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Labour Mobility and the Portability of Social Rights in the EU

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Abstract

The paper first discusses the main sources of concern for people in the perspective of professional mobility abroad as they result from the analysis of the Eurobarometer survey, wave 75.1 of 2011. Second, it tests whether portability of social security within Europe is a determinant of intra-EU mobility. It does this by using Eurobarometer data for the estimation of a multinomial logit model with a propensity matching scheme in which those that made the experience of social security transfer in the past (either difficult or easy) are compared to those that never had such experience. The results suggest that an easy experience with the transfer of social security across countries may increase the propensity to move abroad for professional reasons. In contrast, difficulties are likely to negatively affect mobility incentives. The sign of the effect is stable across countries, but intensity varies depending on the group of countries considered being them EU-15 or EU-12.

JEL-Code: J610, J620, H550, C250.

Keywords: labour mobility, portability, social protection, European Union.

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1. Introduction

The majority of OECD countries are confronted to population ageing and the decline of the working age population. These developments put public budgets under pressure. For example, as younger cohorts shrink, the number of people holding jobs falls, the pool of domestic savings in the economy gets smaller, with negative consequences on productive investments (Oliveira Martins, *et al*., 2005; Burniaux, *et al*., 2003). Moreover, with declining working age population the size of contributions collected may drop further.

In this perspective, countries have taken measures aimed to improve their economic, social and demographic prospects. Among these is a better utilisation of the labour force through a better match of skills in occupations and countries. For example, the Lisbon strategy of the European Union sets the playfield for the improvement of employment by mobilising the unused potential of individuals through actions directed to improve both their adaptability to new jobs and ability to move.

Occupational and geographical mobility, and the quality of labour market information disclosed to recipients, are therefore issues that deserve a proper consideration. Intra-EU mobility, in particular, is both a mean and an end towards an integrated labour market. In addition, under certain conditions, it may help to overcome some of the demographic challenges and labour market imbalances faced by some European countries (see OECD, 2012b)

Moving on from the analysis of perceived barrier of mobility as reported in Eurobarometer wave 75.1 of 2011, and in particular from the observation that social security abroad is reported among these, the paper provides some insights on the role that international social benefit portability may have on the propensity to cross-border intra-EU labour mobility. It does this with an econometric model based on matching in a multiple-treatment environment which uses multinomial logit to estimate propensity scores. The variable of interest here is the intention to move in the future for professional reasons within the EU as reported in the Eurobarometer survey. This variable is thus observed in each given country of origin and independently of the actual realisation of the move abroad.

The estimates suggest that smooth experiences with portability may boost the propensity to move abroad for professional reasons, while "negative" experiences are likely to have opposite effects. Though having the same sign, the magnitude of these effects varies across EU-15 and EU-12 groups being larger for people living in the EU-15.

While the study of causal relationships using matching models is increasingly popular among policy analysts, techniques for multiple or continuous categories of treatment are still underdeveloped (for a detailed discussion, see Rosenbaum and Rubin, 1985; Imbens, 2000; Lechner, 2001). The analysis presented in the paper combines the advantages of the propensity score model with the accuracy of matching using the Mahalanobis distance which reduces bias in observational studies.[2]

So far, empirical research on this topic has been scarce and the paper offers a novel approach to look at this relationship. Using mobility *intentions* rather than mobility *decisions* leaves out the possibility of estimation biases due to migrant self-selection, as it happens when the mobile population is observed once

[2] Mahalanobis distance is the distance between two N dimensional points scaled by the statistical variation in each component of the point. For example, if X and Y are two points from the same distribution with covariance matrix Ω, then the Mahalanobis distance can be expressed as $D(X,Y)=(X-Y)'\Omega^{-1}(X-Y)$. In other terms, the Mahalanobis distance is a weighted Euclidean distance that uses the pooled variance-covariance matrix of selected covariates as weights. When the covariance matrix is the identity matrix, Mahalanobis distance becomes the Euclidean distance. Mahalanobis Metric (see Feng et al., 2005).

the settlement abroad has taken place. Moreover, this way, the paper is aligned to a growing stream of the literature emphasising that the interest in socioeconomic models is not *realised mobility* rather the *potential for mobility* (Liebig and Sousa-Poza, 2003; Fourage and Ester, 2007). Indeed, for socio-economic policies aimed at improving labour mobility, primary targets are immobile workers and especially those that, though showing an interest for labour mobility abroad, eventually give up and do not realise such aspirations.

The paper also investigates perceived portability difficulties and it does not attempt to measure losses due to lack of portability. The choice of proceeding along this line is supported by two arguments. First, as subjective intentions are the focus of the analysis, consideration of subjective measures of the risk stemming from social benefits' portability are given priority. Subjective concerns may in fact depend on the amount of information necessary to assess the portability risks which may in turn be linked to the complexity of the system.

The barriers and obstacles to labour mobility are important topics to focus on. There is in fact an abundant literature on the factors that influence the different dimensions of mobility, both between jobs and between countries. However, few studies are devoted to the access to social protection for migrants and the portability of social benefits.

Prior to moving, perceived portability difficulties can play a strong discouraging role and the degree of risk aversion of the individual may affect the actual decision to move. This is especially true when strong factors against mobility exist in the country of origin. In this respect, the fear of suffering a non-access to social benefits may add to other concerns, with the consequence that the person does not move even if the expected loss might be limited.

The paper is organized as follows. Section 2 presents some facts about mobility in European countries and in OECD countries. Section 3 discusses some perceived barriers to mobility using data from Eurobarometer. Section 4 discusses the issue of portability while section 5 presents a short of review of the literature about portability and mobility of social benefits. Section 6 illustrates the empirical model based on an original approach combining both propensity score and Mahalanobis metric matching in a multiple treatments environment. Section 7 introduces and discusses the Eurobarometer data used, the variables and the sample. Section 8 presents and discusses the results of the empirical analysis. Sensitivity analysis is added to check for the quality and robustness of the results presented in section 9. Section 10 concludes.

2. Some key figures and facts about mobility within the EU

The decision leading a person to move abroad and to decide where to settle is reached through a complex process of assessment of the risks/costs versus the opportunities/benefits associated with the move. In addition to institutional and economic factors, social, psychological, cultural and educational factors matter.

Mobility incentives (the so called "pull factors") are various. Usually, expectations on the level of income that can be earned in the new settlement are key determinants of the decision to move. There follows factors related to the overall appeal of the prospect country in terms of living conditions and social environment.

People might also weight their opportunities to access the welfare system of the host country: health-care, in particular, but also some social assistance benefits in case of inactivity and unemployment benefits in case of job loss (Heitmueller, 2005).

However, a difficult political environment, wars, persecutions, the advent of an economic crisis, an inadequate educational system or a burdensome access to the labour market in the home country may also be strong incentives to move to another country.

Often, the decision to move is favoured by the presence of family, friends or a community of nationals already settled in the country of destination. Several studies provide evidence that migrants often circulate within family and ethnic networks (OECD, 2006). The presence of a national community in the destination country reduces the risk and cost associated with mobility, thereby raising motivation.

Obstacles to mobility may also be individual-specific and related to external barriers. There are financial risks due to the cost of moving house or to the loss of income in the transfer period; as well as psychological distress, when the family separates or other social ties in the country of origin are broken.

Most studies on mobility barriers also take account of difficulty to access the labour market, of the difficulty to communicate due to language differences, of the risk of marginalization, discrimination and prejudices, of the presence of statutory restrictions to social assistance and of services for non-citizens.

A circumstance that can further increase the cost of moving is the lack of sufficient and adequate information about the conditions, opportunities and benefits available in the destination country. This is often the case for migrants from low-income countries or for migrants who are poorly-educated.

In this respect, the EU is putting a lot of effort to improve the efficiency and effectiveness of their information policies, to the use and benefit of all working groups. The improvement of the existing unified portal for the posting of vacancies across member countries of the EU (EURES), the regular publication of reports and bulletins for the monitoring of labour demand in Europe are some examples. These means are designed to help workers to make informed choices and to know what benefits and rights they might dispose of once living in another country. With this objective, though with different efforts, governments inform and assist both incoming migrants and natives living abroad.

2.1 Labour Mobility in the EU

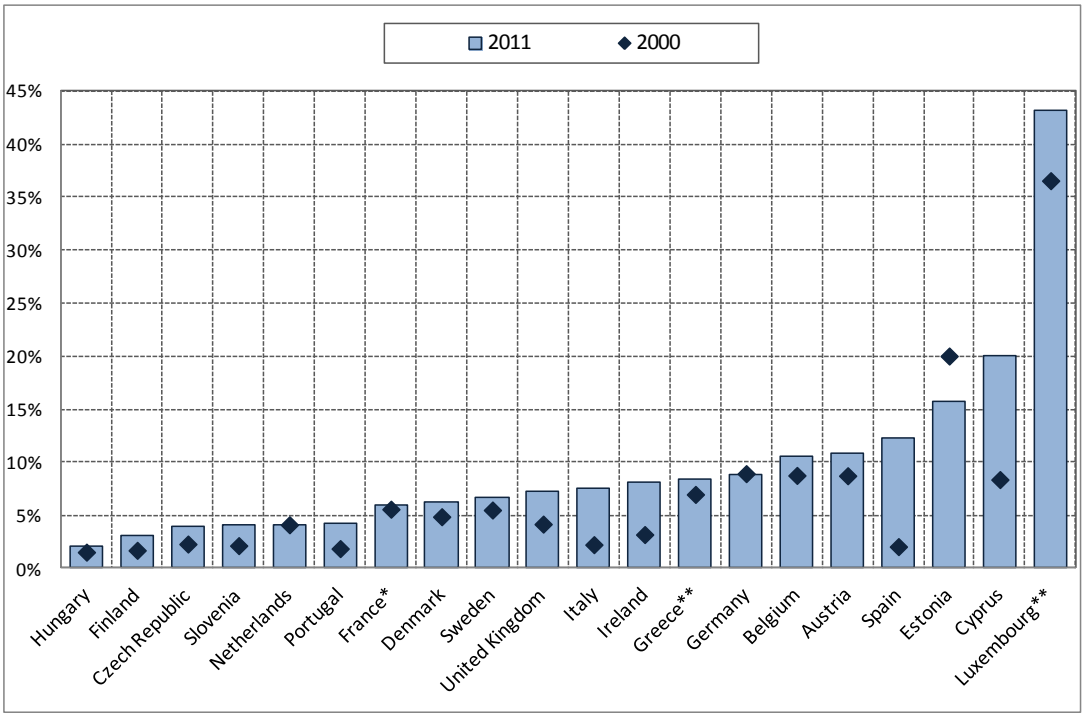
In 2011, about 33.3 million foreign people were residing in the 27 countries of the European Union (EU-27), which represented 6.7% of the total population.[3] In the last decade, such foreign population has increased in almost all the EU countries, with remarkable growth rates in Spain, Cyprus[4], Luxembourg and Italy (Figure 1).

[3] Foreign people in the text are commonly referred to as "non-nationals", i.e. people who are not citizens of their country of residence.

[4] 1. Footnote by Turkey: The information in this document with reference to « Cyprus » relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognizes the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of United Nations, Turkey shall preserve its position concerning the "Cyprus issue". 2. Footnote by all the European Union Member States of the OECD and the European Union: The Republic of Cyprus is recognized by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus."

Figure 1. Foreign Population in EU Countries

As percentage of Total Population



'Note: * Data for France refers to 1999 and 2011. ** Data for Greece and Luxembourg refers to 2001 and 2011.

Source: Eurostat (Census).

In the European Union (EU), about 12.8 million (38.5% of total foreign population) are EU citizens living in a Member State of the EU which is different from the one of their own nationality.

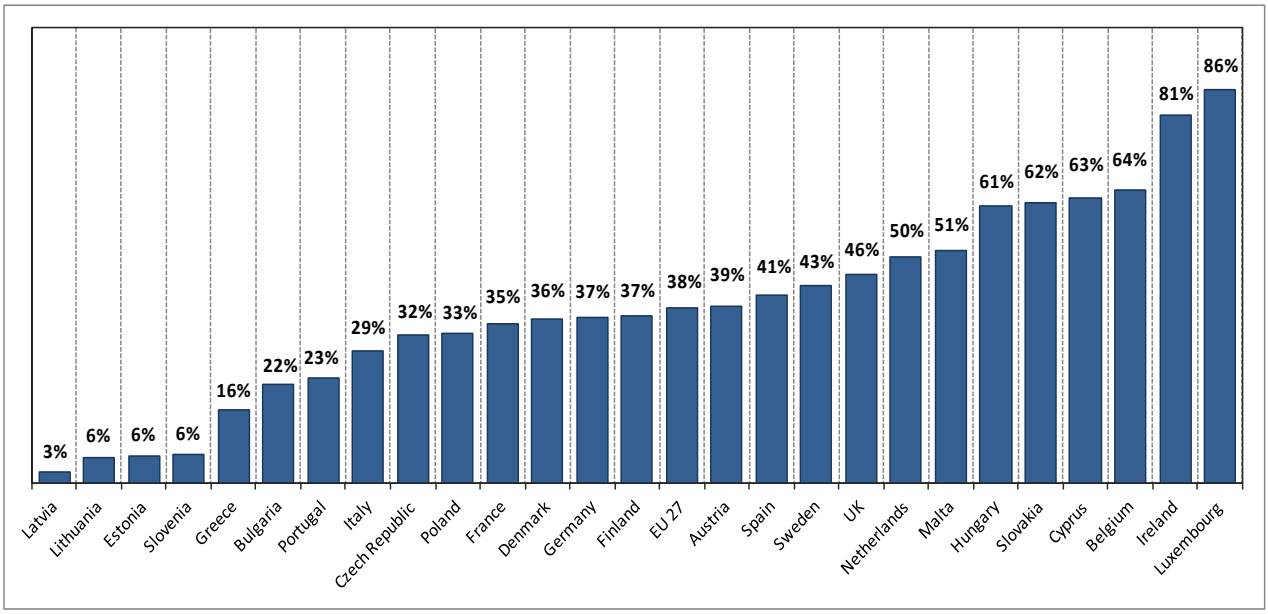
Nevertheless, country differences exist. For example, in the Baltic countries and South-Eastern Europe, the foreign population consists largely of non-EU citizens. In contrast, in Luxembourg, Ireland, Belgium, Cyprus and the Slovak Republic most foreign residents are EU citizens – where foreign should be interpreted as foreign nationality.

In absolute terms, Germany has by far the largest stock of foreign residents (7.2 million in 2011), followed by Spain (5.6 mln), Italy (4.6 mln), the United Kingdom (4.5 mln) and France (3.8 mln).[5] These countries also host the largest number of citizens from another country: Germany host 2.5 mln inhabitants from the other EU-27 countries; Spain, the United Kingdom and France have respectively 2.3, 1.9 and 1.3 million EU-national immigrants. Relative to population size, however, Luxembourg and Cyprus lead the league of the countries with the largest stock of foreign EU-nationals.

[5] See Eurostat (2011) and OECD (2012b).

Figure 2. EU-National Immigrants per Country of Destination

As percentage of the Total Foreign Population of the Destination Country



Note: In the figure, immigrant is equivalent to "foreign-born"

Source: Eurostat (2011)

In recent years, a major incentive for Intra-EU mobility has come from the enlargement of the EU free mobility zone. This is currently the most significant example of a free movement area, both in terms of numbers of countries involved and the scope of the liberalization (OECD, 2012a). In May 2004, Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia entered the European Union. Migrating flows from these 10 countries (EU-10) to the 15 earlier EU members (EU-15) has increased from about 0.9 million at the end of 2003 to 1.9 million at the end of 2007. Between 2004 and 2008, the number of migrants to the EU for Bulgaria and Romania – which entered the EU in January 2007 - increased from 0.7 million to 1.9 million.

However, the growth of the mobility wave has not been constant over time. Apart from an expected peak in conjunction with the accession, there is evidence that migratory flows from the EU-10, Bulgaria and Romania towards the EU-15 started to grow rapidly well beforehand, since early 2000. In light if this, Holland, *et al.* (2011) argue that the peaks in mobility registered shortly after the enlargement are mostly due to the regularisation of foreigners already settled in the respective country, rather than new entries.

Movements within the EU-15 have increased as well since 1995. Past OECD estimates suggest that, on average, between 2000 and 2005, annual movements within the EU-15 for labour opportunities involved between 0.1 and 0.3 percent of the working-age population (OECD, 2007). Most recent estimates suggest movements at around 0.3% in the EU-27 (OECD, 2012c).When measured in terms of stocks, rather than flows, differences figures are much higher because of the large wage differentials.

Despite an increasing trend, the degree of cross-border labour mobility within the EU is remarkably small if compared to major federal systems overseas (Figure 4). In 2005, if annual cross-border mobility within the EU-15 was about 0.1% of total working-age population, mobility across the 50 US countries was above 3%. Though estimates of inter-regional mobility in the EU are higher - around 1% -, they slightly match the nation-wide mobility of Canadians

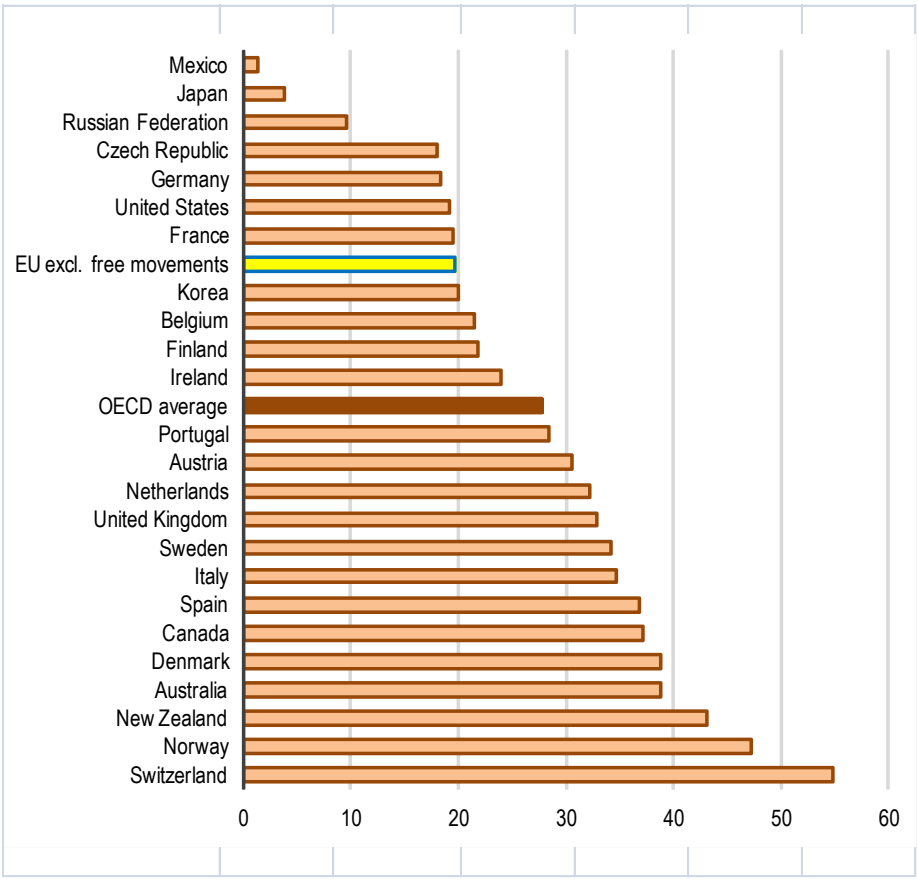
The relative growth in mobility is probably the result of the geographic and demographic enlargement of the Union, though mitigated by recent economic downturns in some EU-15 countries which were key determinant of economic outcomes of post-enlargement.

Indeed, the economic crisis hitting the EU-15 since 2008 has reduced international migration. This is reflected especially in recent intra-EU mobility flows.

The period 2001-2007 saw strong economic growth in the EU-15 and was accompanied by the highest inflows, not only from the 12 new Member States but also from non-EU countries. However, the trend changed rapidly with the economic crisis, as the resulting fall in labour demand caused a sharp reduction of mobility opportunities. In 2008 and 2009, inflows shrunk in almost all the EU countries. Preliminary 2011 data seem to suggest that the decline in migratory flows is reducing, probably as the result of a gradual recovery (OECD, 2012b).

Moreover, as suggested by OECD (2012b), the relative scale of migration remains significant particularly when considering new permanent immigrants as a percentage of all new entries into the working-age population (Figure 3).

Figure 3. Permanent movement as an estimated share of entries into the working age population, 2010



Source: OECD (2012), *International Migration Outlook*

Temporary workers migrants are most reactive to changes in the economic condition.[6] Among EU-OECD countries, the share of mobile temporary workers declined sharply in 2009 (-26.5% with respect to 2008). In 2010, the decline has been more modest, by 4% and (OECD, 2012b).

These trends seem to suggest that intra-EU mobility is primarily affected by trends in the general economy, rather than impulses prompted by the enlargement. In addition, the degree of international mobility within the EU is sensible to country differences, reflecting disparities - for example - in economic opportunities, labour market characteristics, language proximities, the presence of favourable mobility policies, inclusion programmes, the tightness of cross-national relationships.

3. Perceived obstacles to mobility

A number of barriers may thus prevent people to freely move across countries. Eurobarometer wave 75.1 of 2011 contains information related to some of the perceived barriers to mobility.

Respondents to the survey are indeed interviewed about the most common barriers to mobility. They have to state the most relevant "practical difficulty" (s)he believed (s)he would face if working in another EU country. 13 alternative answers are suggested: language barriers, cultural differences, bureaucracy involved, family considerations, tax implications, affordability to live in another EU country, fear that qualifications will not be recognized abroad, lack of information about the opportunities abroad, fear of difficulty in finding an appropriate job abroad, concern that social security standards (such as pensions, healthcare or unemployment) are lower abroad than in the current country, other barrier(s), none and don't know.

These variables provide interesting information about the ways individuals prioritise the obstacles to mobility and may inform about the extent of the perceived difficulties to move to another country

The first 10 alternatives proposed in the survey question are representative of the most important barriers identified by the literature and on which policy reforms for improving mobility currently focus.

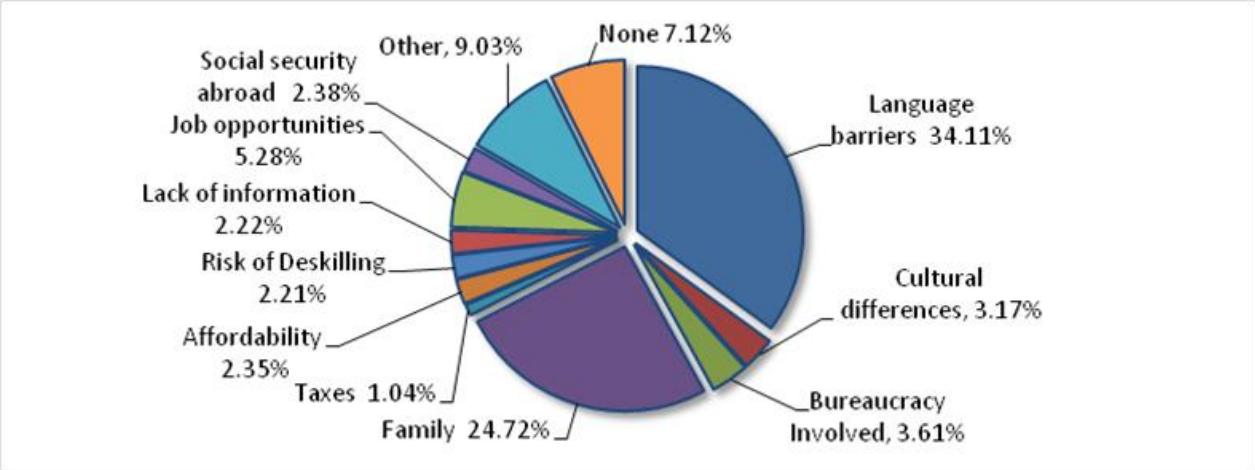
In the total population (26,836 people), linguistic barriers and family ties are perceived as major impediments to mobility (Figure 4). However the third and fourth most frequent answers have been *Other* and *No barriers*.

The non negligible frequency of *Other* barriers demands further investigation on the aspects of mobility barriers which may have been underestimated. It is possible indeed that new barriers are emerging and/or are gaining a greater role.

It should also be observed that the high frequency associated with the *None* answer is a positive result. When possible, monitoring this information rate across time may help to shed some light on the effectiveness of policies for reducing mobility barriers.

[6] Temporary worker migration is a very heterogeneous. Seasonal workers, mainly low-skilled workers in agriculture, continue to be the single most important group of temporary worker migrants in the OECD (OECD, 2012b)

Figure 4. Main perceived obstacles to mobility



Source: own calculations based on EB-75.1 (2011)

Despite instructive, the information presented in Figure 4 is averaged across the whole population and does not allow to capture the variability in the responses' distribution across countries. In the following we try to overcome this limitation presenting an overview of the two most frequently occurred answers per each country, as well as the frequencies associated with options *Other* and *No* barriers.

It is not surprising that in almost all countries the most cited barrier is the language, eventually followed by family considerations. However, it is important to notice that in two cases – Finland and Malta –the option *Other* emerges among the top two answers. In both these countries, family considerations are the more frequent perceived barrier, but the role of the language is tertiary: in Malta the language is mentioned only by 8.8% of the surveyed population. Again, the fact that the alternative *Other* prevails over other well-known barriers claims for renewed attention on the issue of properly identifying the currently most relevant barriers to mobility.

Table 1 also displays - in bold - the highest and/or lowest frequency of each alternative observed across countries. This allows a better understanding of the country distribution of answers. For example, while language barriers are, on average, the most frequently cited barrier to mobility across countries, its frequency varies from a lowest of 25.45% in Luxembourg to a highest level of 53.19% in Spain. Thus, the highest national frequency associated with language barriers is more than twice of the value observed in the country with the lowest share.

The incidence of *Other* barriers as well is highly dispersed across countries. If the overall average is about 10%, the highest recorded rate is more than 25% (Finland), while the lowest is 2.3% (Italy). In contrast, the distribution of the *None* alternative is more balanced across countries.

Concerning individual characteristics, language barriers are comparatively a less relevant problem for relatively younger people: 36% among people aged below 41 relative to 40.5% among people aged 41 and above. In the youngest generations, barriers such as family, affordability, qualification recognition, bureaucracy, taxes and finding a job abroad are more important than in older cohorts, who instead are relatively more bothered with social benefit coverage and *other* barriers.

Distinguishing the employment status of the respondent (i.e.: student, unemployed, retired, house worker) provides further insights. On average, employed people are less concerned about language barriers

(37% vs. 40%) and affordability (2% vs. 2.5%). Nevertheless, they are significantly more to be concerned about qualification recognition, bureaucracy, taxes, social security and difficulty in finding appropriate jobs.

The relatively higher rate associated with family considerations in the employed group with respect to the non-employed (26% vs. 18%) is probably due to the different age composition of the groups, as the non-employed include both students and retired people, both less likely to be affected by family constraints.

Table 1. Perceived barriers to mobility by country

Country	Most frequent answer	%	2nd most frequent answer	%	Other	None
Latvia	Language	34,42%	Family	23,27%	17,36%	7,00%
Spain	Language	**53,19%**	Family	19,52%	8,07%	4,38%
Bulgaria	Language	31,37%	Family	18,28%	8,29%	6,89%
Greece	Family	34,90%	Language	29,00%	7,60%	8,40%
Malta	Family	45,00%	Other	11,60%	11,60%	10,00%
Poland	Language	39,30%	Family	23,10%	9,30%	10,40%
Italy	Language	34,66%	Family	25,32%	**2,34%**	6,23%
Estonia	Language	27,02%	Family	21,34%	19,84%	**10,67%**
Cyprus	Language	35,60%	Family	31,60%	3,60%	9,80%
Hungary	Language	31,20%	Family	29,06%	11,47%	4,18%
Lituania	Language	51,60%	Family	**13,80%**	9,04%	5,05%
Czech Republic	Language	41,72%	Family	27,32%	2,86%	**2,27%**
Slovakia	Language	36,44%	Family	26,83%	6,35%	7,02%
Romania	Language	30,86%	Family	17,95%	7,88%	4,75%
Portugal	Language	27,92%	Family	18,81%	8,51%	8,91%
Finland	Family	25,17%	Other	**25,27%**	**25,27%**	9,39%
Ireland	Language	41,71%	Family	26,42%	5,36%	6,06%
UK	Language	46,07%	Family	15,28%	12,25%	8,40%
France	Language	52,85%	Family	15,94%	7,92%	6,38%
Slovenia	Language	27,60%	Family	23,38%	9,23%	9,92%
Austria	Family	33,40%	Language	23,11%	5,53%	4,66%
Belgium	Language	29,85%	Family	28,00%	4,10%	4,68%
Germany	Language	36,19%	Family	26,63%	3,64%	10,11%
Netherlands	Family	29,74%	Language	23,02%	8,30%	8,40%
Sweden	Language	29,88%	Family	26,66%	14,36%	4,98%
Denmark	Family	32,18%	Language	26,95%	6,61%	6,42%
Luxembourg	Language	**25,45%**	Family	23,86%	7,95%	8,55%

Source: own calculations based on EB-75.1 (2011)

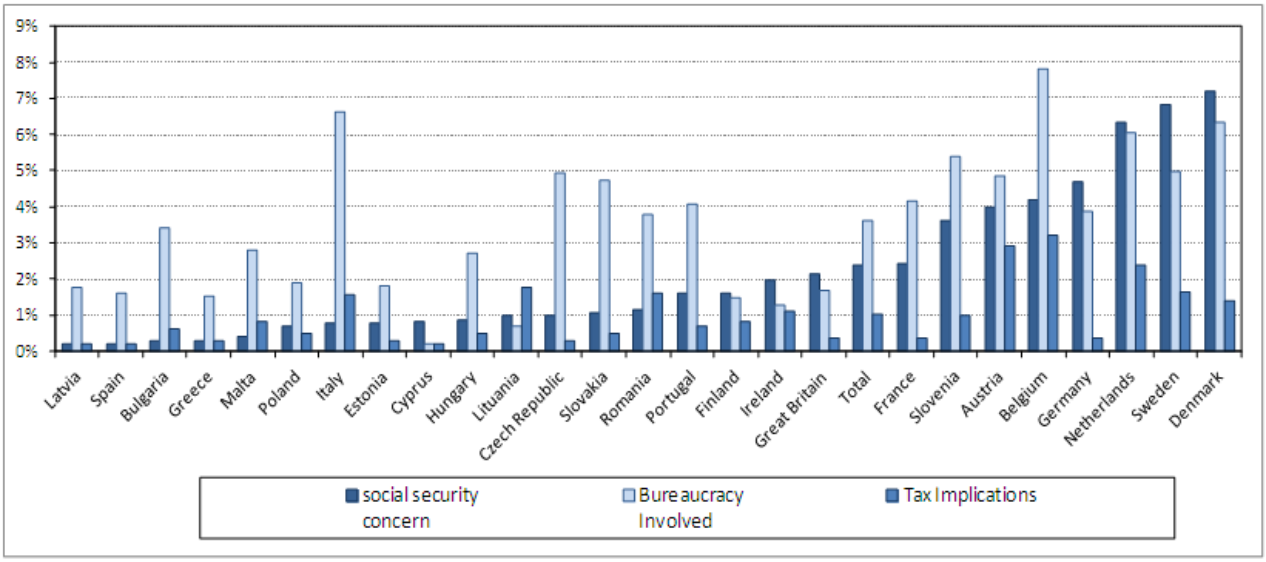
3.1 Concern about Social Security abroad

Another important aspect which may affect mobility abroad is the concern about social security abroad. From the survey analysis, anxiety about social security coverage abroad is quite widespread and, on average, more important than other well-known and reputable barriers, such as diploma recognition, fiscal treatment, affordability and information gaps.

Such concern records only few decimal points below the rate associated with more general barriers such as bureaucracy and cultural difference. This again indicates that the concern for portability-related issues is often spread among the population.

Figure 5 presents a cross-country overview of the three alternative responses that are mostly dependent on the administrative organisation of a country, namely: tax level, social security coverage and general bureaucracy. The table shows that in countries such as Denmark, Sweden, the Netherlands, Germany and Cyprus, concern about social benefit provision abroad is relatively the most important of the State-dependent barriers. Conversely, in countries such as Italy, Belgium, Slovenia, Austria, the Czech Republic and Slovakia, bureaucracy dominates remarkably over the other options.

Figure 5. Some specific sources of concern for mobility abroad: social security, tax treatment and bureaucracy

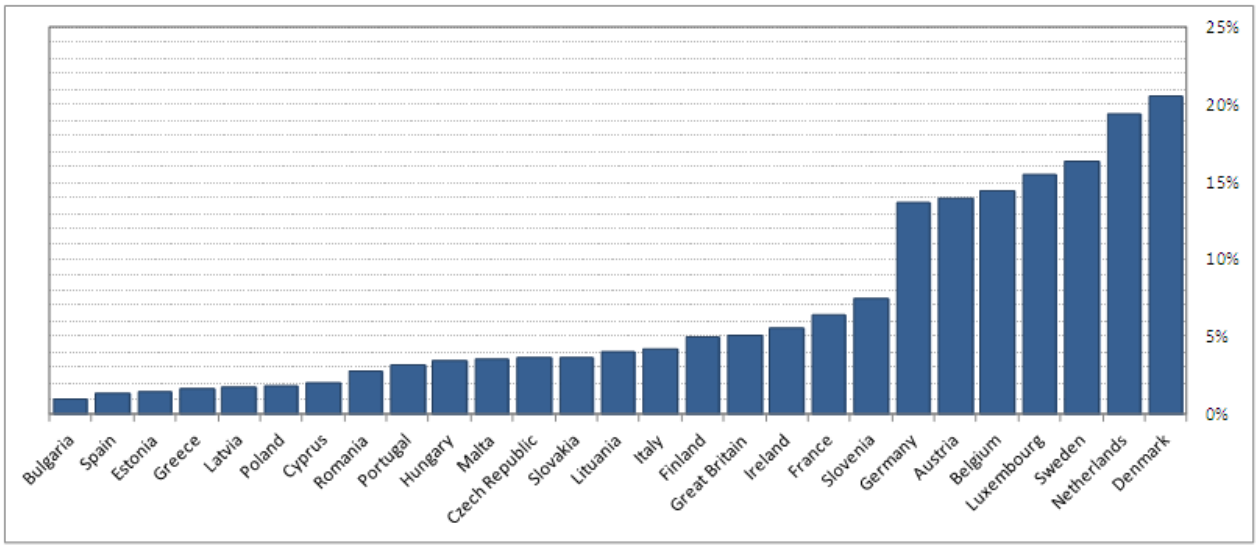


Source: own calculations based on EB-75.1 (2011). Countries are ranked in ascending order of social security concern.

Social security abroad is the 1st or 2nd major source of concern for professional mobility for 6.9% of the population. A low percentage is found on average, but with a large cross-country variability (Figure 6).

Respondents mostly concerned with social security abroad live in countries where welfare state is particularly well-organised (Denmark, Sweden). Similar rates of concerns with social security abroad are also observed in some countries of Continental Europe (such as the Netherlands, Belgium, Austria and Germany). People interviewed in these countries all report rates of concern for social security abroad which are significantly higher than the corresponding values for the other EU Members. Among countries with the lowest relative rate for concern about social security abroad, are Bulgaria, Spain, Estonia and Greece.

Figure 6. Share of respondents for whom social security is a major concern



Source: own calculations based on EB-75.1 (2011)

In terms of age–distribution, people who declared themselves most concerned with social security abroad are aged between 50 and 59 (19% of responses), followed by people aged between 40 and 49 years old. Also people between 60 and 69 are relatively concerned about social security abroad and this may be linked to the fact they are very close to pension age.

In absolute terms, women are also more concerned about social security abroad than man (52% vs. 47%). Married people are relatively more concerned than single and separated or divorced people.

People who have one or more children (66.5%), representing 7.4% of all the households with children in the sample, are also more concerned about social security abroad than childless individuals.

Concerning the educational level, the highest share of people concerned with social benefits abroad are those with highest level of education (20 years or more in education): 40%. These are followed by people with 16 to 19 years of education (38%). People without full-time education are only marginally affected (4% of the group).

In absolute terms, middle class people are more concerned relative to upper and lower social classes (44%) but, conditioning on group relative dimensions, upper class people appear most concerned (10.37% of the group).

Finally, managers and, in general, people in white collar jobs are relatively more concerned with social portability than other occupational categories.

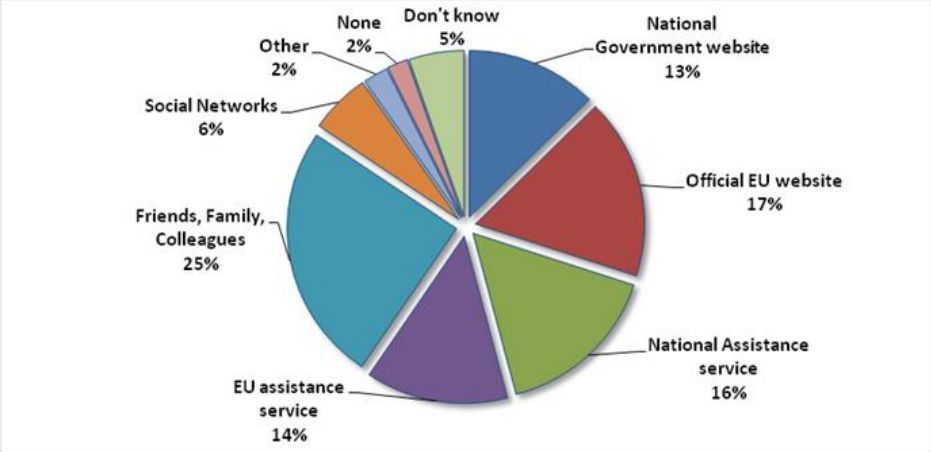
3.2. Does information matter?

There is one element that may help people to overcome obstacles to mobility abroad. It is the extent of information disclosed to them. To investigate this aspect, the paper uses the information reported in the Eurobarometer survey about the major sources of information people rely on to find solution to problems/queries they have or might have while abroad.

It is likely that mobile people rely on diversified sources of information and options to do so have increased significantly in recent years, thanks to the development of new media and web-based resources. EB-75.1 provides some data on this issue by surveying the population about their preferred information sources.

In this respect, Figures 7 and 8 below suggest that those who never worked abroad are more likely to rely on informal information sources such as family and friends. This is, despite people with past experiences might have established connections with local residents during their periods abroad. The graphs also point to the fact that people who worked in another EU country in the past are more likely to rely on super-national information sources, such as the EU web site and EU assistance services, than people who never moved. The latter seem indeed still more informed by nation-wide sources.

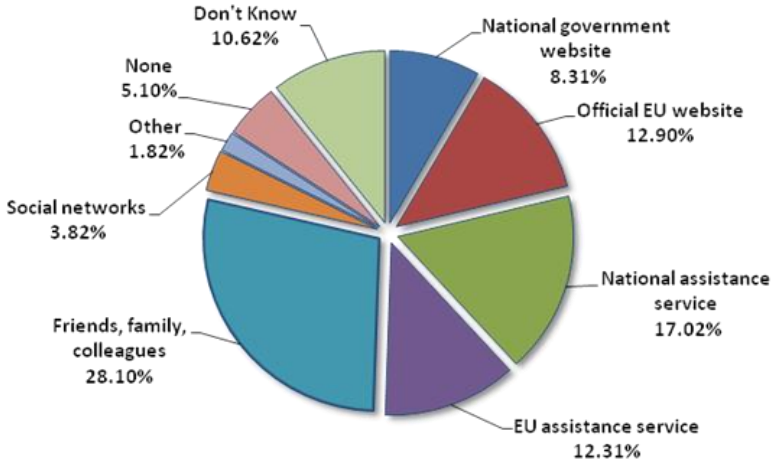
Figure 7. Sources of information for people having worked abroad in the past



Note: Information sources concerning working opportunities abroad.

Source: EB-75.1 (2011)

Figure 8. Sources of information for those who have never worked abroad in the past



Note: Information sources concerning working opportunities abroad. *Source*: EB-75.1 (2011)

4. Portability of social rights

As it was discussed above, the degree to which migrants are granted some social welfare benefits may condition their decision to move. In this respect, portability of benefits across countries may also affect their choices.

Portability is meant here as the possibility of acquiring and keeping social benefits' entitlements and/or social rights in the event of mobility for work reasons. Mobility can be either related to a change of employer within the same country (job-to-job mobility), or may involve a simultaneous and connected change of both the employer and the country. This paper focuses on this sort of mobility and portability thereof.

Social benefits' entitlement lacking full portability may impose on the worker a portability loss - a *shortfall* of benefits - directly related to the switch of the protection system induced by mobility. Such loss is generally suffered when the benefit becomes payable, such s upon retirement, or in case of interruption of the employment relation, or in case of illness or disability. The damage can concern either the amount of the benefit or the conditions for its delivery.

Historically, portability has been introduced in national welfare systems by means of bilateral agreements or multinational conventions (see Holzmann and Koetll, 2012). In many cases, cooperation was promoted by a history of repeated and substantial migratory flows between the countries eventually signing the agreement.

However, the agreements vary significantly in their scope and depth. Some only establish a general principle of mutual protection of mobile workers, while others commit to a sort of equal treatment and are hence thorough.

Developed countries have so far engaged themselves in a variety of mutual commitments to realise extensive portability across their boundaries. In case of reforms, a timely review of the co-ordination mechanisms is necessary if effectiveness of the scheme were to be maintained. Today, such review processes are very complex. The result is such that social protection for international workers is rather intricate in practice and pitfalls are looming (see again Holzmann and Koetll, 2012)

The issue of portability has been addressed by EU governing bodies since the 1960s. The problem has been central to EU policy agenda, as the lack of portability is perceived as an obstacle to the success of the unique labour market. Indeed, if people believe that changing job and moving entail a loss in terms of social security coverage, this belief may act as a disincentive to the use of EU-citizens' right to free movements within the Union.

Portability requires fundamentally an efficient co-ordination of national social security schemes. This is generally achieved by means of European Council's Regulations.

The first prominent and comprehensive framework was laid down in EEC Regulations No. 1408/71 and No. 574/72 which have pioneered the theoretical and practical solutions to portability issues in the EU. In recent years, a major enacting role has been played by the activity of the European Court of Justice. The 1st May 2010, a new Regulation, No. 883/2004, entered into force in replacement of the former apparatus. [7]The Regulations do not harmonise the different Member State's schemes; instead, they contain rules that co-ordinate rights granted under different national legislations.

[7] Reg. No. 1408/71 and No. 574/72 continue to co-ordinate activities between the EU and other members of the European Economic Area (EEA): Norway, Iceland and Lichtenstein. Also, from the 1st of June 2002,

Portability policies in the EU have been developed in regards to many differing types of social benefits: health care services, long-term benefits such as old-age and disability pensions, short-term social assistance (such as maternity, unemployment benefits, family allowances, as well as public housing facilities and education).

Yet, the depth and effectiveness such policies is highly diversified. Each benefit entails specific complexities. Even among the most portable benefits, not all of the obstacles have been removed.

Despite these challenges, the current framework of norms, principles and methods is such that the EU system for social protection of mobile workers is very advanced.

5. Portability and Mobility: a short Review of Literature

So far, issues related to the portability of social benefits have been mostly examined under the lenses of the law, rarely assisted by economists' insight into the implications of proposed solutions (Holzmann and Koettl, 2011; Holzmann and Koetll, 2012).

Past economic analysis devoted to "portability" focused almost exclusively on the effects of pension systems' design on labour mobility incentives (mainly within the same country). Such research, starting in the 1980s, grew as a niche in the wide literature on pensions systems.

Initially, economists focused on the characteristics of pension systems which were more likely to influence workers' decision to switch jobs (Lazear, 1983). In order to secure a certain job tenure to the benefit of the employer, measures against job-mobility started to be deliberately included in pension schemes –especially in employer-sponsored, private schemes in the US.

Some researchers started later to evaluate the possibility of using pension schemes' characteristics not only to keep employees, but also to attract human resources and to impact on the labour market. For example, Jousten and Pestieau (2002) describe a possible "race to the bottom" in contribution levels for Pay-As-You-Go systems when countries compete for the best international human resources. Breyer and Kolmar (2002) show that imposing equal contribution rates can avoid such competition while ensuring an efficient allocation of labour. In this way, co-ordination among countries emerges as an optimal solution.

Most recently, the focus on pension design returned to be dominant; for example, in the comparison of defined-benefit and defined-contribution schemes in case of mobility, or in computational tests to ascertain the mobility-neutral attitude of a pension formulas (Fenge and Von Weizsäcker, 2010).

While most of these papers were aimed at identifying mobility bias rooted into pension schemes' design, few authors addressed the more demanding mission of proposing sustainability solutions to the portability challenge in a comprehensive way. In this stream of research, the work by Holzmann and Koettl (2011), Holzmann *et al*. (2005), Forteza (2008), Cruz (2004) and Avato, *et al*. (2009) should be mentioned. While carefully evaluating existing setups for international portability of social benefits, these studies also advance new paradigms tailored to the evolving global context. The work of Holzmann and Koettl (2011 and 2012), for instance, present a model of Social Risk Management (SRM) which should guide portability of benefits across countries.[8]

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the relations between the EU and Switzerland are also co-ordinated the Reg. 1408/71 and 574/72. The aim of these dispositions is to protect the acquired social security rights of those people moving within the EU and the EEA.

[8] According to Holzmnn and Koettl (2012) the SRM- framework offers strategies for the management of risk prevention, risk mitigation and risk coping. The arrangements to tackle these risks are of three types:

Finally not only do these studies discuss about the portability of pension rights, but also of unemployment compensations, family allowances and, especially, health care benefits. The major contribution of such research is to highlight the complexity and hazard of social co-ordination but, at the same time, to unveil the huge possibilities stemming from efficient regimes.

6. The empirical strategy

In the dataset used in the paper, a portion of the population reports having experienced social benefit transfers in the past, while the remainder never did. This distinction identifies immediately a group that has not been treated that is, people who did not experience portability of social benefits, i.e. NT. Those who experienced portability are further divided in two sub-samples: one gathers individuals who, according to their replies to the survey, experienced an easy transfer, while the other gathers individual that experienced difficulties in the transfer of social benefits.

These subjective outcomes of the transferability process (i.e. easy and difficult) are hence used as distinct clusters, so as to finally consider three groups: a control and two treatments which are easy and difficult transfer, respectively.[9] Each individual may be assigned to only one group in a non-arbitrary way. Groups are hence exhaustive and mutually exclusive.

Denote with *S* the set of observations which include the treated (easy and difficult transfers) and non-treated (those who did not experience any transfers of social security) Superscripts *m* and *l* are employed as generic running indices for the possible values of *S*, so that: *S = {Non-treated, easy, difficult}, m, l* ∈ *S* and $m \neq l$ at the same time. Associated with each individual *i* and each generic treatment *m*, there is a potential outcome: Y_i^m.

Each individual *i* ideally presents a vector Y_i grouping all outcomes under different treatment statuses. However, only one value of the vector Y_i is known, depending on the effective treatment to which the individual has been assigned. Outcomes associated to unassigned treatments are unobservable.

Assuming a sample of *N* individuals, the outcome vector associated with treatment *m* is:

$$Y^m = (Y_1^m, Y_2^m, \dots, Y_i^m, \dots, Y_N^m).$$

Using matching methods it is possible to compute two average effects. The first is the expected average effect of treatment *m* relative to treatment *l* for an individual randomly selected from the population.

$$\alpha^{m,l} = E\left(Y^m - Y^l\right) = E(Y^m) - E\left(Y^l\right).$$

This is an unconditional effect: the average causal effect of exposing *all* individuals *i* to treatment *m* rather than to treatment *l*. It implies estimation of latent components of both Y^m and Y^l. Inverting the relation, we obtain the expected average effect of treatment *l* relative to treatment *m*, denoted as: $\alpha^{l,m}$. It follows immediately that $\alpha^{l,m} = -\alpha^{m.l}$.

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informal, market-based, and public. The authors mention that "(…)Conceptually, SRM defines "Social Protection as public interventions to (i) assist individuals, households, and communities better manage risk, and (ii) provide support to the critically poor" (Holzmann and Jorgensen, 2001).

[9] The tree structure of the sampling model cannot be exploited using conventional nested or conditional models, due to data limitations. The two nodes (easy and difficult) of the experienced group are hence presented as first-level alternatives. Nevertheless, estimates of the probability of group assignment (propensity scores) take account of the conditional structure.

The second is the expected average treatment effect of *m* relative to treatment *l* for an individual randomly selected from the group of participants in *m* only:

$$\theta^{m,l} = E\left(Y^m - Y^l | S = m\right) = E(Y^m | S = m) - E\left(Y^l | S = m\right)$$

In this case, the sample is limited to people assigned to treatment m, so that $Y^{,m}$ is entirely known by data, while Y^l is estimated. Because of the conditioning clause, $\theta^{l,m} \neq -\theta^{m.l}$.

To properly estimate α and θ, it is crucial to adopt a valid strategy for treatment effects' identification. In this paper, we rely on *propensity score matching* (Rosenbaum and Rubin, 1983).

Techniques based on the propensity score have been frequently used in observational studies aimed at exploring causal relationships. A major advantage of the Propensity Score approach is that it reduces the bias caused by non-random treatment assignment (Rosenbaum and Rubin, 1985), which is often an issue in experimental data. In addition, adjustment based on the Propensity Score may help to reduce the bias associated with differences in pre-treatment variables between treated and non-treated groups when the number of pre-treatment variables is large and their distribution varies substantially across treatment statuses (Imbens, 2000).

For each observed unit, the Propensity Score (PS) is the conditional probability of receiving a treatment *S* given the vector of pre-treatment variables *X*. Supposing an individual *i*, a treatment *m* and knowledge of pre-treatment variables x_i, the PS is defined as:

$$P_i{}^m(X) = Pr[S = m | X = x_i]$$

In our model, the PSs are estimated for each unit and each treatment status via a multinomial probability model, which is a multinomial logit.

After the estimation of the propensity scores, a matching metric guides the construction of suitable samples for pair-wise comparisons. The goal of this phase is to identify individuals subject to different treatments but who resemble each other with respect to selected characteristics (*X*). We have decided to match individuals on the basis of closeness in their propensity scores, that is, their probability of group assignment given the value of the covariates in *X*.

Because of the multivariate setting, matching occurs following the rule of the nearest control unit in terms of the Mahalanobis distance from the treated. In our analysis, propensity scores are used as primary covariates.

Additional mechanisms ensure that individuals are almost exactly paired if they both have had a past mobility experience by limiting the maximum distance between matched observations such that only close matches are accepted. The analysis in the paper relies on two alternative algorithms: *nearest-neighbor(s) within caliper* and *kernel*.

In the *nearest-neighbour within caliper*, control units which are within a set distance from the treated are matched. The maximum distance allowed is the *caliper* and it is used with the aim of guaranteeing only close matches. A narrow caliper allows controlling for good matches; however, if the caliper is too small and/or observations are very sparse, there is a high risk of unmatched treated units and poor results.

In *kernel* matching, each control unit is assigned a weight based on its distance to the treated unit in a way that allows the closest control units be given the highest weights. The method requires selecting a bandwidth of the kernel distribution in order to determine a common weight denominator for all

observations. Kernel matching controls for close matches as well as *caliper* matching, but the kernel method differs from former in the way weights are assigned to values at the extreme of the propensity score distribution. Substantial differences in the two method's results would likely indicate a major role of extreme values.

7. The Data

Data come from the Eurobarometer Survey Series, wave 75.1, 2011 (henceforth, EB-75.1), covering each of the EU Member countries and involving people aged 15 and above. Wave 75.1 covers a wide and heterogeneous set of topics: from environmental concerns to product counterfeit and EU rights exercise.

These surveys are conducted on behalf of the European Commission since 1973 and each wave covers a different set of questions on topics of relevance for the EU agenda. Each wave is built upon a different sample of the EU population, selected randomly.

A multi-stage random probability sampling design has been used in all recent Eurobarometer Surveys and in wave 75.1 as well. In the first stage, primary sampling units (PSU) are selected from each administrative regional unit of the country, in accordance with the nomenclature of territorial units approved by EUROSTAT (NUTS II or equivalent). PSU selection is systematic, with probability proportional to population size. Stratification occurs in accordance with the degree of urbanization of the area. In the second stage, a cluster of households is randomly selected from each sampled PSU. Further units are included using standard random route procedures. In each household, a respondent is drawn randomly, following the closest birthday rule. No more than one interview is conducted in each household.

As a general rule, the target sample size is 1000 respondents per country. There are exceptions, however. For example, since separate samples are considered for Great Britain and Northern Ireland, Eastern and Western Germany, the total samples of the United Kingdom and Germany have a relatively larger population. Conversely, smaller countries and islands - such as Luxembourg, Malta and Cyprus – intentionally have a reduced size, around 500 interviews each. The effective number of interviews per country can be seen in the second column of Table 2.

For EB-75.1, data has been collected through interviews carried out between February and March 2011. In total, 26,836 people have taken part in this survey, across all the 27 countries of the European Union. Interviews were conducted face-to-face in people's home and in the appropriate national language. Participants have been selected amongst the residents in the corresponding country but they include both national and non-national citizens.

The database provides weighting variables that correct national samples so as to bring them as close as possible to known national population distributions. Population data are taken from national Survey Research Institutes and/or from EUROSTAT. Weights are calculated using intercellular and marginal weighting techniques. We use these weights throughout the whole analysis to follow.

7.1 The outcome variable

In a specific question, respondents have been asked to state whether they would consider working abroad anywhere in the EU. Answers were constrained to four alternatives: (1), "Yes" (2) "No, because you are not interested"; (3) "No, because there are too many obstacles"; and (4) "Don't know". We have used these answers to construct a dummy variable that takes a value of one in case of the "Yes" and zero

in case of "No". This binary variable is the outcome variable (*Y*). Since *Y* records the share of people interested in moving abroad for professional opportunities, we refer to it as the "propensity variable". [10]

Table 2. EB-75.1 Full-data sample: a summary

	Total surveyed	People who would		Transfer		
		consider moving	not consider moving	Yes	Easy	Difficult
Austria	1,030	15%	82%	28%	11%	17%
Belgium	1,025	22%	76%	35%	11%	23%
Bulgaria	1,001	16%	81%	1%	0%	1%
Cyprus	500	20%	78%	12%	5%	6%
Czech Republic	1,014	12%	87%	34%	6%	29%
Denmark	1,013	34%	65%	6%	4%	3%
Estonia	1,003	38%	60%	15%	6%	9%
Finland	1,001	36%	61%	18%	10%	8%
France	1,035	18%	77%	21%	7%	14%
Germany	1,622	26%	68%	14%	6%	8%
Greece	1,000	25%	74%	12%	4%	9%
Hungary	1,029	24%	74%	21%	7%	14%
Ireland	1,007	34%	63%	12%	8%	5%
Italy	1,027	21%	73%	22%	9%	13%
Latvia	1,014	41%	57%	9%	3%	6%
Lituania	1,029	30%	66%	23%	7%	15%
Luxembourg	503	20%	76%	33%	20%	13%
Malta	500	16%	81%	9%	3%	6%
Netherlands	1,012	27%	70%	11%	4%	7%
Poland	1,000	22%	75%	28%	10%	17%
Portugal	1,010	16%	79%	22%	8%	14%
Romania	1,053	22%	71%	12%	3%	10%
Slovakia	1,040	25%	73%	43%	8%	35%
Slovenia	1,018	29%	68%	8%	5%	3%
Spain	1,004	31%	66%	26%	10%	16%
Sweden	1,024	65%	33%	11%	6%	5%
UK	1,322	30%	67%	6%	3%	3%
Total	*26,836*	*27%*	*70%*	*18%*	*7%*	*11%*

Notes: Country abbreviations are as follows: AT=Austria; BE=Belgium; BG=Bulgaria; CY=Cyprus; CZ=the Czech Republic; DK=Denmark; EE=Estonia; FI=Finland; FR=France; DE=Germany; EL=Greece; HU=Hungary; IE=Ireland; IT=Italy; LV=Latvia; LT=Lithuania; LU=Luxembourg; MT=Malta; NL=the Netherlands; PL=Poland; PT=Portugal; RO=Romania; SK=Slovakia; SI=Slovenia; ES=Spain; SE=Sweden; UK=United Kingdom.

[10] This choice has been motivated by several reasons. First of all, it was more convenient for our analysis to deal with a simple dummy variable in the form of a "yes/no" answer, because our main interest lies in the underlying individual probabilities of moving or not moving. Secondly, the structure of the original question is neither empirically useful nor adequate: categories are not equally spaced and the difference between answer No. 2 and No. 3 is not clear-cut. In addition, the survey does not investigate which specific barrier(s) are intended for an answer falling in No. 3, so there is practically little interest in keeping this answer as a separate category.

Source: Own calculations based on EB-75.1

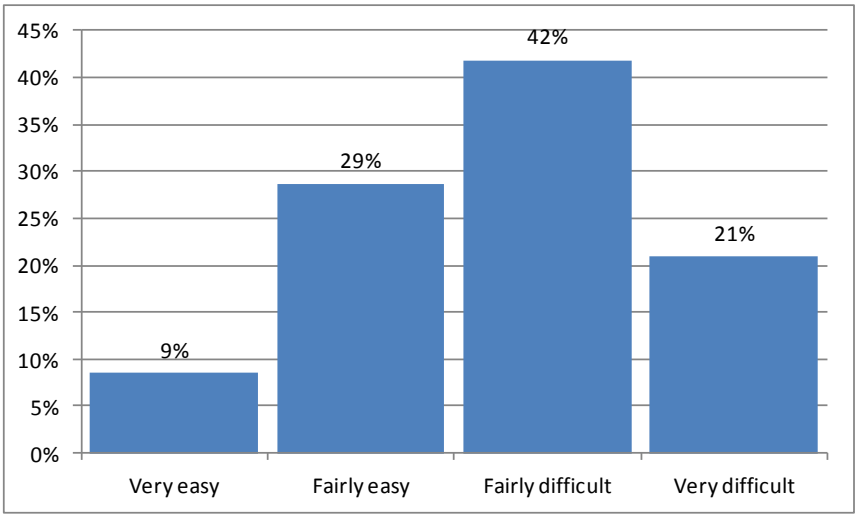
The magnitude of mobility intention across European countries varies sensibly. It is possible to spot groups of countries where propensity is relatively higher with respect to others such as in Sweden, Finland, the Baltic countries and Ireland. The propensity is relatively low in Austria, Bulgaria and the Czech Republic.

It must be stressed that the main disadvantage of this module lies in its omission of some important aspects in respondent's intentions. Namely, the survey does not consider the time at which the mobility intentions should realise, nor the country to move to, nor the expected duration of the stay abroad.

7.2 The treatment indicator

An essential question for the analysis presented in this paper has been included in EB-75.1. The survey asked people having experienced social benefit transfer(s) from or to a country of the EU to state their opinion about the easiness of such mechanism. Answers were sorted into four categories. Since the question was conditional on experiencing benefit transfers, not the whole sample population was able to respond. In total, 4,858 people[11] (18,2% of the total sample) answered the question. Matching these responses with those to mobility interests, it is possible to isolate a sample of 4,727 individuals who answered both questions in a valuable way. Figure 9**Error! Reference source not found.** below shows the distribution of this sample according to the four alternatives of the transfer question.

Figure 9. Distribution of those with previous experience of Social security transfer



Source: Own calculations based on EB-75.1

The majority of people (42% or 1,977 units) found the transfer mechanism "Fairly difficult" and a total of 2,968 people (62.8% of the responding population) experienced difficulties in transferring social security benefits. In contrast 1,759 individuals, the remaining 38%, had fairly or very easy experiences. For sake of convenience, we have generated two wide sets: one grouping people who on average gave an "easy" evaluation of the transfer; the other grouping all "difficult" experiences. In this way, the treatment indicator (*S*) - applied to the whole population - is derived from this survey question, and it is a three-level categorical variable, dividing people among those who had none, easy or difficult transfer experiences.

[11] Excluding "Don't know" answers.

Concerning the geographical distribution people (easy and difficult) who experienced such transfers, responses vary remarkably. Residents in Ireland, Slovenia, Luxembourg, the UK and Denmark have experienced on average the easiest transfers. In the Czech Republic, Slovakia, Romania and Lithuania the proportion of difficult transfers is much higher. Positive and negative experiences are much balanced in Cyprus, Germany, Finland and Sweden. (See Figure 10 below)

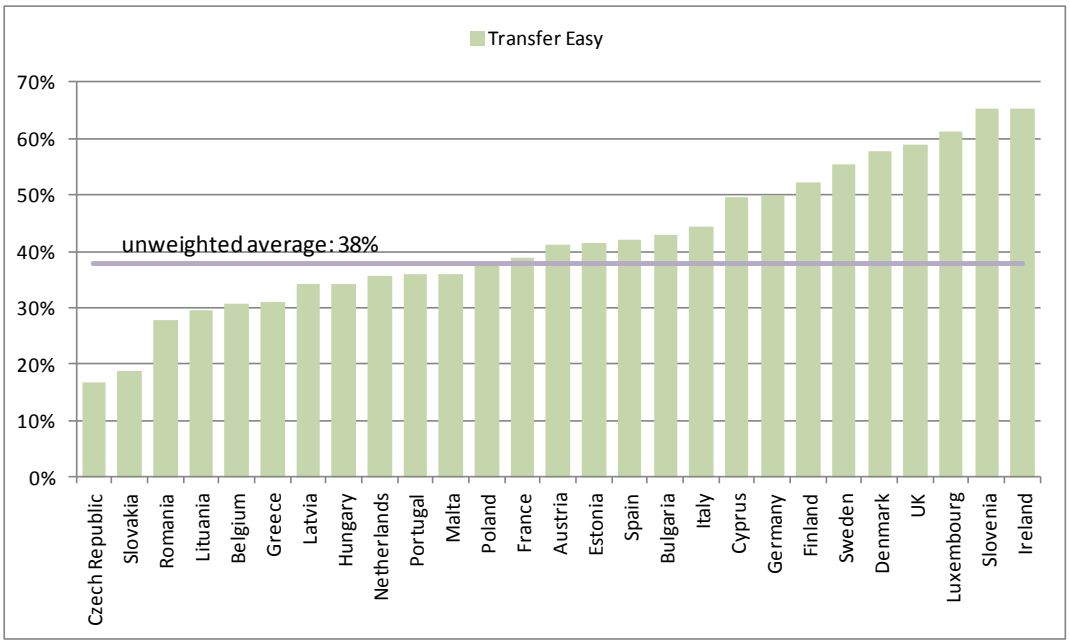
It also necessary to highlight that the survey question on transferability of social security does not explicit which social benefits were the objects of the transfer, which countries were involved or what difficulty was exactly encountered. Because of such omission, some assumptions have been necessary.

First of all, the question refers solely to the "transfer" of social benefits. It is well known among experts that benefit transferability is a different concept from the one of "portability" of the same rights. Indeed, transferability involves the pure transfer of assets - representing acquired social entitlements - from one scheme to another and the recognition of vested or vesting rights is neither automatic nor guaranteed by law.

Because of the general target of the survey and the lack further specification, the two concepts may have been confounded by respondents, so that cases of portability and of transferability coexist in the data. This assumption is also supported by the evidence of a fairly high frequency of reported transfers in the data: almost 20% of the population. In practice, benefit portability occurs more frequently than transferability, especially across EU countries and for the cross-national transfer of public services. For this reason, making no practical distinction between portability and transferability in the context of this analysis might neither alter the analysis' results nor misrepresent the implications.

Second, the generic formulation of the survey's question does not allow to discriminate which social benefits/services lied behind responses. It would have been of great interest to know which social benefits were more "difficult" to transfer, which benefits are requested by mobile people, how demands differ across age groups, etc. But all this is not possible with the data at hand. Because of this, no strong theory can be advanced neither about the nature and origin of the transferred benefits, nor about the complexities the transfer featured.

Figure 10. Perceived easiness of social security transfers



Source: Own calculations based on EB-75.1 (2011).

7.3 The Sample

The sample has been built using some key demographic characteristics. The age range has been defined between 25 and 55 years of age. This solution allows to consider a sufficiently mature share of the population, to exclude students, pensioners and people with an age close to normal retirement age. Limiting the age of the individual to 55 allows indeed excluding people close to the end of their employment life and for which willingness to move job now would be improbable, regardless of transferability experiences. Similarly, the exclusion of students and very young individuals increases the chances of including people who might have already vested or vesting social benefits, whose fate could be of relevance when weighting up mobility opportunities.[12]

In summary, the sample considered in the analysis consists of people aged between 25 and 55 who have never, once or more times in their life experienced social portability/transfers to or from a Member State of the EU. The majority of people in the sample are currently in employment but there are also unemployed people. In terms of the educational background, the majority of people (51%) report having some tertiary education, while people with no formal education are less than 1%.

After sample redefinition, there are 10,899 individuals in the sample. 2,347 (21.5%) of them experienced benefit portability, while the remaining 8,552 never did. For convenience, we refer to the group with no portability experience (the *non-treated* group) with the letter *A*. *B* is the group reporting easy transfers, while *C* is the group of individuals who suffered difficulty. The treatment indicator can also be referred to as the *portability* variable. A cross-tabulation of the propensity to mobility variable and the three-level treatment indicator is provided in the following Table 3.

Table 3. Mobility and treatment group

Row percentages on each second line

	Would consider to move abroad		Total
	No	Yes	
(A) Never transferred	5850	2702	8552
Previous experience of transfer of social security	1553	794	2347
(B) Easy transfer	492 (32%)	356 (45%)	
(C) Difficult transfer	1061 (68%)	438 (55%)	

Note: Sample size is 10,899 units

Source: Authors' calculations based on EB-75.1

A number of explanatory variable have been included in the estimated models as individual-specific information is extensively provided in EB-75.1: age, gender, occupation, years of education, marital status, household composition, wealth[13] and social status. Past working experiences abroad and foreign

12 Further selection of the sample has allowed to exclude students and retired people even within the selected age range. In addition, we have also excluded workers who declared they are currently residing abroad.

13 The wealth variable - a dummy for "wealthy" persons - has been estimated on the basis of responses given to survey question D60: "During the last twelve months, would you say you had difficulties to pay your bills at the end of the month?" The dummy assigns a value of zero if the answer was "Most of the times" or "From time to time", and one if it was "Almost never\never". We acknowledge the fact that a subjective

citizenship[14] are also included as dummy variables. We expect all of these variables play a role in both the probability of experiencing benefit transfers and the propensity to cross-border mobility.

To our knowledge, however, none of these covariates has emerged to be a perfect predictor of either the treatment indicator or the propensity variable[15]. Matching appears a convenient solution in this context.

EB-75.1 also surveys the major perceived individual obstacles to labour mobility as it has been discussed above.. The variables ares included in the list of covariates for the matching, in order to have people with similar concerns matched together. Aware that the inclusion of such variable could severely bias the estimates, we conduct a series of pre- and post-matching tests to ascertain whether the variable is dependent on the treatment indicators. All tests reject firmly this hypothesis.

Finally, we include country dummies to account for cultural, socio-economic and political differences across the countries of residency of each individual. Table 4 below gives an overview of the independent variables of the model.

Table 4. Descriptive statistics of the sample

Variable	Mean	Std. Dev.	Min	Max	N	Details
Age	3.110	.0858	2	4	10,899	categories: 25-34, 35-44, 45-55
Gender	0.544	0.498	0	1	10,899	Dummy: 0 = male, 1 = female.
Marital status	1.517	.0723	1	4	10,808	categories: married, single, separated/ divorced, widow.
Children	0.606	0.488	0	1	10,808	Dummy: 0 = no, 1 = yes.
Occupation	3.482	1.474	1	6	10,899	categories: self-employed, manager, white collar, manual worker, house persons, unemployed.
Years in Education	2.275	.0637	1	4	10,805	categories: 15-, 16-19, 20+, no full-time education.
Area of living	1.948	0.793	1	3	10,890	categories: small, medium, large area.
Wealthy	0.512	0.499	0	1	10,899	Dummy: 0 = no, 1 = yes.
Social class	2.025	0.714	1	3	10,569	categories: low, middle, high class.
Foreign	0.0166	0.127	0	1	10,898	Dummy: 0 = no, 1 = yes.
Moved in Past	0.106	0.308	0	1	10,882	Dummy: 0 = no, 1 = yes.

interpretation of the alternatives might be a source of deviation from the objective situation, but we believe that, having assigned a code 1 only to the third alternative, the risk that a wealthy status is wrongly assigned is reduced to the minimum. Then, to reduce the bias possibly caused by unavoidable uncertainty, the practical and analytical role of this variable in the causal model is deliberately maintained little.

[14] This group is created on the basis of declared nationality/ies. National citizens but with multiple nationalities are not included in the foreign group. The data does not allow isolating a foreign-born population as well.

[15] Particular attention has been paid to test whether one or more covariates were perfect predictors (collinear) of the treatment indicator. The tests have concerned, in particular, the hypothesis that having had a past working experience abroad was a necessary (or sufficient) condition for falling into group B or C of S. Results suggest strongly that such a condition is not verified.

Obstacles to mobility abroad	4.366	3.515	1	13	10,899	Categories: (see paragraphs above)
Country dummies					10,899	A dummy for each of the 27 current EU countries

8. Results

Table A.1 in the annex presents the results of the multinomial logit model (MNL) which is used to build the propensity scores introduced in the matching procedure.[16] (See the Annex)

The benchmark matching algorithm to estimate average treatment effects is based on the Nearest Neighbour according to the Mahalanobis distance given by estimated propensity scores and past mobility experience. Matching quality was controlled by setting a caliper of 0.05 as the maximum allowed distance between treated units and matched controls.[17].

The matching involves separate estimates of α and θ (as defined above for average and conditional effects, respectively) for country clusters of EU-15 and EU-12. These are summarized in Tables 5 and 6 respectively. In each row, treatment groups are compared in pairs, the first column denoting the treatments and the relationship that is being tested, where A is the group of the non-treated, B is the group of those "treated" with easy transfers and C is the group of those treated with the difficult transfers

Estimates for EU-15

Relation	$\alpha^{m,l}$	Std.Err.	$\theta^{m,l}$	Std.Err.
B-A	0.080	0.039	0.036	0.035
A-B	-0.080	0.039	-0.084	0.043
C-A	-0.013	0.033	-0.035	0.027
A-C	0.013	0.033	0.010	0.031
B-C	0.099	0.039	0.097	0.038
C-B	-0.099	0.039	-0.101	0.040

Note: A: no transfer in the past; B= easy transfers of social security; C: difficult transfers;

Source: Authors' calculations

16 In MNL models, the error terms are assumed to be independent and distributed according to the type-1 extreme value distribution, which is also sometimes called the log Weibull distribution. The estimated variance-covariance matrix accounts for the country clustering of data (see the Annex).

17 This caliper is widely used in applied studies (Caliendo and Kopeinig, 2005). Moreovert, following the method suggested in Rosenbaum and Rubin (1985) to define a suitable caliper on the basis of propensity scores' distributions, an optimal caliper for our analysis would be between 0.02 and 0.07. Both the benchmark caliper and the sensitivity analysis presented later in the paper seem to fulfil the requisites for an accurate estimation under Rosenbaum and Rubin (1985)

Table 5. Estimates for EU-12

Relation	$\alpha^{m,l}$	Std.Err.	$\theta^{m,l}$	Std.Err.
B-A	0.014	0.038	0.022	0.044
A-B	-0.014	0.038	-0.014	0.062
C-A	-0.060	0.019	-0.041	0.027
A-C	0.060	0.019	0.064	0.045
B-C	0.054	0.034	0.097	0.046
C-B	-0.054	0.034	-0.037	0.045

Source: Authors' calculations

In general, the results point to a positive effect of easy transfers of social security benefits (group B) on the propensity to move abroad. However, the effects have different magnitude in the two country clusters considered. For the EU-15, for example, the estimates of the effect of difficult transfers vs. easy transfers (C – B) suggest that the propensity to move is twice the one observed for people belonging to the cluster of country of the EU-12. These average effects are statistically significant at 5%.

It is worth noting that the role of easy transfers seems to be more important to boost the propensity to move for people in EU-15. Moreover difficult transfers do not appear to affect incentives similarly in the two country-clusters.

These results stem from the analysis of both population-average (α) and conditional (θ) effects. For example, for people in the EU-15 the estimates suggest that the reduction in the propensity to move deriving from not having had easy transfers is higher than the increase in the propensity to move deriving from not having experienced difficult transfers. For people in EU-12, in contrast, results are less clear-cut but the impact on the propensity for future mobility of negative experiences of transfers seem larger than the one estimated for easy experiences.

The structural differences across EU-15 and EU-12 groups are likely to be crucial for such results and can be driven by either cultural, political, economic factors or by different beliefs on and knowledge of the EU system in these countries.

Overall, the estimates suggest that, on the one hand, experiences of easy transfers are likely to influence positively the propensity to mobility abroad, especially in EU-15 countries. On the other, difficulty experienced with benefit portability may affect people's attitudes to future mobility.

9. Investigating the quality and robustness of the results

9.1 Matching Quality

A good balance in the distribution of the independent variables in both the treatment and control group is a key requisite to construct an appropriate matching sample. This task is performed via a matching quality analysis.

To do so one estimates the reduction that matching realises in the mean absolute standardized bias, i.e. the percentage difference of the sample means in the treated and non-treated matched samples, calculated as a percentage of the square root of the average of the sample variances in the treated and non-treated groups (Rosenbaum and Rubin, 1985). The standardized bias summarises the degree of covariate imbalance across samples.

A good match would entail a low standardised bias between matched units, thus implying that the samples resemble each other in terms of covariate distribution. Though there is no fixed rule, most research suggests that a successful match occurs when the standardised bias after matching is smaller than 20 and/or when the reduction in the bias due to matching is of at least 3-5%.

In comparing the control group (A) with all the treated units (i.e. the groups B and C), we observe that the samples were already well balanced before matching, with an average standardised bias of 10.6 for EU-15 countries and of 8.5 for the EU-12 group. With benchmark matching, these biases lower to 4.6 and 5.3, respectively, accounting to a percentage reduction of 56.6 and 37.6 points. Both reductions are statistically significant at the 0.001% level.

Using a narrower caliper (0.01), the biases would reduce even more: up to 3.8 (-64%) for EU-15 and to 4.9 (-43%) for EU-12.

When the matching quality is investigated using all the three groups, the percentage bias reduction under the benchmark matching ranges from a minimum of 22% (in comparing A and C for the EU-12) to a maximum of 58% (while comparing A and B for EU-15 countries). For example, comparing A and B, the mean bias declines from 12.2 to 6.3 for EU-15 countries and from 17.1 to 10.6 for the EU-12. Again, all these reductions are statistically significant and the post-matching standardised biases are all between 10.6 (A vs. B for EU-12) and 4.7 (A vs. C in EU-15).

In terms of single covariates, the highest reduction in the imbalance – up to 99% in mean standardised bias - is always achieved for the variables *Moved in Past* and *Foreign* in each pair-wise comparison. This is not surprising, since the matching metric has explicitly sought high matches with respect to the *Moved in Past* variable. The bias reduction in *Moved in Past* imbalance ranges between 94.4 and 98.4 for the EU-15 under the benchmark matching model. For EU-12 countries, reductions are slightly lower, around 88. [18]

9.2 Sensitivity analysis

A number of tests have been carried out to check for robustness of the estimated effects.

A first battery of test searches to investigate whether the use of alternative matching algorithms alters significantly the estimates. The focus is in particular on the variability of the sign of the average effects under different specifications of the matching algorithm. Indeed, absolute values are more likely to be influenced by differences in the specification method, but sign consistency can be assumed as fairly good evidence that a causal relation may exist between the treatment and the outcome value.

The matching assumes a set caliper of 0.01 instead of the benchmark 0.05. A narrower caliper would allow a more precise matching estimate but increases the risk of unmatched units.

[18] The highest reduction of 99 pp was achieved in the match between A and the joint group (B +C) for EU-15 countries and with a caliper of 0.01. When such high match is achieved with respect to a single variable, it is likely that the bias reduction in other variables is traded off. However, our model shows good reductions also with respect to other relevant variables, namely up to 91% bias reduction after matching for gender imbalances, 97% for age and 86% for the obstacle variable.

Second, we consider an Epanechnikov kernel formula with a limit bandwidth of 0.05. The kernel estimator is potentially more efficient than the simple matching based on the caliper, but it gives more weight to less comparable units than the matching with a narrow caliper. The estimated average effects under these different matching algorithms are presented in table 7 and 8.

In the first column of each table the original estimates with the benchmark matching method are proposed, for comparison. Since the average treatment effects (α) are symmetric throughout, we only report one estimate for each pair comparison. In the last column of the tables, we also report the average treatment effects under the assumption of exogeneity of regressors. These exogenous treatment effect originate from simple pair-wise mean differences in the average propensity to mobility across groups.

The exogenous estimates may help to investigate the hypothesis of self-selection into treatment. This would occur if the difference between the endogenous and the exogenous estimates is significant, leading to significant different average treatment effect estimates. In particular, sign variations and/or differences in the relative strength of the effects across compared groups would suggest that the model is weak with respect to the effects it aims to test. The results suggest that the endogenous effects, though being smaller than the exogenous ones, are aligned with the latter in terms of both the signs and the relative magnitude across compared groups.

The tables show that, with one only exception, all estimates have the same sign for each pairwise comparison. Moreover, in most cases, the absolute values of the estimates themselves are very close or coincide under different matching techniques. In particular, results are very close if we compare the kernel and the benchmark model. But a narrow caliper also produces very similar estimates.

The sensitivity analysis thus suggests that changing either the matching algorithms or the caliper does not impact on the significance of the findings based on the benchmark model. The majority of the estimated coefficients remain significant even under different specifications.

Table 6. Robustness checks , for $\theta^{m,l}$

EU-15

Relation	caliper 0.05	caliper 0.01	Kernel 0.05
B-A	0.036	0.033	0.056
	(0.035)	*(0.037)*	*(0.034)*
A-B	-0.084	-0.098	-0.08
	(0.043)	*(0.46)*	*(0.036)*
C-A	-0.035	-0.025	-0.035
	(0.027)	*(0.028)*	*(0.027)*
A-C	0.010	0.001	0.010
	(0.031)	*(0.032)*	*(0.026)*
B-C	0.097	0.085	0.098
	(0.038)	*(0.040)*	*(0.032)*
C-B	-0.101	-0.105	-0.098
	(0.040)	*(0.042)*	*(0.039)*

Standard Errors in parentheses

EU-12

Relation	caliper 0.05	caliper 0.01	Kernel 0.05
B-A	0.022	-0.004	0.010
	(0.044)	*(0.045)*	*(0.043)*
A-B	-0.014	-0.028	-0.017
	(0.062)	*(0.54)*	*(0.059)*
C-A	-0.041	-0.037	-0.049
	(0.027)	*(0.028)*	*(0.027)*
A-C	0.064	0.063	0.065
	(0.045)	*(0.046)*	*(0.029)*
B-C	0.097	0.063	0.107
	(0.046)	*(0.48)*	*(0.032)*
C-B	-0.037	-0.031	-0.034
	(0.045)	*(0.047)*	*(0.042)*

Standard Errors in parentheses

Source: Own computations

Table 7. Robustness checks , for $\alpha^{m,l}$

EU-15

Relation	caliper 0.05	caliper 0.01	Kernel 0.05	Exogenous
B-A	0.080	0.092	0.077	0.114
	(0.039)	*(0.042)*	*(0.039)*	*(0.022)*
C-A	-0.013	-0.004	-0.013	-0.024
	(0.033)	*(0.036)*	*(0.019)*	*(0.018)*
C-B	-0.099	-0.097	-0.098	-0.139
	(0.039)	*(0.029)*	*(0.030)*	*(0.027)*

Standard Errors in parentheses

EU- 12

Relation	caliper 0.05	caliper 0.01	Kernel 0.05	Exogenous
B-A	0.014	0.025	0.017	0.109
	(0.038)	*(0.027)*	*(0.044)*	*(0.028)*
C-A	-0.060	-0.059	-0.062	-0.022
	(0.019)	*(0.020)*	*(0.025)*	*(0.018)*
C-B	-0.054	-0.041	-0.055	-0.131
	(0.034)	*(0.033)*	*(0.031)*	*(0.031)*

Standard Errors in parentheses

Source: Own calculations based on EB-75.1 (2011)

A second battery of test has aimed to check whether the results of our analysis are biased because of failure of the *unconfoundedness* assumption (Rosenbaum and Rubin, 1983). Also known as "Conditional mean-independence", this assumption is intended to rule out the possibility that individuals self-select into treatment on the basis of unobservable factors.

Unconfoundedness is a fairly strong assumption and it is fundamentally untestable. Because perfect randomisation of treatment assignment is hardly verified in observational data, self-selection into treatment is always a crucial issue.

In general, matching is able to balance somehow also as regards unobserved characteristics, especially those correlated with the *X*. Consequently, matching is also able to reduce the bias due to treatment selection on unobservables. However, some degree of endogeneity of the treatment is unavoidable in non-random empirical data.

To shed light on the robustness of estimates as regards unobserved relevant variables we have therefore applied the method based on Rosenbaum bounds (Rosenbaum, 2002), as developed by Becker and Caliendro (1997). This method does not directly test the unconfoundedness assumption, but it provides evidence on the degree to which estimated results can be affected by an unobserved parameter. The results

indicate that estimated effects are statistically significant under the hypothesis of no hidden bias and are hence valid. The highest significance (at the 0.05 level) is attached to the average treatment effects between groups B and C in both the EU-15 and EU-12. For the EU-15, the same degree of accuracy concerns treatment effects between A and C. Overall, a higher robustness is evident for estimates within the EU-15 group.

10. Conclusion

This paper aimed to provide empirical evidence on the relationship between the propensity to cross-border mobility and the mechanisms for the international portability of social rights. In particular, the paper investigated whether experiences of past portability and their perceived easiness influence people's likelihood to work abroad.

For this purpose, the paper has used recent survey data included in the Eurobarometer survey, wave 75.1, of 2011.

First, the paper investigates the perceived barriers to mobility as they appear in the Eurobarometer survey. Further, it discusses the different sources of information used by the respondents of the Eurobarometer survey to learn about prospects abroad.

Second, adopting a matching approach with multiple treatments and using propensity scores as balancing factors, the paper estimates average treatment effects associated with different portability outcomes. Estimation have been run separately for two clusters of country: the older EU-15 and the newer EU-12.

The findings of the analysis help to shed some light on the ways policies to improve mobility via better information about workers' opportunities, obligations and rights while abroad, are producing their effects.

People who experienced mobility might have come to appreciate the quality of the information and assistance service provided by official EU and national governmental institutions, so they rely much more on such sources today than on informal (and discretional) sources. On the other hand, to encourage mobility in the immobile share of the population it is important that such information channel are better advertised and promoted. In this way, not only mobility can be better encouraged, monitored and assisted, but also it is possible to destroy false myths and prejudices about moving abroad which spread with informal networks.

Estimation results suggest that smooth experiences with portability may boost the propensity to move abroad for professional reasons, while "negative" experiences are likely to have opposite effects. Though having the same sign, the magnitude of these effects varies across EU-15 and EU-12 groups. They are larger for people in the EU-15 than for people in EU-12. The structural differences across EU-15 and EU-12 groups are likely to be crucial for such results and can be driven by either cultural, political, economic factors or by different beliefs on and knowledge of the EU system in these countries.

Despite the limitations discussed above, the data used in this paper contain information which may help to better understand the (perceived) obstacles to mobility. Given the topicality of the issue further research is needed to improve awareness of the implications of policy to improve professional mobility across countries of the European Union.

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ANNEX

This annex presents the results from the Multinomial Logit Model (Table A.1) and discusses conditions required in the pre-matching stage, such as the choice of a suitable multinomial model for propensity score estimation and major concerns regarding specific variables to be included in the model.

The Multinomial Logit model and the IIA assumption

Differently from the binary setting, the choice between probit- and logit-based models is not indifferent in multivariate experiments (Hahn and Soyer, 2005). While it is well-known that the multinomial logit model requires stronger assumptions, the multinomial probit model is computationally more burdensome, making the latter less attractive to use when data is quite large (Caliendro and Kopeinig, 2005).

A major issue with the MNL model arises from the "independence from irrelevant alternatives" (IIA) assumption. Meeting the IIA requires that the odds ratio between two alternatives is independent of other alternative(s) included in the model. The probit model, in contrast, does not require such a strong assumption.

To properly apply the MNL model, we have firstly tested for IIA. Though the test suggests that we should not be concerned about the IIA in our analysis, it is important to find arguments in support of this conclusion from a theoretical point of view as well.

Again, this appears to be possible. The IIA states that the inclusion (exclusion) of an option in the choice model should not alter the relative ordering among other alternatives. This is equivalent to saying that the inclusion (exclusion) of a new option for the choice does not affect the individual in his/her decision. In empirical data, this condition is hardly met, for obvious behavioural rules: individual's decisions – and preferences – are the result of a choice process that generally takes into consideration the *full* set of options at disposal. Only in the case of a *strongly* preferred option, the availability of alternatives can become irrelevant.

In our model, the situation is different from a standard choice model; the "alternatives" we consider - A, B and C - are not akin to choice options. Since each group/alternative originates from a different outcome of the experience in benefit transferability, individuals are not exactly called to *choose* among alternative groups but they find themselves in one of them on the basis of an external and often automatic mechanism.

For this reason, the IIA can be fully credible in our model, even with theoretical arguments: the inclusion (exclusion) of an alternative cannot alter the (ex-ante) positioning of individuals, because only one group corresponds to the person's background. Moreover, the design of clearly distinct, non-overlapping groups improves the strength of the IIA in the model, thus preventing any form of possible re-allocations of individuals.

In conclusion, both strong mathematical and theoretical arguments allow applying safely and correctly the MNL model to our sample for the estimation of propensity scores.

The estimates from the MNL are presented in table A.1 below.

Table A.1: Estimates from the MNL model

Base outcome: Group A		Group B		Group C	
Variables		**Coef.**	**Std.Err.**	**Coef.**	**Std.Err.**
Age	25-34	(base)			
	35-44	0.112	0.092	-0.085	0.099
	45-55	-0.13	0.172	-0.152	0.149
Gender		-0.161	0.091	-0.116	0.089
Marital stat	Married	(base)			
	Single	-0.038	0.140	-0.192	0.126
	Divorced/separ	-0.437	0.228	-0.214	0.162
	Widow	-0.319	0.595	-0.408	0.362
Children		0.235 **	0.084	-0.006	0.115
Occupation	Self-employed	(base)			
	Managers	0.309	0.329	0.119	0.204
	White collars	0.403 *	0.193	0.160	0.190
	Manual workers	0.208	0.331	0.200	0.255
	Hosue persons	-0.127	0.292	0.445	0.255
	Unemployed	-0.091	0.179	0.303	0.170
Education	-15 yrs	(base)			
	16-19 yrs	0.389	0.368	-0.105	0.118
	20+ yrs	0.500	0.311	0.046	0.268
	No fulltime	-11.63 ***	0.758	1.444 ***	0.524
Area living	Small	(base)			
	Medium	0.034	0.214	0.205	0.155
	City	-0.229	0.224	0.065	0.229
Wealthy		-0.162	0.168	-0.233	0.178
Social class	Low	(base)			
	Middle	0.222	0.150	0.216 *	0.096
	Upper	0.470	0.251	0.528 **	0.178
Foreign		1.182 *	0.496	1.920 ***	0.378
Moved in Past		2.150 ***	0.171	1.152 ***	0.142
Obstacles	Language	(base)			
	Culture	1.096 ***	0.202	0.793 ***	0.195
	Bureaucracy	0.360	0.268	0.540 *	0.256
	Family	-0.005	0.153	-0.122	0.142
	Tax	0.826 *	0.383	1.362 **	0.519
	Affordability	0.432	0.452	0.581 *	0.251
	Qualifications	0.152	0.432	0.209	0.470
	Info	0.495	0.471	0.052	0.140
	Find Job	0.735	0.402	0.409	0.271
	Soc.Security	0.280	0.515	0.021	0.218
	Other	0.327	0.342	-0.037	0.278
	None	0.857 ***	0.162	0.335	0.253
	Don't Know	0.146	0.516	0.632 *	0.259

2 The choice of covariates for the matching

A fundamental issue in matching models is the choice of an adequate set of covariates X to match on. There is often a trade-off to consider in this decision. Omission of relevant covariates can seriously increase the risk of biased estimated (Heckman, Ichimura and Todd, 1997; Rubin and Thomas, 1996).

On the other hand, too large models cause the "curse of dimensionality" (Rubin and Rosenbaum, 1983), which may render the estimation computationally burdensome and the matching inefficient.

The propensity score estimation strategy has the advantage to lessen the difficulty of matching when there are many covariates, but it should not be seen as a shortcut to large models. To solve the dilemma, the general rule suggests including variables that are likely to influence simultaneously the participation and the outcome variable. However, those variables likely to be affected by the treatment status should be

avoided, as they often cause the unconfoundedness condition to fail. The choice of covariates suggested by economic theory, past empirical findings and statistical significance are also frequent approaches adopted in the empirical literature.

Correlation between the treatment status and past working experiences abroad.

A major concern of the analysis presented in this paper was about the assumption of the link between past working experiences and the treatment status. Past professional experiences abroad are likely to heavily affect the propensity to future mobility, but they are often also a necessary condition for asking benefit transfers.

It is thus rational to assume that people who request the transfer of social benefit transfers have worked abroad for a certain period and that such period is sufficiently long to vest benefits that could be worth or important to transfer once moved in another country.

The data used in the analysis suggest however that there there is a considerable number of people (1,788) who have never worked abroad in their past but still have asked for social benefit transfers (Table A.2).

Table A.2: Past Mobility and Transfer experience

	Worked abroad in Past		
Treatment	**No**	**Yes**	**Total**
Never transferred	7,933	611	8,544
Transferred Soc. benefits	1,788	550	2,338
Total	9,721	1,161	10,882

Note: Data considers the restricted sample used in the empirical analysis.

Source: Own calculations based on EB-75.1.

The most probable explanation of this finding is the way respondents have interpreted the related survey questions. For example, the question about past mobility only concerned job mobility: it is perfectly possible that some respondents have lived abroad in their past without working thereof. Their stay abroad and/or the nature of their (non-working) activity might have been sufficient to vest social rights or to be eligible to receive social benefits.

Indeed, depending on the specific type of welfare system, public support can be received also on the basis of residency criteria. In addition, the question on the transfer may have been interpreted with respect to the whole household rather than to the single individual. The person in the household entitled to the transfer of social security transfer might have thereby answered the question. Evidence in favour of such hypothesis comes again from the high share of posiitve responses to the transfer question and from the fact

that there is a considerable number of young respondents among them as well. It is hence probable that family benefits have been included in the transfer question.

Correlation between the treatment status and the "obstacles" variable.

As mentioned in the paper, the inclusion of the variable collecting opinions on individual concerns about mobility abroad – the "obstacles" variable – can alter the robustness of matching estimates, as this variable is likely to be influenced by treatment status (i.e. having had previous experience of transfers and not having had such experience).

For this reason, we have tested the hypothesis of a correlation or links between the two. Looking at the distribution of the variable about the perceived obstacle to mobility across the group of people with transfer experiences (B + C) and of those with no transfers (group A), there does is no evidence of systematic differences.

Among the categories of the obstacles variable, one which could be mostly affected by treatment status concerns social security standards. However, the share of respondents saying that social security is a source of concern for mobility amounts to 2% among both the treated and the non-treated. This suggests that the obstacle-variable is not likely to be a source of bias in the matching estimation. (see Table A.3 and Figure A.1).

Table A.3: Mean of the obstacle variable across treatment groups

	Mean	Std. Err.	[95% Conf. Interval]	
No Tranfers	4.352081	0.0378991	4.277792	4.42637
Transferred	4.420537	0.0733476	4.276762	4.564312

Figure A.1: Distribution of Responses to the "Obstacles" question according to treatment status