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Occupation-Education Mismatch of Immigrant Workers in Europe: Context and Policies

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NON-TECHNICAL SUMMARY

Immigrants' labor market outcomes are by far the key indicators of their success and integration in the receiving societies. However, the full use of immigrants' potential is rarely the case, as the mismatch between immigrants' skills, qualifications and jobs remains a salient feature of immigrants' labor outcomes in destination countries. This mismatch often translates into persisting wage penalties, aggravating inequalities between immigrants and native born.

This paper provides Europe-wide evidence on the occupation-qualification mismatch of immigrants as compared to the native born. Using European Social Survey for the years 2002-2009, and covering 22 destination and 76 origin countries, it provides three main results. First, we show that immigrants' mismatch relative to native born is important and pervasive across all countries: immigrants are more likely to be both under- and overeducated in the jobs that they perform compared to the native born. These outcomes are consistent with the fact that immigrants may have difficulties transferring their skills and experience across countries, as well as with the fact that, among individuals with little schooling, only most able and talented individuals move.

Second, the labor market outcomes of immigrants do converge to those of the native born, as the years of professional experience increase. Most of this convergence is due to a better match of those immigrants who perform jobs for which they are overeducated upon arrival.

Third, we also show that home country characteristics, such as the degree of income inequality and the quality of human capital, mostly affect undereducation of immigrants. In contrast, overeducation is determined to a much greater extent by destination-country economic conditions and labor market institutions. Notably, immigrants are less likely than native born to experience upward occupational mobility in rigid labor market environments. Immigrants are also responsive to immigrant-specific policies adopted in destination countries, such as those allowing better access to jobs, providing specific targeted measures of labor market integration, and fighting discrimination. These results are rather remarkable in the light of the debates regarding common migration policies of European countries. We show that some "best practice" countries can achieve a considerably fuller use of immigrants' potential. If this is the general objective of other countries, too, our results suggest that there is room for improving immigrant outcomes through policies.

ABSTRACT

This paper analyses occupational matching of immigrants from over seventy countries of origin to 22 European countries. Using European Social Survey for the years 2002-2009 and the multinomial logit framework, we show that, relative to the native born, immigrants are more likely to be both under- and overeducated for the jobs that they perform. This mismatch is due to individual-specific factors, such as labor market experience and its transferability. Immigrants' outcomes converge to those of the native born with the years of labor market experience. The mismatch is also due to immigrants' selection and sorting across countries. Notably, we show that origin countries' degree of income inequality and the quality of human capital, by affecting selection, mostly matter for undereducation of immigrants. Overeducation is determined to a greater extent by destination-country economic conditions and labor market institutions. Immigrant-specific policies in destination countries, such as those improving eligibility and fighting discrimination, also positively affect overall matching, while policies promoting integration decrease undereducation.

L'INADÉQUATION ENTRE COMPÉTENCES ET EMPLOIS DES IMMIGRÉS EN EUROPE :
CONTEXTE ET POLITIQUES

RÉSUMÉ NON TECHNIQUE

Les parcours professionnels des immigrés sont parmi les indicateurs clés de leur réussite et de leur intégration aux sociétés d'accueil. Leur potentiel est rarement utilisé pleinement, et l'inadéquation entre leurs compétences et les emplois qu'ils occupent reste une caractéristique marquante. Ce décalage se traduit souvent par la persistance de sous-rémunérations qui aggravent les inégalités entre immigrés et autochtones.

Notre analyse porte sur l'inadéquation entre niveaux de qualification et emplois qui caractérise la situation des immigrés en Europe relativement à celle des autochtones. En utilisant l'Enquête Sociale Européenne qui couvre 22 pays européens d'accueil et 76 pays d'origine des immigrés pour les années 2002-2009, nous dégageons trois résultats principaux. Tout d'abord, nous montrons que l'inadéquation entre qualifications et emplois s'observe dans tous les pays : les immigrants sont, davantage que les autochtones, susceptibles d'être sous- ou surqualifiés pour les emplois qu'ils occupent. Ce résultat est cohérent avec le fait que, parmi les individus peu scolarisés, seuls émigrent les plus talentueux qui auront la capacité d'occuper des emplois requérant une qualification supérieure à leur niveau d'études ; de leur côté, les plus formés peuvent avoir des difficultés à faire reconnaître leurs compétences et l'expérience acquise dans leurs pays d'origine de sorte qu'ils ne peuvent accéder qu'à des emplois pour lesquels ils sont sur-éduqués. Cependant, et c'est notre deuxième résultat, la situation des immigrés sur le marché du travail converge vers celle des autochtones au fil des années et de l'expérience professionnelle ; cette convergence provient essentiellement des immigrés surqualifiés à leur arrivée.

Troisièmement, nous montrons que ce sont essentiellement les caractéristiques du pays d'origine, telles que le degré d'inégalité des revenus et la qualité du capital humain, qui expliquent la sous-qualification des immigrés par rapport à leurs emplois dans les pays d'accueil. En revanche, la surqualification est surtout déterminée par les conditions économiques et les institutions du marché du travail des pays d'accueil ; dans des environnements rigides, les immigrés sont notamment moins susceptibles que les autochtones de connaître une mobilité professionnelle ascendante. Les immigrés sont également sensibles aux politiques d'immigration adoptées dans les pays d'accueil, qu'il s'agisse des conditions d'accès à l'emploi, de mesures ciblées d'intégration au marché du travail ou de lutte contre la discrimination.

Ces résultats apportent des éclairages utiles aux débats sur les politiques migratoires qui se déroulent actuellement dans tous les pays européens. Ils suggèrent, en effet, que les pays avec de « bonnes pratiques » parviennent à une utilisation nettement plus complète du potentiel des immigrés.

RÉSUMÉ COURT

Ce document porte sur l'adéquation entre compétences et emplois des immigrés de 22 pays européens originaires de plus de 70 pays. En utilisant les données de l'Enquête Sociale Européenne pour les années 2002-2009 et un modèle de logit multinomial, nous montrons que les immigrés sont davantage que les autochtones susceptibles d'être sous- ou surqualifiés pour les emplois qu'ils exercent. Cette inadéquation s'explique en partie par des facteurs individuels, comme la capacité de transférer dans le pays d'accueil l'expérience acquise dans le pays d'origine ; les différences entre immigrants et autochtones se réduisent d'ailleurs avec les années d'expérience professionnelle. Cependant, l'inadéquation est également due aux conditions prévalant dans les pays d'origine et d'accueil. Le degré d'inégalité des revenus et la qualité du capital humain dans les pays d'origine affectent la sélection des émigrants et expliquent leur sous-éducation par rapport aux emplois qu'ils occupent dans les pays d'accueil. En revanche, la surqualification est déterminée largement par les conditions économiques et les institutions du marché du travail des pays d'accueil. Les politiques spécifiques des pays d'accueil – conditions d'accès à l'emploi, mesures ciblées d'intégration au marché du travail ou lutte contre la discrimination – affectent également l'adéquation.

Classification JEL : I21, J24, J61, F22
Mots-clefs :   Immigration, inadéquation des compétences, surqualification

OCCUPATION-EDUCATION MISMATCH OF IMMIGRANT WORKERS IN EUROPE: CONTEXT AND POLICIES[*]

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1. INTRODUCTION

Immigrants' labor market outcomes are by far the key indicators of their success and integration in the receiving societies. It is widely acknowledged that most of the immigrants are positively selected from their origin countries [Beine, Docquier, and Rapoport; 2001, 2007, 2008]. However, the full use of immigrants' potential is not always the case, as the mismatch between immigrants' skills, qualifications and jobs remains a salient feature of immigrants' labor outcomes in destination countries. If only about 13% of the native born have qualifications significantly higher than those required for their job, 22% of immigrants face overeducation in Europe, and 16% are undereducated. Over-qualification reaches up to 35% of immigrants in some countries like Great Britain, and up to 47% in Portugal[1]. This mismatch can also translate into persisting wage penalties [Chiswick and Miller, 2008], potentially aggravating inequalities between immigrants and the native born.

This paper contributes to the analysis of immigrant' labor market outcomes in two ways. First, using the European Social Survey data, we provide Europe-wide evidence on the occupation-qualification mismatch of immigrants as compared to the native born. Previous studies have mainly focused on the US or on individual European countries. Second, we analyze the factors responsible for this mismatch. Exploring differences across origin and destination countries, we organize the discussion around selection, sorting, and human capital transferability issues, with a special focus on the role of institutions and policies in destination countries.

The paper contains three main results. First, immigrants' mismatch relative to native born is important and pervasive across all countries: immigrants are more likely to be both under- and overeducated in the jobs that they perform compared to the native born. These outcomes are consistent with the notions of both poor human capital transferability among better educated immigrants, and positive selection among lower-educated immigrants.

[1] Source: authors' calculations based on the European Social Survey; see details below.

Second, controlling for country-pair specific effects, we show that the labor market outcomes of immigrants do converge to those of the native born, as the years of labor market experience increase. Most of this convergence is due to a better match of those immigrants who are overeducated upon arrival.

Third, and this is perhaps the most novel result in the literature, we report a differential impact of selection and sorting on under- and overeducation of immigrants. We are able to do so thanks to the rich data that cover several destination and origin countries, and thus allow controlling for bilateral effects. By doing so, we confirm the independence of selection and sorting suggested by Grogger and Hanson (2011) in the setting of occupational matching. Specifically, we show that home country characteristics, such as the degree of income inequality and the quality of human capital, by affecting selection, mostly matter for undereducation of immigrants. In contrast, overeducation is determined to a much greater extent by destination-country economic conditions and labor market institutions. Policies and institutions that are common to both immigrants and native born are relevant for destination country differences in overeducation. Notably, immigrants are less likely to experience upward occupational mobility in tighter labor market environments. Immigrants are also positively responsive to immigrant-specific policies adopted in destination countries, such as those allowing better access to jobs, and fighting discrimination. Specific measures of labor market integration targeted at immigrants allow reducing their undereducation, although they also can lead to overeducation.

Our paper contributes to bridging the gap between two strands of migration literature. The first is on immigrant's assimilation in the labor markets. This literature examines immigrants' outcomes in terms of wages and return to education [Chiswick, 1978; Borjas, 1994], employment [Wheatley, 1998], and occupational matching [Green, 1999; Amuedo-Dorantes and De la Rica, 2007; Barrett and Duffy, 2008]. One of the common features of these studies is their focus on the assimilation process, or convergence of immigrants' outcomes to those of the native born. The mere possibility and the speed of assimilation, however, are inevitably linked to immigrant's selection and to the transferability of their skills [Chiswick and Miller, 2009], and we build in both issues into our analysis.

The second strand of literature is on cross-country differences as determinants of migration. These differences are at the heart of migration selection models [Borjas, 1987]. However, they have been rarely related to immigrants' specific outcomes at destination. One of the exceptions is Mattoo, Neagu, and Ozden (2008), who explain significant differences in the occupational attainment of immigrants in the US from different origin countries by quality of human capital and selection effects. However, these authors rely on a single destination country, thus not being able to distinguish selection (supply side) and sorting (demand side) effects.

The paper is organized as follows. Section 2 contains the literature overview on mismatch and its relevance for immigrants, organizing the discussion along the role of individual, destination, and origin-specific effects. In Section 3, we describe the data and give descriptive

evidence on the occupation mismatch in Europe. Section 4 provides the results of the econometric analysis and their discussion. The last section concludes.

2.   WHY MISMATCH? A THEORETICAL OVERVIEW

2.1.   Individual-Specific Reasons

Imperfect match of education and jobs is a standard feature of labor markets in general, and has been documented for North America and Europe [Freeman, 1976; Rumberger, 1981; Groot, 1996; Dolton and Vignoles, 2000; Chevalier, 2003]. Theoretical and empirical explanations of this phenomenon include, among others, the imperfect "screening" of workers' education by employers [Spence, 1973]; the incorrect temporary matches due to imperfect information in the labor market [Groot and Van den Brink, 2000]; career building or conscious overeducation that can bolster promotion [Sicherman and Galor, 1990]; the trade-off between, and hence a substitution of, different types of human capital, such as education and experience [Sicherman, 1991]. The latter suggests that overeducation does not necessarily represent a waste, but may be an optimal, albeit temporary, outcome. It also implies that overeducated workers will typically have less experience, while undereducated workers will have more.

Chiswick and Miller (2009) offer a theoretical explanation to how these and other reasons may aggravate or mitigate the mismatch for immigrants, as opposed to the native born. For example, employers may be less able, or eager, to correctly "screen" the quality of foreign schooling, and hence may prefer hiring immigrants with education levels higher than needed for the job. In addition to this, skill transferability plays a paramount role [ibid; Friedberg, 2000]. Differences in schooling and non-recognition of diplomas, different technologies and barriers to entry into specific occupations, as well as discrimination against immigrants make skill transferability across labor markets less than perfect. This usually leads to overeducation of immigrants, which, however, has a tendency to decrease with the duration at the destination. In contrast, as immigrants are often favorably selected, they are more able to substitute schooling with other productivity-enhancing skills, and hence to be undereducated. This tendency may be independent of duration at destination in some cases; or increase with time in others, as more country-specific experience is gained.

These theories directly provide several hypotheses for testing: extra year of experience lowers the probability of being overeducated but increases the probability of being undereducated. For immigrants, duration of stay may have an asymmetric implication for the mismatch, while better knowledge of the market and especially possession of language skills may improve the matching.

2.2. Home Country Determinants: Selection and the Supply Side

Immigrants' occupational outcomes, as well as their observed individual characteristics, are also a result of immigrants' selection and further sorting across destination countries. As already noted, most of the evidence points to a general positive selection of immigrants. However, negative selection also remains a possibility. Both are determined by income differential and relative inequality between origin and destination countries, which largely influence the reward to skill and the incentives to migrate, as well as by the costs of moving [Borjas, 1987, 1999; Chiswick, 1999].

Thus, a direct implication of the selection models is that numerous bilateral factors, such as distance between countries, sharing a common border or a common language, having a common colonial past, by reducing the costs of moving, should negatively affect the selection [Docquier *et al.*, 2008; Mayda, 2010; Belot and Hatton, 2008]. With higher moving costs, only individuals with better employment prospects and earning potential at destination will move. Both common language and past colonial relationship may also ease the transferability of human capital and reduce overeducation.

In addition, selection, and the portability of human capital, is also affected by the level and quality of schooling that immigrants receive at home. Some authors have tested the impact of input measures, such as expenditures per pupil or pupil-to-teacher ratio as indicators of the education settings that translate into individuals' labor market outcomes [Card and Krueger, 1992; Bratsberg and Terrell, 2002]. Others have used outcome measures, such as test scores in international standardized tests [Chiswick and Miller, 2010a] to show that poor quality of schooling incites only "most able and most highly motivated to migrate", while higher quality of schooling allows immigrants' drawing from a wider ability distribution (ibid, p.34). Given a certain controversy regarding the use of the schooling input measures (reviewed in Hanushek, 1986), we give a preference to outcome measures in this paper.

2.3. Destination Country Determinants: Sorting and the Demand Side

Immigrants' further choice of destination countries is rarely a random outcome. Once bilateral country characteristics are accounted for, this choice is also influenced by destination country's economic conditions and its attractiveness in terms of providing a better return to skill. These destination-country conditions are the same for the native born and immigrants, although they may affect the outcomes of the two population groups differently. Immigrants' choice can be also influenced by immigration policies, both general and specific to skill transferability and selection. Once at the destination, these conditions will also have a long-lasting, and repeating, effect on labor market outcomes, accommodating or impeding correct matching of skills.

We consider the following general characteristics of destination economies, or the demand side, relevant for occupational matching of natives and immigrants: income level and income inequality measures, general level of unemployment, quality of education, measures of labor

market flexibility, and the extent of the informal sector. This list is not exhaustive, but allows covering the largest part of most relevant features suggested by earlier literature.

High levels of unemployment have direct implications for the assignment of workers to available jobs [Sattinger, 1993]. Competition for jobs is more intense generally, and educated workers may compete with the less educated for any job available, irrespectively of occupation. Hence, we expect a higher overall incidence of overeducation in an economy with higher levels of unemployment. At the same time, undereducated workers are more likely to change jobs within the same occupation because of their previous investments in occupation-specific, rather than general, human capital [Alba-Ramirez, 1993]. They may thus be preferred to perfectly matched or overeducated but inexperienced workers, thus increasing the incidences of undereducation; too. The effect of overall excess supply of workers in the economy should be the same for immigrants and the native born, although potentially more pronounced for the former if they are more affected by unemployment than natives.

Higher quality of schooling gives a higher payoff in the labor markets, especially for correctly matched individuals [Chiswick and Miller, 2010a]. However, higher quality of education may also allow an easier substitution of the years of experience for schooling, thus having a direct implication for the probability of being undereducated compared to the requirements of the job.

If markets are flexible, for example, if firing costs are low, workers are more easily laid off [Boeri and Jimeno, 2003], turnover is increased, while unemployment duration lowers [Bentotila and Bertola, 1990]. Increased turnover, coupled with the firing flexibility for employers, will increase incidences of over- and under- education in the short-run. It may also lead to higher incidences of perfect match and undereducation in the long run, as only most suited workers, in terms of education or experience, will remain in the job. As higher employment protection also increases the costs of on the job screening, employers will tend to select those whose education and experiences is less costly to assess. For immigrants, this may translate into higher incidences of overeducation, as screening of foreign diplomas and experiences may be particularly costly. Also, employers will be more risk averse to substitute immigrants' foreign experience with required schooling; hence undereducation of immigrants will be rare.

Unionism has been shown to reduce the probability of separations, because workers, dissatisfied with conditions, are able to voice their concerns [Freeman, 1980]. As such, unionism has similar implications for education-skill matching as stricter firing restriction. At the same time, unionism has positive implications for the availability and duration of on-the-job training [Booth, Francesconi, Zoega, 2005], the latter having a significant positive impact on undereducation, but not overeducation [Groot, 1997].

Larger share of informal economy may allow native-born to move freely between jobs and substitute more easily experience for education, hence increasing the probability of being undereducated. In contrast, for immigrants, it may provide little protection against discrimination and limited recognition of their qualifications, and hence overeducation.

Larger informal sectors can also enhance the negative selection of immigrants, by lowering the costs of moving to and operating in an informal setting.

Finally, we may also think of immigrant-specific policies that may additionally affect the mismatch. For example, specific policies of labor market integration, such as eligibility to take up specific jobs or availability of labor market integration measures provided by the state, would be expected to have direct implications for matching. Linked both to the transferability of human capital, and positive selection, policies and practices of anti-discrimination are also expected to reduce the overeducation, and potentially lead to undereducation of immigrants.

Given considerable difference between European countries in their migration-specific policies, our interest is to see to what extent these differences translate into the matching outcomes of immigrants.

3. DATA AND DESCRIPTIVE STATISTICS

3.1. The data

The analysis of this paper builds on the European Social Survey (ESS), conducted biannually in most European Union countries[2]. We use the main questionnaire and the first four waves of the survey, available for the years 2002-2009. The data contain information on individual socio-economic characteristics, occupation, education, as well as on individual's country of birth, allowing to distinguish between natives and immigrants, and the amount of time spent in the country for the foreign born.

The sample is restricted to men and women employed at the time of the survey, and aged 20-65 as to insure focusing on individuals likely to have completed their formal schooling[3]. For immigrants, we also exclude those with unknown place of birth or duration of residence, and whose both parents are born in the destination country. We further restrict the sample to immigrants represented by more than ten individuals from the same source to the same destination country. The final sample consists of 59477 native born and 4425 immigrants in 22 host countries and from 76 source countries. Table A1 of the Appendix describes the sample by focusing on destination countries, while Table A2 also provides the number of immigrants by country of origin in the sample. While the majority of immigrants come from other European countries, there is also a significant number of non-EU-15 nationals, notably from Turkey, Russia, Eastern Europe and the MENA region.

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2 ESS is a representative survey. For details on methodology and sampling procedure, see www.europeansocialsurvey.org . See also Jowell *et al.* (various issues).
3 Restricting further the sample to prime-age individuals (25-64) leads to similar results.

3.2. Dependent variable

To measure education-qualification mismatch, we use the realized matches' procedure [Chiswick and Miller, 2010b; Hartog, 2000]. It amounts to computing the mean of educational attainment within each occupation, and qualifying individuals with education level one standard deviation above this mean as being overeducated, and individuals one standard deviation below this mean as undereducated [Verdugo and Verdugo, 1989; Kiker *et al*., 1997]. This constructed measure is used as a dependent variable in further analysis. It is thus composed of three categories: 1 – undereducated, 2 – perfectly (correctly) matched, 3 – overeducated[4].

Table 1 presents the distribution of the native born and immigrants across the three possible occupation-education matches. Overall, there is approximately the same number of under- and overeducated native-born individuals, it is around 13%. This is a relatively common finding, given the definition of the mismatch that reflects the normal distribution property of realized matches [Hartog, 2000]. In contrast, immigrants have a significantly higher incidence of both types of the mismatch. Undereducation of immigrants has a clear tendency of rising with duration at destination, while the opposite pattern is observed for overeducation. Correct matches are also more frequent for immigrants speaking an official language of their residence country at home, and for those originating from countries sharing a common language with their destination country. Differences between immigrants from countries with our without colonial past, as well as between immigrants from developed and non-developed countries are less pronounced.

Table A4 of the Appendix additionally describes the incidence of mismatches by occupation. In particular, overeducation of immigrants is omnipresent in high- and semi-high skill requiring jobs, mostly reflecting the less than perfect skill transferability of immigrants. In contrast, undereducation is prevailing in the intermediary- and low-skill occupations, reflecting mostly the favorable selectivity of immigrants. In some intermediary occupations, however, both under- and over-qualification of immigrants are important. Potentially, both skill-transferability factors and favorable selectivity are at work for these types of jobs.

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4 Alternatively, one may operate with the mode of educational attainment within each occupation, however, this reduces significantly the variation of the variable, and may also lead to an erroneous qualification of individuals with schooling that is around the mode as over- or under-qualified. See Table A3 for an illustration: the self-reported mean schooling is different across all occupations, while the mode is the same for all but one occupation. Other measures of over- and under-qualification proposed in the literature include «normative» approach, which amounts to using national/international standards to match jobs with educational requirements [Chevalier, 2003; Dumont and Monso, 2007]; using occupational prestige scores [Chiswick, Lee, Miller, 2005]; workers job satisfaction or self-assessment of skills needed for the job performed [McGoldrick and Robst, 1996]; probability of being in an occupation, or occupying a top position [Barrett and Duffy, 2008]. Chiswick and Miller (2010b) and Hartog (2000) show that the analysis of the questions of interest is relatively insensitive to the choice of the measure, be it realized matches or, for example, workers self-assessment.

3.3. Independent Variables

Human capital model, search and mobility theories offer natural candidates for individual determinants of mismatch. These include experience in the labor market as the most important component of human capital and the main determinant of occupational status and mobility along the career. Variables affecting labor market participation and possibly occupational choice also include marital status, household size, being a member of an ethnic minority, past unemployment, total hours worked, and being a union worker (see Appendix Table A5 for variables' definitions).

Since the immigrant status is a (constrained) optimal choice outcome, immigrants are expected to differ from the native born along these characteristics. This is confirmed by the descriptive statistics of Table A6, which contains sample means of individual characteristics for both native born and immigrants. The two groups differ substantially in marital status, belonging to an ethnic minority, having incidences of past unemployment, and belonging to a trade union. They are, however, not different in terms of the number of hours worked.

While at first sight there is also no difference in experience, computed as age minus years of schooling, minus six, the disparities become apparent if immigrants are distinguished by years since migration. Migrants with more than 20 years since migration have 12.73 years of schooling on average, compared to 13.04 years among more recent immigrants, and compared to 13.24 years among the native born. These veteran immigrants are also on average older than more recent immigrants and than the native born. Age and education differences are mirrored in the differences of experience across these three groups: on average, immigrants with over 20 years at destination have 28.45 years of experience, while for more recent immigrants this indicator is 17.70. The incidence of past unemployment is also significantly higher among immigrants as opposed to native born, regardless of the relative advantage of veteran immigrants over native born in terms of experience. This suggests that some persistent differences between immigrants and native born, other than observable human capital, are at work, and potentially they are related to persistent differences between host and origin countries.

Further, the European-level data allows us comparing the differences in occupational match of immigrants and the native born across European destinations. Figure 1 plots the share of undereducated against the share of overeducated immigrants, both measured relatively to the share of native born in the same group. Countries lying above the horizontal and vertical unit lines are those where immigrants are more likely to be under- and overeducated, respectively.

The plot confirms important heterogeneity of outcomes across host countries. In a large majority of countries, immigrants have significantly higher rate of overeducation than the native born. The incidence of undereducation is widespread, too. It is however less often observed among immigrants than among native born in South-European and some new immigration countries (Portugal, Spain, Ireland, Hungary, Slovakia), but also in Great Britain and Nordic countries. This discrepancy may be related to both specific labor market conditions in these countries, as well as specific migration patterns.

Figure 1 : Immigrants and Native-born Relative Mismatch across Host Countries
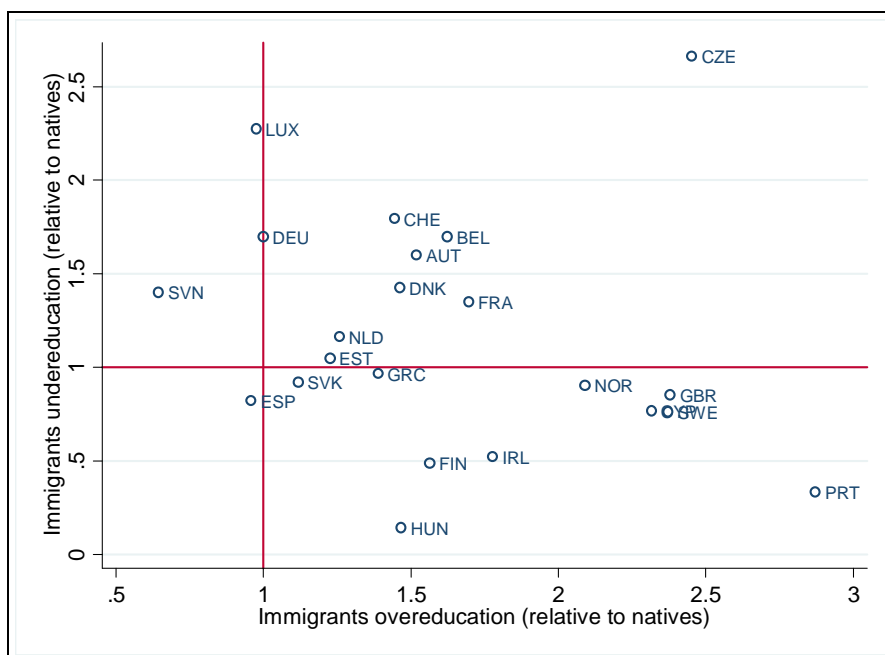
Source: authors' calculations based on the ESS.

Another reason for immigrants' occupational mismatch may be their self-selection from the population of origin countries along dimensions that could positively or negatively affect their occupation outcome at destination. We illustrate this point in Figure 2 with respect to education selectivity. The graph shows that migrants are disproportionately drawn from the highly educated segment of their origin country population. This evidence of positive selection is important since education is also likely to be correlated with other "non observable" productive characteristics that could explain labor market outcomes of immigrants in their host countries: to the extent that education and talent are correlated, positive selection on education may drive a positive selection on unobserved heterogeneity. These differences across countries in terms of selection motivate our interest for investigating further the exact origin of source country heterogeneity that can explain immigrants' selection and eventually immigrants' labor market outcomes at destination.

Thus, we compile the data on bilateral and country-level unilateral characteristics from various sources (Appendix Table A5). For bilateral controls, we distinguish, on the one hand, characteristics that affect the cost of moving from and to a particular country which is constant across cohorts, such as geographic distance, past colonial relationship, common language, and sharing a common border. On the other hand, we control for differences across cohorts in selection and sorting using general economic variables, such as the ratio of GDP per capita at destination to the GDP per capita at the origin, and a similar ratio of Gini coefficients. Both these variables are measured at the time of migration. We use average values over three decades: the decade of arrival in the 2000s, in the1990s, and in the 1980s

and earlier. Thus, for each immigrant, home country effects are linked to her decade of migration.

Unilateral country characteristics include destination and home country measure of human capital quality, proxied by the average cognitive skills assessed by international standardized tests [Hanushek and Woessmann, 2009]. Destination countries' characteristics also include two measures of labor market rigidity (EPL index and the extent of trade union density), the rate of unemployment, and the extent of shadow economy. Destination country's GDP and unemployment are measured at the year of the survey; all other variables correspond to the year 2005.

Figure 2 : Tertiary Education in Source Countries and among Immigrants
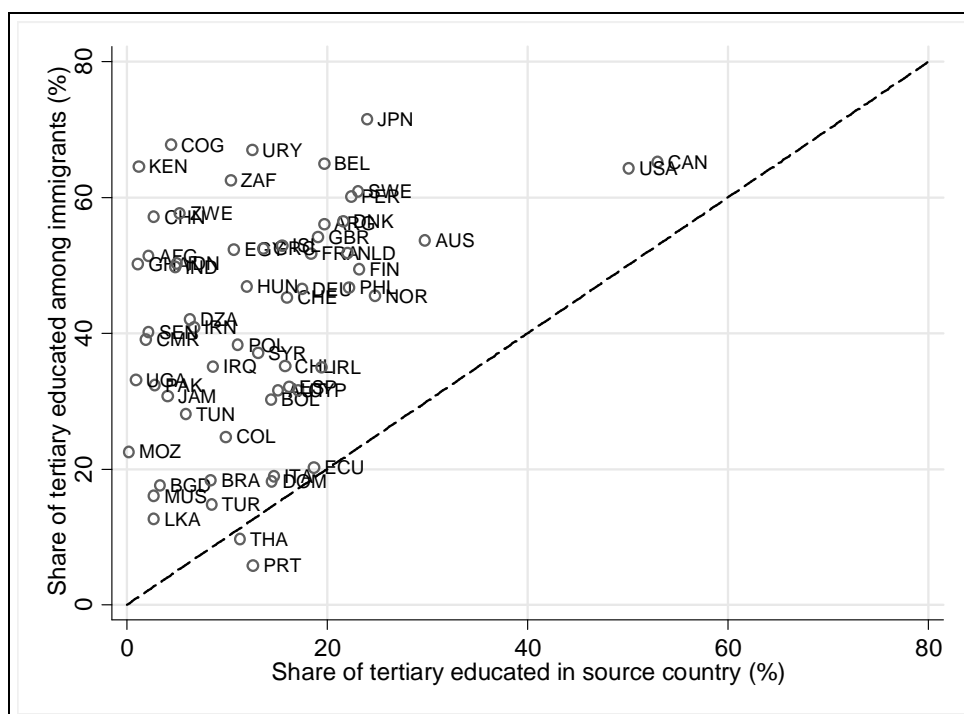
Source: authors' calculations on the basis of the ESS and the education data from Barro and Lee (reference year is 2000).

The data on migration-specific institutions in destination countries come from the MIPEX database, which measures policies to integrate migrants in European countries. We work with three indices. First is the index of immigrants' eligibility to take up specific jobs or being precluded from them. This variable ranges from 0 to 100, 100 meaning that immigrants are not excluded from any jobs available for the native born, while 0 meaning that the situation is highly unfavorable for immigrants.

A second indicator is the MIPEX degree of labor market integration, which is also measured on the scale from 0 to 100, and which reflects what the state is doing to help migrants adjust

to the demands of the labor market. Conceptually, this measure is different from the eligibility index, as it reflects specific measures taken up by the government in face of immigrants already present on its territory, their needs, as well as specific needs of the economy. In contrast, the eligibility measure is more likely to affect immigrants' sorting and, to a certain extent, transferability of their diplomas.

To appreciate the differences in these two measures, consider, for example France. It has one of the worst scores in Europe in terms of eligibility, as migrants are denied legal access to approximately 30% of all jobs in the country. This is more jobs than in any other European country, placing France way below the EU average (see MIPEX methodology and country analysis for details). In contrast, France scores above the European average in terms of targeted measures of labor market integration, as it has targeted policies of migrants' professional orientation towards jobs where shortages are observed. Unfortunately, however, such orientation does not always account for the qualification; neither provides an official recognition of qualifications, thus perpetuating occupational mismatches.

Finally, we also use the MIPEX composite index of anti-discrimination policies, which measures the practice of various countries with respect to discrimination on the grounds of religion or belief, ethnicity, race, and nationality. It also ranges from 0 to 100, with 100 signifying best practice. The index takes into account the punishment of discrimination on the grounds of religion, belief, ethnicity, race and nationality; the coverage of these principles; the degree of the enforcement; and the role of the equality bodies and the state. Linked both to the transferability of human capital and fairer screening, better anti-discrimination practices are expected to reduce overeducation, and potentially lead to undereducation of immigrants.

4. EMPIRICAL ANALYSIS

We estimate a multinomial logit model for the probability of being over- or undereducated versus being perfectly matched, for the pooled sample of the native born and immigrants, and separately for natives and immigrants. The model for the education occupation match is given by:

$$Y_{iod\,j}\,|X_{iod} = \frac{e^{\beta_j X_{iod}}}{\sum_{j=1}^{3} e^{\beta_j X_{iod}}} \qquad (1)$$

Where $Y_{iod\,j}$ is the probability that worker i coming from country o to country d is in one of the three (jth) education-occupation match categories: undereducated, correctly matched, or overeducated. The vector X_{iod} includes individual-specific characteristics outlined above.[5] Additionally, to control for differences in the distribution of workers across industries and

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5 Worker's actual level of education, although it is an important determinant of occupational outcome, is omitted from the model. As it already appears in the construction of the dependant variables, its inclusion would lead to spurious correlation.

occupations due to sorting, different skill requirement, or regulations of occupations, in all regressions, we include one-digit occupation fixed effects and industry fixed effects. All specifications include a full set of survey year and country of residence fixed effects. Depending on the regression, they also include immigrant-specific characteristics, such as citizenship, language spoken at home, and the length of residence, as well as country-specific and country-pair effects. In the regressions for the native born, and in basic regressions for immigrants without home-country and dyadic controls, expression $Y_{iod\,j} \mid X_{iod}$ reduces to $Y_{id\,j} \mid X_{id}$.

4.1. Baseline results

The benchmark results of estimating model (1) are presented in Table 2. Column (1) is estimated on the sample of European native born, column (2) pools the sample of native born and immigrants, and column (3) is estimated on the sample of immigrants. The estimated coefficients are transformed to relative-risk ratios, with perfect match being the benchmark.

For the native born, our estimates of the key labor market ingredient of the model –experience - confirms previous studies for Europe and the US. From column (1) of Table 2, an increase of labor market experience raises the relative risk of being in the group of undereducated as compared to the group of perfectly matched. This suggests that workers do substitute their lack of formal schooling with years of labor market experience to obtain a job requiring higher educational credentials, as predicted by human capital theories. At the same time, an extra year of experience lowers the probability of being overeducated. This is the pattern suggested by optimal mobility and on-the-job search theories, whereby individuals accept jobs requiring lower educational credentials as an investment into the labor market and better career prospects. A similar pattern could also be explained by increasing educational standard owing to technological change over time [Kiker *et al.*, 2000].

Socio-economic characteristics, such as being a male, married or divorced, increase the relative risk of being overeducated rather than perfectly matched, and at the same time diminish the probability of undereducation. The opposite effect is observed for household size. Describing oneself as a member of an ethnic minority increases the odds of both types of the mismatch, potentially due to the discrimination, or deliberate specialization in tasks where discrimination would be overcome. The same is true for having been unemployed in the past: opportunity costs of being overeducated for these individuals are lower, and they are more prone to accepting any kind of job. We also find that trade union members have a higher probability of being overeducated, which is probably due to their lower turnover. Individuals working more hours are also more prone to the mismatch, although this effect is quantitatively small.

From column (2), reported estimates on immigrant dummy suggest that for immigrants relative to native born, the relative risk of being either under- or overeducated rather than perfectly matched would be expected to increase by 54% and 61%, respectively. This increase could be the result of imperfect transferability of skill. Alternatively, or in addition, it could

also be the result of negative selection among more educated immigrants and positive selection among the lower educated ones.

To gauge the importance of skill transferability hypothesis, we compare the estimates in the sample of immigrants (column 3) with the estimates in the sample of native born (column 1). Years of labor market experience change the likelihood of being overeducated among both immigrants and the native born by approximately the same magnitude. However, the relative probability of undereducation among immigrants is virtually unaffected by years of labor market experience (only the square term is significant, and only at 10%). On the one hand, this implies that immigrants have difficulties substituting their lack of formal schooling with their experience. A human capital interpretation of this finding suggests that experience accumulated abroad is a poor substitute to formal schooling. Another possibility could be that immigrants specialize in jobs in which accumulated experience is less useful for accessing jobs at the upper level of the skill ladder. On the other hand, this also suggests that the higher incidence of undereducation for immigrants is rather due to some persisting differences with the native born, consistently with the idea of the initial positive self-selection of low-educated immigrants.

For immigrants, years since migration seem to have little impact on occupation matching (omitted category is less than 6 years since migration). This suggests that among immigrants, mismatch is a relatively persistent phenomenon. However, we would be cautious to interpret this finding as a lack of assimilation or of upward occupational mobility, since the use of cross section data inevitably confounds assimilation and changes in cohort quality [Borjas, 1985, 1994]. In our case, it could be that earlier arrivals are of a lower quality than newer ones, perhaps due to a more selective immigration policy. In contrast, other immigrant-specific characteristics, such as speaking an official language of a country at home or being a citizen, lower the likelihood of undereducation as compared to a perfect match.

4.2. Bilateral Determinants of Immigrants' Mismatch

To account for the immigrants' choice of destination countries along characteristics influencing the portability of their human capital and their selection from skill distribution, we control for specific country-pair factors, starting with bilateral characteristics common to all cohorts. They include the natural logarithm of distance between origin and destination countries, dichotomous variables for common language, common border, and common colonial past.

Table 3 column (1) summarizes the estimates of this specification. Previous results remain robust to the inclusion of bilateral controls. Common colonial past decreases the likelihood of undereducation, consistently with both cost and skill transferability interpretation: countries sharing a colonial past may also share certain institutions, educational systems, and have stronger networks, making it less costly to migrate for low educated immigrants. As a consequence, they are less positively selected. However, colonial past does not affect overeducation for more educated workers. This can signify the lack of human capital

transferability advantage for highly educated immigrants from these countries, or the balancing out of the negative selection and of the transferability effects. In its turn, the common border effect in our setting mostly reflects the intra-European migration. Since European countries have relatively similar levels of development, these migrants should be endowed with a relatively more transferable human capital, and thus less overeducated. In addition, there may be better information flows about available jobs between neighboring countries, making it easier for immigrants to find more suitable jobs before moving.

Perhaps by far the most important economic determinants of immigrants' selection and sorting are income differential and relative inequality between origin and destination countries, which largely determine the reward to skill and the incentives to migrate [Borjas, 1999; Grogger and Hanson, 2011]. Thus, in Table 3 column (2) we further control for the ratio of GDP per capita between destination and home country, as well as the ratio of Gini coefficients. Both variables are cohort-specific and are measured at the time of migration, distinguishing three cohorts: the 2000-es, the 1990-es, the 1980-es and earlier. This allows us to increase the variability in the data, and also to control for a potentially different quality of cohorts.

We find a positive impact of higher income differential on the probability of being undereducated, and no effect on overeducation. Since migrants between countries with comparable levels of development should also have comparable levels of human capital, we interpret these results as differential selection pattern among lower educated and more educated workers. Our result suggests that immigrants with low education from relatively poorer countries are more positively selected. This could be the outcome of higher migration costs for immigrants from poorer countries, such that despite having more incentives to move only the most able will succeed.

In its turn, the coefficient on relative income inequality shows that low educated immigrants from relatively more unequal countries are more likely to be undereducated, suggesting a positive selection for this group of lower educated immigrants. In contrast, there is a positive, albeit non-statistically significant effect on overeducation. These results contrast those of Borjas (1987), but are in line with other studies [Orrenius and Zavodny, 2005; Belot and Hatton, 2008]. Taken together, results on sorting point to differential barriers to mobility for less educated and more educated immigrants from unequal and poorer countries.

We use the obtained estimates on the mismatch of immigrants, and also of the native born, to plot predicted probability of each education-occupation match category across years of labor market experience (Figure 3). There is a striking convergence of immigrants with the native born with years of labor market experience. Most of the convergence takes the form of better match for the initially larger share of overeducated pool of immigrants. Provided that overeducation is associated with wage penalty compared to a correctly matched worker [Chiswick and Miller, 2009], the figure points to occupational upgrading as a potentially important form of immigrant wage assimilation.

The multinomial logit model and the relatively small sample size do not allow us to include the full set of origin country fixed effects. In an effort to control for fixed origin-specific differences across immigrants, we introduce regional dummies in column (3) of Table 3. Compared to immigrants from other Western European and North American countries (the omitted group), it is African and MENA immigrants that have the higher likelihood of being overeducated. There are no significant differences between European and American immigrants and immigrants from other regions of the world[6].

Figure 3 : Mismatch Predicted Probabilities over the Life-Cycle
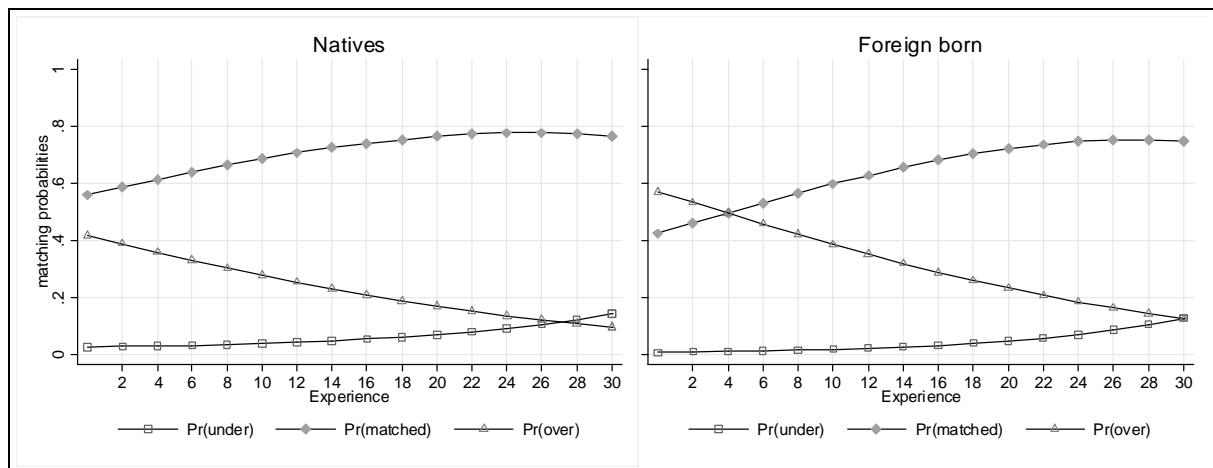
Note: Predicted probabilities are computed at sample means for immigrants and natives using coefficient estimates of Table 3 column 1 for the native born and Table 4 column 2 for immigrants.

Source: authors' calculations based on the ESS.

In the literature, immigration is mostly viewed as an individual decision. Yet, very often it is a joint family decision, and migration takes place involuntarily for migrant children [Borjas and Bronars, 1991]. On the one hand, the lack of country specific human capital, and thus skill transferability, should be more of a concern for those who acquired most of their skills in their origin country. On the other hand, selectivity should be mostly observed among those involved in the decision-making, but not among tied movers. For these reasons, we further restrict our estimation sample to those who migrated at the age of 18 or older, and thus who have higher chances to have acquired their schooling at the origin, and to have migrated voluntarily. The results for this restricted group are presented in column (4) of Table 3. They show that experience acquired at home is of no relevance for undereducation, while overeducation decreases with years of labor market experience, and at a higher rate than in the whole sample of immigrants. This differential rate of return is consistent with the idea that these immigrants start with a lower level of country-specific human capital. Other effects point into the same direction as in the whole sample, and, in most cases, are amplified. Thus,

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6 These results also hold if we omit North American migrants (86 observations) from the analysis.

selection and skill transferability explain labor market outcomes of immigrants who are involved in the migration decision making.

4.3. Country-Specific Determinants of Immigrants' Mismatch

As a last step, in this section we take advantage of sorting across multiple destination countries of immigrants sharing similar characteristics with respect to the origin country, in order to analyze separately the role of home and host country characteristics in the occupational outcomes.

Table 4 column (1) focuses on home-specific determinants of mismatch for the native born. Individuals in countries with higher quality of education have a higher risk of under education: they are able to substitute more easily the years of experience for schooling. At the same time, they are also less likely to be overeducated, and rather perfectly matched. Similar pattern is observed in countries with larger informal sector, where diploma requirements or screening may be more lax, and lower formal barriers to entry into certain occupation can ease the ability of natives to substitute their formal schooling with their talent and experience. In contrast, individuals in countries with higher trade union density have a lower risk of being undereducated. We do not find, however, any impact of cross-country differences in unemployment, employment protection measures, or relative inequality, on the occupational match of the native born.

In column (2), we repeat similar regression for immigrants. These regressions also build up on the specifications of Table 3. They include all dyad controls, except the ratio of GDP per capita and the ratio of Gini coefficients, which are now included separately as home country determinants.

Both higher quality of schooling and the higher degree of shadow economy in the destination countries have a negative association with overeducation, in line with the results for the native born, albeit stronger in magnitude. The former result reflects the attractiveness of countries with an overall higher education quality for talented immigrants and/or those with a more transferable human capital. This hypothesis is confirmed further in other specifications of the model, where we additionally find a positive effect of destination country's quality of education on immigrants' probability to be undereducated. In its turn, the result on the shadow economy points to a demand-driven positive selection of unskilled immigrants who can more easily find lower quality jobs in an informal economy.

Further, unlike what was found for the native born, higher degree of employment protection leads to higher risk of overeducation of immigrants. In countries where firing costs are high, while the screening of migrants' diplomas and abilities is imperfect, employers may deliberately increase education standards at a hiring stage. Thus, higher credentials serve as an insurance against the risk of poorer performance and the difficulty of firing. Widespread presence of trade unions acts much as higher employment protection. In contrast, immigrants have a higher propensity of being undereducated in countries with higher incidences of

unemployment (a result that is less intuitive, but also non-robust). We also note that a more unequal income distribution is associated with higher overeducation. This is the effect of sorting: in countries where income inequality is high, the returns to human capital of top-earners are significantly higher than the returns of workers at the lower end of the income distribution. Thus, more educated immigrants may be particularly lured to more unequal countries, and their overeducation may be a deliberate choice.

We build the model further, and include now immigrant-specific policies embraced by destination countries (Table 3, column 3). Three types of policies are considered: eligibility of immigrants to take up some specific jobs, the degree of labor market integration, and anti-discrimination policies.

Given the conceptual difference between the two labor market policies, it is not surprising to find opposing effects of these two measures on overeducation. Better eligibility practices help attracting immigrants with the right qualification, reduce overeducation of immigrants and improve the match. Immigrants choosing Sweden (country with best eligibility practice in Europe, scoring 100) rather than Cyprus or Slovakia (scoring 0), would decrease the probability of overeducation relative to perfect match by 80% percent, given the other variables in the model are evaluated at their means.

In contrast, better labor market integration policies tend to attract better educated workers who hope to be better matched in the future thanks to the actions of the state and certain openness, but who are not necessarily matched immediately. Immigrants choosing Sweden or the Netherlands (country with best labor market integration practice in Europe, scoring 100) rather than Austria or Finland (scoring 0) would increase the probability of overeducation relative to perfect match by 75%, given the other variables in the model are evaluated at their means.

The result on the anti-discrimination index suggests that countries with better antidiscrimination policies allow for a fairer screening, better transferability of human capital, and positive demand-driven selection, thus reducing the risk of overeducation. Using the obtained coefficient, we can compute that, for an immigrant choosing between Estonia (which has the lowest score of 23) and, again, Sweden (94), the probability of being overeducated rather than perfectly matched would be 42% lower in Sweden than in Estonia.

As a final step, in column (4) of Table 4, we control for destination and home country effects at the same time. As the model already contains an important number of controls, we include only three measures responsible for selection and human capital portability: GDP per capita, income inequality, and the quality of education [Hanushek and Woessmann, 2009].

The inclusion of these variables does not alter previous results. Our findings show that immigrants drawn from the lower end of the education distribution from countries with higher income inequality are favorably selected, as only the most able and motivated individuals migrate. In terms of the quality of education at home, less educated emigrants from countries with higher educational quality are more favorably selected; immigrants from countries with

lower quality of education may be selected from the full range of the ability distribution. Thus, consistently with the findings for the US labour market (ibid), the quality of education in origin countries improves the labour market performance of lower educated immigrants.

Overall, our results reveal that home country characteristics, by affecting selection, mostly matter for undereducation of immigrants. In contrast, overeducation is determined to a much greater extent by destination-country economic conditions, policies, and institutions, confirming that, in addition to selection, the sorting of immigrants plays an independent, and important, role for their labor market outcomes.

5. CONCLUSIONS

We have used the European Social Survey to examine differences in education-occupation mismatch between immigrants and the native born. Immigrants are shown to be more likely than the native born to be both over- and undereducated, and this phenomenon is due to the heterogeneity across origin and destination countries.

Our results suggest that human capital quality in origin countries affects immigrants' labor market outcomes at destination by changing the selection process rather than by affecting immigrants' human capital transferability per se. In turn, differences across destination countries have to do with the differential impact of labor market institutions and conditions on the mismatch of immigrants as compared to the native born.

We have also documented significant correlations between immigrant-specific policies adopted by destination countries and immigrants' occupational placement. These correlations are important in their own right, supporting further sorting hypothesis. However, since some of the policies are very recent, in the current context we are not able to distinguish whether better policies have attracted certain migrants, or whether the establishment of some policies has changed the outcomes of immigrants who were already at destination. Clearly, more research into this direction is needed. Despite this shortcoming, our results suggest that some "best practice" countries can achieve a considerably fuller use of immigrants' potential. If this is the general objective of other countries, too, our results suggest that there is room for improving immigrant outcomes through policies.

Recent literature has also been concerned with understanding the immigrants - natives' differences in earnings and returns to schooling within the overeducation - undereducation framework. Our findings have implications for the results that one could obtain from the earnings equations in the European context. As far as heterogeneity across countries is concerned, the reward that immigrants receive for their human capital varies across origin and destination countries, is also due both to selection and sorting. Occupational upgrading is a potentially important form through which immigrants' earnings could converge to those of the native born.

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TABLES

Table 1 : Incidence of mismatch in the European labor markets in 2002-2009, in percent

	Undereducated	Correctly matched	Overeducated
Native born	**12.67**	**73.59**	**13.74**
Immigrants	**16.15**	**61.15**	**21.93**
of which:			
Report having lived in a country			
0 to 5 years	10.18	61.26	28.56
6 to 10 years	12.31	64.50	23.19
11 to 20 years	16.03	64.17	19.80
more than 20 years	17.76	65.54	17.00
Speak an official country's language at home			
Yes	12.69	73.18	14.12
No	17.07	65.50	17.43
Originate from a former colony			
Yes	15.27	64.34	20.39
No	16.62	62.91	20.47
Originate from a country with a common language			
Yes	10.27	66.71	23.02
No	16.90	63.48	19.62
Originate from developed countries			
Yes	13.71	65.03	21.26
No	12.98	63.61	23.42

Source: authors' calculations based on the ESS.

Table 2 : Individual Determinants of Occupational Mismatch: Baseline Results

	(1) Native Born		(2) Pooled Sample		(3) Immigrants	
	Under-	*Over-*	*Under-*	*Over-*	*Under-*	*Over-*
Exp	1.031***	0.955***	1.030***	0.956***	1.035	0.951**
	(0.007)	(0.007)	(0.007)	(0.006)	(0.030)	(0.021)
Exp sq	1.001***	1.000***	1.001***	1.000***	1.001*	1.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Male	0.875***	1.411***	0.876***	1.386***	0.919	1.270
	(0.044)	(0.066)	(0.043)	(0.062)	(0.172)	(0.195)
Hhmmb	1.152***	0.902***	1.146***	0.903***	1.065*	0.877***
	(0.023)	(0.017)	(0.021)	(0.016)	(0.062)	(0.041)
Married	0.577***	1.562***	0.610***	1.542***	0.929	1.636***
	(0.035)	(0.080)	(0.035)	(0.075)	(0.208)	(0.274)
Divorced	0.725***	1.305***	0.750***	1.346***	1.124	1.984***
	(0.057)	(0.103)	(0.057)	(0.101)	(0.350)	(0.513)
Ethnic Min	1.304*	1.395***	1.633***	1.201*	1.722***	1.024
	(0.193)	(0.177)	(0.172)	(0.117)	(0.304)	(0.160)
Past Unempl	1.099	1.167**	1.088	1.130*	0.959	0.934
	(0.075)	(0.080)	(0.070)	(0.074)	(0.205)	(0.198)
TU mem	0.911*	1.146***	0.902**	1.147***	0.720	1.192
	(0.047)	(0.055)	(0.045)	(0.053)	(0.153)	(0.233)
Hours worked	0.996**	1.004**	0.996**	1.005***	0.991	1.008
	(0.002)	(0.002)	(0.002)	(0.002)	(0.006)	(0.006)
Immigr			1.542***	1.605***		
			(0.129)	(0.122)		
YSM6-10					0.830	0.919
					(0.245)	(0.187)
YSM11-20					0.952	0.735
					(0.255)	(0.159)
YSM20+					0.581*	0.950
					(0.164)	(0.216)
Language					0.606***	1.088
					(0.105)	(0.170)
Citizen					0.715**	1.148
					(0.121)	(0.179)
Pseudo R-sq	0.109		0.111		0.160	
Observations	59477	59477	63907	63907	4425	4425

Notes. Reported are coefficients in terms of relative risk ratios from multinomial logit regression. Robust standard errors, clustered on the destination country, are in parentheses. Dependent variable: individual education-occupation match category, taking values: 1- undereducated, 2 - correctly matched, 3 – overeducated. Correct match is used as a reference category. All regressions include the full set effects as in Table3, and are estimated accounting for the population and design survey weights. The symbols (***), (**) and (*) represent statistical significance at p<0.01, p<0.05 and p<0.1, respectively. Source: own calculations based on the ESS.

Table 3 : Immigrants' Occupational Mismatch: Focus on Country-Pair Effects

	(1)		(2)		(3)		(4)	
	Under-	Over-	Under-	Over-	Under-	Over-	Under-	Over-
Exp	1.033	0.953***	1.030	0.954***	1.030	0.958***	1.044	0.921***
	(0.028)	(0.012)	(0.032)	(0.014)	(0.032)	(0.014)	(0.045)	(0.015)
Exp sq	1.001	1.000	1.001*	1.000	1.001	1.000	1.001	0.999
	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)
YSM6-10	0.816	0.921	0.817	0.933	0.888	0.824	0.850	1.144
	(0.107)	(0.060)	(0.120)	(0.071)	(0.163)	(0.136)	(0.147)	(0.130)
YSM11-20	0.978	0.737	1.037	0.726	1.142	0.622	1.125	1.742*
	(0.140)	(0.217)	(0.168)	(0.239)	(0.159)	(0.228)	(0.196)	(0.539)
YSM20+	0.604**	0.927	0.563**	0.977	0.572**	0.842	0.480**	3.165***
	(0.130)	(0.127)	(0.134)	(0.112)	(0.139)	(0.174)	(0.156)	(0.770)
Language	0.651***	1.188	0.594***	1.291	0.623**	1.188	0.532***	1.057
	(0.091)	(0.222)	(0.095)	(0.224)	(0.119)	(0.188)	(0.095)	(0.212)
Citizen	0.717*	1.185	0.774	1.144	0.717**	1.089	0.556***	1.201
	(0.129)	(0.167)	(0.143)	(0.141)	(0.116)	(0.162)	(0.071)	(0.243)
Ldist	1.172	0.884	0.924	0.901	1.218*	1.075	1.497***	1.209
	(0.137)	(0.124)	(0.102)	(0.154)	(0.139)	(0.159)	(0.200)	(0.164)
Colony	0.539***	0.871	0.504***	0.766	0.511**	0.742	0.437***	0.750
	(0.101)	(0.184)	(0.104)	(0.212)	(0.134)	(0.200)	(0.112)	(0.234)
Common Lang	1.057	0.955	0.982	1.114	1.068	0.973	1.074	0.966
	(0.162)	(0.358)	(0.186)	(0.437)	(0.264)	(0.365)	(0.310)	(0.457)
Contiguity	0.815	0.620*	1.023	0.493***	1.515*	0.536***	1.548	0.580**
	(0.180)	(0.174)	(0.327)	(0.112)	(0.357)	(0.081)	(0.428)	(0.128)
GDP ratio			1.024**	1.010*	1.038***	1.007	1.046**	0.998
			(0.011)	(0.005)	(0.007)	(0.027)	(0.023)	(0.034)
Gini ratio			0.060***	2.190	0.056**	1.862***	0.064*	1.598***
			(0.044)	(1.744)	(0.080)	(1.094)	(0.090)	(0.997)
Africa					0.337	1.706*	0.267*	1.244
					(0.230)	(0.476)	(0.211)	(0.256)
MENA					1.562	1.859**	1.507	1.842
					(0.700)	(0.451)	(0.736)	(0.690)
LA Carib					0.365	2.082	0.290	2.049
					(0.256)	(1.180)	(0.244)	(1.064)
East Asia Pacific					0.786	1.379	0.524	1.172
					(0.368)	(0.462)	(0.307)	(0.362)
South Asia					0.523	0.414	0.382*	0.374
					(0.251)	(0.267)	(0.210)	(0.247)
East Central Europe					0.981	1.024	0.674**	1.088
					(0.119)	(0.135)	(0.163)	(0.084)
Pseudo R-sq	0.162		0.181		0.187		0.203	
Observations	4389	4389	3788	3788	3601	3601	2793	2793

Notes. Reported are coefficients in terms of relative risk ratios from multinomial logit regression. Robust standard errors, clustered on the destination country, are in parentheses. Dependent variable: individual education-occupation match category, taking values: 1- undereducated, 2 - correctly matched, 3 – overeducated. Correct match is used as a reference category. All regressions include the full set effects as in Table 2, and are estimated accounting for the population and design survey weights. The symbols (***), (**) and (*) represent statistical significance at p<0.01, p<0.05 and p<0.1, respectively. Source: own calculations based on the ESS

Table 4 : Mismatch: The Role of Destination and Origin Countries' Context and Policies

	(1) Native Born		(2) Immigrants		(3) Immigrants		(4) Immigrants	
	Under-	*Over-*	*Under-*	*Over-*	*Under-*	*Over-*	*Under-*	*Over-*
GDP pc dest	1.008*	0.994	1.024*	0.995	1.022*	0.995	1.032**	0.988
	(0.005)	(0.005)	(0.014)	(0.009)	(0.013)	(0.009)	(0.015)	(0.007)
Gini dest	0.992	0.984	0.994	1.166***	0.960	1.274***	0.961	1.267***
	(0.011)	(0.010)	(0.042)	(0.057)	(0.048)	(0.098)	(0.044)	(0.084)
Educ qual dest	1.972***	0.476***	3.655	0.071***	6.813**	0.050***	5.506**	0.045***
	(0.441)	(0.095)	(4.887)	(0.052)	(5.382)	(0.036)	(4.119)	(0.028)
EPL dest	1.020	1.043	0.938	2.184***	1.040	1.857***	0.845	2.146***
	(0.055)	(0.053)	(0.248)	(0.352)	(0.178)	(0.317)	(0.155)	(0.349)
Unempl dest	0.993	0.997	1.156**	1.074*	1.067	1.177**	1.139*	1.143**
	(0.016)	(0.015)	(0.072)	(0.050)	(0.065)	(0.078)	(0.079)	(0.068)
TU dest	0.996**	0.999	1.007	1.039***	1.000	1.060***	1.001	1.059***
	(0.002)	(0.002)	(0.010)	(0.008)	(0.014)	(0.016)	(0.014)	(0.015)
Shadow dest	1.039***	0.970**	0.939	0.800***	0.976	0.779***	0.958	0.777***
	(0.013)	(0.012)	(0.061)	(0.033)	(0.055)	(0.037)	(0.049)	(0.035)
Eligib					0.998	0.992*	0.999	0.993*
					(0.004)	(0.004)	(0.004)	(0.004)
LM integr					0.993*	1.010**	0.994	1.009**
					(0.004)	(0.004)	(0.005)	(0.004)
Antidiscr					1.007	0.991*	1.009	0.991*
					(0.007)	(0.005)	(0.007)	(0.005)
GDP pc origin							1.000	1.000
							(0.000)	(0.000)
Gini origin							1.036***	0.974
							(0.011)	(0.020)
Educ qual origin							1.080*	0.978
							(0.047)	(0.059)
Pseudo R-sq	0.111		0.161		0.162		0.175	
Observations	51550	51550	3606	3606	3606	3606	3249	3249

Notes. Reported are coefficients in terms of relative risk ratios from multinomial logit regression. Robust standard errors, clustered on the destination country, are in parentheses. Dependent variable: individual education-occupation match category, taking values: 1- undereducated, 2 - correctly matched, 3 – overeducated. Correct match is used as a reference category. All regressions include the full set effects as in Table 3 column 1, and are estimated accounting for the population and design survey weights. The symbols (***), (**) and (*) represent statistical significance at p<0.01, p<0.05 and p<0.1, respectively. Source: own calculations based on the ESS.

APPENDIX

Table A1 : Sample Statistics: Focus on Destination Countries

Destination Country	Total number of observations	First-generation immigrants as % of the sample	Immigrants with over 20 years of residence, % of first-generation immigrants	N of immigrant countries of origin	Largest immigrant origin country
Austria	3133	5.65	40.68	16	Germany
Belgium	3241	6.20	49.25	18	France
Switzerland	4070	17.57	45.59	39	Germany
Cyprus	1013	5.13	23.08	5	Greece
Czech Republic	1618	1.61	96.15	3	Slovakia
Germany	5159	6.22	36.14	26	Russia
Denmark	3124	3.17	45.45	15	Turkey
Estonia	2140	14.91	85.27	11	Russia
Spain	3285	8.25	3.69	21	Morocco
Finland	4027	0.77	6.45	4	Russia
France	3450	5.22	68.33	15	Algeria
The UK	4009	6.91	38.99	24	India
Greece	1568	10.4	9.82	10	Albania
Hungary	1099	1.18	8.00	4	Romania
Ireland	2507	5.35	26.87	11	The UK
Luxembourg	1139	33.01	37.5	19	Portugal
The Netherlands	3984	6.38	49.61	12	Surinam
Norway	4195	5.10	35.05	19	Sweden
Portugal	2648	4.68	35.48	8	Brazil
Sweden	4351	8.16	54.65	23	Finland
Slovenia	2062	4.90	74.26	5	Bosnia
Slovakia	2085	1.29	66.67	3	Czech Rep.
Total	*68432*				

Table A2. Sample Statistics: Focus on Origin Countries

Largest countries of immigrant origin	DE	IT	PT	FR	TR	GB	PL	RU	MA	FI
Largest countries of immigrant origin, % of all first-generation immigrants in the sample	7.7	5.2	5.1	4.6	4.4	3.9	3.4	2.9	2.9	2.3
Largest countries of non-EU-15 immigrant origin	TR	PL	RU	MA	AL	BA	RO	BR	DZ	IN
Largest countries of non-EU-15 immigrant origin in Europe, % of first-generation immigrants	4.4	3.4	2.9	2.9	1.9	1.8	1.8	1.5	1.4	1.4

**Table A3 : Years of Education Across Occupations:
Native Born and Immigrants, 2002-2009**

Self-Reported Years of Education:	*Number of Observations, by ISCO 1-Digit Classification of Occupations*								
	1	2	3	4	5	6	7	8	9
Mean	14.28	16.72	14.16	12.78	12.00	10.67	11.28	11.01	10.24
Mode	12	17	12	12	12	12	12	12	12
Total Obs	6116	11075	12243	7098	8832	1514	7761	458	4688

**Table A4 : Incidence of Over-, Under-, and Correct Matching among Native Born
and Immigrants, 2002-2009**

		% under-	% correct-	% over-	% of individuals employed in this sector
ISCO	All occupations	12.67	73.59	13.74	100.00
		16.15	*61.15*	*21.93*	*100.00*
1	Legislators, senior officials, managers	15.12	69.61	15.27	9.98
		13.05	*64.49*	*22.45*	*9.07*
2	Professionals	13.75	73.17	13.09	17.76
		9.71	*63.02*	*27.27*	*15.37*
3	Technicians and Associate Professionals	12.34	72.66	15.00	19.71
		9.97	*63.73*	*26.31*	*14.50*
4	Clerks	12.56	73.44	14.00	11.56
		10.69	*62.72*	*26.59*	*8.20*
5	Service, shop and market sales workers	13.87	71.28	14.85	13.90
		17.66	*60.27*	*22.07*	*15.56*
6	Skilled agriculture and fishery workers	13.99	71.21	14.80	3.07
		13.95	*55.81*	*30.23*	*1.02*
7	Craft and related trades workers	12.33	73.85	13.82	11.03
		22.01	*63.08*	*14.90*	*13.71*
8	Plant and machine operators and assemblers	14.45	72.36	13.18	6.33
		24.36	*54.96*	*20.68*	*8.36*
9	Elementary occupations	12.60	71.76	15.64	6.57
		29.83	*46.67*	*23.50*	*14.21*

*Note*s. Values for the native born: in regular font; values for immigrants: in italics.

Table A5 : Variables' Definitions and Data Sources

Dependent Variable
Mismatch: 1 – if under-educated; 2 – if correctly matched, 3 – if over-educated

Individual characteristics
Exp – experience, created as age minus education minus six
Exp2 – experience squared
Male – dichotomous variable equal one if individual is male
Hhmmb – number of household members
Married - dichotomous variable equal one if individual is married
Divorced - dichotomous variable equal one if individual is divorced or widowed (benchmark: never married)
EthnicMin - dichotomous variable equal one if individual reports belonging to an ethnic minority
Past Unempl - dichotomous variable equal one if individual has been unemployed and work seeking for any period that lasted 12 month and more
TU mem - dichotomous variable equal one if individual reports being a member of a trade union
Hours worked – total hours normally worked per week in main job, overtime included
Immigr – dichotomous variable equal to one if individual is foreign-born
YSM6-10, YSM11-20, YSM20+ - years since migration: 6 to 10, 11 to 20, over 20 (benchmark: less than 6)
Language – dichotomous variable equal one if an individual names any official language of the country of residence as the first choice of the language spoken at home
Citizen – dichotomous variable equal to one if an individual is a citizen of the country of current residence

European Social Survey (2002-2009)

Dyadic and Country Characteristics
GDP pc – GDP per capita, PPP-adjusted, divided by 1000. *World Bank Development Indicators, 2010.*
Gini – Gini coefficient. *UN Statistics Division, 2010; WIDER World Income Inequality Database (2010)*
Educ qual – quality of schooling, measured as average test scores in mathematics and science, primary through end of secondary school, scaled to PISA scale and divided by 1000. *Hanushek and Woessmann, (2009)*
Unempl – unemployment rate in a country. *OECD Statistical Database* (2011)
EPL - employment protection legislation index. *OECD Statistical Database* (2011); *Tonin (2007)*
TU - Trade union density: the ratio of wage and salary earners that are trade union members, divided by the total number of wage and salary earners. *OECD Statistical Database (2011)*
Shadow - percent of GDP produced in the informal sector. *Schneider(2007)*
Eligib- eligibility index of migration policies, ranging from 0 to 100 %. Are immigrants excluded from taking some jobs? *MIPEX (2010)*
LM integr - labor market integration index of migration policies, ranging from 0 to 100 %. What is the State doing to help immigrants adjust to the demands of the labor market? *MIPEX (2010)*
Antidiscr – composite index of antidiscrimination policies, ranging from 0 to 100 %. The index consists of 4 components: 1) is discrimination on the grounds of religion/belief, ethnicity/race and nationality punished? 2) In which areas of life does anti-discrimination law apply? 3) Enforcement: Are victims encouraged to bring forward the case? 4) – equality policies: what roles can equality bodies and the state play? *MIPEX (2010)*
Ldist – natural logarithm of the simple distance between most populated cities of two countries, in km.
Colony - dichotomous variable equal one if countries share a colonial past
Common Lang - dichotomous variable equal one if countries share a common language
Contiguity - dichotomous variable equal one if countries share a common border
GDP ratio – the ratio of destination country GDP per capita to origin country GDP per capita
Gini ratio – the ratio of destination country Gini index to origin country Gini index.

CEPII Distances and Geodesic Databases (2009)

Dummy variables for source regions: Africa, Middle East and North Africa (MENA), East Asia and Pacific (including New Zealand, Australia, Japan), South Asia, Latin American and Caribbean, Eastern and Central European, Western European and North American (benchmark category)

Table A6 : Descriptive Statistics

Variable	Native Born		Immigrants	
	Mean	*St.Dev.*	*Mean*	*St.Dev.*
Individual-specific characteristics				
Exp	22.394	12.118	22.277	11.498
Exp sq	648.307	582.432	628.430**	553.499
Male	0.521	0.500	0.530	0.499
Hhmmb	2.899	1.341	2.953**	1.438
Married	0.565	0.496	0.607***	0.488
Divorced	0.104	0.305	0.120***	0.325
Ethnic Min	0.022	0.146	0.282***	0.450
Past Unempl	0.087	0.281	0.116***	0.321
TU mem	0.355	0.478	0.252***	0.434
Hours worked	40.055	13.461	40.280	13.648
YSM6-10	-	-	0.147	0.354
YSM11-20	-	-	0.243	0.429
YSM20+	-	-	0.437	0.496
Language	-	-	0.703	0.457
Citizen	-	-	0.442	0.497
Dyadic factors				
Ldist	-	-	0.216	1.111
Colony	-	-	0.253	0.435
Common Lang	-	-	0.313	0.464
Contiguity	-	-	0.365	0.482
GDP ratio	-	-	3.660	4.564
Gini ratio	-	-	0.894	0.166
Destination characteristics				
GDP pc dest	31.179	8.463	34.343***	12.490
Gini dest	30.522	4.093	31.677***	3.727
Educ qual dest	4.976	0.159	4.965	0.184
EPL dest	2.296	0.588	2.334*	0.637
Unempl dest	7.155	2.841	6.569**	2.417
TU dest	36.525	21.770	32.519***	19.859
Shadow dest	16.545	4.169	15.775***	5.057
Eligib	-	-	55.767	29.687
LM integr	-	-	58.213	27.792
Antidiscr	-	-	57.407	21.661
Origin characteristics				
GDP pc origin	-	-	13.802	10.658
Gini origin	-	-	36.477	7.370
Educ qual origin	-	-	3.475	2.056
Africa	-	-	0.039	0.195
MENA	-	-	0.117	0.321
LA Carib	-	-	0.069	0.254
East Asia Pacific	-	-	0.032	0.175
South Asia	-	-	0.045	0.208
East Central Europe	-	-	0.297	0.457
Sample size	59477		4425	

Notes. 1. The sample includes males and females aged 20 to 65.
2. The symbols (***), (**), (*) represent statistical significance of 1% , 5% , and 10% respectively of differences in means of individual characteristics, based on a t-test for differences of sample means.
3. Source: authors' calculations based on the ESS.

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