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How self-sorting affects migrants' labour market outcomes

Jon Pareliussen

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ECONOMICS DEPARTMENT

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By Jon Kristian Pareliussen

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ABSTRACT/RESUME**How self-sorting affects migrants' labour market outcomes**

Assuming that immigrants select destinations according to absolute returns to their observable and unobservable human capital, I present a human capital model of migration accounting for taxes, transfers and limited portability of skills. The model predicts both segmented sorting of migrants to countries with a compressed income distribution, with negative sorting increasing with lower portability and positive sorting increasing with portability. Sorting to countries with greater income dispersion increases unambiguously with host-country relevant skills. Migrants to countries with compressed incomes will hence be more likely to be either out of work or overqualified and low-paid compared to natives with similar observable skills, and compared to migrants to countries with greater income dispersion. Regressions results on data for 16 OECD countries from the OECD Survey of Adult Skills are in line with the model. Controlling for observable skills and characteristics, including a literacy test score, immigrants from countries that are less wealthy or further away in geographical and cultural distance are significantly more likely to be either out of work or overqualified and low-paid in high-benefit countries. Wage compression, generous transfers and high taxes, typical traits of the so-called “Nordic” or “Flexicurity” model, may therefore contribute to making immigrant integration more challenging.

Keywords: Migration, skills, self-sorting, employment, earnings, mismatch, Nordic model.

JEL: J15, J18, J24, J61.

Comment l'auto-orientation affecte les résultats des migrants sur le marché du travail

Supposant que les immigrants choisissent leurs destinations en fonction des rendements absolus de leur capital humain observable et inobservable, je présente un modèle des migrations basé sur le capital humain, prenant en compte les taxes, les transferts et la portabilité limitée des compétences. Le modèle prédit à la fois l'orientation positive et négative des migrants vers les pays à faible dispersion des revenus, l'orientation négative augmentant avec une portabilité plus faible. L'orientation vers les pays à plus forte dispersion des revenus augmente sans ambiguïté avec le niveau de compétences requises dans le pays hôte. Les migrants dans les pays à faible dispersion des revenus seront donc plus susceptibles d'être soit sans travail, soit surqualifiés et peu rémunérés par rapport aux autochtones ayant des compétences observables similaires et aux migrants vers les pays à plus forte dispersion des revenus. Les résultats de régressions sur les données de 16 pays de l'OCDE provenant de l'Enquête sur les compétences des adultes de l'OCDE sont conformes au modèle. En contrôlant pour les compétences et les caractéristiques observables, y compris un score de littératie, les immigrants originaires de pays moins riches ou plus distants géographiquement et culturellement sont beaucoup plus susceptibles d'être sans travail ou surqualifiés et peu rémunérés dans les pays à prestations sociales élevées. Compression des salaires, prestations généreuses et impôts élevés, les traits typiques du modèle dit «nordique» ou de «flexicurité» peuvent donc contribuer à rendre l'intégration des immigrants plus délicate.

Mots-clés: Migration, compétences, auto-orientation, emploi, revenus, inadéquation, modèle nordique.

JEL: J15, J18, J24, J61.

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HOW SELF-SORTING AFFECTS MIGRANTS' LABOUR MARKET OUTCOMES

By Jon Kristian Pareliussen¹

1. Introduction

People migrate in search of a better life for themselves and their families. In 2015, more than 50% of migrants were living in 10 wealthy countries, of which the United States alone accounted for almost 20% (United Nations, 2015). The extent to which migrants gain employment in their new home countries and to which earnings and employment correspond to their education level varies a lot between destination countries. Immigrants to OECD countries had average employment rates comparable to those of natives in 2012-13, and the employment rate of migrants increased by 1.3 percentage points from 2011 to 2014, compared with 0.5 percentage points for the native-born. Differences between countries are however substantial, with lower employment than natives within the European Union (EU), and higher in non-EU OECD countries. Migrants are more likely to work in less-skilled jobs and earn less than natives with similar qualifications. Observable characteristics, such as age, gender and education, can only explain part of the gap (OECD/European Union, 2015; OECD, 2015).

This paper sheds light on how the shape of the income distribution post taxes and transfers may interact with portability of skills to affect migrants' choices of destinations, and how these choices directly affect labour market outcomes. The Nordic flexicurity model with a compressed wage distribution and a generous social safety net works well for the native born whose skills are nurtured by high levels of schooling, generally of good quality and free of charge. High entry-level wages can be combined with high employment when productivity is high also in the low end of the human capital distribution. Migrants who arrive to these countries are on average less skilled than natives, because they have not benefitted from the comprehensive education system in these countries. This paper also argues that self-sorting yields a mix of migrants with lower observable skills, lower unobservable skills and lower portability of skills, than in countries with higher income dispersion post taxes and transfers (a higher skill premium). The very reasons why Nordic countries can combine high efficiency with high equity may in other words also make immigrant integration more challenging in these countries.

The widely used Roy income maximisation framework (Roy, 1951) shows that those individuals who can expect the highest returns to their skills abroad, net of migration costs, are the most likely to emigrate. Whether this skill-based self-selection increases the likelihood of migration for individuals who are less educated than the average in their countries of origin (negative selection) or for those who are more educated (positive selection) depends on returns to skills in the origin relative to the destination and the structure of migration costs. Low skills premiums in the destination country relative to the country of origin increase incentives to migrate for the low-skilled (Borjas, 1987, Kogan, 2007), but costs of migration may also be higher for the low-skilled (Chiswick, 1999). Borjas (1987) and Moraga (2011), amongst others, found evidence of negative self-selection from Mexico to the United States, but several studies covering a wide range of origins and destinations, including Mexico and the United States, report the contrary (see for example Chiquiar and Hanson, 2005; Grogger and Hanson, 2011; Bauernschuster et al, 2014; Dustmann and Okatenko, 2014; Hatton, 2014). An inverted U-shaped distribution of the propensity to migrate has also been proposed (intermediate selection), where the cost of migrating is high relative to earnings for the low-skilled, and the skills premium for the upper end of the skills distribution is high in the

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country of origin (Chiquiar and Hanson, 2005). This is also consistent with higher migration from middle-income countries than poorer and richer economies (Westmore, 2014).

Skills will not only affect the decision to emigrate or not. Migrants will also select the destinations where they maximise the return to their skills (self-sorting). Countries with large skill-related wage differences attract a higher share of the higher-educated migrants, while the less-educated tend to choose destinations with a lower skill premium. The empirical literature on self-sorting is less extensive than the literature on self-selection. Borjas *et al.* (1992) and Dahl (2002) examine self-sorting among internal migrants in the United States, and Westmore (2014) uses a gravity model to project future migrant flows to OECD countries. Grogger and Hanson (2011) show, by comparing pairs of destination and origin countries, that immigrants tend to self-sort on observable skills to destinations with high skills premiums, and that tax and transfer policies, by reducing the return to skills, have an important effect on the immigrant composition in destination countries.

The value of a particular set of skills may also vary between pairs of origin and destination countries. Migrants' human capital may be less relevant in the host country than that of natives for a number of reasons, including differences in educational quality, bureaucratic impediments to receive recognition of formal qualifications, low language fluency, lack of networks and knowledge of host country labour market functioning (Chiswick, 1978; Borjas, 1994; Friedberg, 2000; OECD/European Union, 2014). Furthermore, immigrants who only plan to stay temporarily may invest less in training and job search than natives, and employers may also reduce the amount of training they offer (Heath and Ridge, 1983; Dustman, 2000; Kalter and Kogan, 2006). Host-country specific human capital should, according to this hypothesis, be accumulated over time, and the disadvantages immigrants face should gradually diminish. But if immigrants are discriminated² against, or form part of homogeneous networks that only give access to information about jobs that are already in the ethnic community's domain, they may never catch up with natives (Portes and Rumbaut, 2001; Behtoui, 2007). Furthermore, immigrants who initially chose poor jobs to reduce job search costs might be caught in a vicious circle of low-status, badly paid, dangerous or unpleasant jobs, because of limited upwards mobility in the labour market (Portes, 1995; Heath, 2007).

The main contribution of this paper relates to a version of the Roy model that differs from the literature in that in addition to a one-off investment cost of migration, I include a broad measure of distance between the origin and destination countries that reduces the portability of skills, and hence reduces the productivity of a migrant in the destination permanently. Furthermore, I demonstrate non-linear effects of a compressed disposable income distribution, introduced in the model by explicitly accounting for taxes and transfers. By doing so, I combine different measures of migrants' labour market status with self-selection from origins and self-sorting to destinations in one single framework. I show that the presence of taxes and transfers leads to negative selection below a threshold determined by a migrants' skills level and the reduced portability of skills, and positive selection if skills adjusted for portability is above the threshold. A migrant may obtain a higher disposable income in the destination country even if her productivity is lower than in the country of origin, since disposable income is determined partly by own human capital, partly by the production structure in the country of residence, and partly by taxes and transfers. In the presence of taxes and transfers, the model predicts segmented migrant streams, where the highest skilled and the lowest skilled are overrepresented, as found by OECD and Statistics Canada (2000), and Kahn (2004). Migrants' limited portability of skills leads to lower employment, lower earnings and a higher incidence of qualification mismatch compared to natives with a similar level of formal education.

Introducing choice between different destination countries in the theoretical framework, I show that the choice of destination and subsequent labour market outcomes are independent of the wage level and

² Either pure "taste based" discrimination, or statistical discrimination, where decision makers in the lack of direct information, substitute individual characteristics by group averages.

tax-transfer structure in the country of origin. Migrants with the very lowest and least portable skills will choose destinations with compressed disposable incomes, and they will be out of work. Migrants with the very highest and most portable skills will choose destinations with dispersed disposable incomes (a higher skills premium), they will be employed, and the wage gap and incidence of overqualification will be lower than in high-tax high-benefit countries. The model allows for self-sorting resulting in more favourable labour market outcomes for migrants than natives with comparable observable characteristics.

Immigrants to destinations similar to their country of origin will only have an incentive to migrate if asymmetric shocks result in a wage differential between destination and origin country big enough to offset migration costs. The model predicts neither wage penalties nor mismatch among migrants from origin countries that are similar to the destination.

A further contribution is that I test the model on data from the OECD Survey of Adult Skills, known as the Programme for the International Assessment of Adult Competencies (PIAAC). The dataset gives the opportunity to compare how employment prospects, earnings prospects and job quality differ between 16 OECD countries when controlling for a rich set of socio-economic background variables, education and literacy proficiency. Comparable migrant data of such detail is relatively rare. Furthermore, the literacy test score accounts for language skills and cognitive abilities. Literacy proficiency measured in the host country language is arguably an important part of host-country relevant human capital, but such a measure is not available in most data sources.

The theoretical model is well suited for investigating both self-selection and self-sorting, but it also allows for testing self-sorting independently. I only test the model predictions on self-sorting, as the data does not allow for comparing the literacy skills and education of migrants with the population in the origin country. I test for differences in observable skills and labour market outcomes across destinations to uncover how sorting on observable and unobservable characteristics depends on the labour market structure in three destination country clusters. The results support the predictions from the theoretical model. Immigrants' labour market outcomes are significantly more favourable in countries with higher dispersion of disposable income, both for migrants from relatively similar countries, and from countries that are less wealthy and/or further away in geographical and cultural distance.

I run several consistency checks, and the results are robust across specifications. The results should nonetheless be interpreted with caution, since destination countries differ on several dimensions not related to skills premiums. Policies and traditions towards humanitarian and work immigration, and peer networks are for example not accounted for. Such factors would likely pull results in the direction found in this paper in a country like for example Sweden, with a long tradition of accepting humanitarian migrants. However, this is not an uncommon weakness in the related literature, and it is reasonable to assume that the economic considerations explored in this paper will affect the choice of destination once a decision to migrate is made. Furthermore, immigrants' literacy proficiency is measured after arrival in the host country, and even when controlling for the length of stay, this remains an imperfect proxy for literacy skills prior to arrival.

The remainder of the paper is structured as follows: A theoretical model of selection, sorting and migrants' labour market outcomes is presented in section two. Section three explains the dataset and some key variables. Results and consistency checks are presented in section four. The main conclusions from the analysis are drawn in section five.

2. A model of selection, sorting and migrants' labour market outcomes

Consider a stylised human capital model of investment in migration based on the Roy income maximisation framework (Roy, 1951). Following Chiswick (1999), I assume for simplicity that wages do not vary by labour market experience, there is no on-the-job training, and post-migration human capital

investments are limited to the initial investment cost of migration occurring in the first period. Furthermore, a working life is very long (infinite). Migration costs include foregone earnings, c_f , and the fixed costs of migrating from country 1 to country 2, c_{12} , where the two cost elements are defined broadly to account for the full cost of relocating and adjusting consumption and labour market activities from the origin to the destination. The rate of return from migration r_h can then be written as:

(1)

$$r_h = \frac{w_2 - w_1}{c_f + c_{12}}$$

where w_2 denotes earnings in the destination country and w_1 in the origin country. A person will migrate if the rate of return from the investment to migrate, r_h , is greater than or equal to the interest costs of funds to invest in human capital.

Chiswick expands the model with two kinds of workers with high and low skills, with the high-skill worker earning $1+k$ times the wage of the low-skill worker both in the origin and destination country. The cost of foregone earnings, c_f , will then also be $1+k$ times higher for the high-skill worker. The rate of return for the high-skill person can then be written as:

(2)

$$r_h = \frac{(1+k)w_{2,l} - (1+k)w_{1,l}}{(1+k)c_{f,l} + c_{12}} = \frac{w_{2,l} - w_{1,l}}{c_{f,l} + \frac{c_{12}}{(1+k)}}$$

It follows from equation (2) that unless the wage premium k or the fixed costs of migration c_{12} equal 0, the returns to migration will be higher for migrants with higher abilities, and there will hence be positive self-selection. Assuming that high-skill migrants are more efficient, they may reduce the time use of both migrating and adapting to the labour market in the receiving country, thereby further reducing the cost of migration compared to the low-skilled migrants. Higher fixed costs and a higher wage differential for the high-skilled relative to the low-skilled increase incentives to migrate for the high-skilled relative to the low-skilled (see Chiswick, 1999 for details).

However, this simple model does not say anything about how immigrants compare to the labour force in the countries of destination. Migrants with relatively high skills in the country of origin may still be relatively low-skilled in the destination country, because of higher average levels of education among natives and limited portability of skills, and this can have significant consequences for their labour market outcomes. Formal qualifications and literacy test scores measure parts of the skill differential, but a significant part is unobservable.

Instead of treating migration costs as an investment cost to incur at the time of migration, assume that the foregone earnings effect does not only materialise as a “waiting time” to become employed as in the Chiswick model, but also in the form of durably lower productivity compared to natives, since the skills the migrant accumulated in his country of origin are only partly transferrable to the destination country. This will affect the likelihood of finding employment, wages and the likelihood of working in a job with lower qualification requirements. Such a lack of transferability is well-documented, and may reflect differences in educational quality, bureaucratic impediments to receive recognition of formal qualifications, low language fluency, or lack of networks and knowledge of host country labour market functioning (Chiswick, 1978; Borjas, 1994; Friedberg, 2000; OECD/European Union, 2014).

To make more realistic assumptions on wages, let us assume that the productivity of a worker is a linear function of her human capital h , determined fully by her education level s , basic skills, b and a broadly defined measure of portability between the country of origin and destination, $d \leq 0$, which takes

the value zero for a native. This measure of portability of skills should be understood as “distance”, broadly defined to include various elements, such as geographical distance and differences in language and culture.³ Productivity p would furthermore depend on the production structure a of the country of residence including capital structure and institutions, here defined as a constant. For a person i , emigrating from country 1 to country 2, her productivity would then be:

$$p_{iab} = h_i a_2 = a_2(\alpha_0 + \alpha_1 s_i + \alpha_2 b_i + \alpha_3 d_{12} + \varepsilon_i)$$

$$(3) \quad p_{i12} = \beta_0 + \beta_1 s_i + \beta_2 b_i + \beta_3 d_{12} + \varepsilon_i$$

The logarithm of disposable income is defined as a constant share $1-\tau$ of a worker's productivity exceeding a wage floor $\bar{w}$ set by benefit entitlements that are the same for all, regardless of education and background. At the outset, τ ($0 \leq \tau \leq 1$) is defined as a progressive income tax and the wage floor is defined as a universal benefit (that is not taxed), and would also encompass in-kind public transfers.⁴ For simplicity it is assumed that the benefit level also sets the lower limit for earned income, thereby disregarding the effect of any earned income tax credits. Individual i 's market income is then:

$$w_i = \bar{w} + (1 - \tau)(p_{i12} - \bar{w}), \text{ which simplifies to:}$$

$$(4) \quad w_i = (1 - \tau)p_{i12} + \tau\bar{w}$$

Assuming that individuals maximize disposable income, the breakeven point between employment and inactivity is where benefits equal wages in equation (4):

$$\bar{w}_i = (1 - \tau)p_{i12} + \tau\bar{w}, \text{ which simplifies to:}$$

$$\bar{w}_i = p_{i12}, \text{ inserting (3), yields:}$$

$$(5) \quad \bar{w}_i = \beta_0 + \beta_1 s_i + \beta_2 b_i + \beta_3 d_{12} + \varepsilon_i$$

An empirical specification of the odds of employment can be found by defining the function E_i , which takes the value 1 if the individual is employed, 0 if not. We see that a higher benefit level will lower the likelihood of employment. In other words, individual human capital needs to be higher to pass employment thresholds in the presence of a high wage floor. More productive capital structure and institutions reduce the employment threshold through better utilisation of human capital.

$$E_i = \begin{cases} 1 & (\beta_0 - \bar{w}) + \beta_1 s_i + \beta_2 b_i + \beta_3 d_{12} + \varepsilon_i > 0 \\ 0 & \text{else} \end{cases}$$

Expressing this as a logistic regression, we define the indicator function I_{Ei} as follows, with k as the constant, encompassing both β_0 and $\bar{w}$:

³ Low portability can also stem from sources at the individual level. Different legal frameworks in the origin and destination country could for example make a law degree less portable than a medical degree. Such sources of reduced portability are not treated explicitly in this paper.

⁴ To the extent benefits are explicitly or implicitly defined relative to the lower end of the earnings distribution, the effects from a legal minimum wage or wage compression following from collective wage bargaining agreements would be similar. In principle one could argue that the wage floor should measure the utility an individual achieve without working, which would also encompass the value of institutions, security etc.

$$(6) \quad I_{Ei} = \ln \left(\frac{P(E_i = 1)}{1 - P(E_i = 1)} \right) = k + \beta_1 s_i + \beta_2 b_i + \beta_3 d_{12} + \varepsilon_i$$

(3) An empirical specification of after-tax (log) wages for employed individuals can be found by inserting in (4):

$$w_i = (1 - \tau)(\beta_0 + \beta_1 s_i + \beta_2 b_i + \beta_3 d_{12} + \varepsilon_i) + \tau \bar{w}, \text{ or:}$$

$$(7) \quad w_i = \gamma_0 + \gamma_1 s_i + \gamma_2 b_i + \gamma_3 d_{12} + \varepsilon_i$$

$$\text{where } \gamma_0 = (1 - \tau)\beta_0 + \tau \bar{w}$$

Over-qualification mismatch, individuals who work in jobs with lower formal requirements than their education level ($s_i > \bar{s}$), can be specified empirically in a similar way as employment. For a job, normally requiring a given education level $\bar{s}$, and where over-qualification mismatch fully reflects productivity differentials, mismatch needs to be balanced by lower basic skills b or lower portability d than the average, well-matched colleague:

$$s_i > \bar{s} \Rightarrow \beta_2(b_i - \bar{b}) + \beta_3(d_{12} - \bar{d}) + \varepsilon_i < 0,$$

which simplifies to:

$$c + \beta_2 b_i + \beta_3 d_{12} + \varepsilon_i < 0,$$

$$\text{where the constant } c = -(\beta_2 \bar{b} + \beta_3 \bar{d})$$

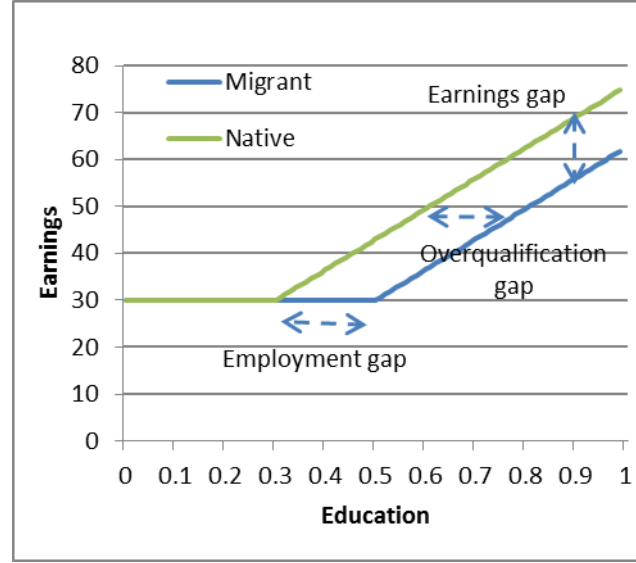
Keeping education constant yields the following mismatch function:

$$M_i = \begin{cases} 1 & c + \beta_2 b_i + \beta_3 d_{ab} + \varepsilon_i < 0 \\ 0 & \text{else} \end{cases}$$

Expressing this as a logistic regression, we define the indicator function I_{Mi} as follows:

$$(8) \quad I_{Mi} = \ln \left(\frac{P(M_i = 1)}{1 - P(M_i = 1)} \right) = c + \beta_2 b_i + \beta_3 d_{12} + \varepsilon_i$$

The difference in labour market outcomes between an immigrant with limited portability of skills and a native can be illustrated as follows in a simple numerical example:

Figure 1. Portability of skills and labour market outcomes

1. Equation (4) above, calibrated for illustrative purposes with education ($\alpha_1 s_i$) ranging from 0 to 1, portability ($\alpha_2 b_i$) = -0.2, productivity in destination country = 100. The tax rate is set at 0.35 and the benefit is set to 30. Due to the linear model specification, the employment gap and the overqualification gaps are identical.

Model predictions

For the economy as a whole, the sum of wages and benefits cannot, at least in the long term, exceed the sum of production. Therefore, it follows from (4) that low-productivity individuals will earn more than the value of their production, while high-productivity individuals will earn less, accounting for taxes and transfers.

If we insert (4) into (2), by incorporating foregone earnings in the origin country into the wage equation and assuming for simplicity that the tax rate is the same in the origin and the destination $\tau_1 = \tau_2 = \tau$, the rate of return from migrating to a country where the migrant's productivity exceeds the benefit level, can be written as:

$$(9) \quad r_i = \frac{w_{2,i} - w_{1,i}}{c_{12}} = \frac{\{(1 - \tau)p_{i12} + \tau\bar{w}_2\} - \{(1 - \tau)p_{i11} + \tau\bar{w}_1\}}{c_{12}}, \text{ or}$$

$$(9) \quad r_i = \frac{(1 - \tau)(a_2 - a_1)(\alpha_1 s_i + \alpha_2 b_i) + (1 - \tau)a_2\alpha_3 d_{12} + \tau(\bar{w}_2 - \bar{w}_1)}{c_{12}}, \quad \text{if } p_{i12} > \bar{w}$$

It follows from equation (9) that individuals who despite the distance between the country of origin and the country of destination earn a wage above the benefit level, will be more likely to migrate the higher and more portable their education and skills (positive selection), the more effective the production structure in the destination country ($\alpha_2 > \alpha_1$), and the higher the difference in benefit level between the destination country and the country of origin. The effect of the tax rate on the decision to migrate is ambiguous on the individual level in this specification, and depends on the relative importance of the wage floor and earned wages in an individuals' disposable income in the two countries.

Another lesson from (9) is that migration may pay off even if the value of a migrant's education is discounted compared to natives with a similar education level due to limited portability. The higher the difference in benefits in favour of the destination country and the higher the tax rate, the lower is the importance of portability of skills in total wages. Immigrants to high-benefit countries should therefore be expected to be less paid and more likely to work in lower-skilled jobs than natives with similar qualifications (Figure 1). In fact, it may pay off to immigrate even if a migrant's productivity in the destination country is lower than in the origin, if the benefit level makes up a sufficiently high proportion of total wages.

However, not all potential migrants' productivity will be above the benefit level in the receiving country. If a migrant's human capital, education and basic skills adjusted for portability, is sufficiently low that their productivity is lower than the benefit level in the destination country, the migrant will be out of work once settled in, and the rate of return on migration is given by the following equation:

$$(10) \quad r_i = \frac{\bar{w}_2 - (1 - \tau)p_{i11} - \tau\bar{w}_1}{c_{12}}, \quad \text{if } p_{i12} \leq \bar{w}$$

We see from (10) that if the potential earnings of an immigrant are below the benefit level in the destination country, the returns from migrating increases with lower human capital. Countries with high benefit levels (widely interpreted) may therefore attract segmented inflows of migrants from both the top and the bottom of the skills distribution in the origin countries (Figure 2). The returns to migration can even decrease monotonically with education if the portability of skills d is sufficiently low, and $\bar{w}$ is sufficiently high.

The model above has shown that a broad measure of portability (or distance) d between pairs of origin and destination countries negatively affects labour market outcomes of migrants. Migration between more similar countries may play out differently. To study this, I construct a special case of equation (9) with two identical countries 1 and 2. Benefit levels are the same in both countries. Portability, d , is one. In steady state $w_2 = w_1$. A positive productivity shock ε in country 2 increases the return of immigration from 0 to:

$$r_i = \frac{(1 - \tau)\alpha_1 s_i (a_2 + \varepsilon - a_1) + \tau(\bar{w}_2 - \bar{w}_1)}{c_{12}}, \text{ or}$$

$$(11) \quad r_i = \frac{(1 - \tau)\alpha_1 s_i}{c_{12}} \varepsilon$$

For two similar countries, immigration will therefore function as a shock absorber, where the return to migration increases with the size of the asymmetric shock and individuals' skills. Migrants from similar countries can be expected to respond to labour market needs, and can help cushion seasonal variations in labour demand, temporary shocks like a construction boom or an asymmetric unemployment shock, or long-term trends, such as different demographics in neighbouring countries. Similar countries with low formal restrictions on migration can still have different taxes and benefit levels to the extent fixed costs to migration offset the benefit differential.

Equation (5) establishes that migrants with skills above a threshold will see incentives to migrate increase with their skills. But will high-skilled migrants still migrate to high-benefit countries if they have the choice between different destinations? Consider a migrant with the choice to migrate to either a low-benefit country, where the tax rate and benefit level are zero and all income is determined by human capital and productivity, or the high-benefit country considered above. Let us assume that the two destination

countries are identical, except that the benefit level is zero and wages equal workers' productivity ($\tau=0$) in the low-benefit destination. Portability, production structure and migration costs are then the same in both destinations ($d_{12l} = d_{12h} = d_{12}$, $\alpha_{2l} = \alpha_{2h} = \alpha_2$, $c_{12l} = c_{12h} = c_{12}$), where subscript l and h denote low- and high- benefit destinations, respectively. For simplicity, benefits are also assumed to be zero and wages equal to workers' productivity in the origin country. The incentive to migrate will increase unambiguously with higher human capital in the low-benefit country. The difference in returns from migrating to the low-benefit instead of the high-benefit destination country will be:

$$\Delta r_i = \frac{p_{i12} - p_{i11}}{c_{12}} - \frac{(1 - \tau)p_{i12} + \tau\bar{w}_2 - p_{i11}}{c_{12}}, \text{ which simplifies to}$$

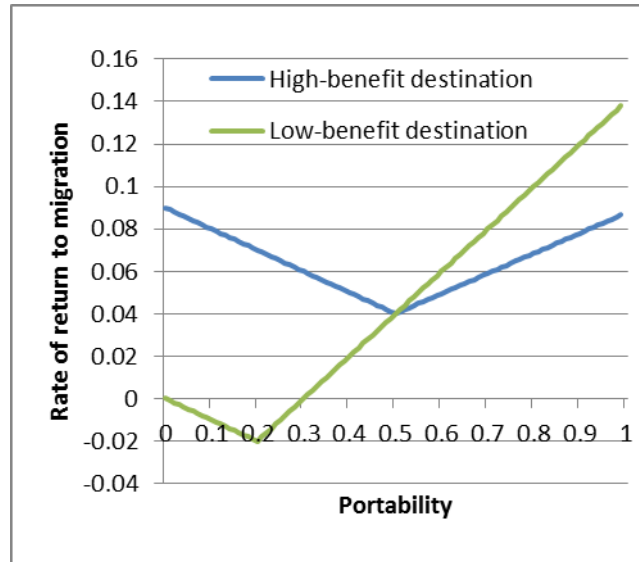
$$(12) \quad \Delta r_i = \frac{\tau(p_{i12} - \bar{w}_2)}{c_{12}}, \text{ or equivalently,}$$

$$\Delta w_i = \tau(w_{2,l} - \bar{w}_2),$$

where $w_{2,l}$ is the wage in the low – benefit destination country.

A migrant with productivity in the two destination countries above the benefit level in the high-benefit country will in this stylized example choose to migrate to work in the low (no)-benefit country rather than the high-benefit one. If a migrant's productivity, which is determined by education and portability, is lower than the benefit level, she will choose to migrate to the high-benefit country and she will be unemployed. The choice of destination and subsequent labour market outcomes are independent of the wage level and tax-benefit structure in the country of origin (Figure 2).

Figure 2. Skills portability, self-sorting and labour market outcomes



1. Equation (9 and 10) above are calibrated for illustrative purposes with education ($\alpha_1 s_i$) standardised to 1, portability ($\alpha_2 b_i$) ranging from 0 (fully portable) to -1, productivity in destination = 100 for both destination countries, productivity in origin = 33 and fixed costs of migration = 333. The tax rate is set at 0.35 and the benefit is set to 30 for the high-benefit destination. Taxes and benefits are set to zero for the origin country as well as the low-benefit destination.

Source: Own calculations.

3. Data

I test the hypotheses related to self-sorting on micro-data from the PIAAC survey with standard regression techniques (Logit and OLS). First, I explore migrant self-sorting on education and literacy skills to three country clusters with different labour market settings. Second, I test the model predictions on how labour market outcomes differ between the same three clusters to uncover sorting on portability. The empirical approach is explained further in section four. This section presents key variables from the PIAAC survey, as well as the construction of destination country clusters and a broad measure of distance.

The PIAAC micro-dataset includes test scores in literacy, numeracy and problem-solving in technology-rich environments for individuals aged 16-64, as well as a rich set of background variables, including country of origin of the migrant population. Out of the 24 advanced OECD countries and regions that participated in the PIAAC Survey in 2012, 6 were removed from the sample due to low sample sizes for the immigrant population. Data from Germany and Australia do not contain information about the country of origin of immigrants, and are hence also excluded. The remaining 16 countries and regions are Austria, Belgium (Flanders), Canada (English speaking), Canada (French speaking), Denmark, Spain, Finland, France, United Kingdom (England), United Kingdom (Northern Ireland), Ireland, Italy, the Netherlands, Norway, Sweden and the United States.

Key variables, including literacy proficiency, a broad measure of distance, destination country clusters and qualification mismatch deserve more attention, and are explained in detail in the following sub-sections. The earnings variable refers to PPP-adjusted monthly gross earnings including bonuses. Employment includes both those in full-time work and those who are working while studying part-time. The indicator of qualification mismatch is defined as follows: a benchmark of “appropriate” qualifications required to get the job is created, based on the following question: “If applying today, what would be the usual qualifications, if any, that someone would need to get this type of job?”. If the person has a qualification⁵ above (below) this benchmark, they are classified as over-qualified (under-qualified) (Adalet McGowan and Andrews, 2015).

Full-time students are excluded from the dataset. Controls for personal characteristics, education and background, type of employment and some immigrant-specific variables are sourced solely from the PIAAC dataset and explained in order of appearance in the empirical section of the paper. Other factors, such as formal barriers to immigration and the role of networks (Beine et al, 2011; McKenzie and Rapoport, 2010), contentment with local amenities like security and public services (Dustmann and Okatenko, 2014; Van Dalen and Henkens, 2007) and risk aversion and patience (Gibson and McKenzie, 2009) are shown to be relevant to the decision to migrate, and the choice of destination country (Bertoli et al., 2010), but are not treated here. A more detailed description of the advantages and limitations of the dataset, as well as a detailed description of how different controls affect migrants’ labour market outcomes in individual destination countries can be found in chapter 8 of OECD/European Union (2014).

The reference group is a man with upper secondary education aged between 35 and 44. He is native-born and at least one of his parents has attained upper secondary education, except when otherwise explicitly stated. In the wage and mismatch regressions any individual not in employment is excluded from the sample, and the reference person is in addition to the above married or living in a couple, and working full time on a regular contract in a private sector company with 11-50 employees.

⁵ Measured by the International Standard Classification of Education (ISCED) level corresponding to their highest qualification.

Literacy proficiency

Literacy proficiency is measured as score points in the PIAAC literacy test.⁶ Literacy measures both language skills and processing skills, as participants in the survey have to first read and understand texts in the native language of the country where the test was taken, before answering to assignments corresponding to different proficiency levels. Score points are divided in a six-level scale ranging from “Below Level 1” (175 PIAAC score points and below) to “Level 5” (equal to or higher than 376 points). Levels 1 to 4 each span 50 PIAAC score points. At level 4 (scores from 326 to 375 points), adults can perform multiple-step operations to integrate, interpret, or synthesise information from complex or lengthy continuous, non-continuous, mixed, or multiple-type texts that involve conditional and/or competing information. They can make complex inferences and appropriately apply background knowledge as well as interpret or evaluate subtle truth claims or arguments. In contrast, at level 1 (scores from 176 to 225 points), adults can only read relatively short texts to locate a single piece of information, which is identical to or synonymous with the information given in the question or directive. These texts contain little competing information. Adults performing at this level can complete simple forms, understand basic vocabulary, determine the meaning of sentences, and read continuous texts with a degree of fluency (OECD, 2013).

Controlling for education in statistical models reduces the labour market disadvantage of being foreign born, but does not remove it (Reyneri and Fullin, 2010). A partial reason for this is that formal education is an imperfect proxy for skills. The PIAAC measure of literacy proficiency captures skills that are important in a workplace, such as language and processing skills, but does not capture job-specific skills and formal requirements that may be better captured by the education level. The same variables that are important in explaining literacy skills are also correlated with employment and earnings prospects, but to an extent only indirectly via skills formation. To the extent socio-economic background variables affect literacy proficiency and literacy proficiency affects employment prospects, regression coefficients will be biased and inconsistent if a measure of literacy cannot be controlled for, as is the case in most survey- and administrative data that are used to explore immigrant integration. This bias affects inference regarding immigrants in particular, since immigrants tend to have lower average literacy proficiency than natives at each educational level (Bussi and Pareliussen, 2015; OECD/European Union, 2014). Immigrants’ literacy shortfall is at least partly caused by lower proficiency in the host-country language, but may also reflect differences in processing skills to the extent the educational systems in different countries differ in quality. Adding literacy is of course not a guarantee that the coefficients will be unbiased, despite its strong explanatory power.

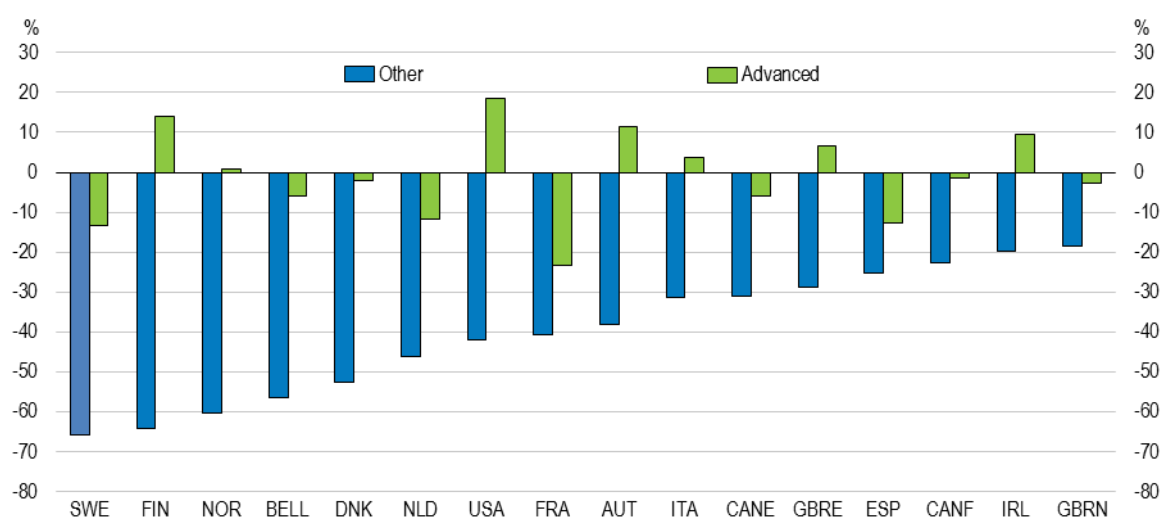
A broad measure of distance

Portability of skills is captured by a broad measure of distance, defined by geographical/cultural distance, and distance in a country’s level of development. Origin countries are divided into two groups according to their geography and PPP-adjusted GDP per capita. “Advanced countries” are for the purpose of this paper defined as those countries on the European and American continents with PPP-adjusted GDP per capita exceeding two thirds of the average PPP-adjusted GDP per capita for “high income countries” in 2012 as defined by the World Bank (2012) World Development Indicators. “Other countries” is defined to comprise all other countries. The distinction is made both on income and on regions to capture that “distance” broadly defined as in this paper encompasses an element of different stages of wealth and development and distance in language and culture to the destination countries in the PIAAC dataset, who all fall within the group of western advanced countries.

⁶ In the regressions, the literacy score is scaled by the sample standard deviation for the ease of interpretation. Standard deviations are fairly similar across countries, ranging from 44 to 51 PIAAC score points.

All such groupings are to a certain extent arbitrary, and some of the countries in the second group of countries (such as Estonia and Greece, which are the first two countries below the threshold) could just as well be placed in the group of “advanced” countries. Countries like Korea and Japan are clearly advanced, but are still placed in the “other” category to reflect geographical, cultural and language differences to the receiving countries in the sample. However, separating between advanced and other economies creates two groups with distinctly different characteristics. The PIAAC data show that other countries immigrants have lower literacy scores than natives in all destination countries. Advanced country immigrants on the other hand score much closer to natives, and even higher in some countries (Figure 3). Consistency checks with alternative groupings and origin country groupings replaced by gravity variables (further explained in section four) show that the main findings are robust across specifications.

Figure 3. Literacy proficiency
Mean PIAAC literacy score for immigrants, difference to natives¹



1. BELL=Belgium (Flanders), CANE=Canada (English speaking), CANF=Canada (French speaking), GBRE=United Kingdom (England), GBRN=United Kingdom (Northern Ireland).

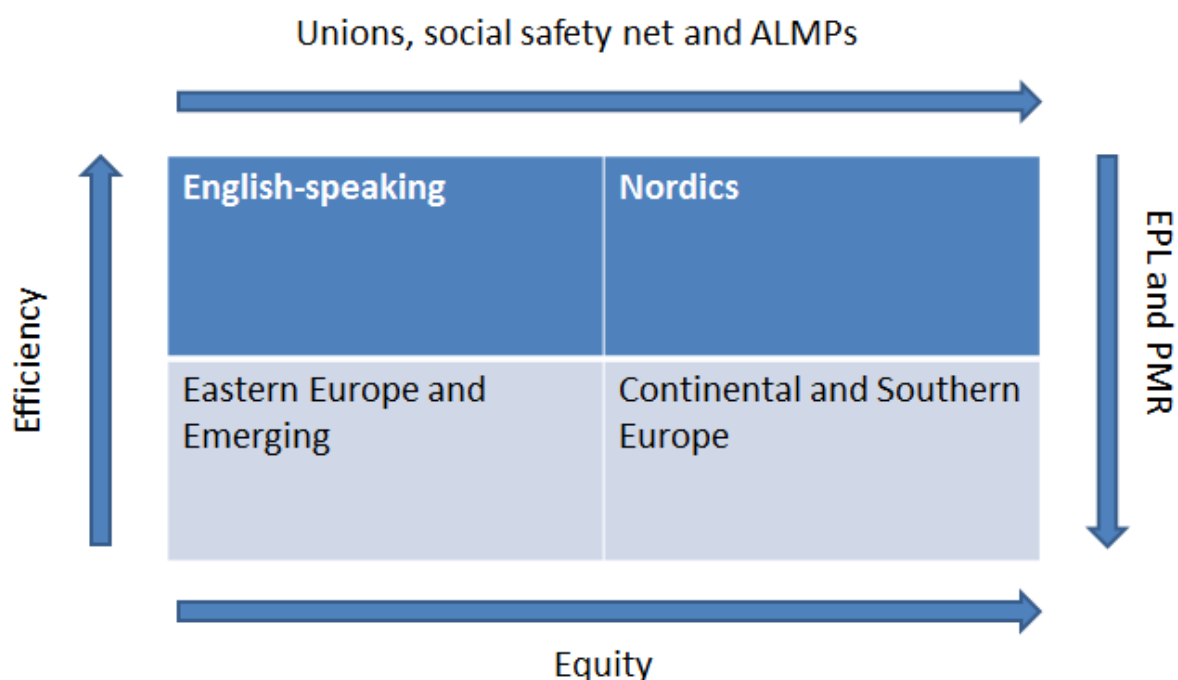
Source: OECD Survey of Adult Skills (2012), Database.

Destination country clusters

Sample sizes for both groups of immigrants are relatively low in each destination country.⁷ To overcome this limitation, countries are grouped in three country clusters to capture differences between high-tax, high-benefit and low-tax, low-benefit destination countries, broadly defined. The grouping of countries is based on a principal component analysis of countries' labour market and framework policies, such as product market regulation, employment protection legislation, tax wedge, unemployment insurance replacement rate, union and collective bargaining coverage. Of four clusters identified (Figure 4), three contain destination countries covered by the PIAAC dataset, and are hence relevant for this study:

⁷ Ranging from 49 to 937 for the advanced country grouping and 53 to 3180 for the other countries grouping.

Figure 4. Country clusters and outcomes



Source: Pareliussen (2014).

The “English speaking” cluster includes Ireland, Canada (both the English-speaking and the French-speaking regions), United Kingdom (England and Northern Ireland) and the United States. This cluster is characterised by low unemployment insurance replacement rates and coverage, low tax wedges, low spending on active labour market policies (ALMP), low union coordination and density and low product market and employment regulation.

The “Continental and Southern Europe” cluster includes France, Italy and Spain, and is characterised by high unemployment insurance replacement rates and coverage, high tax wedges, medium ALMP expenditure, medium union coordination and density and stringent product market and employment regulation.

The “Nordic” cluster includes Austria, Belgium (Flanders), Denmark, Finland, the Netherlands, Norway and Sweden. It has high unemployment insurance replacement rates and coverage and a high tax wedge as in the Continental and Southern Europe cluster, but differs from this cluster in having high ALMP expenditure, high union coordination and density and medium product market and employment regulation.

The English speaking and Nordic clusters have lower unemployment, higher employment and higher GDP per capita than Continental and Southern Europe. In-work and workless poverty rates are highest in the English speaking cluster, followed by Continental and Southern Europe and the Nordics. The difference between the Nordic and English speaking clusters are of special interest, since these two clusters are comparable on efficiency indicators such as GDP per capita, employment and unemployment, while being distinctly different in terms of wage structure and redistribution.

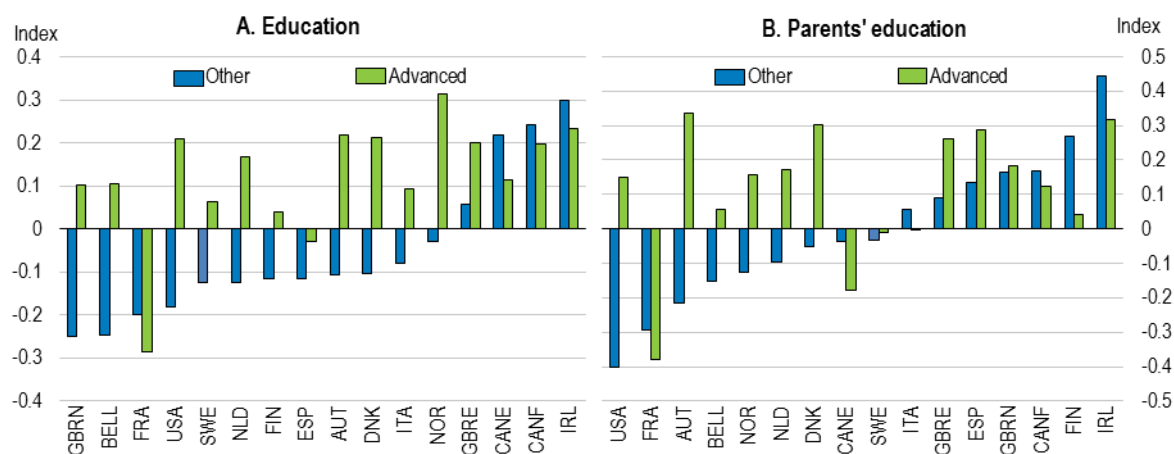
4. Empirical results

Sorting on education and literacy

Immigrants from other countries have on average lower education than natives in most European countries. English-speaking countries, except the United States and Northern Ireland, are attracting immigrants with higher education than the native average. Advanced country immigrants tend to be similarly or better educated than natives in most of the countries in the sample (Figure 5, Panel A). This pattern is also reflected, although not as clearly, in immigrants' socio-economic backgrounds, proxied by parents' education levels (Figure 5, Panel B).

Figure 5. Education and socio-economic background¹

Immigrants, difference to natives²



1. Education and parents' education is measured as an average over the (sub-) population where lower secondary education is assigned the value 1, upper secondary 2 and tertiary education 3.
2. BELL=Belgium (Flanders), CANE=Canada (English speaking), CANF=Canada (French speaking), GBRE=United Kingdom (England), GBRN=United Kingdom (Northern Ireland).

Source: OECD Survey of Adult Skills (2012), Database.

However, a more stringent analysis of self-sorting on educational level is warranted. To test for whether the highly educated migrants are more concentrated in the English-speaking cluster, I run logit regressions on the odds of having tertiary education for both immigrant groups (advanced country and other immigrants), controlling for age and gender. I also control for whether the highest qualification is obtained in the destination country or abroad, since the point of interest is migrants' qualifications at the time of choosing a destination.

Equation (12) from the model section implies that the odds of higher education decreases with higher taxes and benefits, and this is also what we see in the data, where the tax- and benefit level is approximated by the country clusters. The odds of having had a tertiary education at the time of immigration are significantly lower in both the Nordic and the Southern Europe clusters compared to the English-speaking one for both other and advanced country immigrants (Table 1). A higher education premium in English-speaking countries, attracting more qualified migrants is in line with the model framework and fits well with previous empirical findings in the literature (for example Westmore, 2014; Grogger and Hanson, 2011).

A second question is how migrants self-sort on literacy skills. Literacy proficiency increases with own and parents' education, the time of stay, qualifications obtained in the destination country and if the native language has been spoken at home. A similar set-up can be used to test for sorting on literacy, but since the literacy score is a quasi-continuous, I run a simple OLS regression. Other countries' immigrants have fairly similar skills in all three clusters, when controlling for education and other background variables. Advanced country immigrants to the Southern Europe cluster have lower literacy scores than migrants to English-speaking countries, while no significant differences are found on the other metrics (Table 1).

Table 1. Migrant self-sorting to destinations on education and literacy¹

Compared to the English-speaking cluster

	Education (log odds)		Literacy (OLS)	
	Other countries immigrants	Advanced country immigrants	Other countries immigrants	Advanced country immigrants
Nordics	-0.53 [0.09]**	-0.50 [0.16]**	0.08 [0.05]	-0.03 [0.07]
Continental and Southern Europe	-1.07 [0.10]**	-1.5 [0.19]**	0.07 [0.06]	-0.31 [0.08]**
R ²	0.09	0.09	0.37	0.41
N	9505	3401	8936	3199
Gender, age and qualifications acquired in destination country	Y	Y	Y	Y
Education, parents' education, time of stay and language spoken at home	N	N	Y	Y

* $p < 0.05$; ** $p < 0.01$, Standard errors in parentheses.

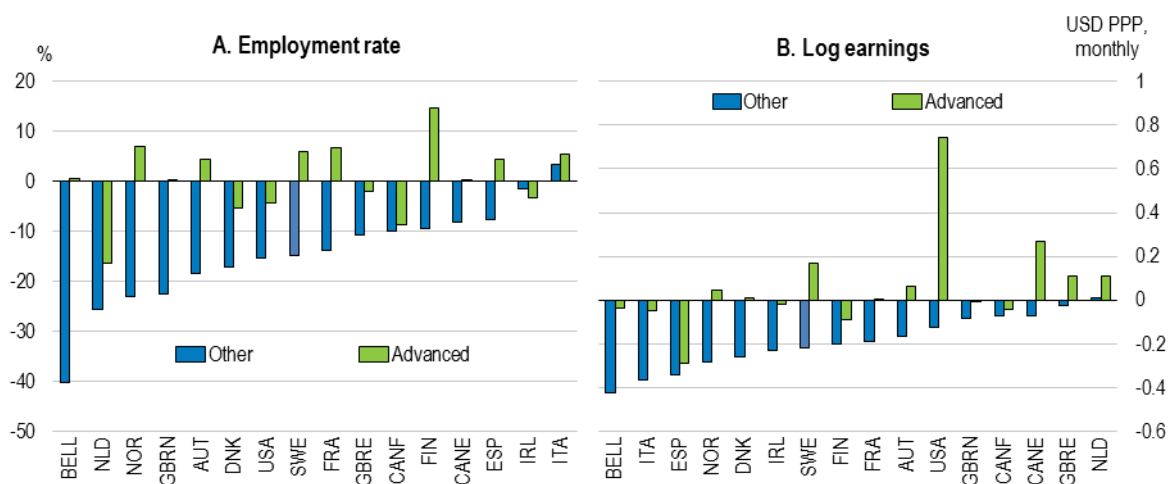
1. Pseudo-R² is shown for the education Logit regressions.

Source: Author's calculations based on the OECD Survey of Adult Skills (2012).

Sorting on unobservable skills and portability

The regressions above show evidence of self-sorting on formal qualifications but no clear pattern of self-sorting on literacy skills. The model framework above also predicts self-sorting on the portability of skills, which is unobservable in the data. However, since the portability of skills affects productivity, it will also according to the model affect labour market outcomes. Conditional on observable skills, migrants to low-benefit countries will be more prone to be employed, less prone to be overqualified and experience less negative wage differentials compared to natives than in destinations with higher taxes and transfers.

Looking at simple average employment rates and log earnings differentials, employment differentials between the other countries group and natives are substantial in many of the countries in the Nordic cluster. Countries in the English-speaking and Continental- and Southern European clusters are more evenly distributed (Figure 6, Panel A). Other countries- to native earnings differentials are lowest in countries in the English-speaking cluster (except for the Netherlands). Advanced country immigrants seem to earn as well as natives or more in most countries. A particularly large positive gap is found in the United States (Figure 6, Panel B).

Figure 6. Labour market outcomesImmigrants, difference to natives¹

1. Employment rates are derived from PIAAC data, and differ from official statistics. Log earnings are only calculated for the employed. BELL=Belgium (Flanders), CANE=Canada (English speaking), CANF=Canada (French speaking), GBRE=United Kingdom (England), GBRN=United Kingdom (Northern Ireland).

Source: OECD Survey of Adult Skills (2012), Database.

I use the empirical specifications developed in the model section to analyse the probability of employment, overqualification mismatch and wage differentials. The null hypothesis is that the size of d is equal in all destinations, which would be the case if immigrants chose destination countries randomly. In other words, returns to education, the probability of employment and mismatch compared to natives with comparable backgrounds should be approximately similar in each destination country.

For all three measures of labour market outcomes the portability of skills can be tested for with an immigrant dummy. The coefficient will capture both limited portability and other unobservable skills and abilities such as motivation and perseverance insofar the average unobservable skills of migrants differ systematically from those of natives. The coefficient will also capture discrimination. I test for differences between the destination clusters by interacting the immigrant dummies with a dummy for each cluster. I run two variants of the regressions for each outcome variable (Table 2). First, to quantify the labour market position of migrants compared to natives within each cluster, the migrant dummies for each of the two sub-groups of migrants (i.e. from advanced and other countries) are interacted with their respective destination cluster. Second, to quantify differences in labour market outcomes in the Nordic and Southern European cluster compared to the English-speaking cluster, I include one dummy for each of the two migrant groups across all three clusters, and include the interacted variables for the Nordic and Southern European clusters only. Outcomes in these two clusters are hence measured as differences to the English-speaking cluster. All other coefficients remain the same.

Table 2. Sorting and labour market outcomes¹
Migrant-native gaps within and relative gaps between clusters

	Employment (log odds)		Earnings (OLS)		Mismatch(log odds)	
	Compared to natives	Comp. to English-speaking cluster	Compared to natives	Comp.to English-speaking cluster	Comp. to natives	Comp. to English-speaking cluster
Other-> English speaking	0.49		-0.11		0.18	
	[0.19]**		[0.08]		[0.19]	
Other-> Nordic	-0.31	-0.80	-0.15	-0.03	0.91	0.73
	[0.15]*	[0.14]**	[0.04]**	[0.06]	[0.17]**	[0.17]**
Other-> C&S Europe	0.05	-0.44	-0.10	0.01	1.12	0.94
	[0.13]	[0.15]**	[0.03]**	[0.06]	[0.17]**	[0.21]**
Advanced-> English speaking	-0.17		0.09		-0.18	
	[0.20]		[0.11]		[0.25]	
Advanced-> Nordic	0.03	0.20	-0.11	-0.19	0.54	0.71
	[0.17]	[0.22]	[0.05]*	[0.11]	[0.18]**	[0.27]**
Advanced-> C&S Europe	0.57	0.75	-0.09	-0.17	0.85	1.03
	[0.20]**	[0.22]**	[0.04]*	[0.11]	[0.21]**	[0.30]**
Destination fixed effects	Y	Y	Y	Y	Y	Y
Family situation, education, parents' education and age	Y	Y	Y	Y	Y	Y
Time of stay, language spoken at home and qualifications acquired in destination country	Y	Y	Y	Y	Y	Y
Firm size, contract type and sector	N	N	Y	Y	Y	Y

* p<0.05; ** p<0.01, Standard errors in parentheses.

Source: Author's calculations based on the OECD Survey of Adult Skills (2012).

Immigrants from the other countries cluster to English-speaking countries are more likely to be employed than natives, and they are no more likely than natives to be overqualified, controlling for literacy, education and other characteristics. A wage gap of 11% compared to natives is not significant due to high variation within the group of migrants. Migrants in this group are much less likely than natives to be employed in the Nordics, where they are also significantly more likely than natives to be overqualified and they see a wage gap of 15%. Labour market performance of these migrants in the Nordics is significantly inferior to the English speaking countries, except for the wage gap, where the additional wage gap of three percentage points is not significant. Migrants to Southern Europe are as likely as comparable natives to be employed, but highly likely to be overqualified, and they see a wage gap of 10%. Employment is weaker, and the odds of mismatch are significantly higher than in English-speaking countries.

Advanced country migrants to English-speaking countries are well integrated in the labour force, controlling literacy, education and other characteristics. The coefficient for employment is negative, wages positive and overqualification negative, but none of the coefficients are significant. Migrants to the Nordics are as likely as natives to be employed, but see an 11% wage gap and higher odds of being overqualified. Such migrants to Southern Europe see a 9% wage penalty to comparable natives, higher odds of being employed, but also high odds of being overqualified. Labour market outcomes are systematically better in the English-speaking cluster also for this group of migrants. Overqualification mismatch in particular is higher in the two other clusters, but employment compared to natives is higher in the Central and Southern European cluster.

Consistency checks and caveats

To control for the somewhat arbitrary assignment of migrants to the two groups of origin countries, I run the regressions on two alternatives, namely “high-income OECD countries”, i.e. OECD less Mexico and Turkey and “advanced economies” as defined by the IMF (IMF, 2015). These checks yield almost identical results as those referred to in this paper. Since PIAAC migrants categorised in one cluster may have a different composition in different destination countries, and since the overlap between the groupings above and the chosen one is fairly high, I also replace the origin country groupings by geographic distance from the CEPII GeoDist database to test the robustness of my findings (Mayer and Zignago, 2011). Distances between origin-destination country pairs and destination clusters are interacted with destination country groupings. As a last consistency check, I include geographical distance interacted with destination clusters, as above, but I also include dummies for common border, common spoken language and colonial history (also from the GeoDist database). Results from these two regressions are qualitatively similar to each other and to the results from the main specification (See Table A2.1 in Annex 2).

A possible shortfall of the identification strategy is that the destination country groupings reflect labour market institutions in 2012, while the question at hand is the flow of migrants over time. However, destination country clusters correspond closely to similar groupings in literature from Esping Andersen (1990) onwards. The robustness over time of the clusters can also be illustrated by sorting the countries in the sample according to their Gini coefficient after taxes and transfers.⁸ The highest Gini in the “Nordic” cluster is lower than the lowest Gini in either of the other two clusters. The highest Ginis are found in the English-speaking cluster, with some overlap with the Continental and Southern Europe cluster. Ranking countries on the Gini coefficient in 1985 yields exactly the same results, except that some Nordic countries shift their relative positions. The Gini coefficient depends to a large extent on the degree of wage compression, the employment rate and taxes and transfers. Higher Gini coefficients in the Continental and Southern Europe cluster reflects to an extent labour market inefficiencies that lead to lower employment, which is not expected to attract immigrants.⁹ Differences between the Nordic and English speaking clusters are of particular interest, since both have high employment and low unemployment. Differences in the Gini coefficient between these two clusters will therefore to an extent reflect the effect of wage compression, taxes and transfers.

The PIAAC data set includes numeracy test scores in addition to literacy. The correlation between literacy and numeracy skills in the PIAAC test is around 0.8. The analyses in the previous section were also carried out with numeracy skills. Numeracy scores of migrants (both groups) to the Nordic and Continental- and Southern Europe, compared to the English-speaking cluster, are significantly more favourable than literacy scores, one more indication of the importance of common language. However, the results from the labour market regressions are close to identical on all three measures of labour market outcomes.

The results presented in this paper should be interpreted with caution, since destination countries differ on several dimensions not related to skills premiums. Language and history of foreign policy are to an extent accounted for in the consistency check including dummies for common border, common spoken language and colonial history. However, other relevant factors, notably policies and traditions towards humanitarian and work immigration and peer networks are not accounted for. These omitted variables would likely pull results in the direction found in this paper in a country like for example Sweden, with a long tradition of accepting humanitarian migrants. This is not an uncommon weakness in the related

⁸ 2012 data, extracted from the OECD Income Distribution Database.

⁹ Involuntary unemployment increases the unemployment-adjusted permanent income of high-skilled relative to low-skilled individuals, since the high-skilled will tend to be less unemployed (Brucker et al, 2002). This may induce positive selection for migrants without a choice of destinations, but migrants choosing between destinations will maximise their returns of migration by choosing a destination with lower unemployment (and higher employment) all else equal.

literature. Even though this caveat should be kept in mind while interpreting the results, it is reasonable to assume that the economic considerations explored in this paper will affect the choice of destination once a decision to migrate is made. A further consideration is that immigrants' literacy proficiency is measured after arrival in the host country, and sometimes long after arrival. The literacy measure is hence not a good proxy for skills prior to arrival. Even though I correct for this by controlling for the length of stay, it remains an imperfect proxy.

5. Summary and conclusions

Less favourable labour market outcomes of migrants compared to natives originate from multiple sources. Except in some English-speaking countries, immigrants born outside wealthy European and North American countries tend to come from less advantaged families, to have lower educational attainment, and for each educational attainment level they tend to have lower language and processing skills than natives. They also tend to have a different age profile, and different family structures. These factors explain a large part of the different fortunes experienced by natives and these immigrants in OECD labour markets, but unexplained residuals remain, and these residuals vary systematically between country clusters with different labour market institutions.

I show in a stylised, theoretical model that for a given stock of migrants, those with low skills and low portability of skills will tend to self-sort to countries with a compressed income distribution post taxes and transfers, where those with the lowest and least portable skills will be out of work, and those with intermediate to high skills will be over-qualified and less paid than natives with similar characteristics. Conversely, migrants with higher and more portable skills will tend to seek destinations with a higher skills premium. Consistent with this, regressions on PIAAC data show that the English-speaking cluster of countries with more wage dispersion and less generous social safety nets, differs from the others in two important ways. Firstly, immigrants in countries in this cluster have higher observable skills. Secondly, other countries immigrants are less penalised in terms of lower employment, earnings and job quality at any given level of observable skills, suggesting that migrants also self-sort on unobservable skills.

The Nordic flexicurity model with a compressed wage distribution and a generous social safety net works well for the native born whose skills are nurtured by high levels of schooling, generally of good quality and free of charge. High entry-level wages can be combined with high employment when productivity is high also in the low end of the human capital distribution. Migrants who arrive to these countries are less skilled than natives, both because they have not benefitted from the comprehensive education system in these countries, and because self-sorting yields a mix of migrants with lower observable skills, lower unobservable skills and lower portability of skills. The very reasons why Nordic countries can combine high efficiency with high equity may in other words also make immigrant integration more challenging in these countries.

Unsurprisingly, immigrants from wealthy countries in Europe and North America are on average distinctly different from other migrants. In a number of receiving countries they are both better educated and have better educated parents than natives, and their literacy skills are even higher than those of natives in some countries, despite literacy being measured in the native language. Labour market outcomes are systematically better in the English-speaking cluster also for this group of migrants.

The model presented in this paper combines different measures of migrants' labour market status with self-selection from origins and self-sorting to destinations in one single framework. This approach could be extended to other datasets. The measures of skills from the PIAAC dataset give valuable information particularly relevant to the study of migration and integration. However, a major constraint is that the immigrant population in most countries is very heterogeneous, and the number of observations within each relevant immigrant sub-group diminishes quickly as additional controls are added, preventing detailed analyses, notably on the origins of migrants. Going further in oversampling immigrants in future vintages of PIAAC, or introducing skills modules in labour force or household surveys would enable a much more detailed understanding of how different groups of immigrants are integrated in their host countries and why.

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Annex 1. Regression tables

Table A1.1. Migrant self-sorting to destinations on education and literacy

Compared to the English-speaking cluster

	Tertiary education (log odds)		Literacy (OLS)	
	Other countries immigrants	Advanced country immigrants	Other countries immigrants	Advanced country immigrants
Nordics	-0.53	-0.50	0.08	-0.03
	[0.09]**	[0.16]**	[0.05]	[0.07]
Continental and Southern Europe	-1.07	-1.5	0.07	-0.31
	[0.10]**	[0.19]**	[0.06]	[0.08]**
Female	0.10	-0.01	-0.01	-0.18
	[0.10]	[0.19]	[0.06]	[0.07]*
Less than 24	-1.82	-1.49	0.05	-0.24
	[0.4]**	[0.38]**	[0.11]	[0.16]
25-34	-0.23	-0.4	0.00	-0.01
	[0.15]	[0.3]	[0.06]	[0.11]
45-54	0.07	-0.52	-0.17	0.01
	[0.14]	[0.30]	[0.07]*	[0.09]
55-64	-0.28	-0.66	-0.29	-0.25
	[0.17]	[0.28]*	[0.08]**	[0.1]*
Arrived less than 5 years ago	1.03	1.12	-0.14	-0.01
	[0.21]**	[0.21]**	[0.07]	[0.12]
Highest qualification in destination	1.02	0.26	0.32	0.22
	[0.13]**	[0.19]	[0.05]**	[0.09]*
Max lower secondary education			-0.50	-0.65
			[0.07]**	[0.11]**
Tertiary education			0.61	0.38
			[0.06]**	[0.09]**
No parent attained upper secondary education			-0.26	-0.24
			[0.06]**	[0.09]**
Atleast one parent attained tertiary education			0.27	0.26
			[0.07]**	[0.09]**
Only foreign languages spoken at home			-0.30	-0.05
			[0.05]**	[0.07]
Constant	-0.86	0.28	4.90	5.70
	[0.14]**	[0.28]	[0.09]**	[0.14]**
Pseudo R²/R²	0.09	0.09	0.37	0.41
N	9505	3401	8936	3199

* p<0.05; ** p<0.01, Standard errors in parentheses.

Source: Author's calculations based on the OECD *Survey of Adult Skills* (2012).

Table A1.2. Labour market outcomes
Migrant-native gaps within and relative gaps between clusters

	Employment (log odds)		Earnings (OLS)		Mismatch(log odds)	
	Compared to natives	Compared to English-speaking	Compared to natives	Compared to English-speaking	Compared to natives	Compared to English-speaking
Other-> English speaking	0.49		-0.11		0.18	
	[0.19]**		[0.08]		[0.19]	
Other-> Nordic	-0.31	-0.8	-0.15	-0.03	0.91	0.73
	[0.15]*	[0.14]**	[0.04]**	[0.06]	[0.17]**	[0.17]**
Other-> C&S Europe	0.05	-0.44	-0.1	0.01	1.12	0.94
	[0.13]	[0.15]**	[0.03]**	[0.06]	[0.17]**	[0.21]**
Advanced-> English speaking	-0.17		0.09		-0.18	
	[0.2]		[0.11]		[0.25]	
Advanced-> Nordic	0.03	0.2	-0.11	-0.19	0.54	0.71
	[0.17]	[0.22]	[0.05]*	[0.11]	[0.18]**	[0.27]**
Advanced-> C&S Europe	0.57	0.75	-0.09	-0.17	0.85	1.03
	[0.2]**	[0.22]**	[0.04]*	[0.11]	[0.21]**	[0.3]**
Literacy		0.27		0.1		-0.37
		[0.03]**		[0.01]**		[0.04]**
Partner, female		-0.98		-0.32		-0.17
		[0.06]**		[0.03]**		[0.09]
Single, female		-0.84		-0.36		0.06
		[0.08]**		[0.03]**		[0.12]
Single, male		-0.69		-0.21		0.16
		[0.07]**		[0.03]**		[0.09]
Mother of child<3		-0.97		0.07		-0.15
		[0.11]**		[0.05]		[0.15]
Less than 24		0.06		-0.49		0.43
		[0.11]		[0.03]**		[0.12]**
25-34		0.09		-0.18		0.23
		[0.06]		[0.02]**		[0.06]**
45-54		-0.09		0.11		-0.04
		[0.07]		[0.03]**		[0.08]
55-64		-1.29		0.1		-0.11
		[0.05]**		[0.02]**		[0.1]
Max lower secondary education		-0.43		-0.11		
		[0.05]**		[0.03]**		
Tertiary education		0.52		0.31		0.55
		[0.06]**		[0.02]**		[0.07]**
No parent attained upper secondary education		-0.12		-0.04		0.27
		[0.06]		[0.02]*		[0.09]**
At least one parent attained tertiary education		0.15		0.04		-0.1
		[0.07]*		[0.02]		[0.11]
Arrived less than 5 years ago		-0.38		-0.05		0.03
		[0.16]*		[0.06]		[0.19]
Only foreign languages spoken at home		-0.03		0.07		-0.17
		[0.11]		[0.03]*		[0.15]
Highest qualification in destination		-0.38		0.07		-0.42
		[0.12]**		[0.06]		[0.19]*
Firm size 1-10				-0.1		0.21
				[0.03]**		[0.07]**
Firm size 51-250				0.07		0.01
				[0.02]**		[0.07]
Firm size 251-1000				0.21		-0.19
				[0.04]**		[0.11]
Firm size > 1000				0.28		-0.57
				[0.03]**		[0.13]**
Work contract - fixed term				-0.08		0.18
				[0.03]*		[0.1]
Work contract - other				-0.12		0.31
				[0.03]**		[0.11]**
Part time worker				-1.1		0.81
				[0.04]**		[0.11]**
Public sector				-0.06		-0.35
				[0.01]**		[0.07]**
Constant		0.76		7.68		0.23
		[0.18]**		[1.75]**		[0.29]
Pseudo R2 / R2		0.15		0.51		0.08
N		87095		55122		43512
Destination country fixed effects		Y		Y		Y

* p<0.05; ** p<0.01, Standard errors in parentheses.

Source: Author's calculations based on the OECD Survey of Adult Skills (2012).

Annex 2. Robustness checks – regressions with gravity variables

Table A2.1 Origin groups replaced by geographical distance

	Education (log odds)		Literacy (OLS)		Employment (log odds)		Earnings (OLS)		Mismatch (log odds)	
	Compared to natives	Compared to English-speaking cluster	Compared to natives	Compared to English-speaking cluster	Compared to natives	Compared to English-speaking cluster	Compared to natives	Compared to English-speaking cluster	Compared to natives	Compared to English-speaking cluster
English*dist	1.72		-0.05		-0.03		-0.06		-0.50	
	[0.16]**		[0.05]		[0.14]		[0.06]		[0.25]*	
Nordic*dist	1.05	-0.67	-0.04	0.01	-0.71	-0.68	-0.16	-0.10	0.90	1.41
	[0.17]**	[0.13]**	[0.08]	[0.07]	[0.17]**	[0.18]**	[0.06]**	[0.07]	[0.26]**	[0.28]**
C&S Europe*dist	0.16	-1.56	-0.03	0.02	0.06	0.10	-0.02	0.04	0.77	1.27
	[0.18]	[0.14]**	[0.08]	[0.08]	[0.16]	[0.2]	[0.05]	[0.06]	[0.27]**	[0.33]**

* p<0.05; ** p<0.01, Standard errors in parentheses.

Source: Author's calculations based on the OECD *Survey of Adult Skills* (2012).

Table A2.2 Origin groups replaced by geographical distance

Controlling for common border, common spoken language and colonial history

	Education (log odds)		Literacy (OLS)		Employment (log odds)		Earnings (OLS)		Mismatch (log odds)	
	Compared to natives	Compared to English-speaking cluster	Compared to natives	Compared to English-speaking cluster	Compared to natives	Compared to English-speaking cluster	Compared to natives	Compared to English-speaking cluster	Compared to natives	Compared to English-speaking cluster
English*dist	1.44		-0.05		-0.06		-0.02		-0.60	
	[0.15]**		[0.05]		[0.18]		[0.06]		[0.3]*	
Nordic*dist	0.55	-0.90	-0.23	-0.19	-0.41	-0.35	-0.15	-0.13	0.89	1.49
	[0.16]**	[0.16]**	[0.07]**	[0.07]**	[0.18]*	[0.21]	[0.05]**	[0.07]	[0.25]**	[0.31]**
C&S Europe*dist	-0.33	-1.77	-0.17	-0.13	0.19	0.25	0.06	0.08	0.59	1.19
	[0.18]	[0.18]**	[0.08]*	[0.09]	[0.21]	[0.2]	[0.05]	[0.07]	[0.33]	[0.33]**

* p<0.05; ** p<0.01, Standard errors in parentheses.

Source: Author's calculations based on the OECD *Survey of Adult Skills* (2012).