How much can you take with you? The role of education in explaining differences in the risk of unemployment between migrants and natives

Héctor Cebolla-Boado, María Miyar-Busto and Jacobo Muñoz-Comet[*]

* Correspondence: jmcomet@poli.
uned.es
UNED, Departamento de Sociología
II (Social Stratification), Calle del
Obispo Trejo 2, 28040 Madrid, Spain

Abstract

This paper looks at how migrants with different skill profiles make use of their education in order to avoid unemployment compared with natives in three European countries with significantly different labour markets and policies for attracting highly skilled migration: France, Spain and the UK. The paper also explores the role played by the quality of the education migrants and natives received in accounting for these differentials, an explanation rarely tested in the literature due to a lack of appropriate data. We here use PIAAC data (OECD), which for the first time offers an interesting proxy of the quality of education, namely the cognitive skills of a representative sample of adult workers in our selected countries. The paper reaches three clear conclusions. Firstly, that it is among the most educated that inequality in obtaining returns to education by migrant status reaches a maximum. Secondly, that there are important differences in how this happens across countries, with the UK minimizing migrant-native differentials when compared with France and Spain. And that thirdly, and most surprisingly, differences in cognitive abilities, our proxy of the quality of education, are somewhat irrelevant in explaining this inequality.

Keywords: Labour market returns to education, Unemployment, High-skilled migration, Low-skilled migration, Cognitive skills, Quality of education, France, Spain, UK

Introduction

This paper explores how migrants and natives with different skill profiles obtain unequal labour market returns from their education, and whether quality of education contributes to explaining this inequality. Specifically, we study how education helps migrants and natives avoid unemployment. This dependent variable is the cornerstone of migrants' labour market integration. The focus on this outcome is especially appropriate in a context of economic crisis. Alternative dependent variables such as quality of employment would mean restricting the analysis to those who are effectively working, representing a positively selected sample. On the other hand, analyzing the risk of being unemployed is important insofar as among the immigrant population the experience of unemployment is a strong determinant of intergenerational social mobility (Platt, 2005).

More specifically, our paper has a twofold objective. On the one hand, we seek to reveal the educational profile of those migrant workers who are less able to use their credentials to avoid unemployment relative to comparable natives. Whilst important international differences exist in how education is transferred across international borders,[1] literature has largely focused on how the best educated migrants suffer a higher risk than natives of experiencing unemployment, over-qualification (Chiswick, Cohen, & Zach, 1997; Heath & Cheung, 2006) and lower wages (Clark & Drinkwater, 2008; Friedberg, 2000). While previous research has focused on either low (Hall & Farkas, 2008) or highly skilled (Arbeit & Warren, 2013; Kaushal, 2011; Tong, 2010) immigrant and native workers, here we jointly look at the performance of workers with different levels of formal qualifications.

On the other hand we explore the role of cognitive skills in explaining this inequality by migrant status. Among the diverse explanations given in the literature, it is sometimes argued that the different (often lower) quality of education brought by migrants from their countries of origin plays an important role in producing this disadvantage. Furthermore, proxying the quality of education migrants obtained is indeed a complicated empirical endeavour, which explains why this argument is most often used ex post to account for unexplained residuals in multivariate analysis. Evaluation of the quality of education provided by the national organizations of schooling has, since the 1990s, generated a growing body of research accounting for international variation in the overall performance of students in different countries. Following other scholars who examine the determinants of schooling quality (Altinok & Murseli, 2007; Lee & Barro, 2001), we understand quality of education as an aggregate dimension of the school system that will be reflected in average student learning results, which in turn are revealed in mean test scores. For the first time, a high quality large scale comparative dataset —the Programme for the International Assessment of Adult Competencies (PIAAC) survey, carried out in 2012— allows us to use cognitive skills among adult workers to empirically proxy this argument. Our analysis studies whether this uncommon feature of research into migrants' labour market performance contributes to explaining differences in how migrants and non-migrants use their education to avoid unemployment.

Our paper focuses on three European countries, which crucially represent different settings for migrants from different educational profiles. Both from the point of view of migration policies and the labour market, the UK is the most attractive setting for highly skilled migrants, with Spain being radically the opposite and France lying somewhere in between. Not by chance, Spain, and to a lesser extent France, have a significantly smaller stock of educated migrant workers than the UK. According to Organisation for Economic Co-operation and Development (OECD) data, the average number of years in education of migrants in 2012 was 13.7 in Spain, 14.7 in France and 17.5 in the UK. This last country is the European country with the most developed policy structures for attracting highly skilled migration. France has made some efforts along this line, which, in practice, remain almost rhetoric. Spain has shown no political sensibility in this matter whatsoever and basically lacks any formal policy intended to attract and manage highly skilled migration (Cebolla Boado et al., 2016). These three countries also represent radically different labour markets. According to Eurostat,

---

[1]In the US, immigrants with a PhD degree receive wages that are similar to or higher than those of natives, while in Canada they are disadvantaged. Similarly, foreign-born individuals in top professional occupations receive substantially higher wages than natives in the US but again do not in Canada (Bertoli & Rapoport, 2015).

unemployment in Spain was around 24.8% in 2012, far above France (9.8%) and the UK (7.9%). The unemployment gap between migrants and natives is also different across countries: whereas in Spain the difference between the unemployment rate of migrants and natives was of 11.6 percentage points (34.5% of migrants and 22.9% of natives were unemployed), the difference in France was only 6.2 pp. (14.9% and 8.7% for migrants and natives) and only 1.5 pp. in the UK (9.3% migrants and 7.8% natives). Testing our arguments in such different national settings increases the robustness of our analyses.

What do we know about migrants' returns to education?

At the risk of oversimplifying already elaborated and complex academic traditions, it can be argued that the broader literature on returns to education originally pointed towards two threads of theoretical elaboration. (1) On the one hand, *human capital theory* suggests that education and the improvement in cognitive skills that it implies, increase productivity. This corresponds directly with the view of employers, unless externalities distort their perceptions. (2) Signalling and screening theories suggest that employers use different signals, such as education, to estimate the productivity of potential employees as well as other unobserved characteristics such as motivation or potential to learn (Sakamoto & Powers, 1995; Spence, 1973). According to Arcidiacono, Bayer, and Hizmo (2008) the distribution of wages among recent graduates mostly reflects inequalities in cognitive abilities, implying that employers have some ability to differentiate between the skills of workers with high educational credentials. From the point of view of this second tradition, workers signal their unobserved abilities through education before they provide direct evidence of their productivity.

Above and beyond these general discussions about returns to education, economic immigrants are, to a large extent, disadvantaged in most advanced societies, a regularity that has been confirmed for different outcomes, including their labour market performance (Reyneri & Fullin, 2011). There are, however, many differences in immigrants' labour market performance across host countries. This is partly due to different configurations of institutions in destination countries, including the approach to integration (Cebolla-Boado & Finotelli, 2015), labour markets (Piore, 1975; Reid & Rubin, 2003), regimes of credential recognition, general attitudes towards immigration and the size of the informal economy.

In this context, a growing literature investigates how migrant and native workers with different skill profiles are able to obtain returns to their education (Arbeit & Warren, 2013; Hall & Farkas, 2008; Kaushal, 2011; Tong, 2010). It is well documented that education obtained at origin and experience in the labour market prior to migration may not be sufficiently valued in destination, and that they may not provide equivalent returns at destination. For instance, employers do not always value educational credentials from migratory countries, and administrations do so only after a lengthy process of formal recognition of foreign degrees (Bratsberg & Terrell, 2002; Li, 2001; OECD, 2007). This may explain why, in the short run, immigrants face obvious difficulties in maximizing the returns they obtain from their education (Friedberg, 2000; Simón, Ramos, & Sanromá, 2014), especially in times of economic crisis (Cebolla-Boado, Miyar-Busto, & Muñoz-Comet, 2015). Not by chance, it has often been suggested that these inequalities in returns explain most of the earnings divergence between migrants and autochthonous workers (Lam & Liu, 2002a; Lam & Liu, 2002b).

Research has suggested a plethora of reasons for why migrants and natives are not equally able to obtain identical labour market benefits from their educational investments. The most straightforward argument relates to discrimination (Kaas & Manger, 2012; Moore, 2010). A mechanism particularly affecting highly educated migrants would be the existence of a glass ceiling which prevents them from accessing the most prestigious occupations, and ultimately insider positions in segmented labour markets (Dell'Aringa, Lucifora, & Pagani, 2012; Zeng & Xie, 2004). However, research on the role played by discrimination is endless in debates and subject to diverse interpretations (Heath & Cheung, 2007; Heath & McMahon, 1997).

The literature has given convincing explanations other than discrimination. Most of them could be systematised into three types of arguments: (A) the imperfect transferability of human capital due to the existence of country-specific knowledge or limited potential to activate foreign credentials; (B) difficulties for employers in establishing the abilities of workers with foreign credentials; and (C) differences in the quality of education acquired across countries of origin. While the first two arguments are frequently an integral part of empirical contrasts conducted in the specialized literature, the third is less so, partly because of the intrinsic difficulty in finding datasets that permit the modelling of the role of cognitive skills as a component of the educational background of workers.

a) The difficulties migrants face in transferring their human capital has been a matter of traditional concern among sociologists and economists (Borjas, 1986; Chiswick, 1978; Jasso & Rosenzweig, 1990). Transferring human capital from origin to destination is not straightforward (Friedberg, 2000). In particular, foreign credentials in certain areas such as for example Law, may not include the relevant competencies for local industries or businesses at destination (Lam & Liu, 2002a). There are limits to this statement. According to Kanas and Van Tubergen (2009, 2014), the smaller the cultural distance between origin and destination countries, the more transferable human capital is, an argument also applicable to education acquired in former colonial territories. On the other hand, migrants may lack the skills to activate their education because of language barriers and other similar impediments to settling in destination such as insufficient information regarding the host labour market. For example, there is evidence that immigrants from wealthier and English speaking countries obtain higher returns to education in the US (Bratsberg & Ragan, 2002). These difficulties should dissipate, at least in part, as time passes after arrival. While it is generally believed that greater time since arrival better helps lowly skilled migrants (Ou & Pong, 2013), others have documented a faster increase in migrants' wages among the most skilled as time since migration passes (Eckstein & Weiss, 1998). This could be due to ability to become more fluent in the host country language being higher among the highly skilled, which in turn implies an advantage in transferring their human capital when compared with their unskilled counterparts (Carliner, 2000). It also indicates that they may have fewer difficulties in identifying the assets they need to effectively compete in the labour market (Berman, Lang, & Siniver, 2003).

b) Signalling and screening theories (Spence, 1973) have some specific developments when applied to different skill profiles and credential origin diversity. First, not all levels of education simultaneously provide the same kind of accurate information about workers' skills. Tertiary education credentials might send more interpretable

signals than credentials held by less skilled workers (say, for instance, those with secondary education). For such workersemployers may need direct evidence of their productivity before setting their salaries. Second, preconceptions and misjudgments about the labour market value of migrants' educational credentials could drive employers to rely less on qualifications from certain countries as valid signals of skills or abilities, which also impacts on inequality in returns to education across ethnic group or migrant status (Bratsberg & Terrell, 2002; Li, 2001; Zeng & Xie, 2004). In most receiving countries, immigrants encounter more difficulties in maximizing the utility of their human capital due to unobserved differences in the 'value' of degrees (OECD, 2007, p. 134). These difficulties may vary depending on the country of origin of education and the postcolonial relation to countries of destination.

c)   Finally, and most importantly to this paper, the limited ability of migrant workers to equalize the returns they obtain from their educational investments with those of natives has also been linked to the education system in which migrants obtained their credentials (Hawthorne, 2005). Inequalities in returns to education between immigrant and native workers could be due to differences in the very quality of the education obtained in origin and destination (Loyalka et al., 2019). If that is the case, we would expect differences in the intrinsic value of educational credentials obtained in different countries (Card, 1999; Card & Krueger, 1992). For example, there is consistent evidence that employers and immigration officials in destination countries rate 'Western qualifications' more highly than others (Iredale, 2001). The value of educational credentials could correlate with indicators of the quality of education systems in countries of origin such as pupil-teacher ratios in primary schools, teachers' wages and expenditure per pupil in the country of origin (Bratsberg & Terrell, 2002). Employers may attribute less value to qualifications earned in less developed countries (Chaloff & Lemaitre, 2009). In Europe, Kanas and Van Tubergen (2009) noted that the probability of being employed among ethnic minorities in the Netherlands is not only higher for immigrants who obtain their diplomas at destination than for those who obtained them at origin, but also that there is significant heterogeneity within immigrant groups, with Turkish and Moroccan people lagging behind Surinamese and Antilleans. The same authors interpret these results as due to differences in the quality of education across countries of origin. Our paper provides consistent evidence for this literature by investigating the importance of quality of education in accounting for labour market returns.

Hypotheses

Relying on the dicussions reviewed above, we here develop two sets of hypotheses, one for each of our two research questions, namely the pattern of inequality in avoiding unemployment by migrant status across levels of education and the extent to which differences in the quality of education (cognitive skills) by migrant status help to explain this potential inequality.

H1.1: Compared to natives with similar levels of education, highly skilled migrants are less disadvantaged than lowly skilled ones because they have the necessary know-how to interpret the host country labor market. This is because highly skilled migrants possess assets that bring them greater success such as greater readiness to learn, more supportive social capital and more information about the functioning of social and institutional rules. Thus, this

hypothesis expects differentials between migrant and native workers to be at their maximum among the less skilled. We call this the *know-how hypothesis.*

H1.2: The human capital brought by the less educated is more easily transferred across borders since their most common occupations require less specialization. The different value that employers attribute to foreign credentials would more severely affect more skilled migrants. According to this second hypothesis we thus expect inequality between migrants and natives to be at its maximum among the highly skilled. We call this, the *specialization hypothesis.*

As we have argued, quality of education is often pointed to as a partial explanation for this potential inequality. Our paper provides insights regarding how quality may explain these differentials. Specifically, we formulate three hypotheses. While the first one is merely about the additive effect of quality of education, the second and third require an interaction between our proxy of quality and specific individual characteristics that may facilitate its use to avoid unemployment.

H2.1: The quality of the education brought from different countries may differ. The value of educational credentials hold by migrants and natives may explain why similar levels of education provide different levels of protection against unemployment. If this is the case, we expect the gap between migrants and natives to shrink after additively controlling for cognitive skills. We call this the *quality of education hypothesis.*

H2.2: Part of the knowledge education conveys can only be relevant in the context in which it was acquired and so, the quality of education might be more determinant in those fields of study that provide more transferable expertise. Degrees in law, humanities and the social sciences might be less directly applicable in destination than those in STEM disciplines (science, technology, engineering, and mathematics). For example, a credential in Law or Accounting is normally centered around the regulations that apply in each individual country. If this is the case, the quality of education may interplay with the field of study in boosting migrants' potential to maximize the returns they obtain from their education. Accordingly, migrants who have expertise in STEM fields of study may be more able to use their education as a valuable asset in the labour market if it was acquired in high quality education systems. Thus, we expect that the interaction between cognition and field of study (STEM) will reduce the gap between migrants and natives in preventing unemployment. We call this the *STEM-quality hypothesis.*

H2.3: Migrants often lack the appropriate language fluency or setting specific knowledge to obtain maximum returns from their educational credentials in avoiding unemployment. It is also known that some of these difficulties dissipate as time in the new labour market passes. We argue that the quality of education might be more determinant among migrants whose length of stay in destination is larger. Thus, the interaction between their cognition and time since migration may well reduce the gap between natives and migrants in avoiding unemployment. We call this *the adaptation-quality hypothesis.*

Data and methods

Comparative cross country analyses are hindered by difficulties in finding appropriate sources of empirical evidence which allow comparability using similar indicators to measure equivalent social processes. Recently, several international initiatives have provided this type of evidence, even if for a limited number of dependent variables. The OECD is a leading institution in this race for international comparability, as shown by its widely known datasets for the comparison of education systems (Programme for International Student Assessment [PISA]). Lately, the OECD has also developed a PISA-inspired survey for the study of skills

and competencies among the adult population, PIAAC, which was carried out between 2011 and 2012 in 24 countries and is used in this paper.

PIAAC measures the cognitive and workplace skills needed for individuals to participate in society and to prosper economically. All respondents carried out three skill tests, consisting of a test in numeracy, a reading test and a module on skills use. They also completed a background questionnaire. The direct assessment of skills included literacy, numeracy and reading components as well as a set of questions on problem solving in technology-rich environments. The module on skills use included cognitive skills, interactive and social skills, physical skills and learning skills. Finally, the background questionnaire included basic sociodemographic characteristics: education and training, linguistic background, employment status and income, use of Information and Communications Technology and literacy and numeracy practices.

The inclusion of cognitive skills in the analysis of returns to education allows us to control for possible differences in the quality of diverse national education systems when comparing immigrants and natives. Until now, lack of such information has been a problem in the literature on immigrants' integration. The questionnaire does not limit its content to cognitive skills but also collects a broad range of information, including home and community information. PIAAC has a number of insightful advantages, including the fact that it is valid cross-culturally and cross-nationally. Therefore, it can provide comparative analysis of skill formation and its outcomes in the international benchmarking of adult skills. Whereas this is a valuable dataset that allows to contrast arguments that are rarely tested, it also imposes a number of important limitations, including the fact that no information is available on experiences prior to migration, and, most importantly, we are unable to decompose our analysis to look at ethnic/country of origin differentials within the immigrant category. Inspite of these important shortcomings, we claim that the sort of analyses that this dataset allows remains innovative.

We restrict our analysis to three main destination countries in Europe: Spain, France and the United Kingdom. This allows us to cover three extremely different destination countries, with notable differences as well in how destination countries approach highly skill migration (Cebolla Boado et al., 2016). While immigration policies in the UK have generally facilitated the migration of highly skilled workers through alternative paths to those for mid and low skilled migrants, Spain has historically lacked this kind of specific tools and, to date, does not have meaningful alternatives for the most educated (or talented) migrants to have priority access to the country. France is somewhere in between these two polar models, with a strong formal commitment to attracting migrants with high levels of education, although it has generally had little success in doing so. Our total sample size amounts to 14,800 observations (Table 1), although we conduct separate analyses for each country involved. The sample includes natives and immigrants who exited the education system before migration. Immigrants with education finished in the destination country are excluded because they do not face problems derived from transferability of human capital.

Our dependent variable takes the value of 1 if the respondent is unemployed at the time of survey, and 0 otherwise. Whenever migrant workers are at a higher risk of experiencing unemployment than their equivalent native counterparts in each destination country, we can conclude that there is an imperfect transfer of their human capital or that, for reasons to be explored, there is no equality in the returns to education for migrants and autochthonous workers.

Table 1 Summary of sample sizes by migrant status and distribution of variables used in the analyses

	Natives			Immigrants		
	N	Mean	s.d.	N	Mean	s.d.
Spain						
Unemployment	3,627	0.21	0.41	446	0.30	0.46
Female	3,627	0.45	0.49	446	0.51	0.50
Age	3,627	40.0	11.50	446	39.1	9.5
Educational level	3,627	2.10	0.70	446	2.0	0.6
Years in education	3,544	13.8	6.20	415	12.4	4.5
Length of residence	3,627	19.7	12.5	446	9.4	6.4
Numeracy	3,627	254.2	47.4	446	210.0	59.1
Science	3,627	0.06	0.25	446	0.06	0.25
France						
Unemployment	4,372	0.10	0.30	249	0.16	0.36
Female	4,372	0.49	0.50	249	0.47	0.50
Age	4,372	40.8	11.8	249	45.6	9.9
Educational level	4,372	2.30	0.5	249	2.0	0.7
Years in education	4,277	14.8	5.3	212	12.6	5.1
Length of residence	4,372	20.0	12.8	249	17.5	11.2
Numeracy	4,372	266.5	51.5	249	197.7	64.1
Science	4,372	0.08	0.28	249	0.04	0.20
United Kingdom						
Unemployment	5,753	0.10	0.30	353	0.12	0.33
Female	5,753	0.54	0.49	353	0.54	0.50
Age	5,753	40.0	12.4	353	38.6	10.2
Educational level	5,753	2.3	0.6	353	2.4	0.7
Years in education	5,234	17.6	8.5	315	15.5	4.7
Length of residence	5,753	17.0	12.9	353	8.9	8.5
Numeracy	5,753	269.4	49.6	353	244.3	57.9
Science	5,753	0.11	0.31	353	0.09	0.28

Source: Authors' calculation based on 2012 PIAAC data

In order to make education comparable across countries, there are two options. One is to the International Standard Classification of Education (ISCED) and recodify it into the most analytically relevant categories for this paper: primary or less, secondary and tertiary education. Alternatively, one can use the number of years respondents spent in the education system. This proxy of formal education is a translation of the number of years respondents to PIAAC accumulated in reaching their highest educational credentials, regardless of the country in which they studied. Technically, this variable allows for a more flexible measurement of the processes we are interested in, although it does not come without difficulties, since migrants on the extremes of the range of values of this independent variable may be too few to provide consistent estimates. The presentation of results prioritizes visual tools with main tables provided in the Appendix. Figures with migrant-native differentials in the predicted probability of being unemployed are presented by level of education, using both categorical and continuous operationalizations.
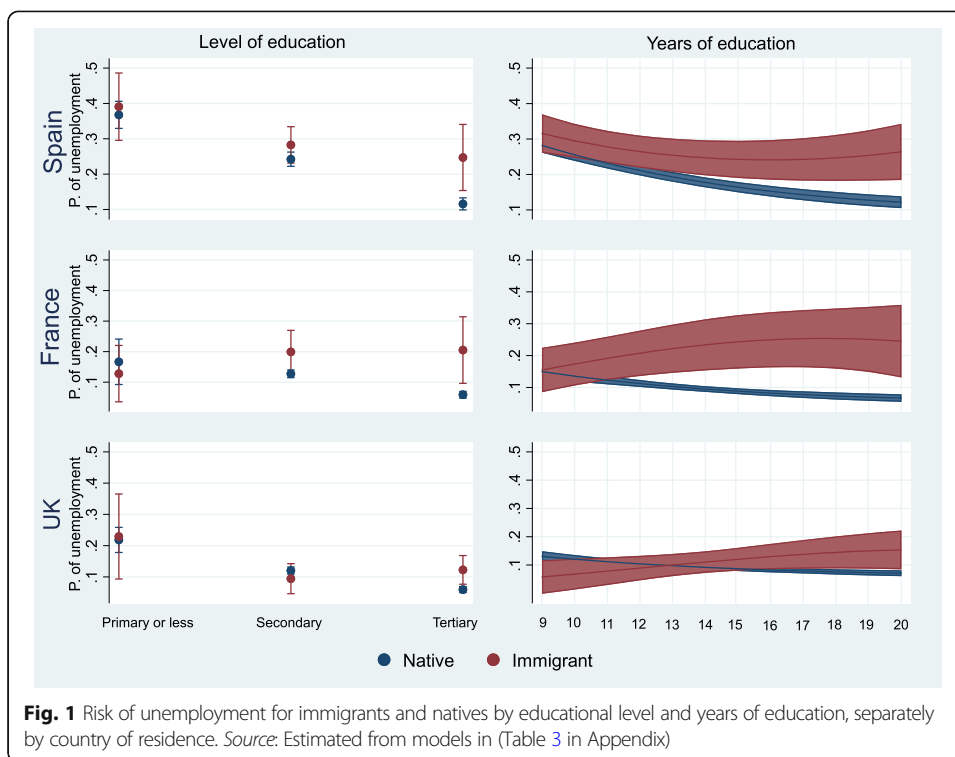
Our main analyses use logistic regressions, which seems a more suitable approach than linear probability in our specific case (Hellevik, 2009). Our empirical section is organized into two blocks. First, we explore differentials in the use that migrants and natives with different levels of education make of their credentials in preventing unemployment. Secondly, we explore the role of cognitive skills in accounting for these differentials. PIAAC data allow us to control for the quality of education as measured by numeracy and literacy tests, which represents a significant advantage when compared with other available datasets. Since social inequalities, and particularly those by national background, are less reflected in numeracy than in literacy, we opted to include only the first of these two test scores in our models. The OECD (2013) defines numeracy as the "ability to access, use, interpret and communicate mathematical information and ideas in order to engage in and manage the mathematical demands of a range of situations in adult life".

In order to distinguish between universal and country specific knowledge, we explore the impact of the broader field of study corresponding to the highest credential obtained by each individual; science/technology and mathematics vs. other areas (general programs, humanities, social sciences, etc.). Note that the specialization only applies to secondary and tertiary education. All statistical models are controlled for gender and age. Finally, we proxy the time of residence of migrants in destination through time in the host labour market. The advantage of using this variable is that it also provides meaningful values for natives. For them, the count starts at the moment individuals end their educational careers. For immigrants, their entrance into the labour market starts upon their arrival in destination.

Results

We first study whether disadvantage between migrants and natives differs across levels of education. Figure 1 shows the different risks of unemployment faced by migrant and native workers at different levels of education (as measured both by the standard classification and years in education) in France, Spain and the United Kingdom (results obtained from logit probability models; see Table 3 in the Appendix). These plots also show the confidence intervals together with the basic trend in order to be able to assess whether the differences detected are statistically significant. Since the sub-samples of respondents differ, the broader the area delimited for each year of education, the more limited is our ability to make clearer interpretations about the differences discussed. Several interesting conclusions can be obtained from a simple visual inspection of the panels in Fig. 1. For natives, as expected, in all three countries education shelters against unemployment. We see this in the negative slope of all line trends for these groups. Note, however, that this is not always the case for the immigrant population. It is so for migrants in the Spanish labour market, where unemployment is by far the highest of all, but not for migrants in France (with a positive slope) and Britain, where there is a flat unemployment rate across respondents' education.

Important country differences apply. Spain is the country in which education is a more effective antidote against unemployment. Yet, in said country we barely see differences (at least in terms of statistical significance) in the risk of unemployment among lowly skilled workers, regardless of their migrant status. In all three cases, the problem is more acute among highly skilled workers. Migrants with secondary education in France, and to a lesser extent in Spain too, are also disadvantaged even if, in this last case, uncertainty is widespread. In other words, it could be said that highly skilled migrants are the most disadvantaged when compared with

Fig. 1 Risk of unemployment for immigrants and natives by educational level and years of education, separately by country of residence. *Source*: Estimated from models in (Table 3 in Appendix)
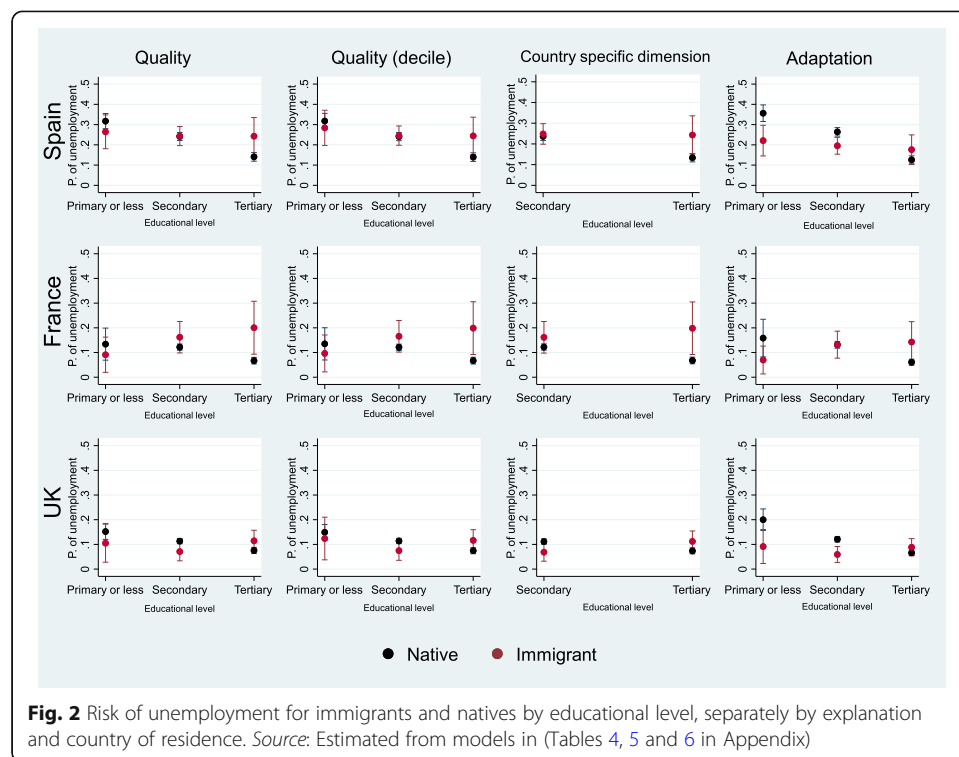
analogous natives. This is bad news if these two countries seek a secure position in the global race for talent, since potential migrants may anticipate this problem in maximizing their returns to education, and their enthusiasm for migration may therefore be reduced. This could also be a signal transmitted by destination labour markets regarding the employability of the highly skilled and the nature of job shortages.

These conclusions stand regardless of whether we use the categorical or the continuous specifications of education. Yet, when using years of education instead of dummies for the standard classification, our prediction is less stable among migrants with the highest level of education because of the low density of migrants in this position. Nonetheless, the trend confirms that there are smaller differences than expected in risk of unemployment for the least educated migrants in all countries. In no country is the rate of unemployment of the most qualified immigrant group above 20%, with this figure being lowest in the UK and highest in Spain (see Fig. 1). Notwithstanding, educated migrants are much more disadvantaged compared with equivalent natives than unskilled ones. This is a sound confirmation of H1.2 (*specialization hypothesis*), namely that the skills brought by less educated migrants are more transferable since workers require less specialization and, potentially, less country-specific know-how.

So far, our analysis has documented that highly skilled migrants are at a significant disadvantage in terms of their likelihood of being unemployed when compared with natives. As we said before, PIAAC is, to the best of our knowledge, the first multi-country dataset that allows us to use cognition to proxy the quality of education in accounting for the aforementioned pattern of migrant disadvantage. With that in mind, our paper uses the workers' PIAAC test scores to test hypotheses H2.1 to H2.3. The results are plotted in Fig. 2.

The *quality of education hypothesis* (H2.1) argues that migrant-native inequality in using education against unemployment is basically due to differences in the quality of education migrants obtained in countries of origin when compared with that of natives. This is tested

Fig. 2 Risk of unemployment for immigrants and natives by educational level, separately by explanation and country of residence. *Source*: Estimated from models in (Tables 4, 5 and 6 in Appendix)

using a linear approach to numeracy cognitive skills as well as decomposing numeracy test scores into deciles to allow for non-linearity (see Tables 4 and 6). As expected, cognitive skills (either linear or non-linearly) have a negative effect on the probability of being unemployed. Still, it is worth noting that the introduction of this variable in the models does not explain the worse situation migrants find themselves in when compared with natives. Moreover, the interaction between migrant status and being highly educated remains significant and does not shrink in the models estimated for Spain and France (models 1 and 2 in Tables 4 and 5). This represents a sound rejection of the *quality of education hypothesis* for these two countries. By contrast, the interaction capturing the specific effect of being an educated migrant in the UK turns out to be non-significant in the non-linear modelization of the impact of cognition (model 2 in Table 6). This may indicate that, at least partly, the reason why the most educated migrants are worse off in the UK may be to do with the quality of education brought by migrants. Yet, this is a very unstable and small effect.

The *STEM-quality hypothesis* (H2.2) suggests that differences between migrants and natives in how their credentials help them to avoid unemployment may not only reflect differences in the quality of education but also problems in transferring part of their context specific skills. Migrants with expertise in more transferable fields of study (STEM) may be more able to use their education if trained in high quality education systems (i.e. those showing higher test scores). The test of this hypothesis requires controlling for a two-way interaction between cognitive skills and field of study. The results are graphically summarized in Fig. 2, where workers with primary education or less have been dropped because for them there is no field of study distinction. It is evident from the plot that the relatively worse position of migrants and, specifically, that of the most educated migrants in France and Spain does not end after controlling for this interactive argument.

Finally, the *adaptation-quality hypothesis* (H2.3) suggests that the impact of the quality of education may be larger as time since migration passes, since it helps migrants gain activation tools such as language abilities, social networks or overcome difficulties in the process of degree recognition, and that migrants with better cognitive outcomes may well find this convergence easier than those with lower test scores. Thus, the test of this hypothesis requires an interaction between cognitive outcomes and time in the labour market. In all three countries length of time in the labour market reduces unemployment, but we do not find any evidence that workers with better cognitive skills improve their labour market outcomes more quickly. Yet, the inclusion of this information in the estimation through an additive variable or an interaction with cognitive scores does not make the migrants' disadvantage dissapear in the models corresponding to France and Spain. The same occurs with the greater difficulties in avoiding unemployment faced by most skilled migrants compared with similarly educated natives.

Note that the last two hypotheses have also been tested using threeway interactions, which should reveal how differently the aforementioned processes operate. While the results of these models are not presented in this document, they are available upon request. In no case are significant interactions between migrant status, test scores and STEM expertise or time in the host labour market to be found.

Conclusions and discussion

Our paper has revealed that it is the most skilled migrants that suffer the largest disadvantage compared with natives when it comes to using educational credentials to prevent unemployment. We have confirmed that this pattern generally applies to three different European destination countries with largely differentiated traditions of accommodating skilled migrants. While many papers in this literature have looked at the specific situation of low, mid or highly skilled migrants, we provide a joint description of the situation across levels of education.

Our paper sets out different theoretical expectations, suggesting that differentials in the returns to education could be most accentuated among the low and highly skilled, and found a strong confirmation of what we called *specialization hypothesis*, namely that it is immigrants with the lowest levels of education that most easily transfer their human capital across borders, while more educated migrant workers have greater difficulty converging with their native counterparts in obtaining returns to their educational investments. In an era frequently framed as a 'global race for talent', where all developed and developing economies seek to attract highly skilled migrants and the best educated workers from the international pool of talent, it is striking that the best educated migrants are significantly disadvantaged when compared with other migrants in terms of their ability to obtain returns from education. Of course, this does not mean that they are in a worse absolute position. Education shelters workers from unemployment, but it does so in a less effective relative manner for skilled than for unskilled migrant workers.

To the best of our knowledge, our paper is the first to document the role that differences in the quality of education play in generating this inequality. PIAAC allows us, for the first time, to explore the value of education (years of education or educational credentials) in the light of the proven cognitive skills of adults, which we took as a proxy of the quality of education. Our evidence proves, also for the first time, that controlling for cognitive abilities does not fully account for migrant-native differentials

Table 2 Summary of the effects on high skilled (with tertiary education) migration unemployment across destination countries

	Indep. Var.	
	Unconditional	Controlled
Spain	Disadvantaged (*) if > 11 years	Disadvantaged compared to natives
France	Disadvantaged (*) if > 12 years	Disadvantaged compared to natives
UK	Disadvantaged (*) if > 18 years	Disadvantaged compared to natives

in risk of being unemployed. Furthermore, we also explore whether the role of quality of education is different for those migrants with more directly transferable knowledge (expertise in STEM disciplines) and those with more experience in their country of destination (time since incorporation into the host labour market). We prove that the interactions between test scores and field of study or time in the host labour market do little to explain why migrants systematically obtain lower returns to their education.

Interestingly, there are remarkable differences between countries. The UK is the country that makes the best use of the migrant human capital it attracts. While the pattern of more educated migrants being more disadvantaged relative to comparable natives also applies in the UK, the differences in said country are either smaller or not statistically significant. France lies somewhere between the UK and Spain, although closer to the latter than the more successful UK. The following Table 2 summarizes the results of our substantive general findings and the between-country findings.

Indeed, it is difficult to account for these differences without making recourse to very casuistic analysis of the labour market institutions in all three countries. Yet, there are two types of arguments that can guide future research. On the one hand, policies, and more specifically policies for highly skilled migration, are importantly different across European countries and the countries in our analysis. While the UK has traditionally had more elaborated and developed policies for dealing with highly skilled migrants, easing family reunification for newcomers with high skills for example, France merely reproduces this type of rhetoric in its laws without ever really enforcing a system for regulating the arrival of highly skilled migrants. Finally, Spain has been absent from this logic, as have other Southern European countries (Cebolla Boado et al., 2016).

The second argument is somewhat connected to this first point. Different market conditions, but also different policies for the management of flow, could impact on the selectivity of flows. In the case of the UK, the combination of a labour market, which our analysis has shown to be more dynamic, and a more developed policy scheme for highly skilled migration, could position the country as a leading player in attracting positively selected, highly skilled migrants who are considering migrating to Europe, at least among the countries included in this analysis.

Future research into migrant native inequalities in obtaining returns to education should look beyond national borders and include these important international aspects in mainstream empirical research.

Appendix

Table 3 Logistic regression on the probability of being unemployed vs. employed (ref.). Gross models (0) controlling separately for educational level and time of education

	Spain		France		UK	
	Level	Time	Level	Time	Level	Time
Native (ref.)						
Immigrant	0.104	0.137	−0.319	−3.420**	0.067	−4.259*
	(0.232)	(0.662)	(0.513)	(1.427)	(0.433)	(2.337)
Primary education (ref.)						
Secondary	− 0.625***		−0.324		− 0.746***	
	(0.107)		(0.289)		(0.141)	
Tertiary	−1.545***		−1.188***		− 1.535***	
	(0.125)		(0.302)		(0.155)	
Ethnic orirgin#Education						
Immigrant**#**Secondary	0.115		0.869		−0.345	
	(0.274)		(0.567)		(0.527)	
Immigrant**#**Tertiary	0.844**		1.772***		0.746	
	(0.364)		(0.633)		(0.496)	
Age	−0.041***	−0.046***	− 0.040***	− 0.040***	− 0.045***	− 0.046***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Male (ref.)						
Female	0.070	0.039	0.254***	0.231**	−0.206**	−0.270***
	(0.079)	(0.080)	(0.098)	(0.100)	(0.086)	(0.093)
Years of education		−0.227***		− 0.192***		− 0.154***
		(0.023)		(0.037)		(0.026)
Immigrant#Years of education		−0.028		0.496**		0.465*
		(0.091)		(0.201)		(0.269)
Years of education^2		0.004***		0.004***		0.003***
		(0.001)		(0.001)		(0.001)
Immigrant#Years of education^2		0.004		−0.012*		−0.010
		(0.003)		(0.007)		(0.007)
Constant	1.029***	2.487***	−0.170	1.138***	0.539***	1.078***
	(0.174)	(0.267)	(0.350)	(0.412)	(0.206)	(0.297)
Observations	4,073	3,959	4,621	4,489	6,106	5,549

Standard errors in parentheses
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 4 Logistic regression on the probability of being unemployed. Explanations for the ethnic gap between natives and immigrants settled in Spain

	Quality (M1)	Quality (decile) (M2)	Country specific (M3)	Adaptation (M4)
Native (ref.)				
Immigrant	− 0.274	− 0.171	0.068	− 0.714***
	(0.241)	(0.243)	(0.152)	(0.253)
Primary education (ref.)				
Secondary	−0.404***	− 0.409***		− 0.463***
	(0.111)	(0.112)		(0.114)
Tertiary	−1.103***	−1.116***	−0.731***	−1.422***
	(0.139)	(0.140)	(0.111)	(0.144)
Ethnic origin#Education				
Immigrant#Secondary	0.288	0.200		0.300
	(0.279)	(0.282)		(0.280)
Immigrant#Tertiary	0.982***	0.898**	0.703**	1.126***
	(0.370)	(0.373)	(0.320)	(0.370)
Age	−0.045***	−0.044***	−0.045***	
	(0.004)	(0.004)	(0.004)	
Men (ref.)				
Women	−0.021	−0.020	− 0.005	−0.034
	(0.081)	(0.081)	(0.092)	(0.081)
Numeracy	−0.007***		−0.006***	−0.005***
	(0.001)		(0.001)	(0.001)
Numeracy decile 1 (ref.)				
Decile 2		−0.254		
		(0.174)		
Decile 3		−0.518***		
		(0.179)		
Decile 4		−0.593***		
		(0.181)		
Decile 5		−0.480***		
		(0.182)		
Decile 6		−0.807***		
		(0.190)		
Decile 7		−0.819***		
		(0.190)		
Decile 8		−0.810***		
		(0.197)		
Decile 9		−1.124***		
		(0.201)		
Decile 10		−1.164***		
		(0.212)		
Sciences			−2.389*	
			(1.271)	
Sciences#Numeracy			0.008*	
			(0.004)	

Table 4 Logistic regression on the probability of being unemployed. Explanations for the ethnic gap between natives and immigrants settled in Spain *(Continued)*

	Quality (M1)	Quality (decile) (M2)	Country specific (M3)	Adaptation (M4)
Time in LM				−0.023
				(0.015)
Time#Numeracy				−0.000
				(0.000)
Constant	2.665***	1.655***	2.071***	1.487***
	(0.286)	(0.224)	(0.347)	(0.374)
Observations	4,073	4,073	3,344	4,073

Standard errors in parentheses
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 5 Logistic regression on the probability of being unemployed. Explanations for the ethnic gap between natives and immigrants settled in France

	Quality (M1)	Quality (decile) (M2)	Country specific (M3)	Adaptation (M4)
Native (ref.)				
Immigrant	−0.446	− 0.394	0.337	− 0.943*
	(0.516)	(0.516)	(0.252)	(0.524)
Primary education (ref.)				
Secondary	−0.111	−0.128		−0.227
	(0.297)	(0.299)		(0.304)
Tertiary	−0.788**	−0.794**	− 0.663***	− 1.092***
	(0.327)	(0.325)	(0.134)	(0.334)
Ethnic origin#Education				
Immigrant#Secondary	0.788	0.771		0.948*
	(0.569)	(0.570)		(0.572)
Immigrant#Tertiary	1.734***	1.669***	0.924**	1.907***
	(0.634)	(0.638)	(0.443)	(0.637)
Age	−0.041***	−0.041***	− 0.042***	
	(0.004)	(0.004)	(0.004)	
Men (ref.)				
Women	0.212**	0.208**	0.249**	0.214**
	(0.099)	(0.099)	(0.102)	(0.099)
Numeracy	−0.004***		−0.004***	− 0.004**
	(0.001)		(0.001)	(0.002)
Numeracy decile 1 (ref.)				
Decile 2		−0.136		
		(0.215)		
Decile 3		−0.358		
		(0.220)		
Decile 4		−0.328		
		(0.219)		
Decile 5		−0.476**		
		(0.230)		
Decile 6		−0.386*		
		(0.222)		
Decile 7		−0.444*		
		(0.230)		
Decile 8		−0.351		
		(0.232)		
Decile 9		−0.736***		
		(0.256)		
Decile 10		−0.804***		
		(0.267)		
Sciences			1.348	
			(1.227)	
Sciences#Numeracy			−0.005	
			(0.004)	

Table 5 Logistic regression on the probability of being unemployed. Explanations for the ethnic gap between natives and immigrants settled in France *(Continued)*

	Quality (M1)	Quality (decile) (M2)	Country specific (M3)	Adaptation (M4)
Time in LM				−0.049**
				(0.019)
Time#Numeracy				0.000
				(0.000)
Constant	0.571	0.055	0.444	0.058
	(0.414)	(0.364)	(0.349)	(0.532)
Observations	4,621	4,621	4,417	4,621

Standard errors in parentheses
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 6 Logistic regression on the probability of being unemployed. Explanations for the ethnic gap between natives and immigrants settled in UK

	Quality (M1)	Quality (decile) (M2)	Country specific (M3)	Adaptation (M4)
Native (ref.)				
Immigrant	−0.451	−0.231	−0.557*	−0.965**
	(0.454)	(0.447)	(0.309)	(0.461)
Primary education (ref.)				
Secondary	−0.362**	−0.331**		−0.637***
	(0.147)	(0.149)		(0.159)
Tertiary	−0.834***	−0.826***	− 0.475***	−1.333***
	(0.171)	(0.172)	(0.113)	(0.184)
Ethnic origin#Education				
Immigrant#Secondary	−0.088	−0.261		0.154
	(0.546)	(0.540)		(0.546)
Immigrant#Tertiary	0.937*	0.750	1.040***	1.299**
	(0.514)	(0.511)	(0.393)	(0.516)
Age	−0.046***	−0.046***	− 0.042***	
	(0.004)	(0.004)	(0.004)	
Men (ref.)				
Women	−0.318***	−0.310***	− 0.348***	−0.358***
	(0.088)	(0.088)	(0.094)	(0.088)
Numeracy	−0.010***		−0.011***	−0.010***
	(0.001)		(0.001)	(0.001)
Numeracy decile 1 (ref.)				
Decile 2		−0.534***		
		(0.169)		
Decile 3		−0.897***		
		(0.176)		
Decile 4		−0.892***		
		(0.177)		
Decile 5		−1.183***		
		(0.187)		
Decile 6		−1.205***		
		(0.189)		
Decile 7		−1.375***		
		(0.192)		
Decile 8		−1.582***		
		(0.208)		
Decile 9		−1.435***		
		(0.204)		
Decile 10		−1.716***		
		(0.220)		
Sciences			−0.830	
			(0.801)	
Sciences#Numeracy			0.004	
			(0.003)	

Table 6 Logistic regression on the probability of being unemployed. Explanations for the ethnic gap between natives and immigrants settled in UK *(Continued)*

	Quality (M1)	Quality (decile) (M2)	Country specific (M3)	Adaptation (M4)
Time in LM				−0.065***
				(0.018)
Time#Numeracy				0.000
				(0.000)
Constant	2.681***	1.234***	2.415***	2.062***
	(0.299)	(0.229)	(0.325)	(0.376)
Observations	6,106	6,106	5,572	6,106

Standard errors in parentheses
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

References
Altinok, N., & Murseli, H. (2007). International database on human capital quality. *Economics Letters*, *96*(2), 237–244.
Arbeit, C. A., & Warren, J. R. (2013). Labor market penalties for foreign degrees among college educated immigrants. *Social Science Research*, *42*(3), 852–871.
Arcidiacono, P., Bayer, P., & Hizmo, A. (2008). *Beyond signaling and human capital: Education and the revelation of ability* (NBER Working Paper No. 13951). Retrieved from http://www.nber.org/papers/w13951.
Berman, E., Lang, K., & Siniver, E. (2003). Language-skill complementarity: Returns to immigrant language acquisition. *Labour Economics*, *10*(3), 265–290.
Bertoli, S., & Rapoport, H. (2015). Heaven's swing door: Endogenous skills, migration networks, and the effectiveness of quality-selective immigration policies. *The Scandinavian Journal of Economics*, *117*(2), 565–591.
Borjas, G. J. (1986). Self-selection and the earnings of immigrants. *The Journal of Human Resources*, *21*, 485–506.
Bratsberg, B., & Ragan, J. F. (2002). The impact of host-country schooling on earnings: A study of male immigrants in the United States. *Journal of Human Resources*, *37*(1), 63–105.
Bratsberg, B., & Terrell, D. (2002). School quality and returns to education of US immigrants. *Economic Inquiry*, *40*(2), 177–198.
Card, D. (1999). The causal effect of education on earnings. *Handbook of Labor Economics*, *3*, 1801–1863.
Card, D., & Krueger, A. (1992). Does school quality matter? Returns to education and the characteristics of public schools in the United States. *Journal of Political Economy*, *100*(1), 1–40.
Carliner, G. (2000). The language ability of US immigrants: Assimilation and cohort effects. *International Migration Review*, *34*(1), 158–182.
Cebolla Boado, H., Pinyol, G., Consterdine, E., Eremenko, T., Jolivet-Guetta, M., & Molinero Gerbeau, Y. (2016). *Inventory of programs aimed at attracting High-Skilled migration to the EU* (TEMPER Working Paper Series, WP 4). Retrieved from http://www.temperproject.eu/wp-content/uploads/2016/09/Working-Paper-4.pdf.
Cebolla-Boado, H., & Finotelli, C. (2015). Is there a north–south divide in integration outcomes? A comparison of the integration outcomes of immigrants in southern and northern Europe. *European Journal of Population*, *31*(1), 77–102.
Cebolla-Boado, H., Miyar-Busto, M., & Muñoz-Comet, J. (2015). Is the Spanish recession increasing inequality? Male migrant-native differences in educational returns against unemployment. *Journal of Ethnic and Migration Studies*, *41*(5), 710–728.
Chaloff, J., & Lemaitre, G. (2009). *Managing highly-skilled labour migration: A comparative analysis of migration policies and challenges in OECD countries*. Paris: Organisation for Economic Cooperation and Development (OECD).
Chiswick, B. R. (1978). The effect of americanization on the earnings of foreign-born men. *The Journal of Political Economy*, *86*(5), 897–921.
Chiswick, B. R., Cohen, Y., & Zach, T. (1997). The labor market status of immigrants: Effects of the unemployment rate at arrival and duration of residence. *Industrial & Labor Relations Review*, *50*(2), 289–303.
Clark, K., & Drinkwater, S. (2008). The labour-market performance of recent migrants. *Oxford Review of Economic Policy*, *24*(3), 495–516.

Dell'Aringa, C., Lucifora, C., & Pagani, L. (2012). *A 'glass-ceiling' effect for immigrants in the Italian labour market?* (SSRN Scholarly Paper ID 2066978). Rochester: Social Science Research Network.

Eckstein, Z., & Weiss, Y. (1998). *The absorption of highly-skilled immigrants: Israel, 1990-1995 CEPR Discussion Paper,* 1853.

Friedberg, R. (2000). You can't take it with you? Immigrant assimilation and the portability of human capital. *Journal of Labor Economics*, *18*(2), 221–251.

Hall, M., & Farkas, G. (2008). Does human capital raise earnings for immigrants in the low-skill labor market? *Demography*, *45*(3), 619–639.

Hawthorne, L. (2005). 'Picking winners': The recent transformation of Australia's skilled migration policy. *International Migration Review*, *39*(3), 663–696.

Heath, A.F, & McMahon D. (1997). Education and occupational attainment: The impact of ethnic origins. In A.H. Halsey, H. Lauder, P. Brown, & A.S. Wells (Eds.), *Education: Culture, Economy and Society,* pp. 646–62. Oxford: Oxford Univ. Press.

Heath, A., & Cheung, S. Y. (2006). *Ethnic penalties in the labour market: Employers and discrimination.* ORCA, Online Research @ Cardiff. Retrieved from http://orca.cf.ac.uk/56299/.

Heath, A., & Cheung, S. Y. (2007). The comparative study of ethnic minority disadvantage. In A. Heath, & S. Y. Cheung (Eds.), *Unequal chances: Ethnic minorities in Western labour markets*. Oxford: Oxford University Press.

Hellevik, O. (2009). Linear versus logistic regression when the dependent variable is a dichotomy. *Quality & Quantity*, *43*(1), 59–74.

Iredale, R. (2001). The migration of professionals: Theories and typologies. *International Migration*, *39*(5), 7–26.

Jasso, G., & Rosenzweig, M. R. (1990). *The new chosen people: Immigrants in the United States.* Russell Sage Foundation.

Kaas, L., & Manger, C. (2012). Ethnic discrimination in Germany's labour market: A field experiment. *German Economic Review*, *13*(1), 1–20.

Kanas, A., & Van Tubergen, F. (2009). The impact of origin and host country schooling on the economic performance of immigrants. *Social Forces*, *88*(2), 893–915.

Kanas, A., & Van Tubergen, F. (2014). The conditional returns to origin-country human capital among Turkish and Moroccan immigrants in Belgium. *Social Science Research*, *46*, 130–141.

Kaushal, N. (2011). Earning trajectories of highly educated immigrants: Does place of education matter? *Industrial & Labor Relations Review*, *64*(2), 323–340.

Lam, K. C., & Liu, P. W. (2002a). Earnings divergence of immigrants. *Journal of Labor Economics*, *20*(1), 86–104.

Lam, K. C., & Liu, P. W. (2002b). Relative returns to skills and assimilation of immigrants in Hong Kong. *Pacific Economic Review*, *7*(2), 229–243.

Lee, J., & Barro, R. J. (2001). Schooling quality in a cross-section of countries. *Economica*, *68*(272), 465–488.

Li, P. S. (2001). The market worth of immigrants' educational credentials. *Canadian Public Policy/Analyse de Politiques*, *27*(1), 23–38.

Loyalka, P., Liu, O. L., Li, G., Chirikov, I., Kardanova, E., Gu, L., … Hu, S. (2019). Computer science skills across China, India, Russia, and the United States. *Proceedings of the National Academy of Sciences, 11*(14), 6732–6736.

Moore, T. S. (2010). The locus of racial disadvantage in the labor market. *American Journal of Sociology*, *116*(3), 909–942.

OECD (2007). *International migration outlook.* Paris: OECD Publishing.

OECD (2013). *OECD skills outlook 2013: First results from the survey of adult skills*. Paris: OECD Publishing.

Ou, D., & Pong, S. L. (2013). Human capital and the economic assimilation of recent immigrants in Hong Kong. *Journal of International Migration and Integration*, *14*(4), 689–710.

Piore, M. J. (1975). Notes for a theory of labor market stratification. In R. C. Edwards, M. Reich, & D. M. Gordon (Eds.), *Labour Market Segmentation.*

Platt, L. (2005). The intergenerational social mobility of minority ethnic groups. *Sociology*, *39*(3), 445–461.

Reid, L. W., & Rubin, B. A. (2003). Integrating economic dualism and labor market segmentation. *The Sociological Quarterly*, *44*(3), 405–432.

Reyneri, E., & Fullin, G. (2011). Labour market penalties of new immigrants in new and old receiving west European countries. *International Migration*, *49*(1), 31–57.

Sakamoto, A., & Powers, D. A. (1995). Education and the dual labor market for Japanese men. *American Sociological Review*, *60*(2), 222–246.

Simón, H., Ramos, R., & Sanromá, E. (2014). Immigrant occupational mobility: Longitudinal evidence from Spain. *European Journal of Population*, *30*(2), 223–255.

Spence, M. (1973). Job market signaling. *The Quarterly Journal of Economics*, *87*(3), 355–374.

Tong, Y. (2010). Place of education, gender disparity, and assimilation of immigrant scientists and engineers earnings. *Social Science Research*, *39*(4), 610–626.

Zeng, Z., & Xie, Y. (2004). Asian-Americans' earnings disadvantage reexamined: The role of place of education. *American Journal of Sociology*, *109*(5), 1075–1108.

Publisher's Note