK, EE, EL, HU, LV, LT, MT, PO, RO, SL and SK where migrants are incorporated in certain spheres of life and excluded from others;

➤ *Multicultural* countries, as BE, ES, FI, IT, NL, PT, SE and UK, where to the ethno-cultural groups are given equal rights as the majority population in the different spheres of social life.

Several differences exist among EU states and **Figure 5** summarizes in six clusters MS, accordingly to healthcare systems and immigration policies. To complete the picture, it is worth to mention that a further classification exists (Cuadra, 2011) and classifies countries in three clusters of health care access for undocumented migrants: less than minimum rights (1), minimum rights (2) and more than minimum rights (3).

**Figure 5. Overview of migrant healthcare treatment in Europe**

	National Health Systems	Social Health Insurance	Out-Of-Pocket Payment
<b>Assimilationist policies</b>	Ireland	France Germany Luxembourg Switzerland	
<b>Exclusionist policies</b>	Denmark Malta	Austria Czech Republic Estonia Hungary Lithuania Poland Romania Slovak Republic Slovenia	Bulgaria Cyprus Greece Latvia
<b>Multicultural policies</b>	Finland Italy Norway Portugal Spain Sweden United Kingdom		

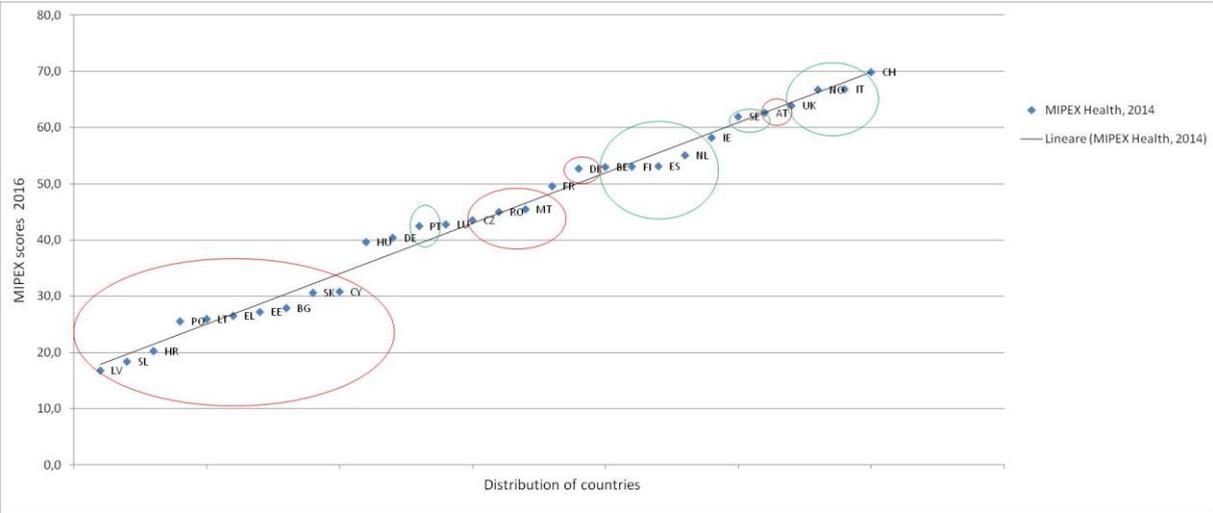
Health care access for undocumented migrants:

- Not available
- Minimum rights
- Less than minimum rights
- More than minimum rights

Sources: Author’s elaboration based on Cuadra (2011), Meuleman and Reeskens (2008) and Thomson *et al.* (2009).

**Figure 6** reports the distribution of countries for migration policies and the MIPEX health score, recently updated for the fourth edition of the index and released by the Migration Policy Group (MPG) to test the migrant health inequalities across states. The differences between migrants' healthcare coverage and ability to access services in MIPEX scores between countries are reflected in the adoption exclusionist and assimilation policies, with some few exceptions, as it can be seen from the Figure 5.

**Figure 6. European countries according to MIPEX Health scores and policies of integration**



Source: Author's elaboration on MIPEX data (2016).

Considerable is the amount of studies utilizing MIPEX in their analyses to characterize the healthcare provision to different classes of citizens in European countries. It has been proved a relationship between MIPEX and depression levels in migrants (Levecque *et al.*, 2015), while it has not been found so explicative for explaining migrants to natives in subjective well-being (Hadjar and Backes, 2013). Malmusi (2014) and, lately, Giannoni *et al.* (2016) demonstrate the impact of the migration policy on migrants' SAH: indeed, scarce integration policies worsen the socioeconomic and health outcomes. As expected, countries that rely on OOP system and adopt exclusionist policies

also present the lower percentages of public health expenditure, while the majority of those having NHS system also presents a multicultural policy, asking their citizens the lower percentages of out-of-pocket taxes contribution. The depth of coverage, together with the understanding of expenditure patterns and funding destinations, are important factors to determine the health financial protection of one state's citizens (Balabanova *et al.*, 2013; Wagstaff, 2007).

Ethnic minority groups may experience more health problems – higher mortality risk and lower level of well-being – in the European countries with stricter integration policies (Ikram *et al.*, 2015; Hadjar and Backes, 2013; Solé-Auró *et al.*, 2012). While the perceived group-discrimination is associated with poor health outcome in the first generation of migrants in Europe (Levecque *et al.*, 2015), but not among their descendants in particular in the assimilationist countries (Borrell *et al.*, 2015). The length of staying, the acquisition of citizenship, the naturalization of individuals, indeed, mitigate the health exclusion and then poor health outcomes after the first generation (André *et al.*, 2010).

**Figures 5 and 6** confirm the fragmented European scenario and our literature review points out the flourishing attention on the measurement and evaluation of health inequalities. Several authors demonstrate that health inequalities between migrants and non-migrants are reduced or disappear after controlling for their SEP. However, some authors sustain that poor SEP can be a result of migrant status and ethnic origin, caused by processes of social exclusion (Rechel *et al.*, 2013; Malmusi *et al.*, 2010; Davies *et al.*, 2009). As such it should be considered as illegitimate component of inequalities (Mackenbach, 2012), which needs to be overcome, since ethnic differences in healthcare can be justified only if healthcare received meets the need for healthcare in all groups (Essink-Bot *et al.*, 2012). Some authors believe that the improved access to general healthcare is therefore essential for minimising disadvantages of these groups of population and maximising advantages of host societies. These strategies are considered crucial at social determinant levels for reducing health inequities within and, at transnational level, between countries (Marmot *et al.*, 2012;

Spinakis *et al.*, 2011; EC, 2008). Moreover, including migrants in comparative public health analysis – such as somatic health care (Norredam *et al.*, 2009) or birth cohort studies (Grosser *et al.*, 2016) – helps to understand the health inequalities faced by them and to gain a further insight on reducing obstacles. Increasing it is the literature dedicated to the most vulnerable groups of migrants such as the undocumented ones (Cimas *et al.*, 2016; Martinez *et al.*, 2015; Suess *et al.*, 2014; Woodward *et al.*, 2014; Chauvin, 2009; FRA, 2011; PICUM, 2010; Cuadra, 2011 and *et al.*, 2010), which are overlooked in this study. In this study we have been more interested in the evidence captured by the official surveys on regular migrants' health, which gives a more realistic portrait of the health inequalities suffered by documented migrants versus nationals.

### EQUALITY OF OPPORTUNITIES IN HEALTH: HOW EUROPE TREATS MIGRANTS

#### Introduction

This chapter is focused on the role played by migration as possible determinant of health inequalities, as factor beyond the individual control and embedded in her own nature. Moving away from epidemiological and socioeconomic perspective, this study has a pure political economy focus and analyses the role played by the *equity in health* principle in describing the migrant health. The concept of equity in health remains always linked to the sphere of redistribution of resources, which does not fully capture the migration phenomenon affected by wider health inequalities. For this main reason in this study we prefer to use the concept of *equality of opportunity* to better describe the migrants' health.

Indeed, migration itself represents the original bottleneck, which does not allow people to access the same set of options in terms of health access, quality and utilization as nationals. That is why we propose a paradigmatic shift to adopt the equality of opportunity principle to analyse the provision of healthcare to one of the most vulnerable portions of population, the migrants.

As already anticipated in the Introductory Chapter, the health inequalities are defined as "*the differences in health, which are not only unnecessary and avoidable but, in addition, are considered unfair and unjust*" (Whitehead, 1990, p. 6). Most of the literature on inequalities in health and its delivery is focused on the observable individual characteristics such as absolute or relative income levels, working conditions, environmental settings, the access granted to healthcare services or health behaviours. Few studies are concentrated on the inequities suffered due to the ethnicity belonging or citizenship status.

This study describes the role played by migration as possible determinant of health inequalities, as factor beyond the individual control and embedded in her own nature. The starting point is the assumption that both **equity in health** and **health inequalities** help to understand why the common used concept of **equality of opportunities** might be central in analysing the migrant health. Further, the introduction of this principle might induce the welfare system towards a state of fairness for all society's components.

Given that, the equity in health principle always remains linked to the sphere of redistribution of resources, which does not well describe the migration phenomenon resulting affected by wider health inequalities as shown in the Introductory Chapter. It is not an easy exercise distinguishing between fair and unfair *health inequalities* (Giannoni, 2007; Peter and Evans, 2001), that should be considered a synonym of *health disparities* (Bhopal, 2014; Rechel *et al.*, 2013; Institute of Medicine, 2002).

The research objects of this chapter is to present a broad literature review which aims to answer the following questions:

- a) which is the approach used by the health literature towards health inequities suffered by migrants?
- b) and why would not be more correct shifting to the principle of the equality of opportunity to the one of the equity in health?

## 1. From the equity to the equality

From the origins of the intellectual debate, it has been deeply developed the concept of *equity* and then of *equity in health* mainly based on the two schools of thought: the liberals and the Marxist-egalitarians. The first considers the access to healthcare services as a reward of their socioeconomic position and, therefore, the utilization of them is strictly linked to the individual willingness to pay or capacity of contribution, while the second contemplates the access as a right of every single citizen. For the egalitarians, therefore, the distribution of health should cover the whole society, disrespectfully of the income inequality (Williams, 1993).

Indeed, according to the Pareto principle, an optimal allocation of resources exists if it is impossible to make any one individual better off without making at least one individual worse off while the health market remains efficient. For having the respect of the paternalistic approach, the allocation of resources must not be based on the individual interests but on a group of principles based on individual right (Giannoni, 2007). This statement is corroborated by the fact that individuals ignore their position in the society (Rawls, 1971) and, therefore, the distribution of resources should be independent by the costs suffered by the whole society (Van Doorslaer and Wagstaff, 1992).

O'Donnell *et al.* (2015) recently stated that the distribution of health may be potentially considered as in a dual relationship, cause and consequence of the income distribution. So far it has been proved that the income inequality causes health differences through material deprivation, asymmetric access, unemployment and earnings (Costa-Font and Hernandez-Quevedo, 2012; Preston, 1975). The reverse causal effect of health on income has not been yet demonstrated. On the ground of the causal effect of income on health, and following the path of different authors (Sen, 1999; Deaton, 2003), the public provision of health as good becomes highly important to reduce income inequalities and for the supply of preventive health care, medical care and education sanitation.

As a consequence of this active debate, the principle of equity in health (WHO, 2006 a/b; Williams and Cookson, 2000; Whitehead, 1990) has been reformulated as:

- the equivalence of access to available care for equal needs;
- the equivalence of utilization for equal needs;
- the equivalent quality of care for all.

A further classification of equity investigated under the egalitarian dimension is *horizontal equity*, which defines that individuals with similar diseases should have the same access to healthcare services, regardless of their personal characteristics and SEP (Wagstaff and Van Doorslaer, 2000 a/b). Basically empirical studies have concentrated their attention on the equality of utilisation and interpreted this as proxy for the equality of access (Cookson *et al.*, 2016).

As already explained in the Introductory Chapter, migration is one of the possible social determinants of health, but it is important to remember that, even though there is a certain extent for individuals to be responsible for their own health consequences, some negative outcomes are beyond the individual control (Roemer and Trannoy, 2015). On one hand individuals are responsible for some of their adopted health behaviours, while other behaviours may be dictated by the condition suffered in the societies. And that is the main reason why we choose to use the concept of the *equality of opportunity* instead of the *equality in health* to better describe the migrant health.

Indeed, the set of opportunities you can access in the society during your existence, the one Arneson (1988) calls the “equality of opportunities for welfare”, might eliminate the involuntary welfare deficiencies (Cohen, 1989). We assume that, given the academic evidences, migration itself results being the original bottleneck, which does not allow people to access the same set of options in terms of health access, quality and utilization. That is why we suggest considering the *equality of opportunity* principle for analysing the provision of healthcare to one of the most vulnerable portions of population, the migrants.

## 2. Equality of opportunity (EOp) in health (EOpH)

The distributional analysis has been traditionally anchored to two fundamental theorems of *Welfare economics*. The first affirms that any competitive equilibrium or Walrasian equilibrium leads to a Pareto efficient allocation of resources, while the second states that any efficient allocation can be sustainable by a competitive equilibrium.

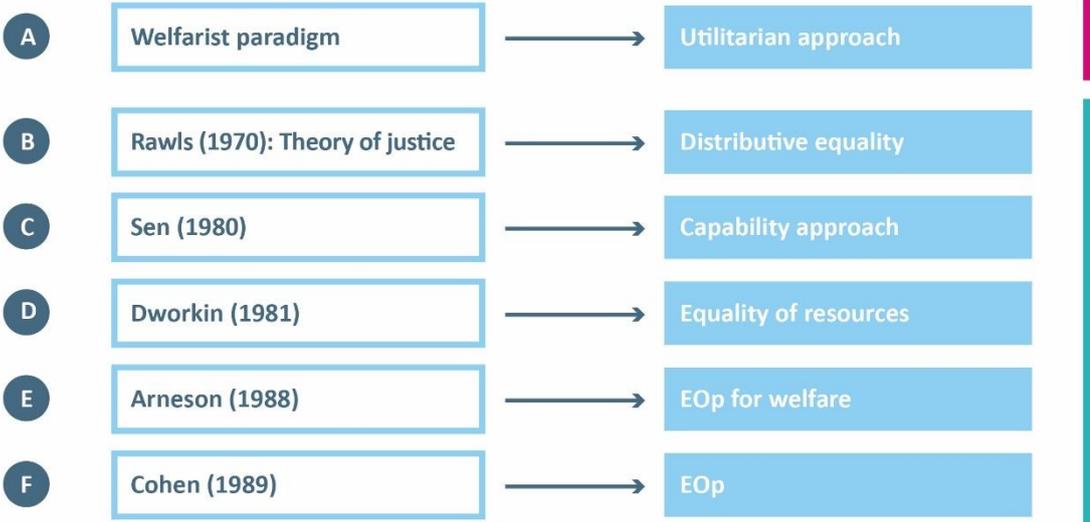
A particular convincing version of the welfare first paradigm has been seen in the *utilitarianism* framework promoted by Adam Smith's "invisible hand" hypothesis (1776), thanks to which competitive markets tend toward an efficient allocation of resources. The theorem supports a case for non-intervention in ideal conditions: let the markets do the work and the outcome will be Pareto efficient. The second paradigm affirms that, out of all possible Pareto-efficient equilibria, one can achieve any particular one by enacting lump-sum wealth redistribution and then letting the market take over. Hence, redistributions can allow individuals to select from all efficient outcomes the one desired in light of the *distributional equity* - given that the transfers have to be lump-sum and the Government needs to have perfect information on individual consumers' tastes as well as the production possibilities of firms.

Friedman (1962) was one of the first in using the expression of "equality of opportunity", affirming that inequality of income may overstate *ex-ante* inequality, and *ex-post* inequality should not ask for a redistributive intervention of institutions. As shown in **Figure 7**, among the most influential critics of the welfarist paradigms is John Rawls (1971), who introduced the concept of *equalisandum*, rather than the problem of choosing the right portion of primary goods, such as basic rights, access, liberties, wealth and income to be equalised among members of a set domain.

After Rawls' contribution, Sen (1980, 1985, 1992) moved the focus from the primary goods, intended as commodities, to the individual capacities. He has sustained that the society should promote and equalize the freedom a person enjoys, rather than the opportunity of attaining the relevant achievement (Ferreira and Peragine, 2015). In his theory the *capabilities* are meant as the

sets of attainable *functionings*, from which the individual is free to choose goods, such as literacy, nutrition or health. Together with Rawls and Sen, Dworkin (1981 a/b) has been one of the most influential critics of *welfarism* approach sustaining that equality should be of personal resources rather than achievements. Thanks to Arneson (1988) and Cohen (1989), the concept of personal responsibility was introduced but the society remains responsible for removing all the obstacles of reaching equality beyond the individual control (Brunori, 2015; Ferreira and Peragine, 2015).

**Figure 7. The evolution of equality theories**



**From the egalitarian philosophy to the normative economics**

Source: Author’s elaboration.

Looking at the more recent contributions of the *Welfare Economics* and *Social Choice Theory* (Bowles, 1973, Atkinson, 1983; Roemer and Trannoy, 2013), the social class – often measured through the income - might influence the *equality of opportunity* (EOp) in life (Roemer, 1998, 2000). The inequality of opportunities is, therefore, strictly linked to the inequality itself: you cannot have one without the other since, together with the differences in circumstances beyond the individual control, you can have different sources of inequality. Indeed, the reasons for the existing of EOp may vary from the income gradient (Friedman, 1962), educational background (Bowles, 1973), the role of luck at birth (Nozick, 1974), intergenerational transmission process (Bowles and Gintis, 2002; Becker, 1967), intergenerational mobility for inequality and poverty traps (Atkinson, 1981, 1983; Atkinson and Bourguignon, 1982) and individual capabilities (Sen, 1985) as the occupation and employment grade (Deaton, 2002).

The most relevant study of EOp is the one by Roemer (1993, 1998), who has proposed an algorithm in order to identify policies which would equalize opportunities for achievements of a given objective in a population. In his view, the inequalities due to circumstances should be removed while the ones due to the level of efforts do not. Fleurbaey (2008) has introduced and suggested that also the personal responsibility plays an important role as preferences concur with resources' endowments to establish the level of individual welfare.

The existence of EOp may in turn does not prevent further possible inequalities in health (Li Donni *et al.*, 2011) as the responsibility on own health status (Andersen *et al.*, 2013), therefore if you take risky health behaviours, it might be related to the social class to which you belong to such as to the degree of responsibility you consciously assume towards yourself. That is why Roemer has distinguished between the **level** and the **degree** of efforts: while the former is based on behaviours, the latter is determined by what one can reasonably expect by someone taken into account her circumstances. In opposition, according to Barry (2005), effort should be entirely rewarded and the correlation of effort and circumstances does not require to be acknowledged.

Indeed, the ideal *equality of opportunity in health* (EOpH) might be determined by some legitimate and illegitimate components, which govern the inequalities: the first are related to the responsibility characteristics – as the adopted health behaviour, while the second are related to exogenous circumstances - such as personal characteristics, family background or ethnicity (Li Donni *et al.*, 2011). According to Bossert (1995) and Fleurbaey (1995), the ideal of EOp merges two distinct ethical principles: the **principle of compensation** and the one of **reward**. The first affirms that differences in individual achievements, unambiguously attributed to differences in circumstances, are inequitable and need to be compensated by society. Therefore, if inequality can only be attributed to the different **circumstances** people with the same effort are compensated and should obtain the same outcome, otherwise the principal of the EOp will be violated. While for the second principle, differences of achievements - attributed to the personal **efforts** - are equitable and should not be compensated. Given that, any inequality of outcome among individuals with the same circumstances might be considered as unfair and the inequality of opportunity should be independent of the inequality of outcome within types.

As clearly stated by Roemer (1998, 2002, 2008), the society should compensate individuals for differences in outcome arising as a result as differences in circumstances, but not for their different efforts in holding ability constant, since it is on the distribution of circumstances that social policies may have a direct effect and equalize achievements of individuals. As well known, the individuals might suffer discrimination in the societies for those traits acquired by birth, determining differences in rights and access perpetuating through the choice of several welfare models as explained in the Introductory Chapter. In particular, what might be of primary interest in our societies is the allocation of resources – in this case health - according to personal characteristics for which nobody is responsible for and, therefore, should be compensated (Fleurbaey, 2008). Race and ethnic groups are, indeed, circumstances which are out of gambler's control in a lottery, therefore any outcome based on that should be considered unjust.

Some of the health differentiations, embedded in the healthcare systems fall in the definition of *fair discrimination* of minority health given by Bhopal (2014), according to whom to promote equality we need to treat groups and people unequally but with the main goal of meeting the needs of their particular groups. This apparently ideal principle needs an accurate judgment in terms of social justice: healthcare services provided should be tailored-made to needs, given that some differences are “fair” since based on needs or preferences (Fleurbaey and Schokkaert, 2012). Given that health is not a “good” that lends itself for redistribution, its unfairness is tragic but needs to be judged accurately through normative analysis of circumstances and its distributional mechanisms that lead the process (Deaton, 2013; Mackenbach, 2012; Whitehead, 1990), as partially presented in the Introductory Chapter through the welfare state systems analysis.

Recently Kanbur and Wastaff (2014) have considered the principle of EOp as a policy instrument often used to influence the political discourse in our societies. As already highlighted by Kanbur (1987), our moral institutions exercise a very important role in determining when the redistribution of resources should be supported in order to avoid a sense of injustice and deprivation among agents. We might claim that our inner moral institutions are highly influenced by the environment in which we grow and live. Kanbur and Wastaff (2014) are highly inspired by the World Bank report on the Latin America case of study: in that Paes de Barros *et al.* (2009) move a step forward in distinguishing between *opportunities* and *basic opportunities* of education and health - such as the basic endowments defined thanks to the international consensus with the *Millennium Development Goals* (2000). In analysing the WB report, Kanbur and Wastaff (2014) highlight the importance of having as reference groups adults instead of children as in the case of the latter, indeed, access already defines the opportunities they owe since cannot be expected by them any efforts in accessing the basic goods. Then, they analyse the role played by luck, risk and talent in taking advantage of the opportunities and, in particular, they leave the ground open to which perspective adopt for analysing the distribution of the health opportunities in the population. The crucial question on that they argue

is whether the health inequality should be assessed as a stand-alone phenomenon or if the correlation between income and health should be considered as a normative criterion.

In the proposed shift from the *equity in health* to the *EOp* principle, the objective of the study is the *illegitimate components* of health inequalities related to being foreigners in Europe. Asada *et al.* (2015) report that ethically unacceptable sources of inequality exist as they are amenable by policy intervention. It is not possible to change the distribution of personal characteristics in the population, while it is possible to change how society deals with individuals presenting these characteristics.

On the light of this framework, Fleurbaey (2008) analyse the two measures which refer to the unfair health inequalities: the *direct unfairness* and the *fairness gap*. While the first refers to the inequalities in health or healthcare suffered after the removal of all legitimate variables, the second measures the distance between the actual and a fair distribution in which all effects of illegitimate variables have been removed. Fleurbaey (2008) clearly state that it is a normative choice whether to prefer an approach or the other.

The concepts of health inequalities and EOpH, combined together, may help understanding how much the right to access and use healthcare services become essential conditions for the psychosocial wellbeing and integration of migrants. As further explained by different Authors, the EOp might be considered as in the *ex-ante* as in the *ex-post* definition: our attention is focused on the *ex-ante* rather than on the same set of opportunities enjoyed by individuals regardless of their circumstances. Access will remain central since it synthesizes both, the opportunity and the capacities to obtain the services individuals want (Cohen, 1989).

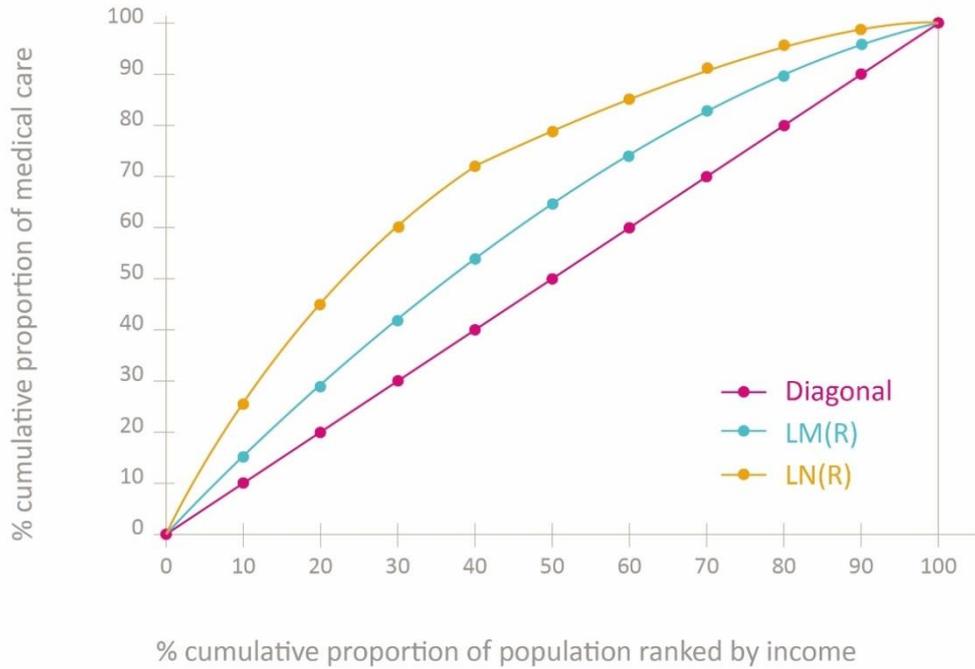
### 3. Equity in health and EOpH: the measurement

#### 3.1 Equity in health and the horizontal iniquity index ( $HI_{wv}$ )

Van Doorslaer, Wagstaff *et al.* (2000, 2003, 2004) have introduced and measured the horizontal equity in access to GPs, medical specialists and hospitals and explain income-related inequalities in doctor utilisation in Europe (2004) and the dental care (2004), utilizing a horizontal iniquity ( $HI_{wv}$ ) index based on indirect standardization.

Let  $y_i$  denote the amount of medical care received by individual  $i$  in a given period: the distribution of medical care according to the income – hence the inequality - is captured by the medical care concentration curve  $L_M(R)$  as in **Figure 8**. The horizontal axis,  $R$ , is the cumulative proportion of population ranked by income – from the poorer to the richer – while the vertical axis is the cumulative proportion of medical care received. Therefore,  $L_M(R)$  describes the medical care proportion used by each individual, according to her income.

**Figure 8. The concentration curves for actual and expected utilization**



Source: Author's elaboration based on Van Doorslaer, Wagstaff *et al.* (2000) and Giannoni (2007).

If the actual distribution of medical care is equal for all individuals,  $L_M(R)$  coincides with the diagonal, if  $L_M(R)$  lies above (below) of the diagonal, the distribution of medical care favours the poorer (richer). The concentration index  $C_M$ , corresponding to  $L_M(R)$ , indicates the degree of inequality in the distribution of medical care and can be measured as twice the area between  $L_M(R)$  and the diagonal, equivalently to:

$$C_M = 1 - 2 \int_0^1 L_M R d(R) \quad (3)$$

The degree of inequality in utilization of medical care predicts the degree of inequity only in the unlikely event that need for medical care does not vary with income: but, as we know, needs are

independently distributed from income. Therefore, using the method of indirect standardization, we can generate a predicted value  $y_i^*$  for each individual  $i$  indicating the amount of medical care she would have received if she had treated as others with the same need characteristics.

The second curve,  $L_N(R)$ , represents the need of medical care: if the distribution corresponds to needs,  $L_N(R)$  coincides with the diagonal. Contrary if  $L_N(R)$  lies above (below) the diagonal the distribution of medical care favours the poorer (richer). Hence, we can then define a concentration index of need (e.g. indirectly standardized medical care),  $C_N$ , based on the concentration curve of need such as  $L_N(R)$ :

$$C_N = 1 - 2 \int_0^1 L_N R d(R) \quad (4)$$

For measuring the level of horizontal equity in access to healthcare services, we need to compare the level of population needs with the actual utilization of healthcare, each according to income (Wagstaff and Van Doorslaer, 2000b). The degree of horizontal inequity can be measured comparing the curves  $L_M(R)$  and  $L_N(R)$  as in **Figure 8**: if the latter lies above (below) the former, the higher-income groups obtain a higher (lower) share of medical care than their share of need, and we say there is horizontal inequity favouring the better-off (worse-off). To better explain, it is possible that the poorer individuals utilize more intensively the medical care as they demand more healthcare than the richer. Looking **Figure 8**, the first 30% of cumulative population ranked by income receive 42% of cumulative proportion of medical care, while their needs represent 60% out of total medical care needs. Therefore, the utilization of medical care is not sufficient to cover their need and the distribution of cares favour the better-off (Giannoni, 2007).

The proposed measure of horizontal inequity  $HI_{WV}$  is defined as twice the area between the need and medical care concentration curves and can simply be computed as the difference between  $C_M$  and  $C_N$ :

$$HI_{WV} = 2 - \int_0^1 [L_N(R) - L_M(R)] dR = C_M - C_N \quad (5)$$

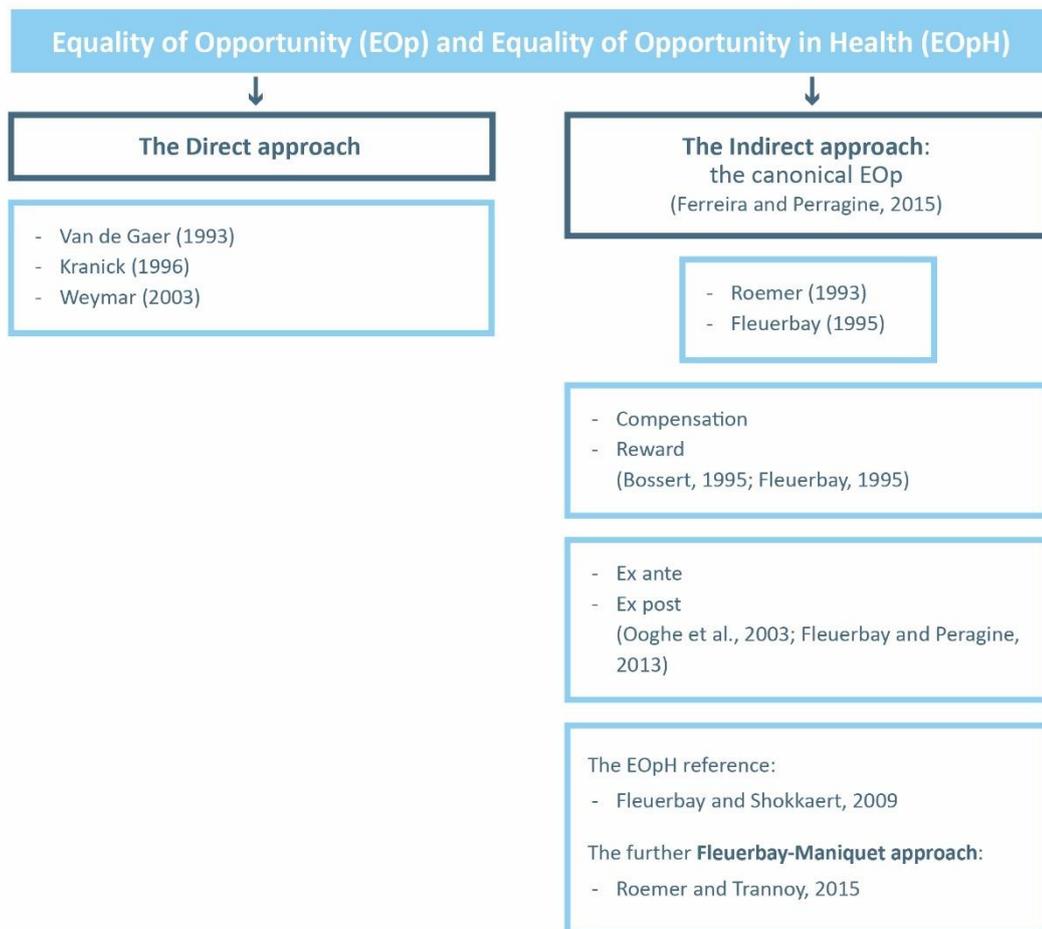
A positive value of  $HI_{WV}$  indicates horizontal inequity favouring the better-off (richer), while a negative value of  $HI_{WV}$  favours the worse-off (poorer). A zero index value indicates no horizontal inequity, e.g. that medical care and need are proportionally distributed across income classes. In case of horizontal inequity favouring the richer (poorer),  $C_M$ ,  $C_N$ ,  $HI_{WV}$  have positive (negative) values.

Just to quote some of the subsequent contributions among dozens of those, also Giannoni (2007) and Giannoni and Masseria (2010) have used the same method to measure the horizontal inequity, respectively in an Italian case study for the Umbria Region, García Gómez and López Nicolás (2007) across the Spanish regions as Bago d'Uva *et al.* (2008, 2009) have studied the horizontal inequities in the use of GPs and specialist doctors in Europe.

### 3.2 Equality of opportunity in health: measurement applications

Following the two most recent and holistic contributions (Ferreira and Peragine, 2015; Roemer and Trannoy, 2015) to the debate on the possible approaches to study EOp, we provide an overview of the EOp measurement approaches, following the scheme reported in **Figure 9**.

**Figure 9. The approaches to measure the EOp and the EOpH**



Source: Author's elaboration.

The one called *direct approach*, is mainly defined by the degree of inequality of opportunity (*IOp*), which relies either on the evaluation of opportunity sets on the basis of their cardinalities, as proposed by Kranich (1996, 1997), or on axiomatic orderings of inclusion, as more recently described by Weymark (2003). This approach presents the problem of measurability and comparability among individual's opportunity sets and also the limit of assuming that the personal endowments of non-rival goods are observable, which does not apply easily to the health status and condition of migrants. Mostly important this approach has been inspired by the Van de Gaer's rule (1993), which empathizes the importance that the opportunity sets have in studying the EOp in the society (Ooghe *et al.*, 2003).

The *indirect approach* of the EOp is defined as *consequentialist* (Ferreira and Peragine, 2015): the initial endowment of goods is not as important as the consequences generated by a given distribution of opportunities, intending them as circumstances and personal characteristics. Therefore, behind this approach, there is the implicit assumption that also the personal level of efforts can change the exogenous circumstances, as stated according to the Roemer rule (Ooghe *et al.*, 2003).

In this approach we can find the **canonical EOp model**, pursued by Roemer (1993, 1998, 2002), Van de Gaer (1993) and Fleurbaey (1995, 2008). Consider the distribution of an individual's achievement or advantage in a population, as  $x$ , and assume that this variable is universally desirable such as income, consumption, or some measures of health status. Then, suppose that all determinants of  $x$ , including luck, can be classified into either a vector of circumstances  $\mathbf{C}$  that lies beyond the individual control, or as responsibility characteristics, summarized by the variable  $\mathbf{e}$ , denoted as the effort. The circumstances belong to a finite set  $\mathbf{\Omega}$  such as  $\mathbf{\Omega} = \{c_1, \dots, c_n\}$ , while the efforts may be treated either as a continuous or a discrete variable belonging to the set  $\mathbf{\Theta}$  such as  $e \in \mathbf{\Theta}$ . The reduced-form model is then:

$$g: \mathbf{\Omega} \times \mathbf{\Theta} \Rightarrow \mathbb{R}_+, \text{ such that } x = g(\mathbf{C}, \mathbf{e}) \quad (6)$$

In (6) the endowments of goods are determined by circumstances and effort, such that all individuals having the same circumstances and the same effort can obtain the same level of outcome.

We complete the overview moving to the proper application of inequality of opportunity in health, as suggested in numerous studies such as Checchi and Peragine (2005), Fleurbaey and Shokkaert (2009) and Li Donni *et al.* (2011, 2014). By  $x_{ij}$  we denote the health status of an individual with circumstances  $c_i$  and effort  $e_j$ . Given a distribution of individual outcomes  $X$ , we introduce two different partitions. The first, defined by the circumstances of each group of this partition, is called a 'type' and includes all individuals sharing the same circumstances. Hence, for  $i = 1, \dots, n$ , type  $i$  is the set of individuals with circumstances  $c_i$ , the outcome distribution of type  $i$  is denoted by  $x_i$  and  $\mu_i$  is the average outcome of type  $i$  and the overall outcome distribution can be written as  $X = \{x_1, x_2, \dots, x_n\}$ .

The second partition is defined by the effort: in each group of this partition all individuals exerted the same effort. For all  $j = 1, \dots, m$  type  $j$  is the set of individuals who have chosen effort  $e_j$ , the tranche  $j$  outcome distribution is denoted by  $x^j$  and  $\mu^j$  is the average outcome of type  $j$ . Hence the outcomes distribution can also be written as  $X = \{x^1, x^2, \dots, x^m\}$  and any inequality measure applied to distribution  $X$ , would capture the overall health inequality in our society.

A two-step procedure is formalized: the actual distribution  $X$  is transformed into an artificial  $\tilde{X}$  one, reflecting the whole opportunity inequality present in  $X$ , removing all the effort-based inequality. The second step is to apply a measure of inequality to  $\tilde{X}$ . Any inequality measure applied to such distribution would be a measure of opportunity inequality consistent with both the reward and the compensation principles shown before. An artificial distribution which would be consistent with the compensation and reward principles is a distribution that (a) preserves fully the outcome inequality among individuals with the same effort and (b) does not contain any outcome inequality among individuals with the same circumstances. Following the literature, it is impossible to construct a distribution since the effect of circumstances on outcome, as endowment of non-rival good, is not

independent of the effort. The artificial distribution  $\tilde{X}$  will violate either (a) or (b) condition and will be either fully consistent with the reward or with the compensation principle.

In order to overcome this problem, different Authors have proposed several solutions. Fleurbaey and Schokkaert (2009) have shown the *fairness gap* and *direct unfairness* such as two artificial distributions, respectively fully consistent with the compensation and the reward principle in turn:

➤ *the fairness gap* ( $\tilde{X}^{FC}$ ) is achieved by substituting to each individual outcome  $x_{ij} = g(c_i; e_j)$  the difference between such outcome and the outcome that would be generated by a reference circumstance  $\tilde{c}$ , with  $g$  as function and  $e_j$  as effort;

➤ *the direct unfairness* distribution ( $\tilde{X}^{DU}$ ) is obtained by substituting, to each individual outcome  $x_{ij} = g(c_i; e_j)$  the outcome that would be generated by a reference effort  $\tilde{e}$ , given the function  $g$  and the circumstances  $c_i$ .

Similarly, we can apply the ex-ante and ex-post definitions of inequality consistent respectively with the reward and compensation principles. The *ex-ante* distribution,  $\tilde{X}^{EA}$ , is obtained by substituting, to each individual outcome, the average outcome of the type the individual belongs to, while the *ex-post*,  $\tilde{X}^{EP}$  is obtained by substituting to each individual outcome in a given type, the ratio between their own outcome and the average outcome of that type. This normalization procedure is intended to remove all inequalities between types and leave unchanged the inequality within those. Hence, for any inequality index  $I$  and any distribution  $X$  we have two different measures of opportunity inequality: the ex-ante measure,  $I(\tilde{X}^{EA})$ , consistent with the reward principle but violating the compensation requirement and the ex post measure,  $I(\tilde{X}^{EP})$ , consistent with the compensation principle which also violates reward.

The contributions start to differentiate here, in the creation and use of possible inequality measures. Fleurbaey and Schokkaert (2009) attempt to conciliate the typical approach of the equity in health with the EOp canonical approach through a structural model known as *Fleurbaey-Maniquet* approach (Roemer and Trannoy, 2015). As underlined by Fleurbaey and Schokkaert (2009), the IOp

measure results being the more valid approach to study health inequalities, since in its multidimensionality takes in consideration the whole opportunity sets offered by welfare systems and personal social background, without any distinction between "fair" and "unfair" inequalities. The amount of the empirical studies on that domain is growing (Carrieri and Jones, 2016; Bricard *et al.*, 2013; Fleurbaey and Schokkaert, 2009, 2011; Garcia-Gomez *et al.*, 2012; Lazar, 2013; Li Donni *et al.*, 2011, 2014; Jones *et al.*, 2011, 2014; Jusot *et al.*, 2013; Rosa Dias 2009, 2010; Trannoy *et al.*, 2010; Van De Gaer *et al.*, 2012) investigating mainly the health inequalities due to personal endowments in terms of circumstances and responsibility.

Indeed, the ideal EOpH might be decomposed into legitimate and illegitimate components, which determine inequalities: the first are related to circumstances – as adopted health behaviours, while the second are exogenous personal characteristics - such as family background or ethnicity (Li Donni *et al.*, 2011). A residual role is also played by “luck”, as confirmed by some studies (Nozick, 1974; Lefranc *et al.*, 2006, 2009).

Rosa Dias (2009), using the *UK National Child Development Study* (NCDS) data, studies the circumstances suffered during childhood, which also influence the present efforts: the educational attainment plays indeed a crucial role in the IOp in the health of adulthood. Using the same dataset, the Author in a further study (2010) combines Roemer framework with Grossman model of health capital<sup>2</sup> and demand through a recursive system of equations for health and lifestyles, finding that the IOp persists due to partial observability of circumstances, such as an unobserved heterogeneity which impacts on both, health outcomes and efforts put in place in the adulthood. These results on the EOp seem confirmed also by Jones *et al.* (2011, 2014) for the evaluation of educational health policies.

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<sup>2</sup> The Grossman model tries to investigate how age, education, health status and income influence the production of health through the demand for health capital. For the Author health is a fundamental commodity produced by inputs that are labelled as either circumstances or effort by the researcher. The health production function is assumed to be increasing and concave in effort.

Li Donni *et al.* (2011) have proposed an Atkinson inequality index applied to the *British Household Panel Survey* data and, as confirmed also by a further contribution (2014) on the ex-ante and ex-post inequality, they have demonstrated that EOp accounts for more than one-third of the overall equality, although individual choices on health-related habits highly contribute to determine the equality of health among individuals. Recently Carrieri and Jones (2016), through the data collected in the Health Survey for England, have estimated the IOp in four bio-markers associated with some of the most prevalent non-communicable diseases. They have found that the largest contribution to inequality is represented by a direct effect of circumstances for all bio-markers, while the indirect circumstances effects is generally the second leading causes of inequality and the third cause of inequality is represented by individual responsibility.

Trannoy *et al.* (2010), using the *SHARE* in Europe, have explored the inter-generational transmission of health inequalities confirming that IOp in health in France is largely influenced by social background and parents' longevity given the difference, already underlined by Lafranc *et al.* (2006, 2009), that IOp due to genes is different from the one due to social attainment. Furthermore, Jusot *et al.* (2013) have used the French Health, Health Care and Insurance Survey (ESPS), testing three hypotheses from the literature on social justice on how the correlation between circumstances and efforts should be treated and confirming a high degree of IOp in health in the French case study.

Van De Gaer *et al.* (2011) have studied the effect of the *Mexican Oportunidades* program on children's health occasions finding that the program favours the opportunities of the most disadvantaged (in term of income) children and children of indigenous origin. Garcia-Gomez *et al.* (2012), using the hospital admissions and cause of death registries in the Netherlands, have tried to estimate with a recursive model the IOp in health, and more specifically the mortality, confirming a strong educational gradient in healthy lifestyles with a positive effect on mortality.

Concluding, Lazar (2013), using the *Israeli Social Survey*, finds that in both the ex-post and ex-ante approaches, most of IOpH is due to unequal circumstances - such as individual religion and

ethnic group (e.g. Jews), which account for approximately 90% of the overall inequality. Bricard et al. (2013), using the Retrospective Survey of *SHARELIFE*, show that not only social background affects adult health opportunities, but also IOPH is determined by a strong social and family determinism of lifestyle.

#### 4. Conclusions

The concept of the EOp, combined together with the explanation of health inequalities, plays a vital role in understanding the psychosocial wellbeing and integration of migrants, considering the set of opportunities enjoyed regardless of the circumstances.

As further investigated by Brunori (2015), in the self-perception of IOp in Europe, race and ethnicity belonging may play a role even though with some difference impacts at country level. Moreover, the social mobility might result crucial in determining the acceptability of a certain grade of inequality, since the opportunities increase with mobility and personal beliefs as proved in the US versus the European case (Stockey, 1998; Alesina and La Ferrara, 2005; Alesina *et al.*, 2001a; Piketty, 1995). In ethnically fragmented societies, if we let health provision led by personal preferences, they might lead to a lower supply of public goods to not favour disadvantaged ethnic minorities (Alesina *et al.*, 1999). An increasing attention is devoted by the literature to study the dynastic inequality (Kanbur and Stiglitz 1982, 1986, 2015), which can become a serious issue in case of next generations of migrants in terms also of health access to services and diseases suffered. Indeed, in the intergenerational transmission of the economic success, health status also plays a determining role nonetheless it results understudied (Bowles and Gintis, 2002). However, as underlined by Lefranc *et al.* (2008), in the Western societies the scenarios most affected by IOp are far from been perfectly correlated with inequality of outcomes, but there is a positive link between IOp and inequalities of outcomes in the case of income inequalities, as widely confirmed by the literature especially in Europe (Checchi *et al.*, 2016; Brzezinski, 2015; Marrero and Rodriguez, 2012, 2010).

There is no evidence that in Europe legal migrants, especially skilled migrants, are net recipients of transfers from the state; although there is a “residual dependency” on non-contributory transfers and self-selection of migrants more likely to draw on welfare in countries with the most generous welfare state (Boeri, 2009, *et al.*, 2002). “Closing a welfare door policy” (Boeri and Brucker, 2005) should never be a solution for European countries, since especially in the health sector might

generate pandemic emergencies of preventable diseases and creating left out individuals. As explained in Alesina *et al.* (2001b) Europeans have a higher public provision of welfare than US, since they are more likely to pursue redistribution policies even if it favours racial minorities.

The academic evidence on illegitimate components and circumstances seems to confirm, in the end, our initial supposition on their importance in determining the EOp in a health distribution within a population. Moreover, it is worth underlined that an opportune attention in case of EOp of migrants should be dedicated to initial opportunity sets that can be accessed by them (Oeghe *et al.*, 2003), without letting the *laissez-faire* doctrine regulating exogenously the provision of health goods irrespectively of the should produce “inequality traps” (Fleurbaey and Peragine, 2013; Checchi *et al.*, 2010; Yazbeck, 2006). Despite the literature has started studying the circumstances which violate the EOp in case of migrants - such as the ethnicity or migration status - it is still missing an academic reflection on the possible efforts of these vulnerable groups. As already underlined in Introductory Chapter, the health habits – such as smoking, diet, alcohol, sedentary lifestyle – play a crucial role in European migrant’s health which need to be deepened.

Quoting Marmot (2005) “meeting human needs” should be the final goal of the European Union in treating citizens and migrants in the same way, granting the same access to healthcare services as guarantying them the same level of care in mix of ethics and political pragmatism (Roemer, 2000). The EOp and so the EOpH are multifaceted concepts, which may lead to conflict in interpretations of its components (Fleurbaey and Peragine, 2013), but they should be mainly the theoretical framework in which analysing the ex-ante illegitimate components of health inequalities linked to the personal characteristics such as ethnicity belonging, race and migration status.

### INEQUALITIES BY IMMIGRANT STATUS IN UNMET NEEDS FOR HEALTHCARE

Co-written by: Guidi C.F, Palencia L., Ferrini S., Malmusi D.

#### Introduction

The recent contributions to the literature of migration and ethnic inequalities in healthcare research are numerous (Suess *et al.*, 2014; Essink-Bot *et al.*, 2012; Smith Nielsen and Krasnik, 2010; Norredam *et al.*, 2009) and mainly aim at investigating what should be considered an illegitimate component of inequalities (Mackenbach, 2012; Fiscella *et al.*, 2000), since inequalities in healthcare occur when healthcare received does not meet the need for healthcare in all groups (Essink-Bot *et al.*, 2012). A systematic review of European studies on migrants' access to somatic healthcare services suggests that it remains difficult to compare the efficiency of health services due to diverging measures of ethnic or migrant background, outcomes and adjustment variables (Essink-Bot *et al.*, 2012).

In this Chapter we focus on unmet needs (UNs) for healthcare as the main indicator of healthcare access for migrants versus native, taking advantage from its availability in the cross-national survey *EU-SILC*. The study of UNs has become very popular in the United States (Litaker *et al.*, 2005; Shi and Stevens, 2005), especially for investigating the conditions of specific groups of population, such as homeless people (Lewis *et al.*, 2003; Baggett *et al.*, 2010), HIV patients (Heslin *et al.*, 2001; Marcus *et al.*, 2000) or children with special needs (Kane *et al.*, 2005; Dusing *et al.*, 2004).

In Europe the first who analysed the relationship between UNs and personal characteristics in the *EU-SILC* dataset was Koolman ten years ago (2007). He observed that the study of subjective needs is a proxy much closer to access than utilization, since, in order to achieve *horizontal equity* in

healthcare, resources should be allocated accordingly to health needs in the societies (Van Doorslaer *et al.*, 2000). The Author, therefore, focused on the relationship between unmet needs and a selection of non-need factors, labelled as the personal characteristics, which should not affect such allocation. In his study the UNs result for all countries (strongly) concentrated among the lower income households and to a lower degree explained by urbanization, income and ethnicity group. In terms of medical examinations and treatment, this implies that individuals in equal state of health but unequal in other characteristics, such as the ethnicity group, have unequal probabilities in UNs for healthcare. However, as the causes for inequity vary dramatically from country to country, policies to address these inequities might well be equally diverse accordingly to countries specificities.

Similarly, to Koolman (2007), Allin and Masseria (2009a) have found a strong association between income and healthcare needs and, after adjusting for health indicated by the self-health assessment (SAH) which tends to be worse with the lower income, the relationship with income persisted in almost all countries. In a successive paper Allin and Masseria (2009b) has combined *SHARE* and *EU-SILC* surveys to analyse the obstacles in the access to healthcare service in Europe, given the high variety of MS health systems. In the Allin and Masseria's study the variables of interest are self-reported UNs from *EU-SILC* and forgone care due to costs or unavailability of care from *SHARE*, which represent the utilization of the health system. In order to take into account access to the health system, they consider the probability of accessing three services in the last 12 months - as general practitioner, specialist and physician – and the *out-of-pocket* expenditure. Combining the two set of information, the Authors found a positive association between forgoing health care and using health services: people who report to forgo care appear to be relatively higher users of health system than those who do not report this access problem. Further Mielck *et al.* (2009) have studied the association between foregone care and income gradient in five European Western countries - such as France, Germany, Greece, Italy and Sweden - confirming the relationship mainly concentrated in subgroups of individuals with chronic diseases.

Baert and de Norre (2009) have analysed the wave 2007 of *EU-SILC*, finding that in addition to the equivalised income, the level of stated SAH and working position, the factor that is most strongly related to UNs is the country of residence in the EU-25. Hernández-Quevedo *et al.* (2010) have also employed *the EU-SILC* survey to explore the determinants of UNs: they obtain a positive correlation of medical UNs with low education level - primary or secondary education - and also unemployment or self-employment. A variation of UNs by country of residence has also been observed. UNs for dental care are less frequent in elderly people, while employment - such as unemployed, disabled and inactive people - and country of residence are significant predictors of dental UNs.

Political and economic context also matter for UNs, due to changes in affordability and availability of services, especially in vulnerable groups. For a report of the European Commission, Rodrigues *et al.* (2013) have analysed a *EU-SILC* panel dataset (2006-2011) and found increases in the UNs in some of the EU countries more hit by the economic crisis – as Cyprus, Greece, Ireland, Italy, Latvia, Portugal, Slovenia and Spain. The Authors found that UNs have increased since the crisis broke in a number of the countries analysed, confirmed by another recent analysis (Reeves *et al.*, 2015) showing a break and reversal in the previously decreasing trend of UNs in Europe since the beginning of the Great Recession and austerity policies. In a recent study (Chaupain-Guillot and Guillot, 2015), the Authors analysed the 2009 cross-sectional wave of *EU-SILC* estimating the probability of experiencing UNs across countries. The country variability is partly explained by the differences in financing the healthcare systems and the share of *out-of-pocket* expenditure, to which UNs seem positively correlated.

Giannoni (2010) analysed the 2007 *EU-SILC* cross-sectional dataset for the different Italian Regions, concentrating the analysis on the migration status. Given the disposable income, Giannoni underlined the presence of inequities experienced by non-EU citizens due to income and migrant status, both in the SAH measure as in the equity of access to healthcare services on the basis of the UNs variable, more high in the North and South than in the Centre.

In conclusion, several studies report that individuals in equal state of health but unequal in other characteristics, such as income class or immigrant status, might have unequal probabilities in UNs for health care. *EU-SILC* appears to be a promising dataset to explore the determinants of UNs, and migration-related inequalities in UNs. However, even if the dataset is a harmonized dataset, a large heterogeneity in methods of sampling, data collection and response rates exists between countries (Malmusi, 2014). Moreover, the limited participation and the under-representation of migrants in population surveys could represent a limit but the standardized quality of data makes the comparison among nationals and across countries possible.

To our knowledge, a comprehensive analysis of UNs and immigrant status in Europe is still missing and this chapter aims to fill this gap. In this study we propose a novel classification of immigrant status taking into account the citizenship and country of birth, and the impact of these two variables on medical and dental UNs is analysed for the whole European population. The attention is focused on the conditions suffered by the intra-EU migrants in addition to third country nationals. This study aims at answering the following questions:

- a) are there systematic differences in the satisfaction of health care needs in immigrants as compared to natives?
- b) and which are the factors and reasons that influence or explain the inequalities in the satisfaction of healthcare needs?

## 1. Methods

The cross-sectional study is conducted on the 2012 *EU-SILC* individual dataset of 17 European countries: 15 EU MS (AT, CY, CZ, DK, EL, ES, FI, FR, EL, IT, LU, NL, PO, PT, SE, UK) plus Norway and Switzerland. We have included all the countries presenting foreign-born citizens interviewed > 0,5% and distinct categories for foreign-born within and outside the EU, as also proposed by Malmusi (2014).<sup>3</sup> The total sample is composed by 308,728 individuals of over 16 years of age. In general, the EU-SILC questions are posed to all current household members (aged 16 and over) at an individual level but in some specific countries (DK, FI, NL, NO and SE), only to the selected respondent. The randomised selection procedures are used to ensure that a representative sample of people is obtained from the representative sample of households.

Our dependent variables are **Unmet needs** (UNs) for medical and dental care: the needs for medical and dental examination or treatment which do not meet any response from the health system. The questionnaire questions were: *“Was there any time during the past 12 months when you really needed a medical (dental) treatment but did not?”*. The two possible answers were yes or no. Our main independent variable is **immigrant status** and its classification is given by a combination of the citizenship declared by interviewees, which determines their entitlement to public healthcare, and the country of birth, as even naturalised foreign-born may experience origin-based inequalities in access related with culture, knowledge of the system, socioeconomic differences or ethnic discrimination. The weighted total sample of 302,815 individuals is, therefore, divided into five groups: native nationals (89.9%), EU-born nationals (1.21%), non EU-born nationals (3.34%), EU-born foreigners (EU-born with EU nationality, 2.33%) and non EU-born foreigners (non EU-born with non EU nationality, 3.55%). A residual group of less than 1,000 subjects (0.32%), including native foreigners, EU-born non-EU-nationals and non-EU-born EU-nationals, are excluded from the analyses.

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<sup>3</sup> This selection criterion is necessary as some countries mix together data on EU migrant population and third-country nationals.

The main socio-demographic characteristics considered are: age, divided in five groups (16-30; 31-45; 46-60; 61-75; 76-over), and the maximum educational level reached, classified as primary, secondary and tertiary education according to *International Standard Classification of Education* (ISCED). Plus, the occupational level, based on the *International Standard Classification of Occupations* (ISCO) arranged in six categories - managers and professionals, technicians, clerks, skilled manual workers, elementary occupations and armed forces - and the activity status, divided in seven categorizations - employees, employed persons except employees, other employed, unemployed, retired, inactive and other inactive. Lastly, the equivalised household income, categorised in country-specific quintiles and the ability to make ends meet, regrouped in four categories (very) difficult, with some difficulties, fairly easily and (very) easily – in order to define the financial position. The country of residence concludes the socio-demographic control variables.

The main health characteristics declared by the interviewees used to control for different health care needs are: the SAH measure, classified into three categories - (very) good, fair, (very) bad, the reported presence of a limiting chronic or longstanding illness and the limitations in activities due to health problems suffered (yes strongly, yes and no). In addition, we consider also the accessibility to primary health services (with difficulty and easily).

Further, the follow-up questions on the main reason for UNs for medical and dental examination or treatment are considered in this analysis. The questionnaires offered eight possible categories: (1) *Could not afford to (too expensive)*; (2) *Waiting list*; (3) *Could not take time because of work, care for children or for others*; (4) *Too far to travel/no means of transportation*; (5) *Fear of doctor/hospitals/examination/treatment*; (6) *Wanted to wait and see if problem got better on its own*; (7) *Didn't know any good doctor or specialist* and (8) *Other reasons*. We recode this variable into six groups as financial (1), structural (2 and 4), time (3), fear and lack of knowledge (5 and 7), wait and see (6), other (8). The six groups of reasons define different causes for the presence of UNs. In order

to establish the relationship between independent variables and dependent variables, we run some non-parametric tests – Kruskal-Wallis, chi squared and Spearman tests – as reported in **Annex I**. Almost all variables present low p-values (<0,05) suggesting a significant impact of independent variables on UNs: this result confirms the importance to model the data and measure the impact of independent variables.

The *EU-SILC* personal cross-sectional weight is applied to all analyses to account for the sampling design and non-response and all analyses are stratified by sex. In the epidemiological literature, an established model is the robust Poisson regression (Zou, 2004). This model has been proved to be better than the logit model when the probability of success of the binary variable is particularly low. Comparing to a logit model, the Poisson model reports unbiased prevalence ratios which are the parameters of primary interest in this kind of inequality distribution study and immediately interpretable by policy makers. The prevalence ratio is obtained by the robust error variance - procedure known as *sandwich estimator* – and expresses the ratio of prevalence between the exposed and non-exposed. In the study we report the prevalence ratios (PRs) of medical and dental UNs, sequentially adjusting by several explanatory variables.

The Poisson regression models are calculated for medical (**Annex II**) as for dental UNs (**Annex III**), computing the PRs in respect to a baseline category. A set of nested models are reported for the subsample of women and men, considering distinctly the gender as potential effect modifier. Indeed, the PRs for medical and dental UNs by immigrant status are computed adjusting for age and country of residence, after controlling for health characteristics, then also for socio-economic variables. First we have controlled for the equivalised income and the ability to make ends meet, which impact substantially on the PRs, then also adding the maximum education level reached in order to picture all economic and financial explanatory variables. Models present a pseudo  $R^2$  between 0,4-0,12.

## 2. Results

The main characteristics of the sample are reported in **Table 1**. The relevant statistics are stratified by sex and immigrant status (this variable is defined by 5 categories: native nationals, EU-born nationals...). The EU and non EU-born foreigners are mainly concentrated in the 31-45 age group, respectively in the former men 37.9%, women 39.2% and in the latter men 44.7%, women 43.3%, while less than 3% are in the 76-over range the EU and non EU-born foreigners are minimal (respectively men 2.7% and 1.2%, while women 2.8% and 1.4%). The non EU-born foreigners are more likely having a primary education (men 41.7%, women 37%) than secondary (men 33.1%, woman 33.7%) while the reverse is true for the other groups.

The EU and non EU-born foreigners are more concentrated in elementary occupations, while the non EU-born foreigners are more likely being unemployed (men 17.7%, women 12.9%) than the others. Non-EU foreigners are the most concentrated in the lowest income quintiles (men 43.7%, women 43.2%), followed by non-EU born nationals (men 30.8%, women 31.8%). This is confirmed also in the distribution by ability to make ends meet, similar to the whole income distribution.

Surprisingly, non-EU born nationals and foreigners are less likely to report problems in accessibility to primary health care services. Native, EU-born and non-EU born nationals are more likely to declare a bad SAH than foreigners, having chronic diseases and limitations in activities due to health issues. The distribution of having bad SAH, chronic diseases and limitations in activities is slightly worse in women than in men.

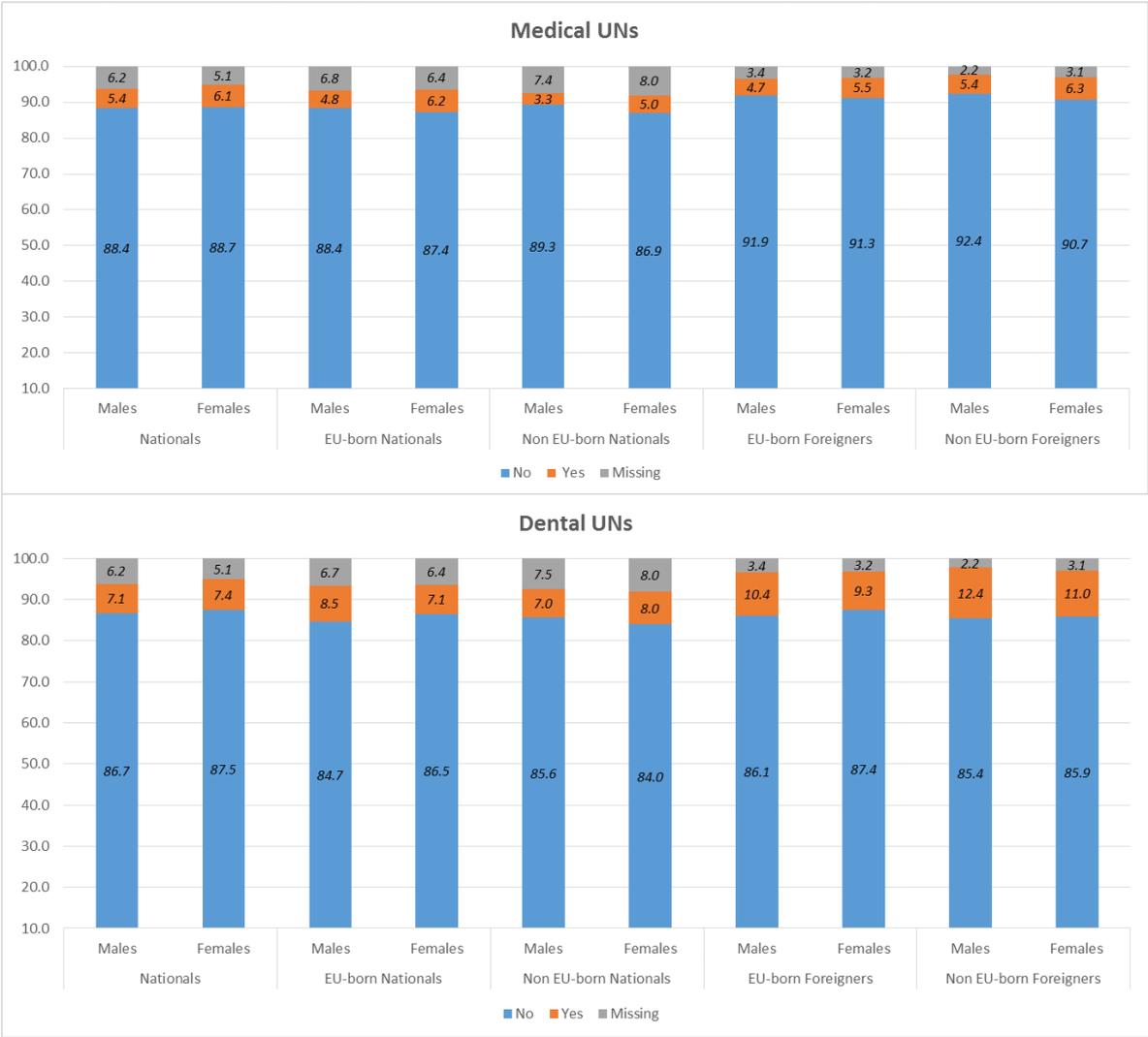
**Table 1. Description in percentage of the sample by sex, immigrant status, socio-demographic and health characteristics**

EU SILC 2012	Men					Woman					
	Native Nationals	EU-born Nationals	Non EU-born Nationals	EU-born Foreigners	Non EU-born Foreigners	Native Nationals	EU-born Nationals	Non EU-born Nationals	EU-born Foreigners	Non EU-born Foreigners	
Sample	132,668	1,822	3,393	4,314	2,903	142,273	2,591	4,182	4,721	3,948	
Weighted	131,247	1,551	4,702	3,322	5,204	140,009	2,103	5,409	3,722	5,545	
Age	Years 16-30	22.3	14.2	16.2	21.9	28.4	20.2	7.7	15.9	24.2	31.3
	Years 31-45	25.9	28.9	31.0	38.0	44.7	24.0	25.8	30.8	39.2	43.3
	Years 46-60	33.2	31.2	37.9	27.9	23.0	32.3	32.1	38.5	27.0	21.2
	Years 61-75	10.6	15.2	8.2	9.5	2.6	11.6	16.6	7.9	6.7	2.6
	Years 76-over	8.1	10.5	6.6	2.8	1.3	11.9	17.9	6.8	2.9	1.4
Education	Primary	32.4	30.1	28.7	25.8	41.8	36.5	34.2	31.0	25.9	37.0
	Secondary	44.0	44.0	35.8	39.4	33.1	39.4	39.2	38.3	35.8	33.7
	Tertiary	22.0	22.5	31.2	28.8	22.1	23.0	25.0	26.7	32.6	27.1
	Missing	1.6	3.5	4.3	6.1	3.0	1.1	1.6	3.9	5.7	2.2
	Managers and Professionals	20.1	21.0	22.9	20.7	10.8	17.4	19.6	16.8	17.9	11.3
Working position	Technicians	13.0	16.3	12.7	9.5	6.6	11.2	11.6	10.8	9.6	5.8
	Clerks	14.8	16.5	17.9	11.0	16.4	31.7	34.7	33.5	30.0	25.8
	Skilled manual workers	34.2	30.1	27.9	40.7	36.5	11.2	9.3	5.7	7.7	6.1
	Elementary occupations	7.5	5.8	9.7	11.8	18.1	11.4	11.9	14.2	24.0	23.7
	Missing	10.4	10.4	8.9	6.3	11.5	17.1	12.9	18.9	10.9	27.4
Sociodemographic Characteristics	Employees (SAL)	45.7	45.4	52.1	56.9	53.1	39.1	35.5	44.7	52.8	40.5
	Employed persons (NSAL)	10.9	8.8	9.9	10.6	7.9	4.8	5.0	4.4	6.6	3.8
	Other employed	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.1
	Unemployed	6.7	6.3	9.0	8.3	17.7	5.7	4.7	7.7	8.1	12.9
	Retired	22.6	29.2	16.6	14.9	4.5	22.5	34.8	14.8	11.0	3.2
Activity status	Inactive	12.8	9.1	10.7	7.9	15.0	26.7	18.9	27.0	19.7	37.9
	Other inactive	0.3	0.5	0.4	0.2	0.1	0.3	0.2	0.2	0.4	0.2
	Missing	1.0	0.8	1.2	1.1	1.6	0.9	0.9	1.1	1.5	1.5
	First quintile	18.8	24.5	30.9	26.2	43.7	21.0	26.4	31.8	28.3	42.2
	Second quintile	18.6	19.0	20.4	18.8	23.8	20.4	21.7	20.8	20.1	23.8
Equivalised Income	Third quintile	19.8	18.0	16.8	21.1	14.2	19.9	17.1	16.0	18.4	14.7
	Fourth quintile	21.0	21.8	16.6	16.8	10.8	19.6	16.9	15.1	16.5	10.4
	Fifth quintile	21.9	16.7	15.3	17.1	7.5	19.1	17.9	16.4	16.6	8.9
Ability to make ends	Difficulty	24.8	23.9	32.2	25.4	47.5	26.7	24.0	35.0	28.9	47.2
	With some difficulties	30.0	28.0	28.2	28.4	30.4	30.9	28.9	28.5	28.7	28.2

<b>Health Characteristics</b>	meet	Fair easily	25.9	27.7	20.4	24.7	12.6	24.9	24.4	18.6	23.6	14.6
		Easily	19.0	19.8	17.9	20.8	8.9	17.2	22.3	16.9	18.4	8.9
		Missing	0.3	0.7	1.3	0.8	0.7	0.2	0.5	1.0	0.4	1.0
	Access to healthcare services	Difficulty	16.7	14.3	10.1	15.6	11.7	17.3	17.0	11.6	16.6	12.1
		Easily	81.2	83.1	88.3	81.7	86.0	80.9	80.9	86.8	81.8	86.4
		Missing	2.1	2.6	1.5	2.7	2.3	1.8	2.1	1.6	1.5	1.5
	SAH	Good	66.8	64.4	66.8	77.6	80.6	62.1	58.8	60.6	76.6	76.6
		Fair	18.2	20.8	17.6	13.0	11.5	21.5	21.7	20.9	14.2	13.8
		Bad	8.3	7.7	7.8	5.7	5.0	10.7	12.9	10.2	5.4	6.3
	Chronic Diseases	Missing	6.7	7.1	7.8	3.7	3.0	5.7	6.6	8.4	3.8	3.3
		No	65.5	60.4	64.8	76.7	81.3	62.1	55.2	60.5	76.3	78.4
		Yes	27.7	32.6	27.5	19.7	16.3	32.1	38.2	31.4	20.0	18.3
	Limitations in activities	Missing	6.8	7.1	7.7	3.6	2.4	5.7	6.6	8.1	3.7	3.3
		Yes, strongly	7.4	8.4	7.1	5.5	3.6	9.4	12.6	9.1	4.3	5.6
		Yes	14.0	14.8	12.1	8.9	8.6	16.8	16.7	15.0	11.0	9.3
	Medical UN	No	71.8	69.8	73.2	81.8	85.2	68.0	64.1	67.7	80.8	81.6
		Missing	6.8	7.0	7.7	3.8	2.6	5.8	6.6	8.2	3.9	3.6
		No	88.4	88.4	89.3	91.9	92.4	88.7	87.4	86.9	91.3	90.7
	Dental UN	Yes	5.4	4.8	3.3	4.7	5.4	6.1	6.2	5.0	5.5	6.3
		Missing	6.2	6.8	7.4	3.4	2.2	5.1	6.4	8.0	3.2	3.1
No		86.7	84.7	85.6	86.1	85.4	87.5	86.5	84.0	87.4	85.9	
Dental UN	Yes	7.1	8.5	7.0	10.4	12.4	7.4	7.1	8.0	9.3	11.0	
	Missing	6.2	6.7	7.5	3.4	2.2	5.1	6.4	8.0	3.2	3.1	

**Figure 10** shows the descriptive distribution of medical and dental UNs. Dental UNs are more frequent than medical ones, especially among non EU-born foreigners (medical UNs: men 5.4%, women 6.3%; dental UNs, men 12.4%, women 11%). Men are more likely than women to have dental UNs, while the reverse occurs for medical UNs.

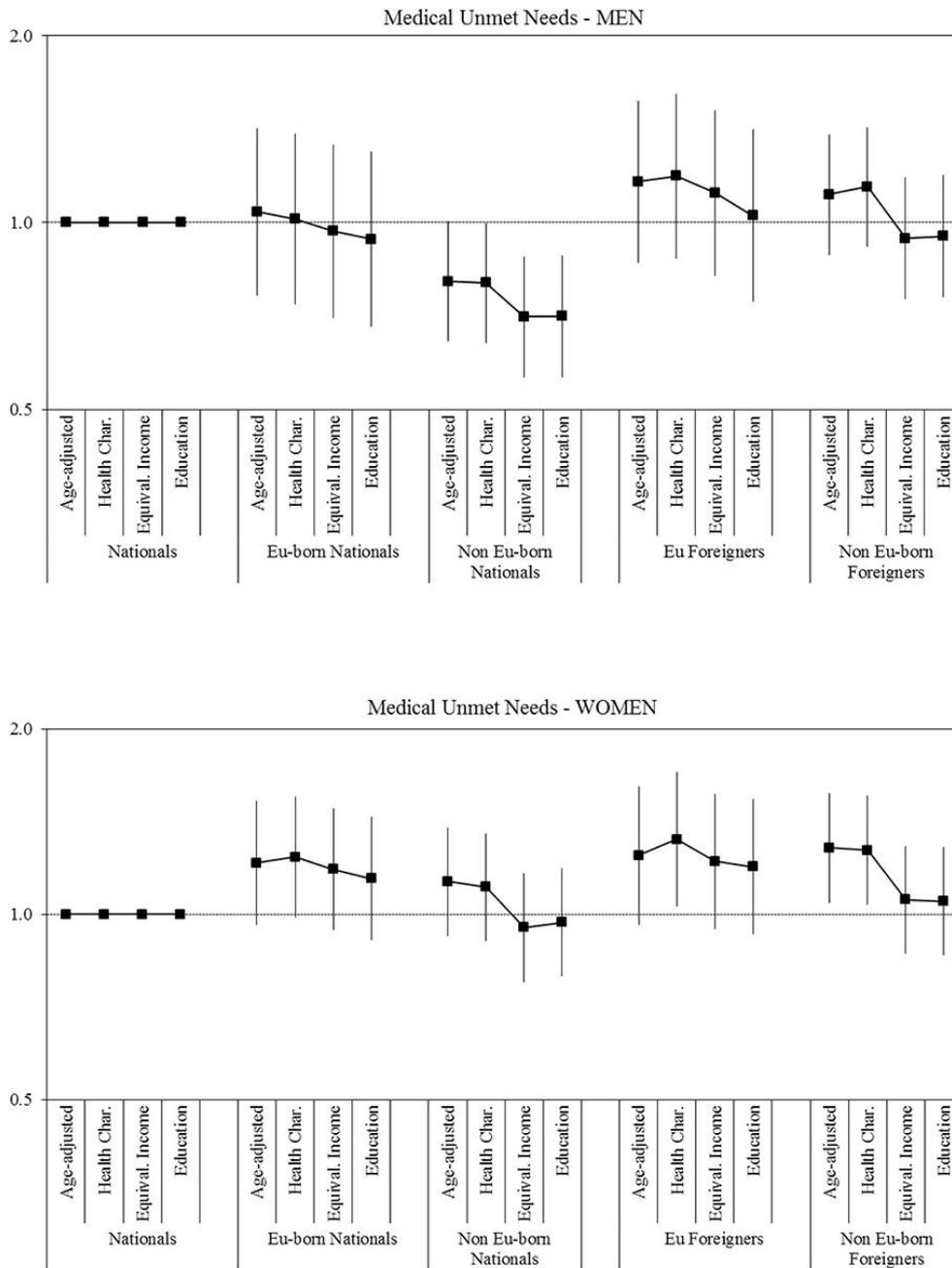
**Figure 10. Description of medical and dental unmet needs by immigrant status and sex**



Source: Authors' elaboration on EU-SILC data.

**Figure 11** reports the PRs and 95% Confidence Intervals (95% CI) obtained by the Poisson models for medical UNs for men and women. The group of natives is chosen as baseline. The age and health characteristics-adjusted risk of medical UNs is significantly lower for the non-EU-born national males (PR=0.80; 95%CI: 0.64-1.00). This trend is confirmed also after adjusting for the equivalised income and education (PR=0.70; 0.56-0.88). The age-adjusted risk of medical UNs is statistically significantly higher only for non EU-born foreigner women (PR=1.28; 1.05-1.57) compared to natives. Considering the health characteristics, the risk is significantly higher in EU foreigner women (PR=1.32; 1.03-1.70) and non-EU foreigner women (PR=1.27; 1.04-1.56) than national women. After adjusting for the equivalised income both differences are no longer significant.

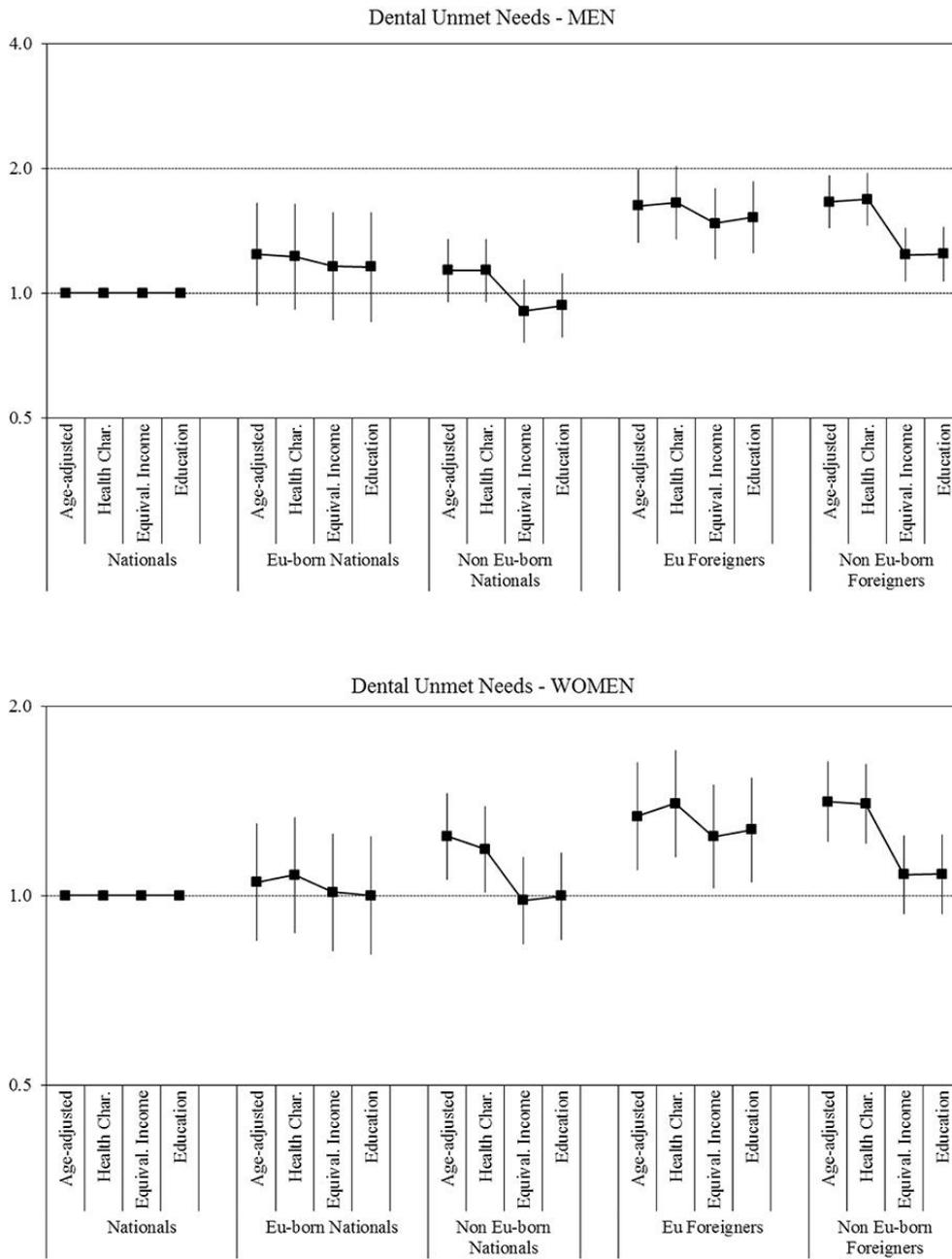
**Figure 11. Prevalence Ratios of medical unmet needs by immigrant status and sex**



Source: Authors' elaboration on EU-SILC data.

In **Figure 12**, we report the PRs for dental treatment UNs. The individual and health characteristics adjusted risk is significantly higher in the EU-born (men: PR=1.65; 1.35-2.02; women: PR=1.40; 1.15-1.70) and non EU-born foreigners (men PR=1.69; 1.46-1.95; women PR=1.40; 1.21-1.62). Once adjusted for the economic and education variables the EU-born foreigners present the highest risks (men PR=1.53; 1.25-1.86; women PR=1.27; 1.05-1.54) although the non-EU foreigners men still show significant results (PR=1.24; 1.07-1.45).

**Figure 12. Prevalence Ratios of dental unmet needs by immigrant status and sex**



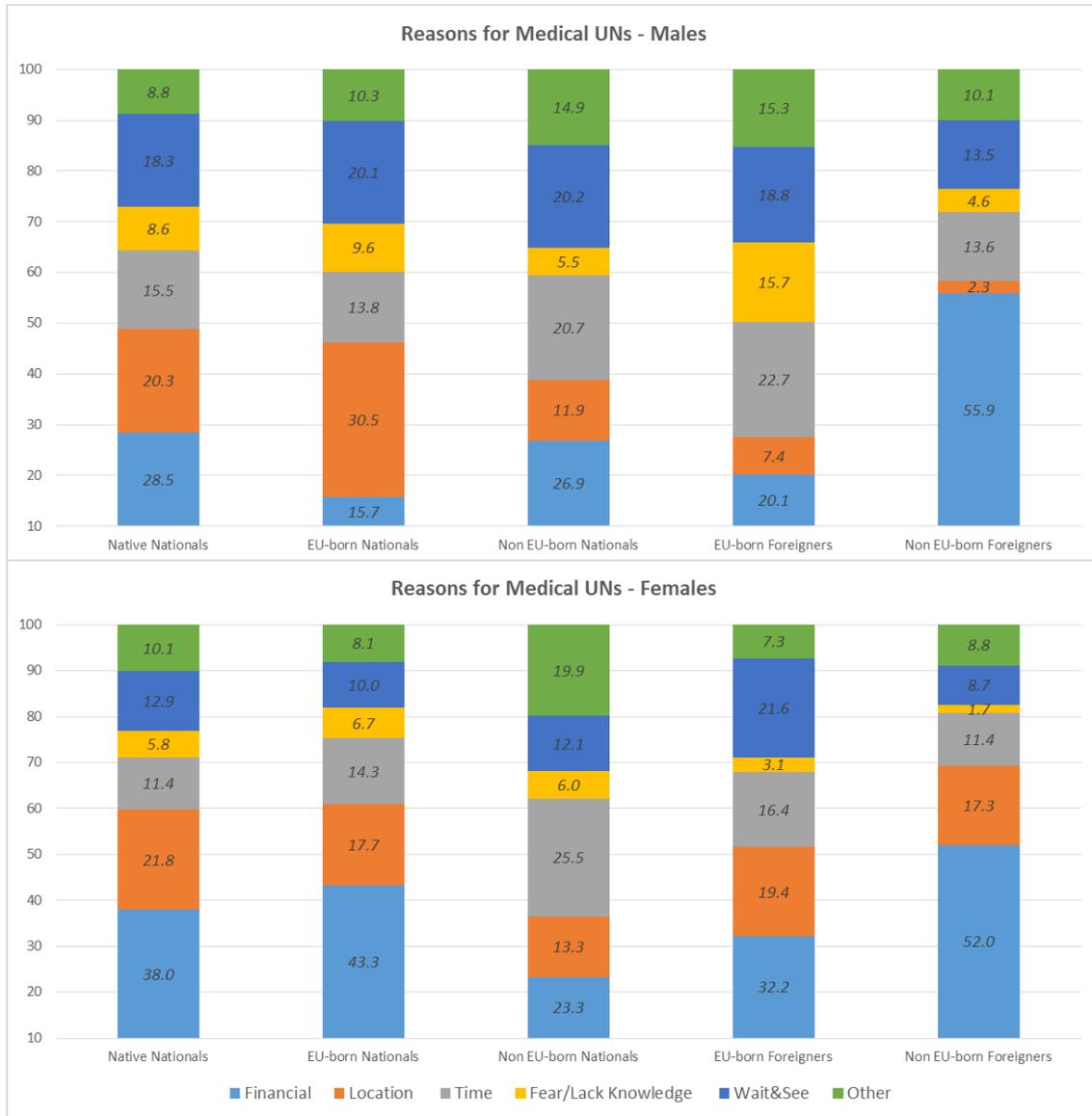
Source: Authors' elaboration on EU-SILC data.

The analysis of the six groups of reasons for the presence of UNs may help to better describe the needs profile of our groups, as reported in **Figure 13** and **14**.

As illustrated in **Figure 13**, for male and female nationals the prior reasons for having medical UNs is financial (respectively 28.5% and 38%). For EU-born national men the most prevalent reasons are related with the structure of healthcare services (30.5%) while for women the main problem is still financial (43.3%). Non EU-born national men are more likely having financial reasons (26.9%) while the women are more likely having shortage of time (25.5%) and vice versa for EU-born foreigner males (22.7%) and females (32.2%). Half of the sample having medical UNs and being non EU-born foreigners are likely having financial reasons (men 55.9% and women 52%).

**Figure 13. Description of reasons by immigrant status and sex among subjects**

**with medical unmet needs**

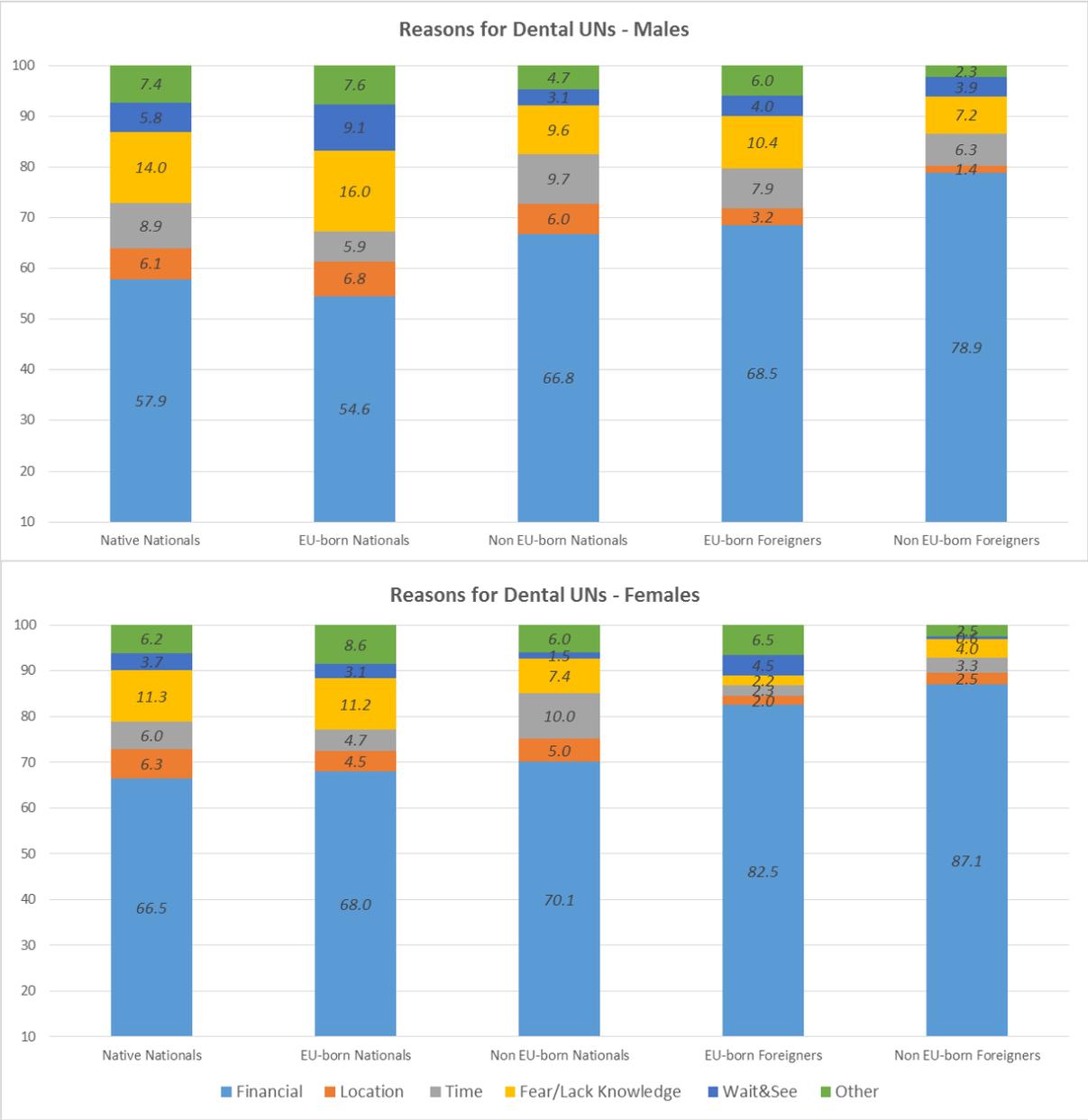


Source: Authors' elaboration on EU-SILC data.

**Figure 14** reports the analysis of the reasons for dental UNs. All groups seem to confirm that high costs of care and treatments are the main reason to neglect oral health: this is especially relevant in foreigners, both EU-born (men 68.5%, women 82.5%) and non EU-born (men 78.9%, women 87.1%), and non-EU nationals (men 66.8%, women 70.1%). Unfortunately, in both cases, medical and dental UNs, EU-SILC does not provide further variables to investigate the nature of "other reasons" answer,

which seems to have an impact, but we are forced to exclude this category from the modelling analysis.

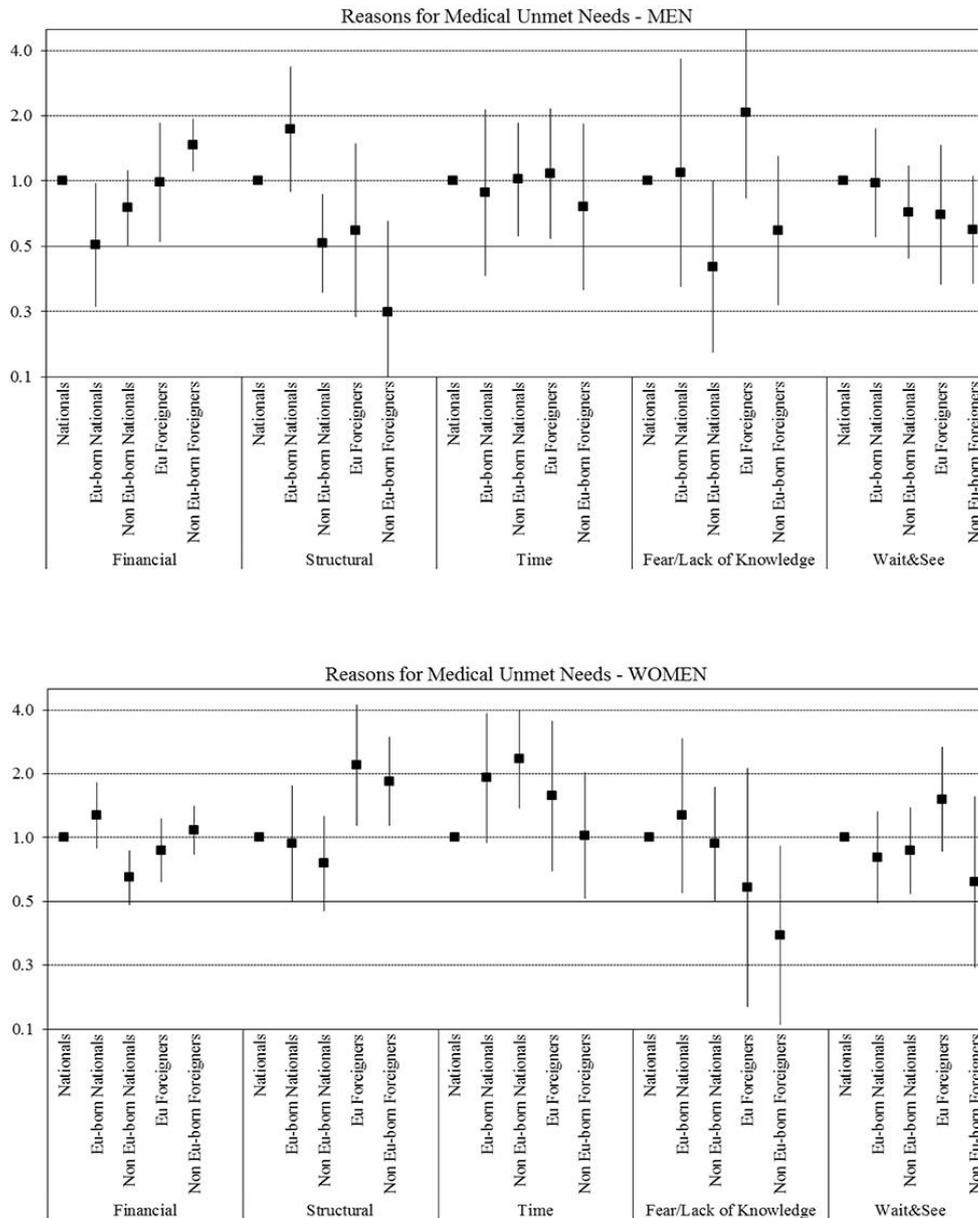
**Figure 14. Description of reasons by immigrant status and sex among subjects with dental unmet needs**



Source: Authors' elaboration on EU-SILC data.

We have calculated Poisson regression models, respectively for medical (**Annex IV**) and dental (**Annex V**) specific reasons for having UNs. **Figure 15** reports PRs for each of the reasons of medical UNs versus no unmet needs. The probability of having UNs due to financial reasons is significantly higher for the non-EU born foreigners males (PR=1.47; 1.11-1.94) than for national men, while considering the structural reason a statistically significant probability is registered by EU-born (PR=2.19; 1.14-4.24) and non EU born (PR=1.84; 1.14-2.98) foreigner women compared to national women. The risk of having unmet needs for lack of time is higher for non-EU born national women (PR= 2.34; 1.37-4.00) than national women.

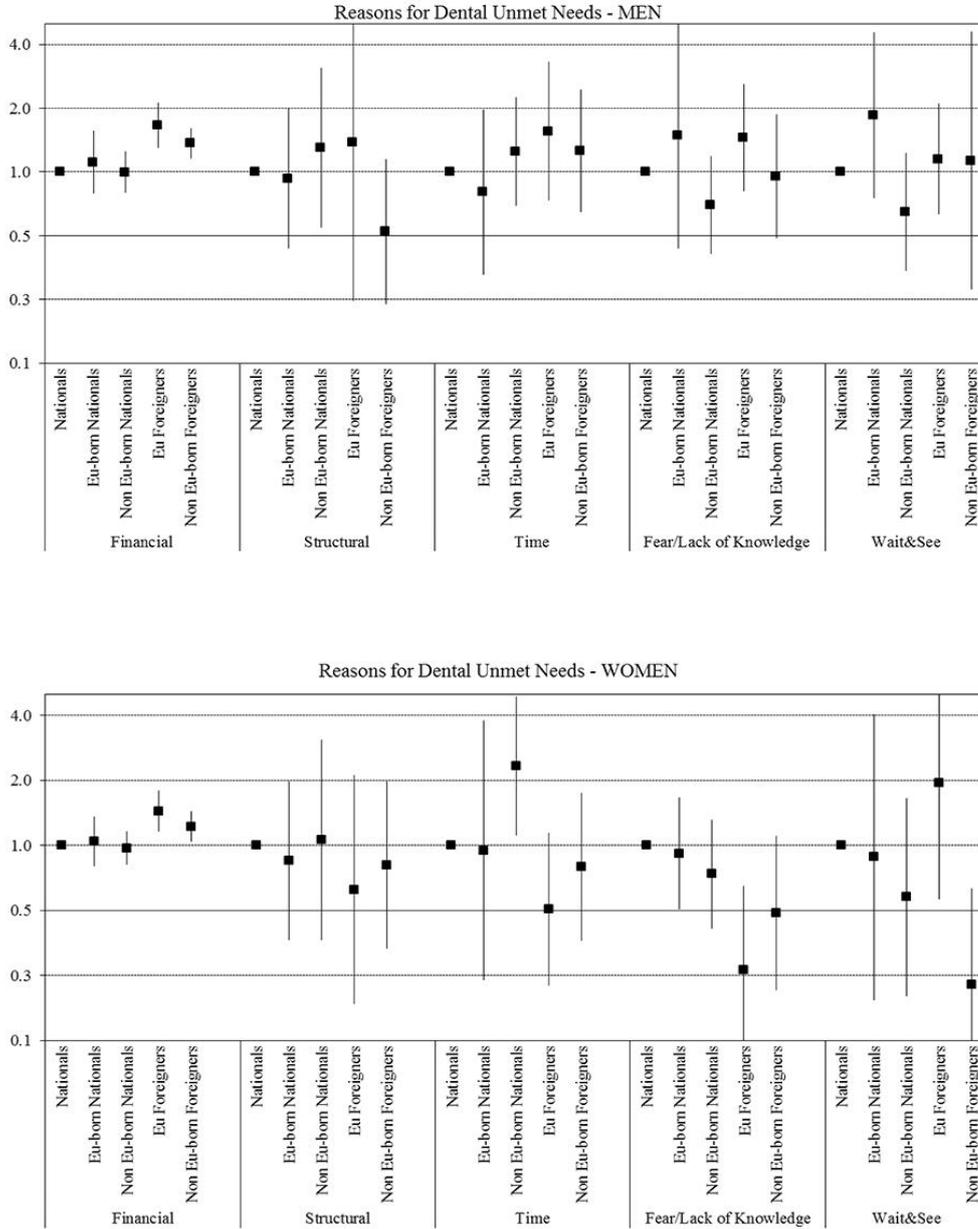
**Figure 15. Prevalence Ratios of medical unmet needs for specific reasons  
by immigrant status and sex**



Source: Authors' elaboration on EU-SILC data.

**Figure 16** complements the analysis reporting the reasons for dental UNs. EU-born foreigner men and women present the highest risks of UNs for financial reasons (respectively PR=1.66; 1.30-2.12 and PR=1.44; 1.16-1.79), followed by non-EU born foreigners (respectively men PR=1.37; 1.16-1.61 and women PR=1.22; 1.05-1.43). In case of UNs due to time, again the non-EU born national females present the higher risk (PR=2.33; 1.12-4.87).

**Figure 16. Prevalence Ratios of dental unmet needs for specific reasons  
by immigrant status and sex**



Source: Authors' elaboration on EU-SILC data

### 3. Discussion

Inequalities by immigrant status in healthcare unmet need are observed in Europe. These inequalities mostly affect foreign citizens, both from within and outside the EU, and are partly explained by socioeconomic circumstances.

If we consider UNs as a proxy of access to healthcare services, as previously done in the literature (Rodrigues *et al.*, 2013; Hernandez-Quevedo *et al.*, 2010; Allin and Masseria, 2009a/b; Koolman, 2007), our results suggest that in the analysed countries needs for healthcare services are not satisfied in the same way for nationals and foreigners. The non-EU foreigners suffer a poorer access to the health care services, but also for EU foreigners, the EU affiliation does not seem sufficient to avoid inequalities in healthcare access. According to their specific framing, in fact, countries provide several level of health care coverage for different groups of migrants and the decision of what constitutes a medical emergency if patients cannot afford to pay are usually left to the provider (FRA, 2011; PICUM, 2010; Stanciole and Huber M., 2009; Romero-Ortuño, 2004).

As previously reported in Rodrigues *et al.* (2013), the socio-economic position (SEP) and cultural factors may influence the way in which people perceive UNs among different countries. Access inequalities between migrants and non-migrants are reduced or disappear after controlling for their SEP, demonstrating that poor SEP might itself be the result of migrant status and ethnic origin, because of processes of social exclusion (Rechel *et al.*, 2013; Malmusi *et al.*, 2010 Davies *et al.*, 2009), and may amplify the inequalities suffered by migrants.

Moreover, a possible explanation of our results would be that intra EU-citizens have more high expectations towards EU healthcare facilities, both in terms of access and utilization, than nationals do. Pursuing the analysis in that direction, it would be interesting seeing if the Cross-border Health Directive n. 24 is playing a role in redeeming the health inequalities suffered by the EU citizens. The Directive, adopted by the European Parliament in 2011 but came into force in all EU Member States only at the end of 2013, assesses the right for all EU citizens to go to another EU country for

treatment and get reimbursed for it. Clearly this new right should not be more linked to personal funds availability and willingness to pay, which, we have seen, affects Europeans in the self-assessment of their needs.

As also tested by Hasanali (2015) for the U.S. case, as foreign-born the more you become familiar with the system and a gain formal access to the healthcare system, the more your needs increased. Another possible explanation would be considered as *de facto* no-existence of the EU in terms of healthcare systems: nationals represent the priority of all countries' welfare systems and foreigners, irrespectively of their country of origin or nationality, come later for macro-level legal aspects or meso- and micro-level interactions between patients and providers. Moreover, EU and non-EU foreigners may share barriers related to the language or lack of knowledge of the system, and suffer in similar ways from insufficient adaptation of healthcare systems to the diversity.

#### **4. Strengths and limitations**

While we believe that this study represents the first comprehensive analysis of immigrant status inequalities in healthcare access in Europe and contributes to the debate on migration and equality of health treatment, we acknowledge that limited participation and the under-representation of migrants in population surveys could represent a limit to the dataset. We may expect survey non-responders to be more marginalised and with more access problems, therefore we may have underestimated the actual level of access inequalities by immigrant status. However, the standardized quality of data makes the comparison among nationals and across countries possible.

We acknowledge that our results might underestimate the effect of health inequalities due to sampling non-response bias. Results remain valid and comparable across countries as similar non-response bias are suffered by whole countries. However, the huge variety of health systems across Europe may influence our aggregated results. Further research is needed to analyse if health inequalities are particularly concentrated in some country clusters (Nielsen *et al.*, 2013) where country-level socio-economic and political circumstances might play a role on health outcomes, beyond individual SEP.

## **5. Conclusions**

The European perceived UNs present health inequalities affected by immigrant status and only partly explained by socioeconomic circumstances. We claim that this study represents the first comprehensive analysis of immigrant status inequalities in healthcare access in Europe and contributes to the debate on migration and equality of health treatment.

Our results show that EU affiliation plays a marginal role in protecting European citizens by suffering healthcare discrimination, even though it might be improved with a re-adaption of the Cross-border Health Directive. Improved access and adaptation of healthcare services to migrant health needs, are, therefore, essential to minimize disadvantages for nationals and migrants and maximise advantages for the host societies (Marmot *et al.*, 2010; European Commission, 2008).

### Annex I. Non parametric tests on medical and dental unmet needs

Dependent and explanatory variables	Medical Unmet Needs			Dental Unmet Needs	
	Non parametric tests	Prob.	Prob. with ties	Prob.	Prob. with ties
Sex	Kwallis test	0,0001	0,0001	0,8209	0,6170
	Chi2 test	0,0000		0,6750	
	Spearman Test	0,0000		0,6752	
Age	Kwallis test	0,0001	0,0001	0,0001	0,0001
	Chi2 test	0,0000		0,0000	
	Spearman Test	0,0000		0,0132	
Citizenship	Kwallis test	0,0270	0,0000	0,0001	0,0001
	Chi2 test	0,0000		0,0000	
	Spearman Test	0,0000		0,0000	
Country of residence	Kwallis test	0,0001	0,0001	0,0001	0,0001
	Chi2 test	0,0000		0,0000	
	Spearman Test	0,0000		0,0000	
Equivalised Income	Kwallis test	0,0001	0,0001	0,0001	0,0001
	Chi2 test	0,0000		0,0000	
	Spearman Test	0,0000		0,0000	
Accessibility to healthcare services	Kwallis test	0,0001	0,0001	0,0001	0,0001
	Chi2 test	0,0000		0,0000	
	Spearman Test	0,0000		0,0000	
Ability to make ends meet	Kwallis test	0,0001	0,0001	0,0001	0,0001
	Chi2 test	0,0000		0,0000	
	Spearman Test	0,0000		0,0000	
Education Level	Kwallis test	0,0001	0,0001	0,0001	0,0001
	Chi2 test	0,0000		0,0000	
	Spearman Test	0,0000		0,0000	
Working Position	Kwallis test	0,0001	0,0001	0,0001	0,0001
	Chi2 test	0,0000		0,0000	
	Spearman Test	0,0000		0,0000	
SAH	Kwallis test	0,0001	0,0001	0,0001	0,0001
	Chi2 test	0,0000		0,0000	
	Spearman Test	0,0000		0,0000	
Chronic Diseases	Kwallis test	0,0001	0,0001	0,0001	0,0001
	Chi2 test	0,0000		0,0000	
	Spearman Test	0,0000		0,0000	
Limitation in activities	Kwallis test	0,0001	0,0001	0,0001	0,0001
	Chi2 test	0,0000		0,0000	
	Spearman Test	0,0000		0,0000	

Source: Authors' elaboration on EU-SILC data

## Annex II. Poisson regression results on medical unmet needs

Poisson Regressions MEDICAL UNs		MEN															WOMEN																								
		Individual Characteristics					Health Characteristics					Financial position					Education level					Individual Characteristics					Health Characteristics					Financial position					Education level				
		IRR	P> z	[95% CI]	IRR	P> z	[95% CI]	IRR	P> z	[95% CI]	IRR	P> z	[95% CI]	IRR	P> z	[95% CI]	IRR	P> z	[95% CI]	IRR	P> z	[95% CI]	IRR	P> z	[95% CI]	IRR	P> z	[95% CI]	IRR	P> z	[95% CI]	IRR	P> z	[95% CI]	IRR	P> z	[95% CI]				
Citizenship	EU-born NAT	1.04		0.76	1.42	1.01		0.74	1.39	0.97		0.70	1.33	0.94		0.68	1.30	1.21		0.96	1.53	1.24		0.99	1.55	1.18		0.94	1.48	1.14		0.91	1.44								
	Non EU-born NAT	0.80	*	0.64	1.00	0.80	*	0.64	1.00	0.71	***	0.56	0.88	0.71	***	0.56	0.88	1.13		0.92	1.38	1.11		0.91	1.35	0.95		0.78	1.16	0.97		0.79	1.19								
	EU FOR	1.16		0.86	1.57	1.19		0.88	1.61	1.12		0.82	1.52	1.03		0.75	1.41	1.25		0.96	1.61	1.32		* 1.03	1.70	1.22		0.95	1.57	1.19		0.93	1.54								
Age	Non EU-born FOR	1.11		0.89	1.38	1.14		0.92	1.42	0.94		0.75	1.18	0.95		0.76	1.19	1.28		*	1.05	1.57	1.27		* 1.04	1.56	1.06		0.86	1.29	1.05		0.86	1.28							
	31-45	1.56	***	1.36	1.79	1.35	***	1.17	1.55	1.41	***	1.23	1.62	1.38	***	1.21	1.59	1.46	***	1.32	1.61	1.23	***	1.11	1.36	1.27	***	1.15	1.41	1.25	***	1.13	1.38								
	46-60	1.58	***	1.38	1.80	0.99	0.85	0.85	1.14	1.07		0.93	1.23	1.06		0.92	1.22	1.51	***	1.37	1.66	0.89	*	0.81	0.99	0.98		0.88	1.09	1.01		0.91	1.12								
	60-75	1.39	***	1.19	1.63	0.67	***	0.57	0.80	0.79	**	0.67	0.94	0.78	***	0.66	0.92	1.50	***	1.34	1.68	0.64	***	0.57	0.73	0.75	***	0.67	0.85	0.79	***	0.70	0.89								
	76-over	1.31	***	1.11	1.54	0.52		0.44	0.63	0.64	***	0.53	0.77	0.64	***	0.54	0.77	1.47	***	1.31	1.65	0.52	***	0.45	0.59	0.62	***	0.55	0.71	0.66	***	0.58	0.75								
	CH	1.11		0.77	1.60	1.32		0.92	1.91	1.40		0.97	2.02	1.41		0.98	2.04	1.96	***	1.43	2.68	2.23	***	1.62	3.06	2.33	***	1.70	3.20	2.32	***	1.69	3.18								
	CY	3.31	***	2.42	4.53	3.53	***	2.58	4.83	2.64	***	1.93	3.61	2.61	***	1.91	3.58	4.75	***	3.58	6.30	5.08	***	3.83	6.75	3.56	***	2.68	4.74	3.45	***	2.60	4.60								
	CZ	2.86	***	2.10	3.91	2.75	***	2.02	3.75	2.32	***	1.70	3.17	2.31	***	1.69	3.15	3.23	***	2.43	4.28	3.14	***	2.36	4.18	2.46	***	1.85	3.27	2.41	***	1.81	3.21								
	DK	5.38	***	3.76	7.69	5.19	***	3.65	7.37	5.26	***	3.69	7.48	5.08	***	3.56	7.26	4.30	***	3.07	6.03	4.43	***	3.17	6.20	4.42	***	3.17	6.17	4.10	***	2.93	5.74								
	EL	6.66	***	4.93	8.98	7.63	***	5.67	10.26	5.05	***	3.74	6.82	4.98	***	3.68	6.73	9.35	***	7.08	12.36	10.56	***	7.98	13.97	6.32	***	4.76	8.38	6.21	***	4.67	8.24								
	ES	4.60	***	3.45	6.13	5.04	***	3.79	6.71	4.14	***	3.11	5.51	4.12	***	3.09	5.51	4.53	***	3.46	5.92	4.99	***	3.81	6.55	3.96	***	3.02	5.20	3.91	***	2.98	5.14								
	FI	4.00	***	2.92	5.47	3.69	***	2.69	5.05	3.78	***	2.76	5.18	3.69	***	2.69	5.07	6.51	***	4.90	8.65	6.22	***	4.67	8.29	6.54	***	4.90	8.72	6.12	***	4.58	8.17								
	FR	4.12	***	3.08	5.51	4.13	***	3.09	5.51	3.76	***	2.81	5.01	3.75	***	2.81	5.00	4.87	***	3.73	6.37	4.86	***	3.71	6.36	4.35	***	3.32	5.70	4.24	***	3.24	5.56								
	IT	4.33	***	3.26	5.74	4.71	***	3.55	6.24	3.67	***	2.77	4.87	3.69	***	2.78	4.91	6.05	***	4.66	7.86	6.63	***	5.10	8.62	4.93	***	3.79	6.42	4.95	***	3.80	6.44								
	LU	2.56	***	1.79	3.65	2.72	***	1.90	3.89	2.98	***	2.08	4.26	3.10	***	2.17	4.45	2.25	***	1.61	3.16	2.43	***	1.73	3.41	2.72	***	1.93	3.83	2.75	***	1.95	3.87								
NL	1.02		0.65	1.62	1.13		0.72	1.77	1.15		0.73	1.81	1.12		0.71	1.77	1.36		0.92	2.02	1.35		0.92	2.00	1.32		0.89	1.95	1.26		0.85	1.87									
NO	1.56	*	1.04	2.35	1.67	*	1.10	2.51	1.80	**	1.19	2.71	1.80	**	1.19	2.71	2.87	***	2.02	4.08	3.14	***	2.21	4.46	3.40	***	2.40	4.82	3.20	***	2.26	4.54									
PO	10.03	***	7.58	13.25	8.94	***	6.77	11.81	7.30	***	5.52	9.65	7.27	***	5.50	9.61	13.35	***	10.32	17.28	12.04	***	9.28	15.62	9.40	***	7.23	12.21	9.15	***	7.04	11.88									
PT	4.35	***	3.24	5.85	3.67	***	2.73	4.94	2.97	***	2.21	3.99	3.00	***	2.22	4.05	4.89	***	3.71	6.43	3.87	***	2.93	5.10	3.04	***	2.30	4.01	3.08	***	2.33	4.07									
SE	8.67	***	6.44	11.67	10.22	***	7.61	13.74	10.90	***	8.10	14.67	10.92	***	8.11	14.70	10.50	***	8.00	13.77	12.43	***	9.47	16.32	13.02	***	9.91	17.12	12.30	***	9.35	16.19									
UK	1.94	***	1.37	2.75	2.03	***	1.44	2.87	1.91	***	1.36	2.70	1.82	***	1.28	2.60	2.51	***	1.89	3.34	2.60	***	1.95	3.47	2.40	***	1.80	3.20	2.30	***	1.72	3.07									
SAH	Fair						2.38	***	2.07	2.74	2.15	***	1.87	2.47	2.18	***	1.90	2.50		2.08	***	1.90	2.29	1.82	***	1.65	2.00	1.87	***	1.70	2.06										
	Bad						2.96	***	2.52	3.48	2.45	***	2.09	2.88	2.50	***	2.13	2.93		2.76	***	2.46	3.10	2.17	***	1.93	2.44	2.24	***	1.99	2.52										
Chronic Diseases	Yes					1.24	***	1.10	1.40	1.29	***	1.14	1.45	1.27	***	1.13	1.43		1.45	***	1.32	1.60	1.48	***	1.35	1.63	1.47	***	1.33	1.62											
	No					0.83	**	0.72	0.95	0.89	***	0.78	1.02	0.88	***	0.77	1.01		0.76	***	0.68	0.85	0.82	***	0.73	0.91	0.81	***	0.73	0.91											
Limitations in activity	2nd Quintile								0.87	**	0.79	0.97	0.88	*	0.79	0.97							0.86	***	0.80	0.93	0.84	***	0.78	0.91											
	3rd Quintile								0.83	***	0.75	0.93	0.84	***	0.75	0.94							0.86	***	0.79	0.93	0.83	***	0.76	0.90											
	4th Quintile								0.81	***	0.72	0.91	0.79	***	0.71	0.89							0.85	***	0.77	0.93	0.80	***	0.73	0.87											
	5th Quintile								0.80	***	0.71	0.90	0.78	***	0.69	0.88							0.85	***	0.77	0.94	0.77	***	0.69	0.85											
	With some difficulty								0.63	***	0.58	0.70	0.63	***	0.57	0.69							0.53	***	0.49	0.57	0.52	***	0.49	0.56											
Ability to make ends meet	Fairly easily								0.53	***	0.47	0.59	0.50	***	0.45	0.56							0.40	***	0.36	0.44	0.39	***	0.35	0.43											
	Easily								0.44	***	0.38	0.50	0.42	***	0.36	0.48							0.38	***	0.33	0.43	0.36	***	0.32	0.42											
	Secondary								1.02		0.94	1.11			1.08	1.33										1.06		0.99	1.13												
Education level	Tertiary							1.20	***	1.08	1.33			1.20	***	1.08	1.33									1.39	***	1.27	1.52												
_cons		0.01	***	0.01	0.01	0.01	***	0.01	0.01	0.02	***	0.01	0.02	0.02	***	0.01	0.02	0.01	0.01	***	0.01	0.01	0.01	0.01	0.02	***	0.01	0.02	0.02	***	0.01	0.02									
Log pseudolikelihood																																									
pseudo R2			0.04				0.08				0.10				0.11					0.05			0.09			0.11					0.12										

Source: Authors' elaboration on EU-SILC data - \* p-value < 0.05; \*\* p < 0.01; \*\*\* p < 0.001

### Annex III. Poisson regression results on dental unmet needs

Poisson Regressions DENTAL UNs		MEN												WOMEN																			
		Individual Characteristics			Health Characteristics			Financial position			Education level			Individual Characteristics			Health Characteristics			Financial position			Education level										
		IRR	P> z	[95% CI]	IRR	P> z	[95% CI]	IRR	P> z	[95% CI]	IRR	P> z	[95% CI]	IRR	P> z	[95% CI]	IRR	P> z	[95% CI]	IRR	P> z	[95% CI]	IRR	P> z	[95% CI]								
Citizenship	EU-born NAT	1.24		0.93	1.65	1.23		0.91	1.64	1.16		0.86	1.56	1.16		0.85	1.57	1.05		0.85	1.30	1.08		0.87	1.33	1.01		0.82	1.25	1.00		0.81	1.24
	Non EU-born NAT	1.14		0.95	1.35	1.13		0.95	1.35	0.91		0.76	1.08	0.93		0.78	1.11	1.24	**	1.06	1.45	1.18	*	1.01	1.39	0.98		0.84	1.15	1.00		0.85	1.17
	EU FOR	1.63	***	1.33	1.99	1.65	***	1.35	2.02	1.47	***	1.21	1.79	1.53	***	1.25	1.86	1.34	***	1.10	1.63	1.40	***	1.15	1.70	1.24	*	1.03	1.50	1.27	**	1.05	1.54
	Non EU-born FOR	1.66	***	1.44	1.93	1.69	***	1.46	1.95	1.24	**	1.07	1.44	1.24	***	1.07	1.45	1.41	***	1.22	1.63	1.40	***	1.21	1.62	1.08		0.93	1.25	1.08		0.93	1.25
Age	31-45	1.50	***	1.36	1.64	1.37	***	1.25	1.51	1.48	***	1.35	1.62	1.48	***	1.35	1.63	1.33	***	1.21	1.45	1.18	***	1.08	1.29	1.25	***	1.15	1.37	1.25	***	1.15	1.37
	46-60	1.48	***	1.36	1.62	1.11	*	1.01	1.22	1.29	***	1.17	1.41	1.27	***	1.15	1.39	1.32	***	1.21	1.43	0.90	*	0.82	0.98	1.06		0.97	1.16	1.06		0.96	1.16
	60-75	1.18	**	1.05	1.32	0.74	***	0.65	0.83	0.96		0.85	1.08	0.93		0.83	1.06	1.06		0.95	1.18	0.55	***	0.49	0.62	0.70	***	0.62	0.79	0.69	***	0.62	0.78
	76-over	0.86	*	0.75	0.99	0.46	***	0.40	0.53	0.62	***	0.54	0.72	0.60	***	0.52	0.70	0.91	***	0.82	1.02	0.39	***	0.35	0.45	0.51	***	0.45	0.58	0.50	***	0.44	0.57
	CH	1.43	***	1.15	1.78	1.59	***	1.28	1.98	1.74	***	1.41	2.16	1.73	***	1.40	2.14	2.27	***	1.84	2.79	2.51	***	2.04	3.08	2.73	***	2.23	3.35	2.72	***	2.22	3.33
	CY	2.90	***	2.39	3.52	3.06	***	2.53	3.71	1.95	***	1.61	2.36	1.92	***	1.59	2.33	3.32	***	2.72	4.03	3.53	***	2.91	4.29	2.25	***	1.85	2.74	2.23	***	1.84	2.72
	CZ	1.41	***	1.14	1.75	1.39	***	1.13	1.72	1.06		0.86	1.31	1.07		0.87	1.33	1.50	***	1.21	1.85	1.46	***	1.18	1.81	1.05		0.85	1.30	1.07		0.86	1.32
Country of Residence	DK	1.84	***	1.39	2.43	1.80	***	1.36	2.38	1.84	***	1.40	2.42	1.87	***	1.42	2.46	2.09	***	1.56	2.78	2.10	***	1.58	2.79	2.10	***	1.59	2.79	2.07	***	1.56	2.75
	EL	2.61	***	2.13	3.20	2.89	***	2.36	3.54	1.56	***	1.27	1.91	1.54	***	1.26	1.89	3.19	***	2.58	3.95	3.50	***	2.83	4.32	1.88	***	1.52	2.33	1.87	***	1.51	2.31
	ES	2.51	***	2.09	3.01	2.69	***	2.25	3.23	1.95	***	1.63	2.34	1.90	***	1.58	2.28	3.43	***	2.85	4.13	3.72	***	3.10	4.47	2.74	***	2.28	3.29	2.69	***	2.24	3.24
	FI	1.76	***	1.41	2.19	1.68	***	1.35	2.09	1.78	***	1.44	2.22	1.79	***	1.44	2.23	2.60	***	2.10	3.23	2.56	***	2.06	3.18	2.77	***	2.23	3.44	2.76	***	2.22	3.43
	FR	2.59	***	2.15	3.10	2.61	***	2.17	3.12	2.21	***	1.84	2.64	2.20	***	1.84	2.64	3.28	***	2.73	3.95	3.25	***	2.70	3.91	2.71	***	2.25	3.26	2.69	***	2.24	3.24
	IT	2.86	***	2.40	3.41	3.09	***	2.59	3.68	2.07	***	1.74	2.46	2.02	***	1.70	2.41	3.93	***	3.28	4.70	4.19	***	3.50	5.00	2.79	***	2.34	3.34	2.77	***	2.31	3.31
	LU	0.77		0.59	1.01	0.81		0.62	1.06	0.93		0.71	1.21	0.90		0.69	1.18	0.91		0.68	1.20	0.95		0.71	1.26	1.12		0.84	1.49	1.09		0.82	1.46
	NL	0.67	*	0.48	0.93	0.71	*	0.51	0.98	0.72	*	0.52	1.00	0.73		0.53	1.01	0.91		0.67	1.23	0.89		0.66	1.21	0.86		0.63	1.17	0.85		0.62	1.16
	NO	2.62	***	2.11	3.26	2.83	***	2.28	3.52	3.27	***	2.65	4.04	3.29	***	2.66	4.06	3.33	***	2.67	4.16	3.60	***	2.89	4.48	4.14	***	3.34	5.15	4.16	***	3.35	5.17
	PO	2.80	***	2.34	3.35	2.63	***	2.20	3.14	1.89	***	1.58	2.26	1.90	***	1.59	2.27	3.38	***	2.82	4.06	3.11	***	2.59	3.74	2.25	***	1.87	2.70	2.26	***	1.88	2.71
	PT	4.96	***	4.14	5.93	4.42	***	3.70	5.28	3.14	***	2.63	3.75	3.01	***	2.51	3.61	6.59	***	5.49	7.89	5.27	***	4.40	6.32	3.85	***	3.21	4.62	3.78	***	3.14	4.54
	SE	2.87	***	2.33	3.53	3.18	***	2.58	3.91	3.61	***	2.94	4.43	3.61	***	2.93	4.44	3.19	***	2.59	3.94	3.64	***	2.95	4.49	4.07	***	3.30	5.02	4.09	***	3.32	5.05
	UK	1.16		0.94	1.42	1.20		0.98	1.47	1.07		0.88	1.31	1.09		0.89	1.33	1.51	***	1.23	1.86	1.54	***	1.25	1.89	1.40	***	1.13	1.72	1.44	***	1.17	1.77
SAH	Fair					1.76	***	1.61	1.91	1.49	***	1.37	1.62	1.49	***	1.37	1.62		***	1.85	***	1.71	2.00	1.51	***	1.40	1.64	1.52	***	1.40	1.64		
	Bad					2.00	***	1.77	2.26	1.46	***	1.29	1.64	1.46	***	1.29	1.65		***	2.38	***	2.14	2.64	1.72	***	1.55	1.90	1.73	***	1.56	1.92		
Chronic Diseases	Yes					1.14	***	1.04	1.25	1.21	***	1.11	1.32	1.22	***	1.11	1.33			1.22	***	1.12	1.32	1.26	***	1.16	1.36	1.25	***	1.16	1.36		
	No					0.92		0.83	1.02	0.94		0.85	1.04	0.94		0.85	1.04		0.87	***	0.80	0.95	0.91	*	0.84	0.99	0.91	*	0.84	0.99			
Limitations in activity	2nd Quintile					0.78	***	0.69	0.89	0.87	*	0.77	0.98	0.88	*	0.78	0.99			0.70	***	0.63	0.78	0.78	***	0.70	0.86	0.78	***	0.71	0.87		
	3rd Quintile									0.83	***	0.77	0.90	0.84	***	0.78	0.91				***	0.63	0.78	0.78	***	0.63	0.78	0.78	***	0.71	0.87		
Equivalised Income	4th Quintile									0.77	***	0.71	0.83	0.77	***	0.71	0.84				***	0.63	0.78	0.78	***	0.63	0.78	0.78	***	0.71	0.87		
	5th Quintile									0.72	***	0.66	0.79	0.74	***	0.67	0.81				***	0.63	0.78	0.78	***	0.63	0.78	0.78	***	0.71	0.87		
	With some difficulty									0.62	***	0.56	0.69	0.63	***	0.57	0.70				***	0.63	0.78	0.78	***	0.63	0.78	0.78	***	0.71	0.87		
Ability to make ends meet	Fairly easily									0.53	***	0.49	0.57	0.54	***	0.50	0.57				***	0.63	0.78	0.78	***	0.63	0.78	0.78	***	0.71	0.87		
	Easily									0.36	***	0.33	0.40	0.36	***	0.33	0.40				***	0.63	0.78	0.78	***	0.63	0.78	0.78	***	0.71	0.87		
	Secondary level									0.27	***	0.24	0.31	0.27	***	0.24	0.31				***	0.63	0.78	0.78	***	0.63	0.78	0.78	***	0.71	0.87		
Education level	Tertiary									0.93	*	0.87	0.99		0.91	*	0.83	1.00				***	0.95	0.99	0.99	***	0.95	0.99	0.99	***	0.89	1.01	
	_cons	0.03	***	0.02	0.03	0.03	***	0.02	0.04	0.07	***	0.06	0.09	0.07	***	0.06	0.09	0.02	***	0.02	0.03	0.03	***	0.02	0.03	0.06	***	0.05	0.08	0.07	***	0.05	0.08
Log pseudolikelihood																																	
pseudo R2																																	

Source: Authors' elaboration on EU-SILC data - \* p-value < 0.05; \*\* p < 0.01; \*\*\* p < 0.001

### Annex IV. Poisson regression results on reasons for medical unmet needs

Reasons for Medical UNs		MEN															WOMEN																								
		Financial			Structural			Time			Fear/Lack of knowledge			Wait			Financial			Structural			Time			Fear/Lack of knowledge			Wait												
		IRR	P> z	[95% CI]	IRR	P> z	[95% CI]	IRR	P> z	[95% CI]	IRR	P> z	[95% CI]	IRR	P> z	[95% CI]	IRR	P> z	[95% CI]	IRR	P> z	[95% CI]	IRR	P> z	[95% CI]	IRR	P> z	[95% CI]	IRR	P> z	[95% CI]										
Citizenship	EU-born NAT	0.51	0.26	0.98	1.74	0.89	3.38	0.88	0.36	2.15	1.09	0.32	3.65	0.98	0.55	1.75	1.27	0.89	1.82	0.94	0.50	1.76	1.91	0.95	3.87	1.27	0.55	2.94	0.81	0.49	1.33										
	Non EU-born NAT	0.75	0.50	1.12	0.52	**	0.31	0.87	1.02	0.56	1.85	0.40	*	0.16	1.00	0.72	0.44	1.18	0.65	***	0.48	0.87	0.76	0.45	1.27	2.34	***	1.37	4.00	0.93	0.50	1.73	0.87	0.54	1.39						
	EU FOR	0.99	0.53	1.86	0.59		0.24	1.49	1.08	0.54	2.16	2.08	0.83	0.53	5.18	0.70	0.33	1.46	0.87	0.62	1.23	2.19	*	1.14	4.24	1.57	0.70	3.53	0.58	0.16	2.13	1.52	0.86	2.68							
	Non EU-born FOR	1.47	**	1.11	1.94	0.25	**	0.09	0.65	0.76	0.31	1.84	0.59	0.27	1.30	0.60	0.34	0.34	1.05	1.09	0.84	1.42	1.84	**	1.14	2.98	1.02	0.51	2.04	0.35	*	0.13	0.92	0.62	0.24	1.56					
Age	31-45	1.39	***	1.11	1.73	1.25	0.70	2.23	1.72	***	1.29	2.28	1.13	0.76	1.69	1.33	*	1.03	1.70	1.41	***	1.18	1.68	1.14	0.90	1.46	1.40	**	1.07	1.82	1.15	0.75	1.77	1.12	0.86	1.45					
	46-60	1.34	**	1.08	1.67	1.11	0.60	2.05	0.86	0.63	1.17	0.72	0.49	1.07	1.06	0.82	1.36	1.21	*	1.01	1.45	1.18	0.94	1.50	0.73	*	0.55	0.98	0.89	0.57	1.39	0.88	0.68	1.13							
	60-75	0.93		0.71	1.21	1.25	0.68	2.29	0.12	***	0.06	0.23	0.53	**	0.33	0.86	0.74	0.53	1.04	0.93	0.76	1.14	1.24	0.95	1.61	0.18	***	0.07	0.45	0.56	0.33	0.97	0.72	*	0.52	1.00					
	76-over	0.72	*	0.54	0.96	1.24	0.68	2.27	0.02	***	0.01	0.06	0.39	***	0.23	0.65	0.63	*	0.43	0.93	0.66	***	0.53	0.82	1.19	0.91	1.55	0.06	***	0.02	0.18	0.37	***	0.20	0.68	0.70	*	0.48	1.01		
	CH	5.80	***	2.61	12.90	0.47	0.11	2.04	1.26	0.53	2.96	0.69	0.19	2.49	0.78	0.34	1.79	6.15	***	3.43	11.02	1.58	0.47	5.36	0.81	0.36	1.80	1.40	0.46	4.27	0.57	0.23	1.46								
	CY	11.47	***	5.64	23.30	0.26	0.06	1.03	0.79	0.31	2.01	1.62	0.64	4.13	2.83	***	1.60	4.99	8.05	***	4.69	13.82	1.49	0.48	4.62	0.25	**	0.09	0.71	1.64	0.64	4.23	2.72	***	1.45	5.10					
	CZ	2.27	*	1.03	5.01	1.92	0.75	4.86	2.98	***	1.45	6.11	1.74	0.68	4.47	3.14	***	1.84	5.36	0.84	0.44	1.61	6.64	***	2.55	17.33	2.34	**	1.23	4.45	1.46	0.56	3.77	3.77	***	2.11	6.76				
DK	0.78		0.23	2.69	7.40	***	2.42	22.67	3.76	***	1.62	8.74	5.12	***	1.74	15.02	7.89	***	4.37	14.23	2.25	0.98	5.14	13.24	***	4.75	36.87	1.18	0.44	3.14	3.07	*	0.98	9.60	5.12	***	2.68	9.79			
EL	19.63	***	9.80	39.34	9.42	***	3.94	22.52	2.73	**	1.27	5.88	3.20	*	1.25	8.24	0.44	0.19	1.04	12.17	***	7.09	20.90	13.56	***	5.14	35.74	2.34	*	1.12	4.90	0.75	0.26	2.16	1.14	0.54	2.41				
ES	1.45		0.67	3.11	2.24	0.91	5.52	8.39	***	4.31	16.34	3.03	**	1.34	6.87	6.21	***	3.78	10.21	1.23	0.68	2.21	3.78	**	1.44	9.95	4.44	***	2.41	8.16	3.20	**	1.41	7.25	6.32	***	3.60	11.08			
FI	2.28		0.82	6.39	23.25	***	10.15	53.23	0.04	***	0.00	0.28	0.50	0.11	2.24	0.20	*	0.04	0.92	0.18	**	0.05	0.62	72.01	***	28.65	180.99	0.41	0.12	1.35	0.31	0.07	1.35	0.11	**	0.02	0.53				
Country of Residence	FR	8.85	***	4.37	17.91	2.22	0.92	5.36	5.07	***	2.60	9.92	3.72	***	1.70	8.14	3.59	***	2.14	6.01	7.06	**	4.13	12.05	3.70	**	1.42	9.64	3.21	***	1.76	6.09	3.65	***	1.63	8.18	2.78	***	1.55	5.00	
	IT	18.58	***	9.37	36.87	4.62	***	2.00	10.63	1.21	0.59	2.50	0.56	0.24	1.35	0.58	0.32	1.08	11.01	***	6.51	18.63	8.44	***	3.36	21.20	3.88	0.44	1.75	1.33	0.56	3.16	0.54	0.28	1.04						
	LU	5.17	***	2.05	13.03	2.84	0.88	9.22	1.73	0.69	4.34	1.93	0.68	5.47	6.17	***	3.43	11.09	3.36	***	1.69	6.66	1.35	0.32	5.63	1.09	0.44	2.72	3.18	*	1.10	9.21	4.18	***	2.16	8.12					
	NL	1.95		0.67	5.69	1.34	0.39	4.65	0.21	*	0.04	1.01	1.67	0.49	5.73	0.02	***	0.00	0.12	1.06	0.39	2.91	6.28	***	2.21	17.88	0.25	0.05	1.23	0.88	0.24	3.28	0.18	**	0.05	0.65					
	NO	5.04	***	1.70	15.00	8.37	***	3.31	21.19	0.44	0.09	2.21	0.17	0.02	1.36	0.30	0.08	1.17	3.11	**	1.37	7.02	17.36	***	6.44	46.81	0.00	***	0.00	0.00	1.48	0.32	6.91	0.32	0.04	2.47					
	PO	12.55	***	6.29	25.07	23.99	***	10.58	54.43	6.33	***	3.27	12.23	5.41	***	2.49	11.74	4.01	***	2.43	6.61	8.45	***	4.98	14.35	53.30	***	21.43	132.57	5.23	***	2.86	9.57	4.88	***	2.20	10.79	3.67	***	2.09	6.45
	PT	7.99	***	3.94	16.20	3.53	**	1.45	8.61	2.50	*	1.19	5.24	2.55	*	1.09	5.98	2.36	***	1.34	4.15	4.48	***	2.61	7.71	5.82	***	2.23	15.21	1.80	0.90	3.60	1.53	0.62	3.76	3.00	***	1.63	5.52		
SE	6.05	***	2.14	17.08	9.48	***	3.91	22.99	8.86	***	4.34	18.10	6.11	***	2.45	15.23	18.70	***	11.31	30.92	3.99	***	1.96	8.13	10.63	***	3.88	29.15	6.09	***	3.20	11.58	11.21	***	4.89	25.65	21.25	***	12.14	37.20	
UK	0.73		0.25	2.14	8.80	***	3.53	21.92	0.19	**	0.05	0.70	1.43	0.58	3.54	0.16	***	0.05	0.47	0.42	0.17	1.04	14.94	***	5.91	37.76	0.39	*	0.16	0.96	0.79	0.26	2.35	0.22	**	0.07	0.73				
SAH	Fair	2.33	***	1.92	2.82	3.32	**	1.27	4.21	2.47	***	1.90	3.19	3.05	***	1.51	2.33	1.82	***	1.55	2.13	1.87	***	1.53	2.30	2.24	***	1.65	3.03	2.85	***	1.84	4.41	1.65	***	1.27	2.15				
	Bad	2.65	***	2.08	3.38	3.03	***	1.67	5.50	1.58	0.92	2.71	3.50	***	2.17	5.64	1.62	**	1.12	2.34	2.25	***	1.86	2.73	2.27	***	1.78	2.90	1.89	**	1.18	3.03	3.39	***	1.96	5.87	1.55	*	1.08	2.23	
Chronic Diseases	Yes	1.06		0.87	1.28	1.61	*	1.10	2.38	1.26	0.96	1.67	1.61	**	1.11	2.35	1.00	0.80	1.26	1.25	**	1.07	1.47	1.72	***	1.42	2.09	1.59	***	1.16	2.20	1.47	0.98	2.21	1.31	*	1.00	1.71			
	No	0.64	***	0.50	0.82	0.93	0.69	1.25	2.18	***	1.32	3.62	1.01	0.62	1.63	1.54	*	1.01	2.33	0.59	***	0.50	0.71	0.77	*	0.62	0.95	2.72	***	1.39	5.34	0.71	0.45	1.13	1.83	***	1.28	2.64			
Equivalised Income	2nd Quintile	0.76	***	0.65	0.88	0.88	0.60	1.28	1.50	*	1.08	2.08	0.85	0.61	1.18	0.91	0.71	1.17	0.72	***	0.64	0.81	1.01	0.86	1.20	1.38	*	1.00	1.90	0.63	**	0.45	0.90	1.05	0.84	1.32					
	3rd Quintile	0.73	***	0.62	0.87	0.92	0.62	1.36	1.45	*	1.04	2.00	0.72	0.50	1.02	0.98	0.75	1.27	0.66	***	0.58	0.75	1.08	0.90	1.29	1.35	0.96	1.90	0.91	0.65	1.27	1.07	0.84	1.36							
	4th Quintile	0.50	***	0.41	0.61	0.94	0.64	1.39	1.72	***	1.22	2.41	0.61	**	0.42	0.89	0.85	0.64	1.13	0.50	***	0.42	0.58	1.13	0.93	1.36	1.71	***	1.21	2.42	0.90	0.60	1.34	1.05	0.79	1.40					

Source: Authors' elaboration on EU-SILC data - \* p-value< 0.05; \*\* p < 0.01; \*\*\* p < 0.001

## Annex V. Poisson regression results on reasons for dental unmet needs

Reasons for Dental UNs		MEN															WOMEN															
		Financial			Structural			Time			Fear/Lack of knowledge			Wait			Financial			Structural			Time			Fear/Lack of knowledge			Wait			
		IRR	P> z	[95% CI]	IRR	P> z	[95% CI]	IRR	P> z	[95% CI]	IRR	P> z	[95% CI]	IRR	P> z	[95% CI]	IRR	P> z	[95% CI]	IRR	P> z	[95% CI]	IRR	P> z	[95% CI]	IRR	P> z	[95% CI]	IRR	P> z	[95% CI]	
Citizenship	EU-born NAT	1.11		0.79 1.56	0.93		0.43 2.01	0.80		0.33 1.97	1.49		0.44 5.12	1.85		0.75 4.58	1.04		0.80 1.36	0.85		0.37 1.98	0.95		0.24 3.79	0.92		0.51 1.67	0.89		0.19 4.05	
	Non EU-born NAT	1.00		0.80 1.25	1.30		0.55 3.09	1.25		0.69 2.24	0.70		0.41 1.19	0.65		0.34 1.23	0.97		0.81 1.16	1.06		0.36 3.09	2.33	*	1.12 4.87	0.74		0.41 1.32	0.58		0.20 1.65	
	EU FOR	1.66	***	1.30 2.12	1.39		0.25 7.78	1.56		0.73 3.32	1.45		0.82 2.59	1.15		0.63 2.10	1.44	***	1.16 1.79	0.63		0.18 2.11	0.51		0.23 1.14	0.27	***	0.11 0.65	1.95		0.56 6.76	
Age	Non EU-born FOR	1.37	***	1.16 1.61	0.52		0.24 1.15	1.26		0.65 2.45	0.96		0.49 1.87	1.13		0.28 4.59	1.22	**	1.05 1.43	0.81		0.33 1.97	0.80		0.36 1.76	0.49		0.21 1.11	0.23	**	0.08 0.63	
	31-45	1.59	***	1.40 1.80	1.38		0.93 2.04	1.65	***	1.19 2.29	1.26	*	1.00 1.59	1.09		0.73 1.64	1.39	***	1.24 1.55	1.30		0.93 1.81	1.14		0.86 1.51	0.95		0.68 1.34	1.23		0.76 1.99	
	46-60	1.52	***	1.34 1.72	0.97		0.66 1.42	1.03		0.74 1.43	1.00		0.78 1.28	0.75		0.51 1.10	1.30	***	1.17 1.45	0.82		0.57 1.16	0.46	***	0.33 0.64	0.64	**	0.45 0.91	0.97		0.61 1.53	
	60-75	1.10		0.93 1.30	1.13		0.71 1.79	0.27	***	0.14 0.52	0.73		0.52 1.02	0.64		0.40 1.03	0.83	**	0.72 0.95	0.65	*	0.43 1.00	0.24	***	0.10 0.61	0.46	***	0.30 0.72	0.63		0.36 1.10	
	76-over	0.66	***	0.54 0.81	0.75		0.45 1.25	0.04	***	0.01 0.15	0.56	***	0.38 0.82	0.44	**	0.24 0.79	0.50	***	0.43 0.58	0.67		0.44 1.02	0.09	***	0.04 0.20	0.28	***	0.16 0.49	0.81		0.42 1.56	
	CH	4.94	***	3.41 7.14	0.99		0.32 3.04	1.20		0.57 2.50	0.27	***	0.15 0.49	0.17	***	0.06 0.45	5.35	***	3.96 7.23	0.69		0.29 1.66	1.85	**	0.86 4.00	0.44	**	0.24 0.82	0.13	***	0.03 0.63	
	CY	3.95	***	2.79 5.59	0.64		0.21 1.96	1.16		0.53 2.56	0.63	*	0.40 0.99	2.66	***	1.55 4.59	3.53	***	2.63 4.72	0.78		0.32 1.90	1.07		0.44 2.65	0.87	**	0.53 1.42	4.24	***	1.86 9.67	
	CZ	0.69		0.44 1.11	2.24		0.94 5.30	2.25	*	1.12 4.53	1.06		0.71 1.57	1.39		0.80 2.39	0.66	*	0.45 0.95	1.95	*	1.00 3.81	2.60	**	1.22 5.53	1.02		0.66 1.57	2.95	**	1.33 6.52	
	DK	4.29	***	2.70 6.80	0.55		0.08 3.58	1.68		0.67 4.22	0.65		0.35 1.22	1.51		0.73 3.10	3.62	***	2.42 5.40	1.20		0.40 3.58	1.62		0.58 4.56	0.52		0.24 1.15	1.10		0.31 3.92	
	EL	3.16	***	2.22 4.51	3.56	*	1.47 8.62	3.11	**	1.38 6.97	0.29	***	0.13 0.61	0.50		0.23 1.06	3.06	***	2.25 4.16	1.61		0.71 3.67	1.94		0.81 4.62	0.43	*	0.20 0.93	1.49		0.57 3.89	
Country of Residence	ES	3.87	***	2.75 5.44	0.18	***	0.06 0.57	2.43	**	1.26 4.70	0.76		0.53 1.10	1.23		0.66 2.29	4.27	***	3.21 5.68	0.54		0.17 1.68	2.94	***	1.43 6.07	0.96		0.63 1.44	2.39	*	1.08 5.29	
	FI	0.90		0.52 1.56	27.00	***	12.38 58.91	0.18	*	0.04 0.82	0.09	***	0.03 0.26	0.37	*	0.15 0.95	0.78		0.45 1.36	24.27	***	13.15 44.78	0.48		0.13 1.72	0.30	**	0.12 0.73	0.88		0.25 3.13	
	FR	3.60	***	2.56 5.07	1.14		0.46 2.79	3.83	***	2.00 7.34	1.54	**	1.09 2.18	1.11		0.66 1.88	3.75	***	2.82 4.99	1.26		0.62 2.56	3.56	***	1.75 7.25	1.67	**	1.14 2.46	1.74		0.78 3.90	
	IT	4.61	***	3.30 6.42	3.28	***	1.46 7.39	1.77		0.91 3.44	0.33	***	0.22 0.49	0.58	*	0.34 0.99	4.56	***	3.45 6.02	2.52	***	1.35 4.71	1.93		0.94 3.93	0.51	***	0.33 0.80	1.29		0.57 2.91	
	LU	1.24		0.77 2.02	0.60		0.15 2.41	0.90		0.36 2.24	0.81		0.48 1.35	1.08		0.56 2.11	1.17		0.75 1.84	0.62		0.19 2.04	0.79		0.25 2.52	1.75	*	1.03 2.98	1.33		0.45 3.89	
	NL	1.12		0.65 1.93	1.38		0.40 4.76	1.30		0.45 3.73	0.32	***	0.02 0.59	1.09	**	0.02 0.59	1.09		0.65 1.81	1.17		0.47 2.93	0.29	*	0.08 1.00	0.55	*	0.31 0.98	0.00	***	0.00 0.00	
	NO	8.21	***	5.65 11.92	9.36	***	4.01 21.82	0.08	*	0.01 0.64	1.15		0.70 1.91	1.04		0.49 2.20	7.67	***	5.54 10.63	4.97	***	2.35 10.51	0.20		0.03 1.61	1.90	**	1.15 3.15	1.26		0.41 3.81	
	PO	2.15	***	1.53 3.04	5.60	***	2.57 12.21	3.33	***	1.75 6.33	1.94	***	1.39 2.70	1.24		0.74 2.10	2.51	***	1.88 3.34	4.23	***	2.29 7.82	3.56	***	1.76 7.20	1.54	*	1.05 2.26	2.67	**	1.23 5.77	
	PT	6.76	***	4.82 9.48	0.47		0.17 1.31	4.18	***	2.08 8.42	0.93		0.63 1.38	1.33		0.73 2.45	6.74	***	5.09 8.93	0.56		0.26 1.25	2.76	**	1.28 5.95	0.75	**	0.46 1.22	2.08		0.87 4.95	
	SAH	SE	7.49	***	5.12 10.96	1.33		0.41 4.35	5.61	***	2.85 11.07	0.89		0.53 1.49	3.63	***	2.12 6.21	6.80	***	4.95 9.36	0.66		0.20 2.12	4.12	***	1.93 8.76	1.62	*	1.01 2.61	5.17	***	2.29 11.68
UK		2.11	***	1.46 3.05	3.13	**	1.38 7.06	0.33	**	0.14 0.79	0.27	***	0.16 0.46	0.08	***	0.03 0.23	1.82	***	1.33 2.49	2.70	***	1.42 5.16	0.59	***	0.25 1.44	0.63	**	0.35 1.13	0.13	**	0.03 0.55	
Fair		1.44	***	1.28 1.61	1.56	**	1.14 2.14	1.48	**	1.10 2.00	1.66	***	1.29 2.14	1.68	***	1.20 2.35	1.49	***	1.36 1.64	1.82	***	1.32 2.53	1.56	*	1.07 2.29	1.73	***	1.31 2.29	1.22		0.77 1.93	
Bad		1.46	***	1.25 1.72	1.17		0.74 1.85	0.96		0.45 2.04	1.48	**	1.06 2.07	1.62		0.98 2.68	1.77	***	1.58 2.00	1.89	***	1.25 2.84	1.31		0.72 2.38	1.46		0.87 2.44	0.87		0.49 1.53	
Chronic Diseases		Yes	1.26	***	1.12 1.42	0.99		0.70 1.40	1.18		0.86 1.61	1.08		0.86 1.36	1.17		0.82 1.67	1.24	***	1.12 1.37	1.30		0.92 1.85	1.29		0.90 1.84	1.34	*	1.05 1.72	1.00		0.65 1.56
Limitations in activity		Yes	1.01		0.89 1.15	0.89		0.59 1.33	1.70		0.89 3.24	0.94		0.70 1.26	0.97		0.62 1.53	1.02		0.93 1.13	0.70	*	0.50 0.98	1.99	*	1.07 3.67	0.61	**	0.43 0.87	1.06		0.64 1.75
No		0.89		0.75 1.05	0.54	**	0.33 0.87	1.99	*	1.02 3.91	0.99		0.72 1.35	0.97		0.58 1.63	0.85	**	0.75 0.96	0.56	**	0.36 0.88	1.76		0.94 3.30	0.71		0.49 1.04	0.69		0.40 1.19	
2nd Quintile		0.85	***	0.77 0.93	0.91		0.65 1.28	0.99		0.64 1.54	0.84		0.67 1.07	0.71	*	0.52 0.98	0.88	***	0.82 0.96	1.10		0.84 1.45	1.09		0.73 1.64	0.82		0.65 1.03	0.94		0.61 1.47	
3rd Quintile		0.74	***	0.67 0.82	1.05		0.72 1.53	0.86		0.55 1.35	0.78	*	0.60 1.00	1.00		0.72 1.39	0.81	***	0.74 0.89	1.11		0.81 1.52	1.07		0.71 1.59	0.84		0.61 1.15	0.90		0.57 1.42	
4th Quintile		0.58	***	0.51 0.66	0.91		0.62 1.34	1.30		0.82 2.05	0.84		0.63 1.12	0.85		0.54 1.34	0.62	***	0.56 0.70	1.30		0.91 1.88	1.36		0.91 2.04	0.77		0.59 1.01	0.87		0.55 1.38	
5th Quintile	0.47	***	0.40 0.56	0.96		0.64 1.46	1.02		0.65 1.63	0.74	*	0.55 1.00	0.82		0.56 1.21	0.48	***	0.41 0.55	1.10		0.74 1.65	1.66	*	1.07 2.58	0.55	***	0.40 0.75	0.59		0.34 1.03		
Ability to make ends meet	With some difficulty	0.39	***	0.35 0.43	0.86		0.64 1.15	1.28		0.97 1.70	0.87		0.71 1.07	1.00		0.76 1.32	0.40	***	0.37 0.44	0.85		0.66 1.09	1.22		0.90 1.65	1.11		0.87 1.43	1.13		0.78 1.63	
Fairly easily	0.15	***	0.13 0.18	0.47	***	0.33 0.67	1.27		0.86 1.88	0.78		0.60 1.01	0.92		0.59 1.42	0.14	***	0.12 0.16	0.58	***	0.42 0.79	0.97		0.67 1.41	1.00		0.78 1.29	1.09		0.69 1.74		
Easily	0.06	***	0.05 0.09	0.49	***	0.31 0.78	1.08		0.72 1.62	0.69	*	0.51 0.94	0.63	*	0.40 1.00	0.08	***	0.06 0.11	0.58	**	0.38 0.89	1.07		0.65 1.75	0.62	**	0.44 0.89	0.93		0.52 1.66		
Education level	Secondary	0.90	*	0.82 0.98	0.98		0.73 1.32	1.29		0.98 1.69	0.95		0.78 1.16	1.26	0.17	0.91 1.75	0.94		0.87 1.01	1.13		0.87 1.46	1.14		0.80 1.63	0.90		0.73 1.10	0.72	*	0.52 1.00	
Tertiary	0.78	***	0.68 0.90	1.10		0.75 1.61	1.49	**	1.09 2.04	0.92		0.70 1.21	1.09	0.63	0.77 1.55	0.89		0.79 1.01	0.81		0.59 1.11	1.76	***	1.23 2.51	0.86	***	0.58 1.26	1.08		0.64 1.81		
_cons	0.03	***	0.02 0.04	0.00	***	0.00 0.01	0.00	***	0.00 0.00	0.02	***	0.01 0.02	0.01	***	0.00 0.01	0.03	***	0.02 0.04	0.00	***	0.00 0.01	0.00	***	0.00 0.00	0.02	***						

### EU ECONOMIC CRISIS, SAH AND UNs OF MIGRANTS IN A LONGITUDINAL PERSPECTIVE

#### Introduction

As extensively shown in the Introductory Chapter, one of the most important challenges in identifying the health inequities is recognising the demographic, geographical, territorial and cultural characteristics that can influence both, **access to healthcare services** for determined health needs as **individual health status** (Devillanova and Frattini, 2016). In particular, as also anticipated in Chapter Two, if available health measures do not capture individual needs for health, even if you control for them, it is difficult depicting the real barriers which create further obstacles especially for migrants. In evaluating the health behaviours and identifying health inequities, beyond the socioeconomic (CSHD, 2008) and cultural traits (Bhopal, 2014), we should consider that each society suffers of observed differences (Whitehead, 1992) and moral judgments (Asada *et al.*, 2005) which influence the healthcare providing (Giannoni *et al.*, 2016).

Between 2007-2008, a global economic downturn affected the Western economics as the result of a financial crisis: started in the American credit market, the crisis has triggered in Europe leading to a tightening of private sector credit, and ultimately the collapse of several financial institutions, sharply increasing public sector debt and declining global trade. The crisis markedly produced a slow or in some cases negative GDP growth and raised unemployment in many industrialised countries (Suhrcke *et al.*, 2011). Initially the crisis was caused by an overabundance of investments in mortgage-backed securities based on valuations of high-risk mortgages, which were poorly and fraudulently administered. It brought

an increase in the interest rates for borrowers, which led to bank defaults and a crash in housing and stock markets: home owners defaulted on their loans and value of their mortgages collapsed. Given that many mortgage-backed securities were sold in Europe, the turmoil in the US housing sector quickly spread to European banks. These complicated financial mechanisms, once collapsed, led soon to even more complex economic crises (Karanikolos *et al.*, 2013), especially in countries as ES, IE and IT characterized by the so-called property-bubbles. Therefore, we should distinguish between different phases: after the immediate recession due to the prolonged crisis, in the EU some MS have adopted EC-ECB-IMF (namely “troika”) loans, with the agreement to undertake reforms and austerity programmes in order to overcome economic and financial effects, provoking stagnation as result in certain cases, such as in ES, IE, IT, PT and UK (McKee *et al.*, 2012).

There is not unanimous consensus on which year should be considered the worse of still on-going economic and financial crisis for the health of the EU citizens: 28 MS, with deeply different epidemiological and economic situations plus several other country characteristics, cannot allow the scientific community to determine “one size for all”, and so none year as the worst for all (European Observatory, 2015; Thomson *et al.*, 2014). Moreover, the judgment is linked to the choice of the indexes: on one hand, we have a set of internationally recognised indexes available to picture the economic and financial part of the crisis – such as the GDP growth rate, the GINI index, the Total Health Expenditure (THE) as percentage of GDP. On the other hand, a set of health measures – such as the subjective well-being, morbidity and mortality rates, incidence of risky health behaviours, the suicide rates - are gaining attention in the “beyond the GDP” approach as reliable to depict the health portraits of the population (Karanikolos *et al.*, 2013).

As already shown in the Introductory Chapter, the EU MS differ in the national health systems, migrant’s integration policies and welfare systems and they can offer various health treatments to migrants. As illustrated by Cylus *et al.* (2012) on *Health OECD Data* related to 24 European countries, the

growth in public health care expense has slowed, whereas the growth in NHS systems is shown to vary after economic crises in conjunction with cost-shifting and other policy responses. While the SHI expenditure growth is found to be altered only in conjunction with policy responses that shift costs and may be less likely to slow following an economic crisis, an increasing for the OOP expenditure among patients is confirmed in the majority of countries.

The impact of financial crisis on social and economic life has been widely discussed in the international literature, both from the economic and epidemiological point of view. As stated by Musgrove (1987, 2004), the crisis has long-term consequences due to two channels, reducing income and decreasing government spending, which directly or indirectly through the health care system, may affect the individual health status. The reduced income produces greater morbidity and less utilization of private health services due to lower salaries and increased unemployment, whereas on the other hand, reduced government spending affects the quantity and quality of public health services available, and thus deterioration of population's health status (Suhrcke *et al.*, 2011; Zavras *et al.*, 2013). According to Marmot and Bell (1999), the reduction as the lack of income and the increase of unemployed people are the primary and direct results of financial crisis, causing losses on prosperity and pushing a substantial part of the population into the extreme poverty. As underlined by McKee *et al.* (2010), the epidemiological research shows the profound health consequences of unemployment and, although less well recognised, fear of unemployment, demonstrating that in 26 EU MS higher unemployment is associated with increased suicide rates or violent deaths due to NCDs (Stuckler *et al.*, 2009 and 2010a).

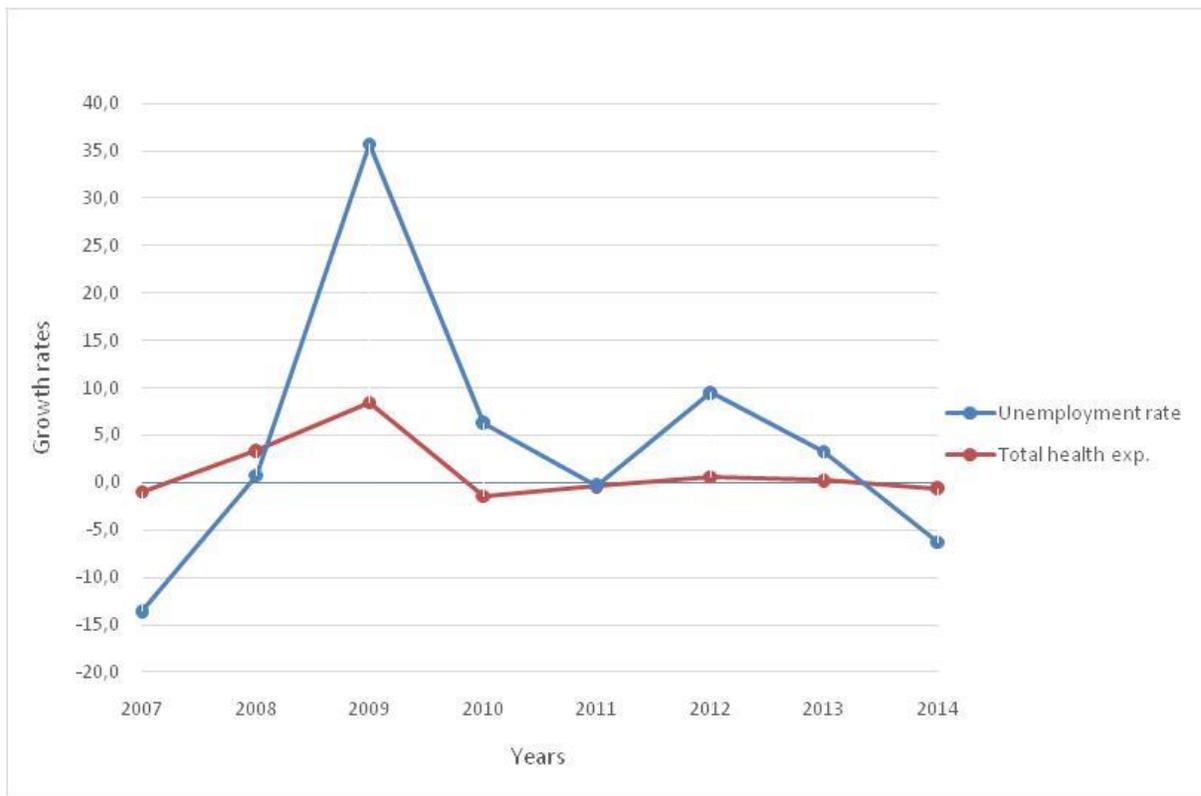
The recent and prolonged crisis' consequences have been intensively investigated in Europe for their spill-over effects on mental well-being (Anderson, 2011; Stuckler *et al.*, 2011; WHO, 2011; Artacoz *et al.*, 2004), on communicable diseases (Bartoll *et al.*, 2015; Suhrcke *et al.*, 2011), on the restructuring of the health sector (De Belvis *et al.*, 2012; Kentikelenis *et al.*, 2011), while have paradoxical effect on mortality rates still in the path described by Mackenbach (2012), reported in the Introductory Chapter. Indeed,

mortality is *pro*-cyclical of the business cycle, rather than it increases during the economic expansions and decreases with contractions - not countercyclical, as expected, has been proved (Catalano *et al.*, 2011; Bezruchka, 2009). Sen (1998) demonstrates for England and Wales that decadal fluctuations in life expectancy behaved in almost exactly the opposite direction as national GDP per capita, rising up during World Wars times. As intensively studied by Costa *et al.* (2012) for the Italian case of study, in accordance with the international literature, in the short period the economic development favours the exploiting of natural resources, pushing the production of pollution as the adoption of risky health behaviour, while in case of recession the negative health determinants diminish their pressure (Rhum, 2000). But, on the long period, the effects of business cycles need to be studied with a certain attention since the increase of wealth, if adequately distributed, brings directly proportioned growth of life and health expectancy (Stuckler *et al.*, 2010b; Costa *et al.*, 2012).

Less analysed are results crisis and austerity policies impacts on health programmes (Health Action Partnership International, 2012) in terms of supply: as shown in Chapter 1, the welfare model for healthcare system is a fundamental as co-founding factors, especially as macro-driver to equity for reducing differences between employed and unemployed people (Farrer *et al.*, 2011; Eurostat, 2010). Stuckler *et al.* (2010a) have confirmed that, in the UK case, while the cuts in social spending are significantly associated with mortality from diseases related to social circumstances - such as alcohol risky behaviours –the healthcare expenditure is not (Suhrcke *et al.*, 2009). Indeed, increases in social welfare spending are associated with reduced mortality but the effect is due to spending on areas other than health (Toffolutti and Suhrcke, 2014; Gerdtham and Ruhm, 2006).

Looking at **Figure 17**, it can be seen how in the longitudinal data by WB, from 2007 until 2014, in the EU-28 in response to increased unemployment growth rate, the THE growth rate is not following a similar path. Even if there is not a direct correlation between the two measures, it might be that for the most vulnerable groups of the population the portion of health care insured has been decreased.

**Figure 17. Trends of unemployment and health expenditure in the EU-28**



Source: Author's elaboration on World Bank Development Indicators data (2016).

The objective of our analysis is to disentangle the differences in the **self-assessment of health** (SAH) and **unmet needs** (UNs), medical and dental, between natives and migrants from outside the EU and across the European countries in the period of the global **economic crisis**. The background of Chapter Three is that the crisis might have produced disparities in health levels between native and migrants and this work aims to shed light on this issue. With reduction of social protection safety nets, the health of vulnerable groups such as migrants has been depicted as at risky (Suhrcke *et al.*, 2011). If the economic crisis impacted differently on migrants and natives, due to their level of occupation or for other socio-economic characteristics, it would be reflected in a worsening of the health perceptions of migrants. Whether the study can demonstrate that migrants suffer more than natives on SAH and UN due to the

economic crisis this might prompt the need for urgent health policies able to guarantee equal conditions of access and quality of treatment to the whole EU population, beyond the particularities of EU countries.

In order to test the research hypothesis, we analyse the *EU-SILC* cross-sectional databases for the year 2007-2013. Just countries presenting more >2% of third country nationals are included in the analysis. The seven years were chosen to assess the SAH and medical/dental UNs before the crisis started (years 2007-2008), during the central years - years 2009-2012 with 2010 recognised as a remarkable crisis peak - and after (year 2013). The main research questions we would like to investigate are the following:

- a) whether in those seven years the economic crisis affected the SAH and UNs globally;
- b) to what extent the crisis effect might be impacted due to the migration status.

## 1. Methods

Since the health measures are not reported in the longitudinal *EU-SILC* datasets, we have constructed a pseudo-panel data, through the analysis of 2007-2013 *EU-SILC* cross sectional databases. As individuals are anonymized from year to year, the spirit of the research is to measure net changes in health measures over the time – considering that each year represents a sample of EU population.

Nine are the EU countries considered: AT, BE, CY, EL, ES, FR, EL, IT, LU and UK. These groups have been obtained combining the variables **country of birth** and **citizenship** declared:

- native nationals (NAT): locals with the citizenship of the country in which they reside;
- intra-EU migrants (EU-migr): born in the EU MS but with the citizenship of the country of residence or any other European country;
- third country nationals (TCN): born outside the EU and with the citizenship of any other country except the one of residence or any other European country.

Moving forward from results obtained in Chapter Two, we want to deepen the health characteristics of the EU migrants in comparison with other two distinct groups of population - such as locals and migrants - excluding any sort of exception like naturalization or double citizenship.

The main socio-demographic characteristics considered are: average age, gender distribution, maximum educational level reached, classified as primary, secondary and tertiary education according to ISCED. Plus, the occupational level, based on the ISCO six categories - managers and professionals, technicians, clerks, skilled manual workers, elementary occupations and the activity status, divided in four activity categorizations – employed, unemployed, retired, and other inactive. Lastly, the equivalised household income, categorized in country-specific quintiles and reported in average values, and the ability to make ends meet, regrouped in two categories difficultly/easily – in order to define the financial position.

The main health characteristics declared by the interviewees regards the SAH measure, classified into two categories - (very) good and (fair/very) bad, plus two other dummies variables: the reported presence of a limiting chronic or longstanding illness and the limitations in activities due to suffered health problems. Further, the medical and dental (both dummies) UNs and the follow-up questions on the main reason for UNs for medical and dental examination or treatment are considered in this analysis, regrouped in the six groups previously explained – financial, structural, time, fear and lack of knowledge, wait and see, other. The country of residence distribution concludes the list of variables considered. A further classification of countries effect is through the classification accordingly with their integration policies (POL) and adopted health mechanism of contribution (MECH) as described in the Introductory chapter.

In the following section we have described the average values of SAH, medical and dental UNs across population groups and countries over the seven years. As illustrated in **Annex VI** we have performed several *t-tests* between the average values of SAH, medical and dental UNs of different population groups between them (e.g. average value of SAH “good” of nationals vs. EU-migrants) and across countries (e.g. in Belgium vs. in Cyprus). We have reported value “1” when rejected hypothesis zero, meaning the average distribution of SAH is not independent by the sample numerosity distribution, while the hypothesis zero is accepted in most cases for medical and dental UNs, even though for these last is increasing in the recent years.

Three different logit models with robust standard errors have employed to study the factors influencing SAH, medical and dental UNs, as reported in **Annex VII, VIII and IX**.

## 2. Results

### *Descriptive statistics*

**Table 2** reports descriptive statistics of our pseudo-panel, according to personal characteristics of population by migrant status, age, gender, educational level, occupation, income and financial difficulties suffered over the seven years.<sup>4</sup>

As it can be seen, the population distribution is constant, as reported by the average value over the seven years:

- natives (NAT) represent the major group of population (average value 92.1%);
- the third country nationals (TCN) represent the second group (average value 4.3%);
- the intra-EU migrants (EU-migr) result the third class of population per numerosity (average value 3.6%) with a rising trend.

As expected, the natives represent the oldest group (average age 48.1), followed by the EU migrants (46.4) and by third-country national (average age 38.6). In all three groups the sample of interviewees result equally distributed by gender: in average native females and third country nationals are respectively 51.5% and 51.2%, while the female EU migrants result constantly higher with 54.1% of average presence.

According to the ISCED categorization, on average the less educated people result the third country nationals with 46.1%, almost half of them with primary education level, followed by natives (40.2%) and intra-EU migrants (36.4%). Natives and EU-migrants are equally secondary educated (respectively 37.8 and 35.5%) but the most educated are surprisingly the intra-EU migrants presenting 26.1% of them tertiary educated, while only 22.1% of natives and 21.7% of third-country nationals have the same

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<sup>4</sup> Gender has been excluded by the stratification of models, after the results in Chapter 2 which show that gender is not a potential modifier in this context.

education level. Moreover, EU migrants tertiary educated are growing constantly by +0.2% year by year, resulting 31.3% of the sample in 2013.

Following the ISCO classifications, over the seven years, the elementary occupations are held by third-country nationals (29.9%), followed by EU migrants (20.1%) and native (12.5%). The distribution slightly changes for skilled manual workers mostly represented on average by third-country nationals (29%), then EU-migrants (26.8%) and natives (25.7%): but on the opposite direction of the elementary occupation, for which the third-country nationals present a decreasing trend. On average, technicians and clerks are represented mostly by natives (respectively 13.9% and 27.1%), followed by EU migrants (11% and 23.4%) and third country nationals (6.7% and 23.6%). Not surprisingly, managers and professional category are represented mostly by natives (average value 20.8%), followed by intra-EU migrants (18.7%) and third-country nationals (10.8%), however the last groups are presenting an increasing trend.

According to the working activity status declared, on average natives result the less employed (50.1%), while EU migrants lead the statistics (55.5%) followed by the third country nationals (54.9%). Indeed, on average, natives present the highest percentage of retired people (22.7%) followed by EU migrants (19.7%) and third-country nationals with only 4.2% of average components in pension but that is justified by distribution per age. Focusing on the unemployment, on average the third country nationals presents 12.9% of unemployed in their groups, followed by EU-migrants (7.2%) and nationals (5.7%): however, we should notice that all three groups present an increasing trend in unemployment starting from 2011, with growth rates of +0.09% for natives and +0.20% for both intra-EU migrants and third country nationals. Lastly third country nationals present on average 28% of people as economically inactive, which describes who are neither employed nor unemployed - students included, followed by nationals (21.5%) and EU migrants (17.6%).

On average, nationals are in the third quintiles of equivalised income, while EU migrants in 2.7 and third country nationals in 2.1. This is confirmed by the ability to make ends meet with difficulties, affecting respectively on average 75% of foreigners, 60.9% of EU migrants and 57.7% of locals.

Looking at health indexes, on average interviewees declaring having bad SAH are 29.5% for nationals, 26.5% for EU migrants and only 21% for foreigners: this is confirmed also by the distribution of chronic diseases (respectively 30.7% for natives, 26.2% for EU citizens and 17.1% for third country nationals) and limitations in activities due to health problems (average value respectively 24.4% for locals, 20.5% for EU migrants and 13.9% for foreigners). Obviously these trends are justified by the age distribution as by the HME, as anticipated in the Introductory Chapter.

Concluding the health description, medical UNs seem affecting on average more third country nationals with 6.7%, followed by locals and intra-EU migrants with 5.2%: all three groups present an increasing trend over time. In case of dental UNs, these needs hit still more third country foreigners with 11.4%, followed by EU migrants with 8.6% and natives with 7.3%, as expected also by the equivalised income distribution.

**Table 2. Description in percentage of the sample by immigrant status, socio-demographic and health characteristics**

EU--SILC 2007-2013		2007			2008			2009			2010			2011			2012			2013		
		Nat	EU	TCN																		
	Sample	147,351	6,999	5,517	145,248	8,013	5,138	144,078	8,201	5,409	141,725	9,094	5,157	141,725	9,094	5,157	144,695	9,86	5,579	141,082	7,922	5,286
	Weighted	149,033	3,473	6,188	145,572	5,223	6,552	143,911	5,784	6,942	142,027	6,231	6,737	142,027	6,233	6,737	142,791	6,246	7,257	140,104	6,388	6,908
	Weighted, %	93.9	2.2	3.9	92.5	3.3	4.2	91.9	3.7	4.4	92.1	3.7	4.2	91.6	4.0	4.3	91.4	4.0	4.6	91.3	4.2	4.5
Age	average value	47.3	49.8	38.8	47.7	46.6	38.7	48.0	45.8	38.5	48.1	46.3	38.0	48.5	45.5	38.2	48.6	45.7	38.9	48.8	45.3	39.5
Gender	Males	48.5	44.8	49.7	48.4	47.3	49.8	48.4	46.8	48.6	48.4	46.2	49.2	48.6	44.5	48.8	48.5	45.4	48.3	48.5	46.4	47.2
	Females	51.5	55.2	50.3	51.6	52.7	50.2	51.6	53.2	51.4	51.6	53.8	50.8	51.4	55.5	51.2	51.5	54.6	51.7	51.5	53.6	52.8
Education	Primary	42.5	46.2	47.8	41.7	39.2	50.5	42.2	38.1	49.6	41.0	36.4	47.7	38.1	33.4	45.1	38.1	31.5	40.9	37.7	29.7	41.1
	Secondary	38.4	33.6	33.9	37.0	36.6	30.2	36.6	37.7	30.1	36.7	37.6	31.5	38.9	39.2	30.9	38.5	38.9	34.0	38.2	39.0	35.0
	Tertiary	19.1	20.2	18.3	21.3	24.2	19.2	21.3	24.2	20.3	22.3	26.0	20.9	22.9	27.4	24.1	23.4	29.6	25.1	24.1	31.3	23.9
Working position	Elementary occupations	13.2	19.8	28.9	12.9	20.6	31.3	13.0	20.4	31.7	12.4	21.2	29.9	12.1	20.1	29.8	12.1	19.1	27.5	11.9	19.3	29.9
	Skilled manual workers	27.4	28.7	30.4	26.7	27.9	30.9	26.5	28.6	30.7	26.4	27.1	30.3	25.4	26.7	30.3	23.8	24.4	25.6	23.6	24.5	24.8
	Technicians	13.3	10.9	7.2	13.9	12.2	6.2	14.0	10.9	7.0	14.0	10.4	6.2	13.4	10.7	5.8	14.2	11.2	7.6	14.4	10.9	7.0
	Clerks	26.8	22.3	21.5	26.7	22.0	21.9	26.5	22.4	20.4	26.5	21.9	23.7	26.8	23.7	23.8	28.5	25.8	25.9	28.3	25.8	27.9
	Managers & Professionals	19.4	18.3	12.0	19.9	17.3	9.7	20.0	17.7	10.2	20.7	19.4	9.9	22.3	18.9	10.4	21.4	19.4	13.2	21.8	19.6	10.5
Activity Status	Employed	51.1	48.6	58.8	51.6	56.8	60.5	50.7	56.8	58.4	49.6	54.2	53.5	49.4	56.2	51.6	49.4	56.6	51.6	48.8	59.3	49.9
	Unemployed	4.5	5.0	9.2	4.2	6.1	8.4	4.9	6.7	9.7	5.7	7.2	13.7	6.3	8.7	16.4	6.8	8.4	16.1	7.4	8.3	16.9
	Retired	22.1	26.9	4.9	22.4	19.8	4.5	22.8	18.1	4.0	22.8	19.8	4.1	23.2	18.1	3.5	22.8	18.4	3.9	23.0	16.9	4.2
	Other inactive	22.3	19.5	27.0	21.7	17.3	26.6	21.6	18.3	27.8	21.9	18.8	28.7	21.2	17.0	28.4	21.1	16.6	28.5	20.8	15.5	29.0
Equivalised Income	average value	3.0	2.8	2.3	3.0	2.9	2.3	3.0	2.6	2.1	3.0	2.6	2.0	3.0	2.7	2.0	3.0	2.6	2.1	3.0	2.7	2.0
Ability to make ends meet	Difficulty	54.0	55.6	75.5	57.5	60.9	50.0	57.6	62.1	79.4	57.8	61.8	80.6	57.6	62.8	79.6	58.8	60.7	79.5	60.8	62.2	80.0
	Easily	46.0	44.4	24.5	42.5	39.1	50.0	42.4	37.9	20.6	42.2	38.2	19.4	42.4	37.2	20.4	41.2	39.3	20.5	39.2	37.8	20.0
SAH	Good	70.2	67.6	77.4	71.1	73.3	77.8	70.6	73.5	76.7	71.1	74.5	80.3	70.6	75.1	82.2	70.8	75.6	81.3	69.2	74.7	77.5
	Bad	29.8	32.4	22.6	28.9	26.7	22.2	29.4	26.5	23.3	28.9	25.5	19.7	29.4	24.9	17.8	29.2	24.4	18.7	30.8	25.3	22.5
Chronic Diseases	Yes	28.5	31.3	17.6	30.6	26.2	16.4	30.8	26.2	17.6	30.9	25.3	17.0	31.4	25.4	14.8	30.8	24.4	17.4	31.9	24.7	18.9
Limits in activities	Yes	23.1	24.2	16.5	23.9	20.7	13.4	24.4	20.1	14.3	23.1	19.4	11.7	24.8	19.6	11.8	25.3	19.5	13.8	25.9	19.9	15.7
Medical UNs	Yes	3.9	2.9	5.5	4.9	5.6	6.9	5.8	5.4	7.1	5.3	5.0	6.5	5.4	6.0	7.3	5.1	5.6	6.0	5.8	6.2	7.9
Dental UNs	Yes	6.5	6.3	8.8	7.4	8.2	11.4	7.4	9.1	12.1	7.1	7.7	12.0	7.2	9.4	10.7	7.4	9.7	11.6	8.3	10.1	13.3

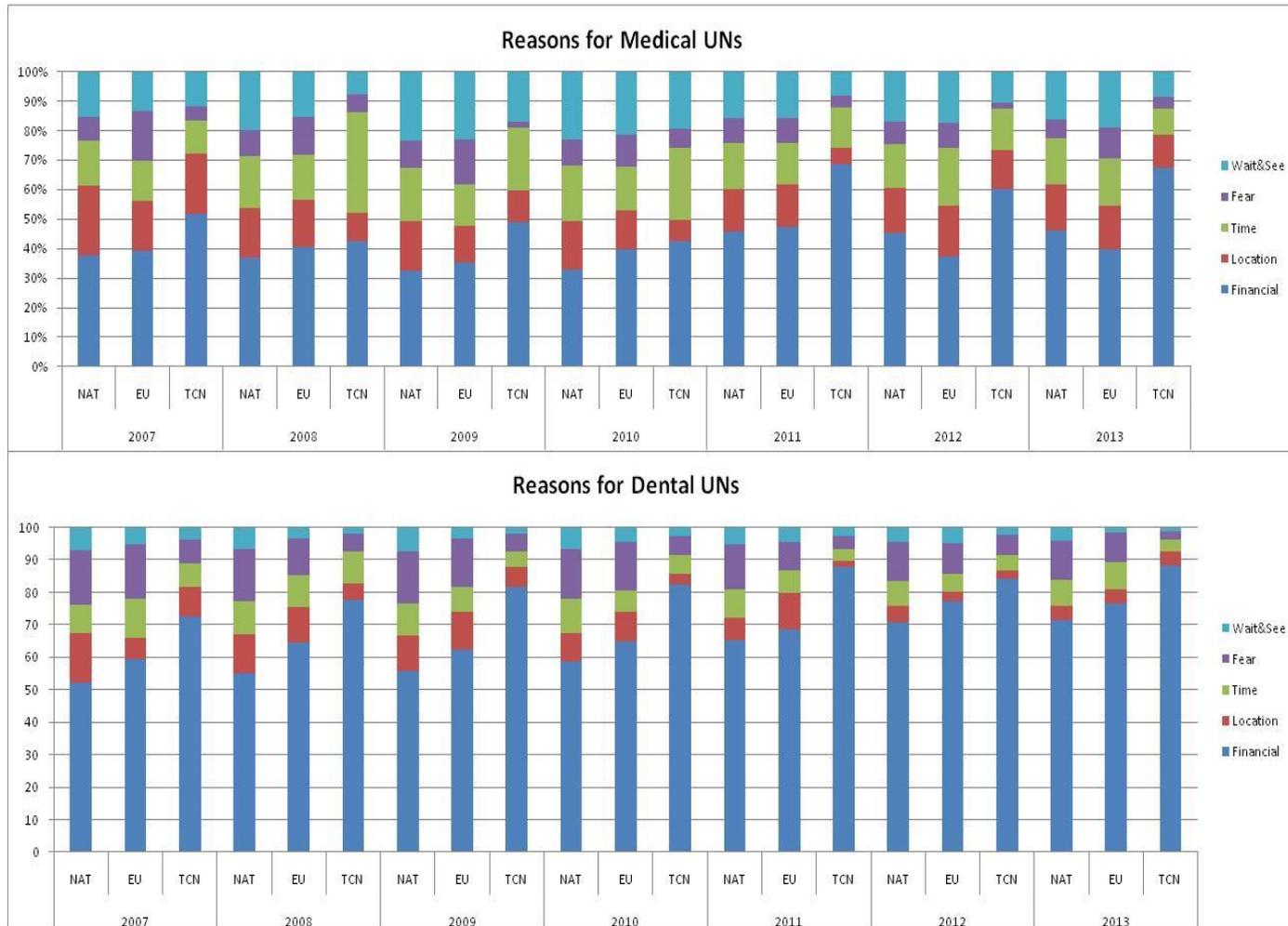
Source: Author's elaboration on EU-SILC data.

As it can be seen in **Figure 18**, differences in medical and dental UNs are explained by slightly various reasons. On average, the financial reasons hit 54.4% of third country nationals for medical UNs, 39.8% of EU migrants and 39.6% natives, while for dental UNs the proportion increases sensitively: 82% of third country nationals, followed by 67.6% of EU migrants and 61.3% of natives, even though in both UNs natives present a rising trend over the seven years for that kind of reason. During 2011, third country nationals present a growth rate of + 0.62% and + 0.45% in case, respectively, of medical and dental UNs.

Location of health services seems a relevant factor in explaining different UNs in medical treatments: 17% of natives are having medical UNs due to location of healthcare providers, while only 15% of EU migrants and 11.2% of third country national neglected their care for the same reason. Lower the proportion in case of dental UNs: on average respectively 9.1% of natives, 8.1% of EU citizens and 4.7% of foreigner are suffering due to the location.

In case of medical UNs, time seems affecting on average mostly third country nationals (18.3%), followed by nationals (16.5%) and EU migrants (15.4%), while for dental UNs regards mostly nationals (9.1%), then EU citizens (8.1%) and lastly third country nationals (5.7%). On average EU citizens are the group having more fear of the medical treatments (11.7%), followed nationals (8.1%) and lastly third country nationals (4.1%), while in case of dental treatments are natives scarier (14.6%), followed by EU migrant (12.2%) and foreigners (5.3%). Just waiting and seeing what is going to happen seems a reasonable solution for nationals and EU citizens (average values respectively 18.7% and 18%), while only 11.9% of foreigners adopts the same solution in case of medical UNs. Much lower the percentages in case of dental treatments, for which pain waiting does not appear tolerable, except for 5.9% of nationals, 3.9% of EU citizens and 2.4% of third country nationals.

**Figure 18. Description of reasons by country of residence and citizenship among subjects with medical and dental unmet needs**



Source: Author's elaboration on EU-SILC data.

### 3. Discussion

On the light of the descriptive statistics and t-test in **Appendix VI**, we have built a pseudo-panel of the seven years, in order to analyse how the economic crisis - through net changes of all variables - has affected the percentages of SAH, medical and dental UNs of the population discriminating for country of birth. Therefore, we have performed three different logit models for each dependent variable, as summed-up in **Annexes VII-IX**. The probability of declaring bad SAH or having medical/dental UNs has been modelled by controlling for personal (citizenship, gender, age), geographical (country of residence), medical (chronic diseases and limitations due to health problems), financial (equivalised income and ability to make ends meet) and socio-economic (education, working position and activity status) characteristics. We have then substituted the geographical variable, such as the country of residence, coherently with the mechanism of contributions and policies of integration clusters illustrated in the Introductory Chapter, in order to capture the individual and country level effects on different citizen groups during the years 2007-2013.

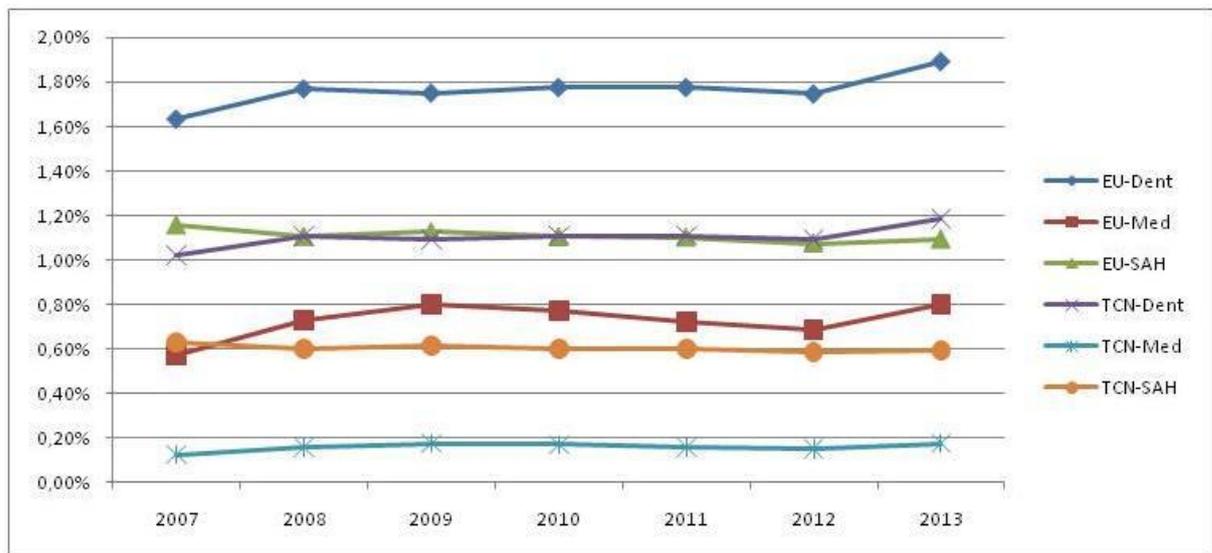
Hence, the following results are stratified per general effects according to the country of residence, then per mechanism (MECH) and policies of integration (POL). As can be seen from the **Annex VII-IX**, all variables present a high statistical significance level: in case of SAH, as suggested by the pseudo  $R^2$ , and dental UNs the models present a high goodness of fit, while slightly less for the medical UNs but still significant. We have decided to report the average marginal effects (AMEs), expressed in percentages, in order to give the more straightforward interpretation of odds ratios with linear probability models, considering nationals as the baseline and concentrating the analysis on the most vulnerable groups of respondents.

### 3.1 General effects

The education gradient plays a role in explaining the probability of declaring bad SAH or having medical/dental UNs in the three groups of individuals (natives, EU-members and third country nationals). When keeping all the covariates constant and focusing on those declaring having primary education, as in **Figure 19**, the AMEs of being EU citizens are greater than those of being nationals in all three dependent variables, while the comparison of TCN with nationals presents lower level of impacts: after an increase in 2008 and an improving in 2012, in 2013 - the last year of the panel - the AMEs suggest a higher impact on the dependent variables for all health needs.

On average being an EU citizen implies respectively +1.8% of possibilities of having dental UNs (even +1.9% in 2013), while only +0.70% of having medical UNs and +1.1% of declaring bad SAH in comparison to NAT. The year 2008 seems to suggest a slightly worsening but, over the crisis, the differences between EU and nationals remain stable.

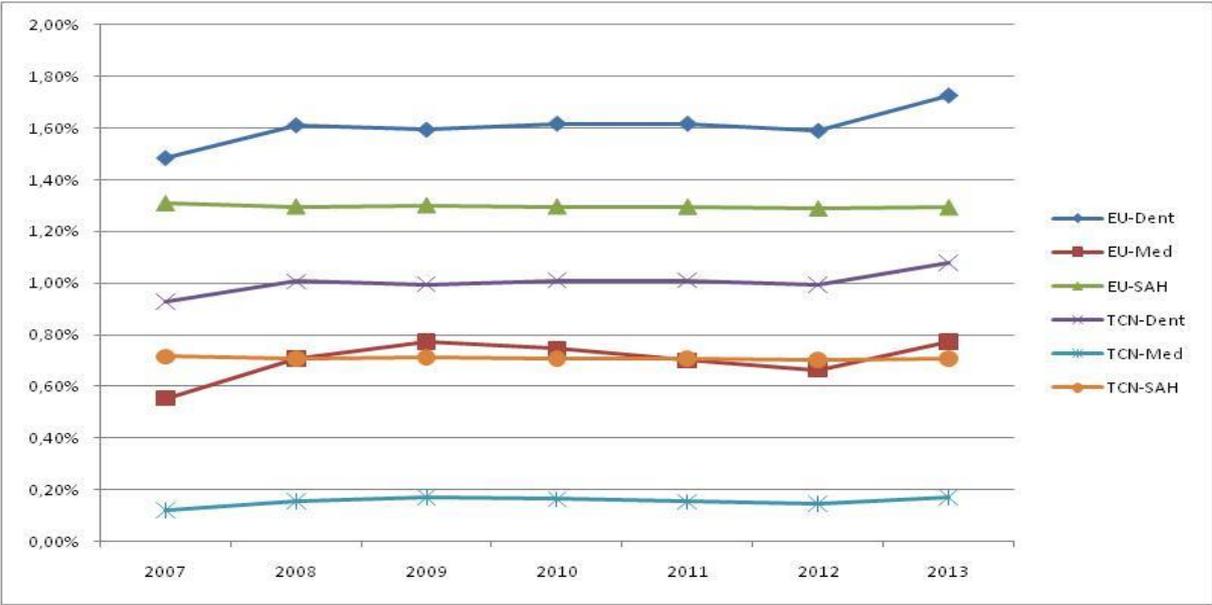
**Figure 19. AMEs of EU and TCN respondents with primary education**



Source: Author's elaboration on EU-SILC data.

Same for the age classes, as shown in **Figure 20**: the probability of declaring bad SAH or having medical/dental UNs increases from the active population (16-65 years) to inactive (65 years-over) as expected due to the ageing effect. When keeping all the covariates constant and calculating the AMEs for the inactive people from the 1<sup>st</sup> percentile of the income distribution, always the EU citizens register a higher probability of having a need or declaring bad health in comparison to NAT and comparably the TCN in respect to NAT presents lower level of impacts. In particular, the probability of having dental UNs is on average +1.6% higher in the old and poor EU citizens than in the NAT, while of declaring bad health +1.3% and of having medical UNs is +0.7% on average. The time trends remain stable for all kind of needs, while the year 2013 seems to suggest a worsening for medical and dental UNs.

**Figure 20. AMEs of poor EU-TCN inactive respondents**

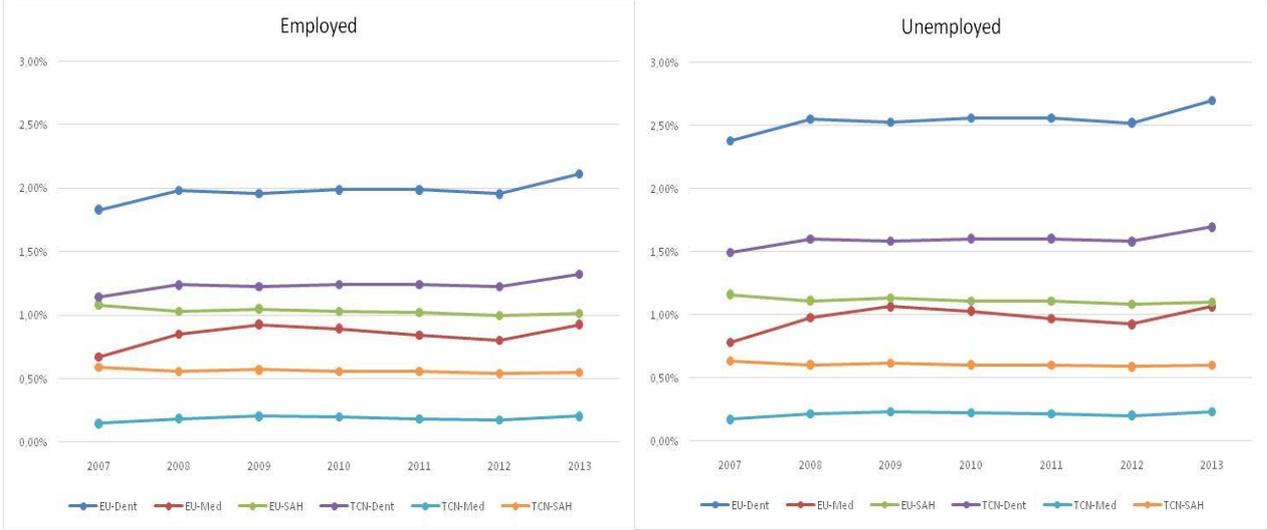


Source: Author’s elaboration on EU-SILC data.

Then, moving to the analysis of the combined effect of occupation and income as reported in **Figure 21**, comparing the active population employed (on the left) with unemployed (on the right) from the first percentile of income, the trends are confirmed in terms of years and citizenship. In

particular, among the unemployed, for EU-migr the probability of having dental UNs is on average +2.5% higher than NAT. Interestingly, these percentages drop of roughly 0.6% when employed. However, towards the end of the crisis the gap between EU-migr employed and unemployed seems slightly higher. An unemployed TCN has +0.4% in comparison to an employed foreigner.

**Figure 21. AMEs of poor EU-TCN active employed and unemployed**



Source: Author’s elaboration on EU-SILC data.

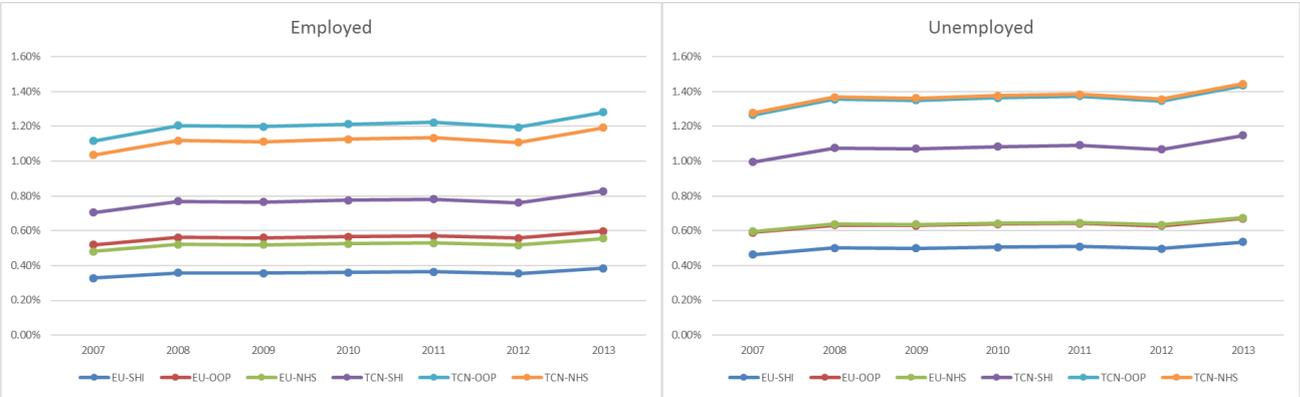
Moving to the medical UNs: the probability of having such a need for an EU-migr is +1% higher than NAT and +0.8 greater for TCN comparing to NAT. In this case differences between employed and unemployed are less evident. Interestingly for a TCN the employment status does not change the probability of presenting higher medical UNs or bad SAH comparing to NAT. The time trends remain stable for all kind of needs, but as before the year 2013 seems to suggest a worsening for medical and dental UNs.

*3.2 Mechanisms effects*

We have also tested to what extent there are differences among AMEs in the three mechanisms of contribution - SHI, OOP and NHS - in having these health needs. As shown in **Figure 22**, it is

interesting to notice that, concentrating on the active poor population employed and unemployed as above, the distribution of dental UNs presents a different story. In this model rather than controlling for countries specific differences (as for Fig.21) are the mechanisms which explain the differences in EU-migr and TCN in comparison to NAT for medical and dental UNs and SAH (models in Appendix VIII). TCN are those having higher probabilities of dental UNs in all cases, confirming OOP as the worst system for employed foreigners (+1.2% on average respectively NAT) as NHS for the unemployed foreigners (respectively +1.4% on average respectively NAT). That might be explained on the light of the fact that dental cares are usually considered as an extra expense on the shoulder of patients in all three systems. Therefore, citizenship plays a clear negative role in a system which totally relies on the personal capacity to pay for employed people and, surprisingly, not a priority in a universalistic system for unemployed.

**Figure 22. AMEs of poor EU-TCN active employed and unemployed - dental UNs & mechanism**

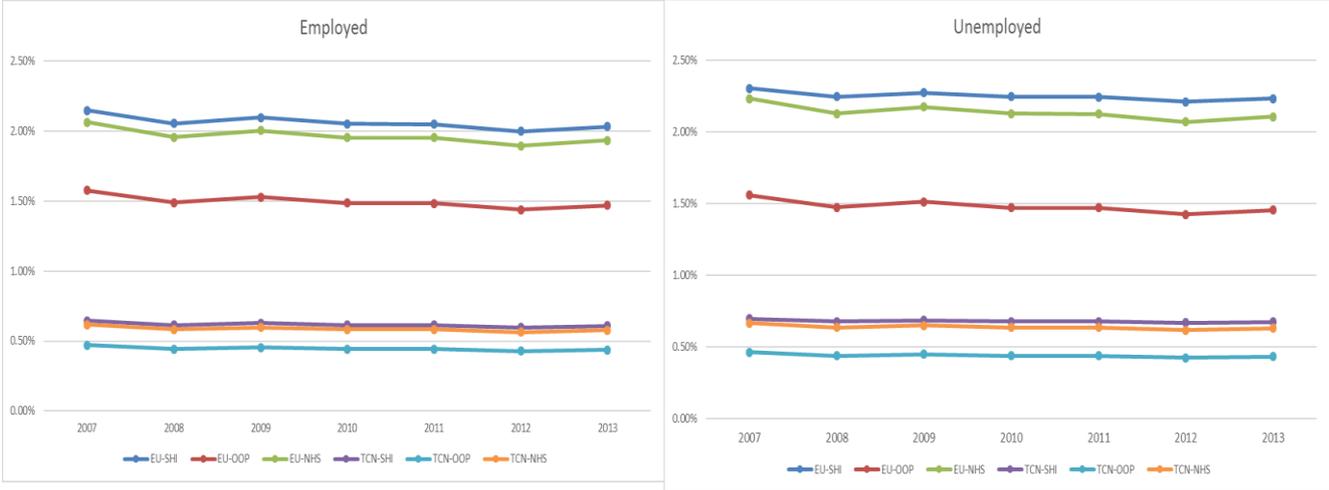


Source: Author's elaboration on EU-SILC data.

Deepening the understating of health systems on different segments of population, **Figure 23** reports the AME for the probability of declaring a bad SAH among the poor employed and unemployed citizens. In declaring a bad SAH the SHI seems to be the worse system for employed (+2.1% on average) and unemployed (+2.2% on average) EU respondents in comparison with NAT.

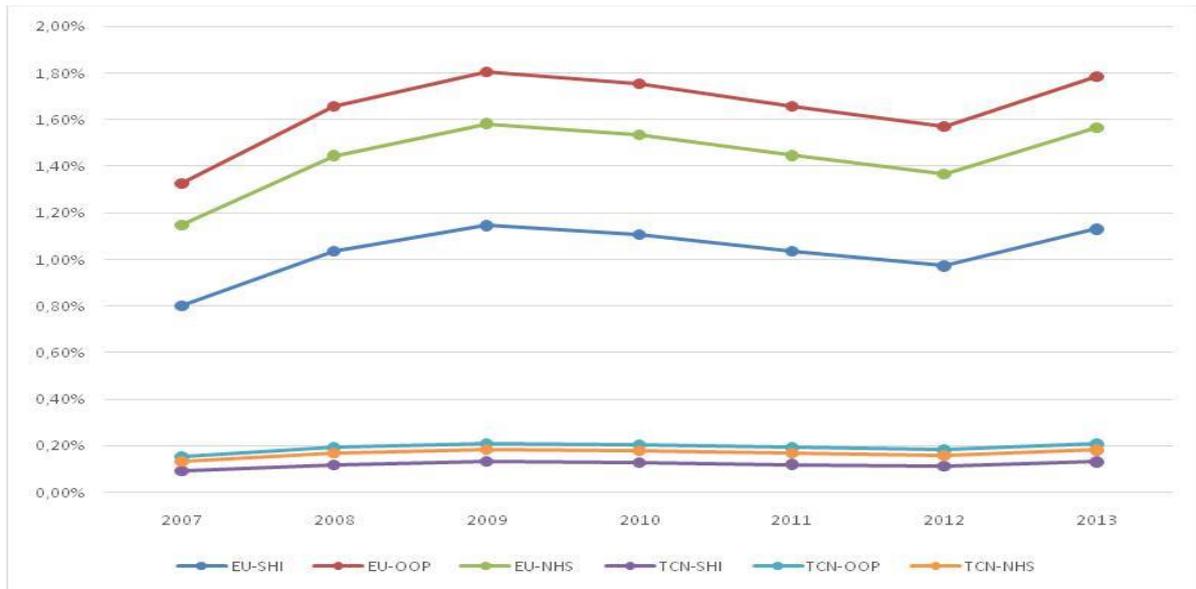
NHS comes second with respectively +2.0% for employed and +2.1% unemployed patients in comparison with NAT.

**Figure 23. AMEs of poor EU-TCN active employed and unemployed - bad SAH & mechanism**



Source: Author’s elaboration on EU-SILC data.

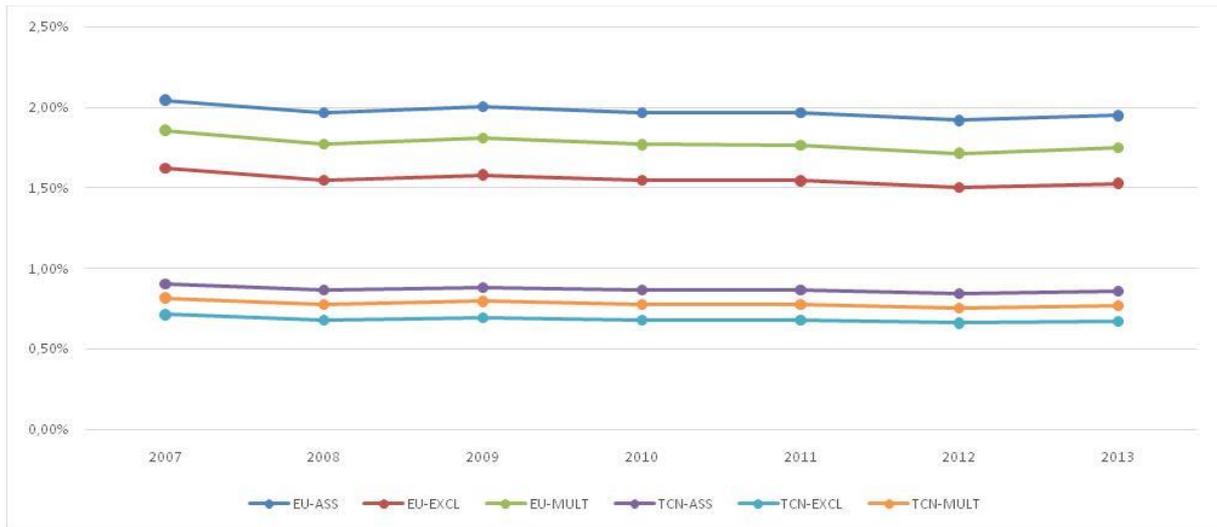
For the medical UNs, it is interesting to deepen the ageing aspects of having chronic diseases and limitations due to health problems in the different mechanisms: indeed, according to the health systems these vulnerable groups should be the most covered without any difference related to citizenship. As shown in **Figure 24**, for EU elderly and sick people is most likely having medical UNs in OOP (+ 1.7% on average), NHS (+1.4% on average) and SHI (+1% on average) systems in comparison to NAT. Differences between TCN and NAT remain on similar levels of percentages. In this case, we can better appreciate also the time trend: according to the graph the 2009 and 2013 crisis peaks seem to affect only EU citizens.



Source: Author's elaboration on EU-SILC data.

### 3.3 Policies effects

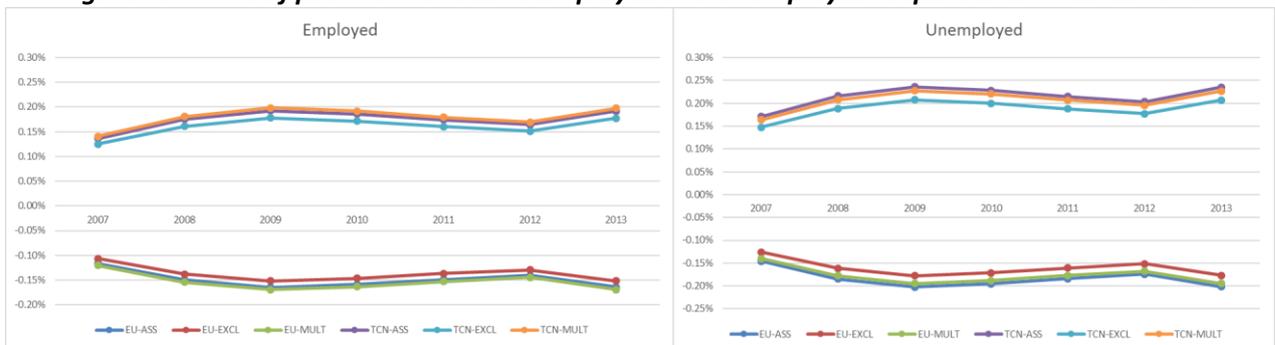
Moving to the analysis of countries clusters divided per policies (models in Appendix IX) – such as ASS, EXCL and MULT - we got several interesting results. As it can be seen from **Figure 25**, the AMEs of declaring bad SAH are constantly higher for an EU-migr in comparison of being a NAT and TCN in all the policies regimes. First come the ASS countries (+2% on average), then slightly lower in MULT countries (+1.8% on average) and, surprisingly lower (+1.6% on average) the case of EXCL countries.



Source: Author's elaboration on EU-SILC data.

Considering the access granted to foreigners through the different systems, we focused on the active group of population, from the 1<sup>st</sup> income percentile, employed and unemployed declaring having medical UNs. From **Figure 26**, it is clear that the AME of EU-migr in respect to the probability of nationals are negative despite an increase registered in 2012, while for TCN citizens higher respect to NAT (+0.2 for employed and unemployed on average). This suggests that under every integration policies EU-migr had always had better SAH and UNs than NAT.

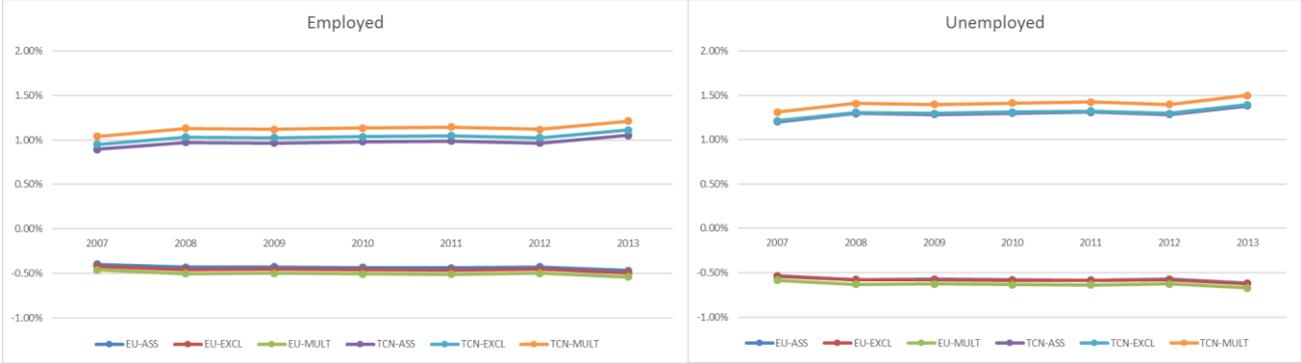
**Figure 26. AMEs of poor EU-TCN active employed and unemployed respondents - medical UNs**



Source: Author's elaboration on EU-SILC data.

Moving to the analysis of dental UNs in the same groups, in **Figure 27** the trends through years and groups are identical, the AMEs of being TCN citizens compared to NAT are greater in absolute terms while EU-migr compared to NAT are always negative. The employed and unemployed status present minor differences. The worse policies system is MULT for TCN employed (+1.1% on average) and unemployed (+1.3% on average). Then comes the EXCL system (respectively on average for employed: +1% and for unemployed +1.3%).

**Figure 27. AMEs of poor EU-TCN active employed and unemployed respondents - dental UNs**



Source: Author’s elaboration on EU-SILC data.

#### 4. Conclusions

As in Chapter 2, given that we are analysing changes in a pseudo-panel, the results of Chapter 3 suggest us to investigate the discrimination suffered by EU-migrants compared to locals and third-country nationals since being EU citizen who reside in another country of the Union, different from the locals, implies an increase in the probability of declaring bad SAH or having medical/dental UNs. Indeed, focusing on general effects of the most vulnerable groups, the health inequalities suffered by EU-migrants become more evident at group level: and that might be related to their higher expectations towards the European health systems. Considering country characteristics, mechanism of contributions and policies of integration the crisis seems to not have played an important effect with the exception of dental UNs, and also for medical UNs in case of policies. Indeed, being TCN seem to confirm the HME of the Introductory Chapter, only if the needs are not taking into consideration the SEP. Considering country characteristics, mechanism of contributions and policies of integration the crisis seems to not have played an important effect with the exception of dental UNs, and also for medical UNs in case of policies.

From a policy perspective some structural fences - such as the lack of information about services availability, language barriers, bureaucratic difficulties, discrimination - and their interplay with other confounding factors - such as financial barriers, labour and economic integration - may have worsened due to crisis. However, according to the results presented, there no is remarkable impact on the health status of native, intra-EU migrants and foreigners along the crisis years and health trends seem to be stable.

It has been proven that countries presenting appropriate public policies, promoting equitable enjoyment of access and use of health services, have relatively low costs but produce positive behavioural responses in the population (Huber *et al.*, 2008), therefore constituting a desideratum for the economists due to cost-effectiveness and minimum distortion on agent's economic behaviour characteristics (Devillanova and Frattini, 2016; Epstein *et al.*, 2009). As underlined by Rogers *et al.*

(1999), the optimality constraint of providing the “right service at the right time in the right place” should animate the European healthcare systems efficiency.

Moreover, McKee *et al.* (2012) underline the importance of evaluating depth and extension of health coverage when commenting the austerity measure in Europe: some measures that have been taken to reduce health expenditures in response to the crisis can be justified, but other reforms are not supported by evidence, such as the introduction of co-payments, which will fail to discriminate between medically necessary and unnecessary utilisation (Goldman *et al.*, 2007; Brook *et al.*, 1983). As seen especially in Southern European countries, the alternative health measures are sustained mainly by the families, risking to not consider the needs of most vulnerable people, such as those non-fully covered by the health systems due to the entitlement and citizenship status, those suffering chronic diseases or those losing income support obliged to take care of their health status by themselves (Thomson *et al.*, 2014).

**Annex VI. T-test on SAH, medical UNs, dental UNs and citizenship groups for countries of residence**

SAH	2007										Medical UNs	2007										Dental UNs	2007									
	AT	BE	CY	ES	FR	EL	IT	LU	UK	Tot		AT	BE	CY	ES	FR	EL	IT	LU	UK	Tot		AT	BE	CY	ES	FR	EL	IT	LU	UK	Tot
NAT-EU		1	1	1	1	1	1	1		7	NAT-EU										0	NAT-EU										0
NAT-TCN			1	1	1	1	1		1	6	NAT-TCN										0	NAT-TCN							1			1
EU-TCN				1			1		1	3	EU-TCN										0	EU-TCN										0
	2008											2008											2008									
NAT-EU		1	1	1	1	1	1	1		7	NAT-EU										0	NAT-EU								1		1
NAT-TCN		1	1	1	1	1	1	1	1	8	NAT-TCN										0	NAT-TCN							1			1
EU-TCN						1	1		1	3	EU-TCN										0	EU-TCN										0
	2009											2009											2009									
NAT-EU		1	1	1	1	1	1	1		7	NAT-EU										0	NAT-EU					1					1
NAT-TCN	1	1	1	1	1	1	1		1	8	NAT-TCN										0	NAT-TCN					1	1		1		3
EU-TCN	1	1							1	3	EU-TCN										0	EU-TCN										0
	2010											2010											2010									
NAT-EU		1	1	1	1	1	1		1	7	NAT-EU										0	NAT-EU										0
NAT-TCN	1		1	1	1		1		1	6	NAT-TCN										0	NAT-TCN	1		1	1	1		1			5
EU-TCN	1		1	1	1				1	5	EU-TCN										0	EU-TCN	1									1
	2011											2011											2011									
NAT-EU		1	1	1	1	1	1	1		7	NAT-EU										0	NAT-EU								1		1
NAT-TCN	1	1	1	1	1	1	1		1	8	NAT-TCN								1		1	NAT-TCN							1	1		2

	2012										EU -TCN	0	2012										EU -TCN	1	1						
	AT	BE	CY	ES	FR	EL	IT	LU	UK	Tot			AT	BE	CY	ES	FR	EL	IT	LU	UK	Tot				AT	BE	CY	ES	FR	EL
EU -TCN	1		1		1			1	1	5	EU -TCN	0	EU -TCN																		
			1	1	1	1	1	1	1	7	NAT-EU	0	NAT-EU																		0
NAT-TCN	1		1	1	1	1	1		1	7	NAT-TCN	1	NAT-TCN			1									1	1		1			3
EU -TCN	1									1	EU -TCN	0	EU -TCN															1			1
	2013											2013																			
	AT	BE	CY	ES	FR	EL	IT	LU	UK	Tot	AT	BE	CY	ES	FR	EL	IT	LU	UK	Tot	AT	BE	CY	ES	FR	EL	IT	LU	UK	Tot	
NAT-EU		1	1	1	1	1	1	1	1	8	NAT-EU	0	NAT-EU													1					1
NAT-TCN	1	1	1	1	1	1	1		1	8	NAT-TCN	1	NAT-TCN				1						1	1	1				1		4
EU -TCN	1	1	1					1		4	EU -TCN	0	EU -TCN												1	1			1		3

Source: Author's elaboration on EU-SILC data - value "1" is reported when p-value < 0.05

**Annex VII. Logit models estimation – general models**

		SAH			Medical UNs			Dental UNs					
		Coef.	P> z	[95% CI]	Coef.	P> z	[95% CI]	Coef.	P> z	[95% CI]			
_CIT2	EU	0.0900	***	0.0512	0.1288	0.1105	***	0.0539	0.1670	0.1781	***	0.1312	0.2251
	TCN	0.0492	*	0.0069	0.0916	0.0250		-0.0308	0.0807	0.1138	***	0.0694	0.1583
_SEX	Female	0.1170	***	0.0984	0.1357	0.0381	**	0.0125	0.0637	-0.0558	***	-0.0776	-0.0341
_AGE4	Inactive Pop	0.8169		0.7502	0.8836	-0.3583	***	-0.4760	-0.2407	-0.3439	***	-0.4455	-0.2422
_COU	BE	0.1468	***	0.1000	0.1935	-0.3412	***	-0.4485	-0.2340	0.1258	**	0.0516	0.2000
	CY	-	***	-	-	1.0164	***	0.9341	1.0987	1.0856	***	1.0219	1.1493
	ES	0.0646	***	0.1040	0.0251	1.2488	***	1.1754	1.3222	0.7933	***	0.7350	0.8517
	FR	0.2660	***	0.2258	0.3061	0.9444	***	0.8697	1.0191	0.7159	***	0.6566	0.7753
	EL	-	***	-	-	1.1877	***	1.1088	1.2667	0.7061	***	0.6421	0.7701
	IT	0.2994	***	0.2615	0.3373	1.1074	***	1.0351	1.1797	1.0359	***	0.9795	1.0923
	LU	0.3631	***	0.3129	0.4133	0.7636	***	0.6718	0.8555	-0.0142		-0.0966	0.0683
	UK	-	***	-	-	0.4672	***	0.3830	0.5515	0.2052	***	0.1361	0.2743
		UK	0.3503		0.3970	0.3035							
_CHR_DIS	Yes	1.8514	***	1.8311	1.8717	0.4854	***	0.4500	0.5207	0.4306	***	0.4005	0.4607
_LIM	Yes	1.8936	***	1.8718	1.9153	0.6567	***	0.6198	0.6936	0.4149	***	0.3828	0.4470
_EQU_INC	2	-	***	-	-	-0.2370	***	-0.2729	-0.2011	-0.2600	***	-0.2896	-0.2305
	3	0.1323		0.1605	0.1041								
	4	0.2022	***	0.2308	0.1737	-0.4482	***	-0.4859	-0.4105	-0.4910	***	-0.5222	-0.4598
	5	0.2187	***	0.2481	0.1893	-0.5543	***	-0.5935	-0.5152	-0.6096	***	-0.6424	-0.5768
		0.2512	***	0.2830	0.2193	-0.6323	***	-0.6752	-0.5894	-0.7329	***	-0.7698	-0.6960
_ABIL	Easily	0.4007	***	0.4217	0.3796	-0.5117	***	-0.5417	-0.4817	-0.7724	***	-0.7995	-0.7454
_EDU3	Secondary	0.4172	***	0.4384	0.3961	-0.0586	***	-0.0883	-0.0289	-0.1338	***	-0.1580	-0.1097
	Tertiary	0.6671	***	0.6960	0.6382	0.0540	**	0.0154	0.0926	-0.1257	***	-0.1587	-0.0927
_ISCO3	Technicians	0.0515	**	0.0838	0.0192	-0.0196		-0.0642	0.0250	0.0557	**	0.0163	0.0951
	Clerks	0.0286		0.0587	0.0014	-0.0103		-0.0508	0.0302	0.0720	***	0.0364	0.1076
	Skilled workers	0.1470	***	0.1156	0.1784	0.0109		-0.0320	0.0537	0.1065	***	0.0697	0.1434
	Elementary	0.2262	***	0.1901	0.2622	-0.0632		-0.1134	-0.0130	0.1362	***	0.0940	0.1783
	Missing	0.2830	***	0.3411	0.2248	-0.2207	***	-0.2994	-0.1419	-0.2401	***	-0.3054	-0.1748
_ACT2	Unemployed	0.1683	***	0.1407	0.1960	0.0501	**	0.0135	0.0867	0.2451	***	0.2159	0.2743
_FLAG	2008	0.1254	***	0.1570	0.0937	0.2973	***	0.2498	0.3449	0.1136	***	0.0752	0.1520
	2009	0.0755	***	0.1070	0.0440	0.4105	***	0.3639	0.4570	0.0985	***	0.0600	0.1369
	2010	0.1281	***	0.1598	0.0963	0.3648	***	0.3176	0.4120	0.1189	***	0.0803	0.1574
	2011	0.1359	***	0.1675	0.1042	0.2856	***	0.2378	0.3334	0.1189	***	0.0805	0.1573
	2012	-	***	-	-	0.2208	***	0.1728	0.2687	0.0948	***	0.0566	0.1330
		-	***	-	-	-	***	-	-	-	***	-	-

	0.2042		0.2359	0.1725								
2013	-	***	-	-	0.4113	***	0.3648	0.4578	0.2126	***	0.1751	0.2501
	0.1566		0.1887	0.1244								
_cons	-	***	-	-	-3.8102	***	-3.9022	-3.7181	-2.8230	***	-2.8954	-2.7506
	1.9816		2.0360	1.9271								
Pseudo R2			0.303				0.0647				0.0791	
sample size			575,144				575,980				575,960	

Source: Author's elaboration on EU-SILC data - \* p-value < 0.05; \*\* p < 0.01; \*\*\* p < 0.001

**Annex VIII. Logit models estimation – mechanisms models**

		SAH			Medical UNs			Dental UNs					
		Coef.	P> z	[95% CI]	Coef.	P> z	[95% CI]	Coef.	P> z	[95% CI]			
_CIT2	EU	0.1662	***	0.1316	0.2009	0.1303	***	0.0796	0.1811	0.0434	*	-0.0008	0.0876
	TCN	0.0509	*	0.0089	0.0928	0.0158		-0.0395	0.0710	0.0916	***	0.0477	0.1356
_SEX	Female	0.1112	***	0.0925	0.1299	0.0355	**	0.0100	0.0610	-0.0583	***	-0.0800	-0.0367
_AGE4	Inactive Pop	0.7555	***	0.6887	0.8223	-0.5128	***	-0.6301	-0.3956	-0.4415	***	-0.5428	-0.3401
_MECH	OOP	0.6933	***	0.7227	0.6639	0.5023	***	0.4630	0.5416	0.4535	***	0.4203	0.4866
	NHS	0.1528	***	0.1725	0.1331	0.4796	***	0.4496	0.5096	0.4316	***	0.4062	0.4570
		-	-	-	-	-	-	-	-	-	-	-	-
_CHR_DIS	Yes	1.7900	***	1.7703	1.8098	0.4667	***	0.4313	0.5021	0.4108	***	0.3808	0.4408
_LIM	Yes	1.9100	***	1.8883	1.9318	0.6426	***	0.6051	0.6800	0.4184	***	0.3860	0.4508
_EQU_INC	2	0.1300	***	0.1581	0.1019	-0.2352	***	-0.2710	-0.1993	-0.2479	***	-0.2773	-0.2185
	3	0.1912	***	0.2196	0.1627	-0.4459	***	-0.4836	-0.4083	-0.4640	***	-0.4950	-0.4330
	4	0.1947	***	0.2240	0.1654	-0.5413	***	-0.5803	-0.5024	-0.5732	***	-0.6057	-0.5406
	5	0.2079	***	0.2395	0.1762	-0.5997	***	-0.6421	-0.5574	-0.6770	***	-0.7135	-0.6405
		-	-	-	-	-	-	-	-	-	-	-	-
_ABIL	Easily	0.4755	***	0.4959	0.4551	-0.5985	***	-0.6282	-0.5688	-0.9064	***	-0.9331	-0.8798
_EDU3	Secondary	0.4434	***	0.4641	0.4227	-0.1331	***	-0.1621	-0.1042	-0.1496	***	-0.1733	-0.1259
	Tertiary	0.7389	***	0.7674	0.7104	0.0052		-0.0328	0.0432	-0.1721	***	-0.2046	-0.1396
_ISCO3	Technicians	0.0286		0.0608	0.0037	0.0043		-0.0401	0.0487	0.0979	***	0.0587	0.1371
	Clerks	0.0612	***	0.0911	0.0312	-0.0005		-0.0406	0.0397	0.0617	**	0.0263	0.0970
	Skilled workers	0.1267	***	0.0954	0.1580	0.0414	*	-0.0013	0.0840	0.1127	***	0.0759	0.1494
	Elementary	0.1742	***	0.1384	0.2099	-0.0446		-0.0939	0.0048	0.1294	***	0.0878	0.1710
	Missing	0.2744	***	0.3325	0.2163	-0.2123	***	-0.2907	-0.1339	-0.1989	***	-0.2640	-0.1338
_ACT2	Unemployed	0.1598	***	0.1325	0.1871	0.0724	***	0.0364	0.1083	0.2383	***	0.2094	0.2671
_FLAG	2008	0.1225	***	0.1542	0.0909	0.3026	***	0.2551	0.3500	0.1128	***	0.0745	0.1512
	2009	0.0672	***	0.0987	0.0358	0.4295	***	0.3830	0.4759	0.1059	***	0.0674	0.1443
	2010	0.1246	***	0.1563	0.0928	0.3860	***	0.3389	0.4331	0.1241	***	0.0857	0.1626
	2011	0.1270	***	0.1586	0.0954	0.3029	***	0.2553	0.3505	0.1349	***	0.0966	0.1732
	2012	0.1962	***	0.2278	0.1646	0.2268	***	0.1791	0.2745	0.0999	***	0.0619	0.1379
	2013	0.1503	***	0.1823	0.1182	0.4125	***	0.3662	0.4587	0.2097	***	0.1723	0.2470
		-	-	-	-	-	-	-	-	-	-	-	-
	_cons		1.6993	***	1.7439	1.6547	-3.1757	***	-3.2417	-3.1097	-2.3817	***	-2.4352
Pseudo R2			0.2995				0.0548				0.0708		
sample size			575,144				575,980				575,960		

Source: Author's elaboration on EU-SILC data - \* p-value < 0.05; \*\* p < 0.01; \*\*\* p < 0.001

**Annex IX. Logit models estimation – policies models**

	SAH				Medical UNs				Dental UNs			
	Coef.	P> z	[95% CI]		Coef.	P> z	[95% CI]		Coef.	P> z	[95% CI]	
_CIT2												
EU	0.1417	***	0.1068	0.1765	-0.0203		-0.0714	0.0308	-0.0451	*	-0.0897	-0.0005
TCN	0.0632	***	0.0213	0.1050	0.0234		-0.0320	0.0787	0.0968	***	0.0528	0.1407
_SEX												
Female	0.1105	***	0.0919	0.1292	0.0277		0.0021	0.0533	-0.0628	***	-0.0844	-0.0411
_AGE4												
Inactive Pop	0.7236	***	0.6567	0.7905	-0.4119	***	-0.5290	-0.2947	-0.3738	***	-0.4751	-0.2724
_POL												
EXC	-	***	-	-	-0.0990	***	-0.1375	-0.0605	0.0601	***	0.0265	0.0938
MULT	0.5754	***	0.6030	0.5479	0.0323	*	-0.0002	0.0647	0.1768	***	0.1480	0.2056
_CHR_DIS												
Yes	1.7875	***	1.7678	1.8073	0.4313	***	0.3963	0.4663	0.3870	***	0.3571	0.4168
_LIM												
Yes	1.9342	***	1.9124	1.9560	0.6242	***	0.5872	0.6611	0.4006	***	0.3685	0.4327
_EQU_INC												
2	-	***	-	-	-0.2281	***	-0.2640	-0.1923	-0.2432	***	-0.2726	-0.2138
3	0.1320	***	0.1601	0.1039	-0.4208	***	-0.4585	-0.3831	-0.4472	***	-0.4782	-0.4161
4	0.1967	***	0.2252	0.1683	-0.4930	***	-0.5320	-0.4540	-0.5392	***	-0.5717	-0.5067
5	0.2075	***	0.2368	0.1783	-0.5197	***	-0.5620	-0.4775	-0.6210	***	-0.6574	-0.5846
_ABIL												
Easily	-	***	-	-	-0.7130	***	-0.7419	-0.6842	-0.9981	***	-1.0241	-0.9721
_EDU3												
Secondary	0.4084	***	0.4290	0.3878	-0.1791	***	-0.2079	-0.1502	-0.1815	***	-0.2052	-0.1579
Tertiary	0.7347	***	0.7632	0.7062	-0.0314		-0.0694	0.0065	-0.1955	***	-0.2279	-0.1631
_ISCO3												
Technicians	0.0204		0.0526	0.0118	-0.0239		-0.0682	0.0204	0.0794	***	0.0403	0.1186
Clerks	0.0576	***	0.0875	0.0276	0.0028		-0.0376	0.0432	0.0631	***	0.0276	0.0985
Skilled workers	0.1231	***	0.0918	0.1544	0.0439	*	0.0011	0.0866	0.1167	***	0.0800	0.1534
Elementary	0.1781	***	0.1423	0.2138	-0.0597		-0.1092	-0.0102	0.1199	***	0.0783	0.1616
Missing	0.2584	***	0.3165	0.2003	-0.2252	***	-0.3032	-0.1473	-0.2053	***	-0.2701	-0.1406
_ACT2												
Unemployed	0.1616	***	0.1343	0.1889	0.0889	***	0.0529	0.1248	0.2433	***	0.2145	0.2722
_FLAG												
2008	-	***	-	-	0.3045	***	0.2571	0.3520	0.1146	***	0.0763	0.1529
2009	0.1231	***	0.1548	0.0914	0.4265	***	0.3800	0.4729	0.1042	***	0.0658	0.1426
2010	0.0656	***	0.0971	0.0341	0.3804	***	0.3333	0.4275	0.1226	***	0.0841	0.1611
2011	0.1242	***	0.1560	0.0925	0.2975	***	0.2500	0.3451	0.1340	***	0.0957	0.1723
2012	0.1287	***	0.1603	0.0971	0.2266	***	0.1790	0.2742	0.1042	***	0.0662	0.1421
2013	0.2029	***	0.2345	0.1712	0.4223	***	0.3762	0.4685	0.2210	***	0.1838	0.2583
_cons	0.1548	***	0.1869	0.1227	-2.7696	***	-2.8367	-2.7025	-2.1509	***	-2.2062	-2.0956

Pseudo R2	0.2989	0.0503	0.0673
sample size	575,144	575,980	575,960

Source: Author's elaboration on EU-SILC data - \* p-value < 0.05; \*\* p < 0.01; \*\*\* p < 0.001

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