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ABSTRACT

Immigrant Selection in The OECD*

The selection of immigrants by skill and education is a central issue in the analysis of immigration. Since highly educated immigrants tend to be more successful in host country labour markets and less of a fiscal cost it is important to know what determines the skill-selectivity of immigration. In this paper we examine the proportions of highly educated among migrants from around 80 source countries who were observed as immigrants in each of 29 OECD countries in 2000/1. We develop a variant of the Roy model to estimate the determinants of educational selectivity by source and destination country. We also estimate the determinants of the share of migrants from different source countries in each destination country's immigrant stock. Two key findings emerge. One is that the effects of the skill premium, which is at the core of the Roy model, can be observed only after we take account of poverty constraints operating in source countries. The other is that cultural links and distance are often more important determinants of the proportion of high educated immigrants in different OECD countries than wage incentives or policy.

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Introduction

In this paper we examine, and attempt to explain, the selection of immigrants by education to OECD countries from a wide range of source countries. The immigration literature has been much concerned with the mechanisms involved in immigrant selection, including economic incentives, immigration policy filters and constraints operating in source countries. The debate has been fuelled by concerns about the performance of immigrants in developed country labour markets and the general finding that the higher are the skills of immigrants, the higher are their earnings and employment probabilities, the more positive is their net fiscal contribution and the more positive is public opinion towards them and towards immigration more generally. Not surprisingly a number of leading immigration countries have moved towards greater skill selection in their immigration policies.

These trends have been accompanied by renewed interest in the 'brain drain'. The gradual increase in migration from poor to rich countries, together with trends in skill-selective immigration policy, have given rise to concerns that some of the poorest countries are being disadvantaged as their best and brightest leave to seek employment in high-wage OECD countries. The recent debate has focused on whether the process of high skilled emigration improves education incentives in poor countries, thereby replacing some or all of the highly educated emigrants. It has also dwelt at length on whether the size and composition of diasporas influence development through generating remittances and creating trade as well as through return migration and technological transfer. By contrast, relatively few studies have focused on what explains the educational selectivity of out-migration across source countries and what combination of incentives and policy determines the skill content of immigration among the main destinations.

The basic framework used in models of skill selection is the Roy model (Roy, 1951), which was introduced to the literature on international migration in a series of influential papers by Borjas (1987, 1994, 1999). The essence of the Roy model is illustrated in Figure 1, which plots the destination and origin wage-by-skill schedules (assumed to be in present values) facing potential emigrants. In this illustration, the destination wage schedule, w(y), is increasing in the individual's skill or education level with a slope that reflects the return to education. If the wage schedule in the origin country is w(x)1, the return to education is lower in the origin than at the destination. Only those with an education level exceeding s_1 will have an incentive to migrate and hence there will be positive selection. By contrast if the origin wage schedule is w(x)2 then only those with education below s_2 will emigrate and there will be negative selection.

The position of the home country reservation wage schedule w(x) depends on a number of other factors that can be considered as costs. One is the individual's preference for (or compensating differential in favour of) the home country, which may differ across individuals thereby introducing greater heterogeneity into selection by skill. A second component is the direct cost of migration, which also displaces w(x) upwards and may vary by skill level. A third is the cost associated with gaining admission through the policy filter, which could vary across individuals and by skill level. Finally, some individuals may be constrained from migrating by poverty, an issue to which we return below. Two points follow from this analysis. One is that even if the wage schedule in country y lies everywhere above the wage schedule in x (country x is much poorer) the other components may still ensure that the reservation wage schedule crosses the destination wage schedule. Thus selection can still be important even when income gaps are large. The second point is that these other components may influence the slope of the reservation wage schedule w(x) so that the relative slopes of the 'raw' (or unadjusted) wage schedules may not be a good guide to the skill-selectivity of migration from x to y.

In his studies using this framework Borjas (1987, 1992, 1994, 1999) finds that the adjusted wage differential for recent immigrants to the US depends negatively on source country inequality and positively on average source country income, which implies that immigrants from poor and unequal countries are negatively selected relative to immigrants from other source countries. Comparison between the US and Canada suggests that immigration policies might also matter as more skill-selective policies in the latter are associated with better immigrant labour market outcomes (Borjas 1993). But this appears to operate largely through the source country composition of immigration rather than through differences in the selectivity of migrants from a given source country (Borjas 1993; Antecol et al., 2003).

More recently, attention has focused on micro-level comparisons of movers and stayers, where the probability of migration is related to the estimated return to skills at home and abroad. Using this approach Ramos (1992) and Borjas (2006) find that migrants from Puerto Rico to the US have less education than non-migrants and that returnees are somewhat more educated than out-migrants. This is consistent with higher returns to education in Puerto Rico as compared with the US, where there are no immigration policy barriers between the two countries. However in a study of 32 source countries Feliciano (2005) finds that Puerto Rico is the only country for which migrants to the US are negatively selected on education relative to the source population. This suggests that the presence of immigration policy increases positive selection, although there is still a weak negative relationship between the degree of positive selection and source country inequality. Interestingly, Aydemir (2003) finds that, for migration from the US to Canada, the high-educated are less likely to apply but are more likely to be accepted through Canada's points system. Overall they are positively selected because effect of skill-selective immigration policy outweighs the incentive effect that would otherwise favour low skilled migration.

Much of the recent attention has focused on the large flow across the southern US border from Mexico, a much poorer country with a higher return to skills. Estimating the wage distribution for migrants had they stayed in Mexico, Chiquiar and Hanson (2005) find that migrants are drawn disproportionately from the middle and upper middle of the income distribution and that they are over-represented among those with 10-15 years of education (see also Orrenius and Zovodny, 2006). This is could be accounted for by the low-educated facing higher migration costs, which in terms of Figure 1, could make the reservation wage function w(x) convex. Other studies have stressed the effects of migration networks in reducing costs and increasing the returns to migration. Thus McKenzie and Rapoport (2007) find that networks identified in the source country increase the proportion of low educated migrants, while Munshi (2003) identifies the positive effects of networks at the destination on the employment probabilities and the occupational status of Mexican immigrants.

These studies have provided much insight into migrant self-selection at the micro-level. They stress the fact that migration costs are important and that policy barriers could be important in raising the costs e.g. of illegal migration. But they offer little insight into the observed differences in the selectivity of migration across countries of immigration. Less still do they explain why the skill-or education-content of emigration differs so much among countries of origin.

By contrast the educational content of emigration has been the central focus of the literature on the 'brain drain'. Recent advances in data collection have improved the measurement of the brain drain. By looking at the foreign born by origin country and education in the censuses or population registers of OECD countries it has been possible to assemble a much clearer picture of the migrant stock by education for a range of source countries. These datasets have been used to test the competing hypotheses of brain drain and brain gain. Following Mountford (1997) they have sought to estimate whether an increase in the prospects of emigration could increase the incentive to acquire human capital by enough to raise education levels even among those who, in the event, stay at home (the brain gain). In a series of studies Beine et al. (2001, 2003) find a positive effect of skilled migration on the share educated (migrants plus non-migrants) across a set of source countries. They estimate significant educational offsets although some countries that are small, relatively poor and have high emigration rates still suffer substantial net losses of human capital (particularly countries in the Caribbean and in Sub-Saharan Africa—see Docquier (2006), p. 38). While these studies are important in assessing key consequences of the brain drain, they are concerned with its effects rather than its causes; indeed the theoretical model of migration is one where those who attain a threshold education level are randomly chosen for emigration.

Here we focus on the factors that drive the educational selectivity of migration across both sources and destinations—something that has been neglected in recent work. However in a recent paper Docquier et al. (2006) estimate models of migration to OECD countries by skill level. Their focus is on the concentration among OECD destinations of (the stock of) migrants from different source countries. For both tertiary-educated and low-educated migrants they find that the concentration in a destination decreases with distance from the source and increases with former colonial links, with linguistic and cultural proximity, and with the size and prosperity of the destination. Interestingly they find that high-educated migration is more responsive to distance and economic incentives while unskilled migrants tend to be more sensitive to colonial ties and linguistic barriers and more responsive to the generosity of welfare programs in destination countries.

A second recent paper related to ours is by Brücker and Defoort (2006). They use a panel data of immigration flows (by education level) to 6 OECD countries over the period 1975-2000. They use the Gini coefficient as a measure of inequality and include a series of measures of geographical and cultural distances between countries. Like us, they investigate the determinants of skill selectivity across countries. They find a positive correlation between inequality in the sending country (measured by the gini coefficient) and the immigration selectivity, which is a priori inconsistent with the Roy model. Our data show a similar pattern, as we will show in the next section. They introduce an extended version of the Roy model where they allow for a negative correlation between skill levels and individual moving costs. This extended model predicts than immigration selectivity could increase with inequality and, therefore, reconcile the theory with the evidence. However, they do not directly test this assumption.

In what follows we use a dataset similar to that analysed by Docquier et al (2006), which counts migrants to the OECD by destination, by source and by education level. However, here we use the framework of the Roy model and we focus more on educational selectivity from the source country perspective.

Educational Selectivity by Source and Destination

Our measures of the educational selectivity of migration are based on a dataset constructed at the OECD by Dumont and Lemaître (2004). This covers the stock of foreign-born in all OECD countries in 2000/01 from all source countries by three levels of education and is discussed in more detail in the data appendix. Here we focus on the share of migrants aged 15 and over that has some tertiary education, which we label as the high educated.

Table 1 looks at these migrants from the destination country perspective. The first column shows each destination country's share of the foreign born aged 15 and over in the OECD. The United States is by far the largest host country with 41.7 percent of the total, while other traditional immigration countries, Australia, Canada and New Zealand account for a further 13.0 percent. The EU-15 accounts for 37.4 percent of the OECD total with Germany the largest individual host country followed by France and the UK. Other countries in Eastern Europe and elsewhere contribute modestly to the total. The second column shows, for each country, the percentage of the population aged 15 and over that is foreign-born. As is well-known, Australia, Canada and New Zealand have immigrant shares of over 20 percent--rates that are matched only by Switzerland and Luxembourg. Less well known is the fact that seven other members of the EU-15 have immigrant shares that are over 10 percent and only little less that the United States at 14.3 percent.

The third column of Table 1 reports the percentage of the foreign-born in each host country that is tertiary educated. Among the countries with skill-selective points systems, Canada, and Australia have ratios of 37-38 percent, which are especially high when compared with European countries many of which have ratios of less than 20 percent. Notable exceptions in Europe are the UK and Ireland, while Norway and Sweden also have ratios of over 20 percent. Outside of Europe there are high ratios for some countries with very low immigration such as Japan. Korea and Mexico which have relatively few source countries (in the case of Mexico 70 percent are US-born).

Clearly a variety of factors contribute to the high-educated share of immigration. One is the extent to which different destination countries select immigrants from a given source more or less positively. To shed some light on this we calculate an adjusted high education ratio that applies the total high-educated ratio of emigrants to the OECD from each source country to the weight of that country in each destination's immigration. Thus if the figure in column (3) exceeds that in column (4) then the destination country in question selects higher educated immigrants from a given source (on average) as compared with other destinations. Just to take a few examples, Australia and Canada, as well as the US and Mexico, tend to select relatively high-educated immigrants given their source country composition. By contrast most European countries have high-educated immigrant shares that are lower than their source country composition would suggest. Nevertheless the correlation coefficient of 0.76 between columns (3) and (4) indicates the much of the variation in high-education ratios is driven by the way in which the pool of migrants from different sources is distributed across destinations.

Column (5) takes this little further by applying the source country weights of immigration for each destination to the high education share of the residents aged 15 and over in the source countries taken from Barro and Lee (2000). Although this does not count the emigrants as part of the source country population it gives an indication of the extent to which each destination draws migrants from relatively high education countries. As is well-known, high education rates are much lower in the source country populations than they are for migrants, and the variation of this weighted average across destinations is also somewhat less than among migrants. But the correlation coefficient between columns (3) and (5) is 0.47, which suggests that some part of the variation across destinations in the immigrant education mix is associated with source country characteristics. Of course this may itself reflect the processes of self-selection and policy as well as other links between specific sources and destinations.

Table 2 examines migrants to the OECD from the perspective of the source region. The first column shows the percentage of OECD immigrant stock that is accounted for by different source regions. A large proportion (46 percent) of these are intra-OECD migrants, while in terms of continents, 29.5 percent come from the Americas, 35.3 percent come from Europe (including the former Soviet Union) and 24.4 percent come from Asia (including the Middle East). The second column shows for each sending region the percentage of its emigrants that are high educated. As might be expected, the ratios are relatively high (30 percent or above) for North America, Australia/New Zealand and Northwestern Europe. But the education content is also high for emigrants from most of Asia, from the former Soviet Union and from Sub-Saharan Africa. To some degree this is reflected by the (migrant weighted) percentages of high educated residing in each region's source countries (column 3). Although the correlation coefficient between columns between columns (2) and (3) is 0.5, there are substantial deviations. For countries in Asia and Africa the high-educated share among emigrants is far higher than that of the source country populations—a result that remains true even when the emigrants are added back to the source populations. In some other cases such as Central America, Southern Europe and North America the gap between emigrants and source country populations is small or even negative. These comparisons immediately raise the question of how such large differences in educational selection across countries and regions can be accounted for.

Before moving to a more formal analysis of these data, it is worth looking to see if the relationships suggested by the Roy model can be observed in crude correlations on country-level data. Migration studies often use the gini coefficient of household income as a proxy for the return to skills. However this variable is far from ideal as it measures income from all sources and it reflects the proportions at each income level. Instead we have constructed a measure of the return to skill based on wage rates for different occupations from Freeman and Oostendorp's (2001) dataset (see data appendix). Figure 2 provides scatter plots of the relationship between the share of high-educated immigrants by destination (Table 1 column 3) and the destination country skill premium. The Roy model predicts that this relationship should be upward sloping. Figure 2 shows that there is very little relationship between the education content of immigration and destination skill premium. Thus the effects of incentives on selection by education are not easily observed across OECD destinations.[1] However, as we have noted above, such effects might be masked by differences in the source country composition of immigration and/or by differences in immigration policy.

The relationship between the skill content of migration and economic incentives should be more clearly observed by comparing those who have emigrated from source countries with those who stayed. Figure 3 plots the percentage point difference between the high-educated shares of movers and stayers (the country-level equivalents to the ratio of columns (2) and (3) in Table 2) against our measure of the wage premium. According to the Roy model, this relationship should be downward sloping: the greater the source country wage premium, the lower the proportion of high-educated emigrants relative to non-emigrants. The result is even more disconcerting for the Roy model. As Figure 3 shows, the relationship is strongly upward sloping. Thus either the Roy model is not a very good characterisation of migrant selection at the global level or else the effects of

[1] We did a similar comparison using the gini coefficient of household income as a measure of the return to skills. This also produced little evidence of a strong positive relationship. The correlation coefficient between our measure and the gini coefficient is 0.41 and is significant at the 1% level.

economic incentives are being obscured by other influences. In order to investigate this further we first outline a model of how such influences might operate.

Theoretical Framework

Selection by skill has been a central focus of much of the literature that employs some variant of the Roy model. Here we use a modified version of this framework. We characterise the probability that an individual migrates as depending on three components. The first is the probability that the individual finds it in his or her interest to migrate on cost-benefit grounds. The second is immigration policy through which migrants are screened. And third there is selection at the origin, arising from the fact that some individuals may be too poor to afford the costs of migration.

The incentive for individual *i* to migrate, I_i, is the difference between the utility from the economic gains and the non-economic loss or compensating differential.

$$I_i = U_{yi} - U_{xi} - z_i \quad (1)$$

where U_y and U_x are economic utility at the destination and the origin respectively and z is the compensating differential representing the individual's non-economic preferences, all assumed to be in present value terms. In order to capture heterogeneity in individual preferences we assume that z_i is a random variable with mean $\bar{z} > 0$ reflecting a positive average preference for the origin country. Assuming logarithmic utility we can express the incentive to migrate as

$$I_i = \ln w_{yi} - \ln(w_{xi} + c) - z_i \text{, or } I_i = \ln w_{yi} - \ln w_{xi} - \ln(1 + \frac{c}{w_{xi}}) - z_i \quad (2)$$

where w_y and w_x are earnings in the destination and origin respectively and c is the direct cost of migration.

Earnings in origin and destination depend on education and a random unobserved productivity component, while earnings at the destination also depend on a term representing the 'cultural' distance between the origin and the destination:

$$\ln w_{xi} = \alpha_0 + \alpha_1 s_i + \varepsilon_{xi} \text{, and } \ln w_{yi} = \beta_0 + \beta_1 s_i - u(\beta_2 - \beta_3 s_i) + \varepsilon_{yi} \quad (3)$$

where s_i is individual *i*'s education level, which we assume is bounded by $0 \le s \le 1$ (later we will assign the value 1 to the high educated and 0 to the low educated). We assume that the unobserved components of the wage ε_x and ε_y have mean zero and are uncorrelated with the individual's preference for migration. The term u is a measure of 'cultural distance' between the source and the destination that affects the transferability of educational skills. The greater the cultural distance the less transferable are these skills and therefore the lower is the wage in the destination. High education may help bridge the culture gap so that if $\beta_3 > 0$ the wage penalty is lower for the more highly educated. On the other hand cultural difference may have smaller effects on productivity in low education jobs where there is little human capital to be transferred, in which case $\beta_3 < 0$.

We characterise the direct cost of migration simply as $d(1-\gamma s_i)$, where d is a measure of the direct costs, which decline with education level. Hence the individual's incentive to migrate is:

$$I_i = \beta_0 - \alpha_0 + (\beta_1 - \alpha_1)s_i - \beta_2 u + \beta_3 u s_i + \varepsilon_{yi} - \varepsilon_{xi} - d + d\gamma_1 s_i - z_i \qquad (4)$$

Immigration policy acts as a screen and it may be skill selective. We interpret immigration policy as raising the costs of migration such that the policy cost for individual i is:

$$P_i = \delta_0 - \delta_1 s_i \qquad (5)$$

If policy is not skill-selective then $\delta_1 = 0$. An across-the-board toughening in policy raises the policy cost of immigration by increasing δ_0, while an increase in skill-selectivity holding overall toughness constant can be achieved increasing both δ_0 and δ_1.

An important feature of our model is the poverty constraint; people living close to subsistence find it much more difficult to migrate. While it might seem possible to borrow, it will be difficult to provide collateral based on future earnings when the purpose of the loan is to leave the country. Thus, the greater are the migration costs, the higher is the general incidence of poverty in the origin country, and the more likely a given individual is to be poor, the less likely that he/she will be able to migrate. We express the poverty constraint effect as the product of these three factors:

$$R_i = C_i r(1 - s_i) \qquad (6)$$

where r is the general poverty rate and C_i represents the total cost of migration including both the direct cost and the policy cost. These costs could be prohibitive for a low educated individual in a poor country facing sufficiently high migration costs.

Substituting direct and policy costs as defined above, the poverty cost can be expressed as:

$$R_i = (d + \delta_0 - (d\gamma_1 + \delta_1)s_i)r(1 - s_i) \tag{7}$$

Provided that the sum of migration costs is positive, the poverty cost R_i is increasing in the poverty rate and decreasing in s up to $s = 1$. Putting together the incentive to migrate, the policy cost and the poverty cost, the probability that individual i will migrate is:

$$\begin{aligned} \Pr(m_i = 1) = \Pr(\beta_0 - \alpha_0 - d - \delta_0 - \beta_2 u + (\beta_1 - \alpha_1 + \beta_3 u + d\gamma + \delta_1)s_i \\ - (d + \delta_0 + (d\gamma + \delta_1)s_i)r(1 - s_i) > z_i + \varepsilon_{xi} - \varepsilon_{yi}) \end{aligned} \tag{8}$$

We characterise the total migration rate as depending on these variables such that:

$$\begin{aligned} \frac{M_T}{N_T} = \beta_0 - \alpha_0 - d - \delta_0 - \beta_2 u + (\beta_1 - \alpha_1 + \beta_3 u + d\gamma + \delta_1)s \\ - (d + \delta_0 + (d\gamma + \delta_1)s)r(1 - s) - \bar{z} \end{aligned} \tag{9}$$

where s is the mean of s_i . We assume two education levels, high educated, $s_i = 1$, and low educated, $s_i = 0$, and thus s is the share of high-educated in the population. The migration rate for high-educated individuals is:

$$\frac{M_H}{N_H} = \beta_0 - \alpha_0 - d - \delta_0 - \beta_2 u + \beta_1 - \alpha_1 + \beta_3 u + d\gamma + \delta_1 - \bar{z} \tag{10}$$

And the migration rate for low-educated individuals is

$$\frac{M_L}{N_L} = \beta_0 - \alpha_0 - d - \delta_0 - \beta_2 u - (d + \delta_0)r - \bar{z} \tag{11}$$

And the difference between the migration rates of the high- and the low-educated is:

$$\frac{M_H}{N_H} - \frac{M_L}{N_L} = \beta_1 - \alpha_1 + \beta_3 u + d\gamma_1 + \delta_1 + (d + \delta_0)r \tag{12}$$

As in the Roy model, an increase in the return to skills in the destination relative to the origin increases positive selection. In this specific case an increase in $\beta_1 - \alpha_1$ increases migration among the high educated but not among the low educated. Cultural distance affects selection through β_3, which could be positive or negative. Positive selection is also related to direct migration costs through $d\gamma_1$ and through the policy selectivity term δ_1. Finally, the degree of poverty, r, reduces unskilled migration and therefore increases positive selection, both directly and through the interaction with migration costs.

Estimating framework and data

We use the theoretical approach above to motivate an empirical model of migrant selectivity from country *x* to country *y* by specifying the following estimating equation:

$$\ln\left(\frac{M_{Hyx}/M_{Tyx}}{N_{Hx}/N_{Tx}}\right) = a_0 + a_1(\ln\frac{w_{Hy}}{w_{Ly}} - \ln\frac{w_{Hx}}{w_{Lx}}) + a_2 Cult_{yx} + a_3 Dist_{yx} + a_4 Pov_x \qquad (13)$$

$$+ a_5(Dist_{yx} \times Pov_x) + a_6 Pol_y + \eta_{yx}$$

The dependent variable is the log of the share of high educated in the total migration from *x* to *y* divided by the share of high educated in the population of origin country *x*. This measures the educational selectivity of migration from *x* to *y*. The first of the explanatory variables is the difference in the wage premium for high over low educated workers between the destination and source countries. The basic test of the Roy model is that $a_1 > 0$. Because of the restriction imposed on the two wage ratios this variable varies by origin and by destination. The second term is cultural distance which is specific to each country pair and which could be positive or negative in sign. The distance between *x* and *y*, which varies across bilateral pairs, is a proxy for direct migration costs. Since these are less of a deterrent to the high educated we expect that $a_3 > 0$.

The fourth and fifth terms capture the poverty constraint that affects the low educated in poor countries. The effect of poverty is to increase high education selectivity, the more so the higher are the costs of migration. Hence we expect $a_4 > 0$ and $a_5 > 0$. The interacted term varies by source and destination but the poverty rate varies only by the origin country. Immigration policy is destination specific and it may be skill selective. In the absence of a measure the two elements of policy--overall toughness and educational selectivity--we introduce a dummy variable for each destination country. This is represented as Pol_y, and it will also capture any other destination specific effects.

The theory set out in the previous section considers only one source and one destination country but in our empirical model we estimate migration from a given source to a number of different destinations. So third country effects could potentially matter. Consider the case in which different destinations $y = 1\ldots n$ are imperfect substitutes and the benefit of each destination (net of destination-specific reservation wage costs) is summarised by w_y and the benefit associated with the source country is ω_x. For destination country k this model may be written:

$$\ln\left(\frac{M_{Hkx}/M_{Tkx}}{N_{Hx}/N_{Tx}}\right) = e_1(\omega_k - \omega_x) - \sum_{y \neq k}^{n} e_2(\omega_y - \omega_k) \tag{14}$$

where e_2 is a symmetric cross-destination effect. By adding and subtracting ω_k inside the bracket of the second term this can be re-written as:

$$\ln\left(\frac{M_{Hkx}/M_{Tkx}}{N_{Hx}/N_{Tx}}\right) = e_1(\omega_k - \omega_x) - ne_2(\overline{\omega_y} - \omega_k) \tag{15}$$

where $\overline{\omega_j}$ is the mean across all destinations (including k), and since this is common across all destinations the second term can be treated as a destination fixed effect.

The data that we use for the numerator of our dependent variable is the share of migrants aged over 15 from a source country to an OECD destination country that have some tertiary education. As noted earlier, this stock data for the year 2000 comes from Dumont and Lemaître (2004). The denominator is the share of the source country population aged 15 and over with some tertiary education in 2000, based on the Barro and Lee (2000) database. In order to obtain the population at risk, we add back the emigrants to the OECD to the source country numbers of high-educated and total emigrants to the Barro-Lee estimates for each source country.

As noted earlier we measure the skill premium using wage rates rather than relying on the gini coefficient of household income, which has often been used as a measure of the return to skills. Our measure of the skill premium is the ratio of the wage in a set of occupations that normally require some tertiary education to the wage in a set of unskilled occupations. These are calculated from Freeman and Oostendorp and cover the years 1983 to 2003. The percentage in poverty is the World Bank's estimate of the proportion of population living with incomes of less than $2 per day for the available year nearest to 2000. Because this is only available for a recent year and because of missing data we develop an alternative measure of poverty using the share of agriculture in GDP. Across the source countries in our data for which the World Bank poverty share is non-zero the correlation between poverty and the agricultural share in 2000 is 0.85. For our alternative poverty measure we apply the prediction from a regression of poverty on the agricultural share to the average agricultural share over the years 1950 to 2000. One advantage is that this reflects average poverty levels for the period over which almost all of the migration took place.

The costs of migration are reflected in the distance between the capitals of the source and destination countries. Variables that are intended capture the cultural distance between the source and the destination include dummies for having a common official or primary language and having a post-colonial relationship. We also include a measure of linguistic proximity, which is based on the number of nodes between one language and another on the linguistic tree. Further details of the definition and sources of the variables can be found in the Data Appendix.

Results for Educational Selection

Our estimates of different variants of the model appear in Table 3. Column (1) shows the results for a baseline specification that includes the wage premium differential and the variables that reflect geographical and cultural distance between the source and destination countries, but excluding the destination country dummies. This produces a negative coefficient on the wage premium differential, which is the opposite of what the Roy model would predict, although it is not significant. When the destination dummies are included in column (2) we find that the coefficient becomes positive although it remains small and insignificant. One reason is that, across source countries, the wage premium is positively correlated with poverty. Thus the source country wage ratio would be capturing a mixture of the 'true' negative effect on selection through the wage premium and the positive selection effect operating through the poverty constraint.

The third column of the table adds controls for the World Bank's $2 per day poverty rate and the interaction between distance and poverty. Our model predicts that the effect of poverty should matter more the further away the source country is from the destination country and so both the main effect and the interaction should take positive coefficients. The results strongly support the hypothesis that poverty matters. We find that the estimates of a_4 and a_5 are both positive and significant, that is, poor countries are associated with more positive selection and the further away they are the stronger is this effect. Introducing these poverty variables has a dramatic effect on the coefficient of the wage premium differential, which now has the predicted sign and is strongly significant.

That is, controlling for poverty, we find that source countries with a higher wage premium are associated with more negative selection. More precisely, the estimated elasticity of skill selection with respect to the wage premium differential is around 0.37. Column (4) uses instead our measure of poverty imputed from the agricultural share. This expands the number of available observations and it produces results that are similar to those in column (3) using the direct measure of poverty.

As noted earlier we have no clear prediction for the effects of cultural distance. On the one hand high education may make it easier to bridge the cultural gap, in which case cultural distance should lead to positive skill selection. On the other hand for the lower educated with fewer skills to transfer, cultural distance may be less of a barrier, in which case it may lead to negative selection. The results in columns (3) and (4) of Table 3 suggest that the transferability of human capital may be highly sensitive to the sharing of a common language; and that cultural proximity does not necessarily enhance the transferability of human capital but reduces the costs of migration for low-skilled workers more than for high-skilled workers. The negative effect of colonial history may reflect the long-term effects of the initially low barriers to immigration from post-independence colonies that generated persistent streams of low-skilled migrants. Finally, distance has a positive coefficient, as we would expect, even in the presence of the interaction with poverty. Thus migration costs increase positive selection, but more so for poor source countries.

The results so far suggest a strong role for poverty in explaining the patterns of skill selection, and we explore this further by looking at poor and rich countries separately. We label source countries as "poor" if their poverty rate is higher than 10% and as "rich" if their poverty rate is smaller than 5%.[2] We then estimate the model separately for each of these two groups. For the poor countries, we estimate a model with and without the poverty variables, to identify precisely the role played by poverty in skill selection. The results are reported in Table 4. These results confirm our previous results. The elasticity of skill selection with respect to the wage premium differential is twice as large in rich countries as in poor countries, when we do not control for poverty rates. Once we do (column (3)), we find a coefficient for the wage premium differential that is

[2] We experimented with alternative classifications of countries and found very similar results.

comparable to the one for rich countries and we find that poverty itself also increases positive selection . The results with the imputed poverty rates (column (4)) are very similar to those with the poverty variables, as we found earlier.

One worry with the results so far is that the wage premium may be endogenous. For example, suppose that the mechanism determining emigration and skill selection are in line with our model. If a country experienced a large emigration of the high-skilled labour force (e.g. a typical case of brain drain), we would expect this to affect the wage premium: presumably, the wage premium will increase as high-skilled workers leave the country. Since our measure of wage premium is an average measure covering a period overlapping with the actual migration movements, we could find that countries with a relatively high wage premium are associated with more positive selection, which would simply be driven by reverse causality. In terms of our estimates, this endogeneity problem works against us, as it would bias the OLS estimates of the wage premium differential downwards. Ideally, we would like to instrument for the wage premium. However, it is hard to think of a variable that would affect the wage premium only, without affecting the incentives to emigrate directly.

Instead, we investigate the potential endogeneity problem by comparing the results for small and large countries. Presumably, the wage premium will be more sensitive to emigration patterns in small countries than in large countries. Comparing small and large countries should provide some evidence on the existence of an endogeneity problem. The results appear in Table 5. We report two different set of estimates, for different samples of source countries: (1) population smaller than 7.5 millions , (2) population larger than 20 millions. The results go exactly in the direction we would expect: We find a positive and significant coefficient for the wage premium differential in large countries, and find a negative coefficient in small countries. The inclusion of poverty rates increases the coefficient of the wage premium differential, but does not help in reversing the coefficient in the case of small countries. These results indicate that endogeneity is an issue indeed and our estimate of the elasticity of skill selection is likely to be a lower bound.

Total Migration

So far we have focused on educational selection from a given source country. But differences in the educational content of migration by destination are also the result of the mix of countries from which the migrants are drawn. In order to estimate total migration from source to destination we specify the empirical counterpart to equation (9) in terms of the share of each source country in the immigration of a given destination country, taking the population of the source country over to the right hand side:

$$\ln(M_{Tyx}/M_{Ty}) = b_0 + b_1 \ln\frac{w_{Ly}}{w_{Lx}} + b_2(\ln\frac{w_{Hy}}{w_{Ly}} - \ln\frac{w_{Hx}}{w_{Lx}})s_x + b_3 Cult_{yx} + b_4(Cult_{yx} \times s_x) + b_5 s_x + b_6 Dist_{yx} + b_7(Dist_{yx} \times s_x) + b_8(Pov_x \times (1-s_x)) + b_9(Dist_{yx} \times Pov_x \times (1-s_x)) + b_{10} \ln N_{Tx} + \nu_{yx} \quad (16)$$

Using immigrant shares as the dependent variable standardises for the very different scale of migration across destinations. The first two explanatory variables represent the wage gaps for high and low skills weighted by the share of high educated in the source country population. The coefficients are predicted to be positive and equal, $b_1 = b_2 > 0$, but we do not impose this restriction initially. The coefficient b_3 is expected to be negative: the larger the cultural distance the lower the share of immigration, but the interaction with the share of high educated is ambiguous for the reasons noted earlier. If the policy costs are less for skilled migrants we predict that $b_5 > 0$. The costs of migration associated with distance are expected to have a negative effect but less so for skilled migrants, so that $b_6 < 0$ and $b_7 > 0$. The two terms involving poverty relate to low-educated potential migrants; poverty is expected to reduce immigration, the more so the greater the distance; hence $b_8 < 0$ and $b_9 < 0$. Finally source country population should positively affect the destination share with a unit elasticity, $b_{10} = 1$, although we do not impose this restriction.

The results of estimating this equation appear in Table 6. We exclude destination dummies since our dependent variable is a share and is therefore normalised for total migration to the destination. In column (1) we find that the unskilled wage differential, representing the overall wage gap is positive and significant as predicted. However, the wage premium differential that captures the effect of skill selection on total immigration is highly insignificant. This seems to be a result of the collinearity between these two variables, which, by construction, contain common components. When in column (2) we impose the restriction that $b_1 = b_2$, the coefficient is positive and significant and the restriction is not rejected. For the variables representing cultural distance, the main effects are all significant and positive, while the interactions with the high-educated share of the source country population are uniformly insignificant. Thus the effects on the educational selectivity that were found in Table 3 are hard to observe for aggregate migration when the main effects are also included. When these interactions are dropped, as in column (2), the main effects remain strongly positive, underlining the importance of shared colonial history, common language and language proximity in determining the source country composition of total immigration.

Turning to the variables that represent the costs of migration we find, in keeping with most other studies, that the effect of distance is strongly negative. And as predicted, the interaction of distance with the share of high educated gives a positive coefficient, indicating that the costs of migration are less of a barrier to the more highly educated. This is consistent with the finding in Table 3 that educational selection is more positive the greater is the distance from source to destination. The interaction between the share of the source country population in poverty and the share with low education is negative as predicted, supporting the view that it is principally the low educated who are constrained by poverty. This too is consistent with the finding in Table 3 that the more widespread is poverty in a source country the more positively selected are the emigrants from that country. Finally, the interaction between distance, poverty and the low educated share is posititve contrary to expectation but the coefficient is small and insignificant and so this interaction is dropped in the second column.

The results of estimating unrestricted and restricted versions of the equation using our imputed measure of poverty appear in columns (3) and (4) of Table 6. As noted earlier, using predicted values of poverty based on the share of the labour force in agriculture allows us to include a wider range of source countries. The results are little changed from those using the direct measure of poverty. In columns (3) and (4) the coefficient on the source country population now becomes insignificantly different from one although we do not impose this restriction.

The coefficient on the share of the source country population that is high educated is not significant in any of the four regressions in Table 6. In columns (2) and (4) several of the interactions with the educational share are dropped, although it still works positively through the interactions with distance and with poverty. However the main effect remains negative and insignificant.

The Effects of Fundamentals and Policy across the OECD

A key question in recent debates has been: how far can differences in the skill selectivity of immigration among OECD countries be explained by wage differentials and other fundamentals such as distance and poverty, and how much remains to be explained by destination-specific factors including policy? Our estimates of the educational selectivity of migration and the share of each source country in the total allow us to decompose the sources of difference in the overall proportion of high-educated immigrants. For destination country *y* the proportion high-educated immigrants is:

$$\frac{M_{Hy}}{M_{Ty}} = \sum_{x=1}^{n} \frac{M_{Hyx}}{M_{Tyx}} \times \frac{M_{Tyx}}{M_{Ty}} \tag{17}$$

The first term in the summation is the source by destination educational selectivity that we estimated in Table 3. The second term is the source country composition of the destination's immigration, which we estimated in Table 6.

In order to assess the effect of fundamentals and policy factors on the overall proportion of high-educated immigrants, we construct counterfactual predictions substituting one by one each of these fundamentals by the mean across all destinations, holding all else constant, including the residual. For example, in the educational selectivity equation, we calculate the following counterfactual for the wage premium differential:

$$\ln\left(\frac{M_{Hyx}/M_{Tyx}}{N_{Hx}/N_{Tx}}\right)\Bigg|_{mean\ premium} = \hat{a}_0 + \hat{a}_1 \frac{\sum_y (\ln\frac{w_{Hy}}{w_{Ly}} - \ln\frac{w_{Hx}}{w_{Lx}})}{N_y} + \hat{a}_2 Cult_{yx} + \hat{a}_3 Dist_{yx} + \hat{a}_4 Pov_x$$
$$+ \hat{a}_5 (Dist_{yx} \times Pov_x) + \hat{a}_6 Dummy_y + \hat{\eta}_{yx} \tag{18}$$

where the $\hat{a}_i$ are the estimated coefficients from column (4) in Table 3 and $\hat{\eta}_{yx}$ are the corresponding residuals. The second term on the right is the mean across all destinations of the differential with source country *x*. Clearly, the variables that matter are those that differ only between destinations or that differ across bilateral pairs. Any variable for which the variation is only across source countries will drop out.

In a similar manner we generate a counterfactual predication for the wage differential working through the composition equation, using the coefficients in column (4) of Table 6. This counterfactual is constructed in the same way as that for educational selectivity in equation (20), except that the sum of the shares, for the source countries in our sample, are constrained to add up to one for each destination.

We then construct a counterfactual for the overall proportion of high-educated immigrants in a given destination country:

$$\left.\frac{M_{Hy}}{M_{Ty}}\right|_{mean\ premium} = \sum_{x=1}^{n} \exp\left[\ln \left.\frac{M_{Hyx} / M_{Tyx}}{N_{Hx} / N_{Tx}}\right|_{mean\ premium} + \ln \frac{N_{Hx}}{N_{Tx}} + \ln \left.\frac{M_{Tyx}}{M_{Ty}}\right|_{mean\ premium} \right] \tag{19}$$

Finally we calculate the difference between the actual value for the overall share of high educated migrants at a given destination (based on the sample used in the regression analysis) and the counterfactual value for the counterfactual.

We also calculate a counterfactual for the joint effect of all the fundamentals, working through the education selectivity equation alone, by setting all the relevant explanatory variables at their global means while holding the source country composition constant. Similarly we calculate a counterfactual for the joint effect of fundamentals working though the source country composition equation by substituting all fundamentals by the means across all destinations, holding educational selection constant. For each destination, we then compare the actual value and these counterfactual values of the education selectivity and the source country composition separately, such that we can assess whether the fundamentals mostly work through the education selectivity or the source country composition.

Table 7 reports the differences between the actual proportion of high-skilled in total immigration and the predicted values based on the counterfactual. A positive number indicates that the fundamentals of that particular destination country make a positive contribution to the proportion of high-skilled in its total immigration. Some OECD countries are dropped from this table (notably Germany) because, as a result of missing data, the share of total immigration covered by our estimates is less than fifty percent of the total. For each destination the share of immigration covered by the source countries in our regressions appears in the last column of the table.

Column (1) of the table is the actual share of high educated migrants for each destination, over the source countries in our sample. Column (2) reports the counterfactual difference for variables working through the educational selectivity equation, while column (3) reports the counterfactual difference for the variables working through the composition equation. To illustrate, the first row of column (2) shows that, for Australia, the overall proportion of high educated is 5.69 percentage points higher as a result of variables working through the educational selectivity equation than it would have been if these variables were set at the mean for all countries. Column (3) shows that the effect of variables working through the source country composition contributes to 2.37 percentage points to the high-educated proportion. Across the countries in the table, there is a positive correlation of 0.53 between the counterfactual difference working through educational selectivity and the high education shares in column (1). However, this counterfactual includes the effect of the destination dummies and the correlation is much lower (at 0.28) if the dummies are excluded from the counterfactual calculation. Selection effects work particularly strongly for Canada and Ireland and also for Portugal and the UK. The country composition effects reported in column (3) are typically somewhat smaller and the correlation between these counterfactual differences and the overall high education shares in column (1) is 0.36. The countries that benefit most from composition effects are Mexico and the US.

Columns (4)-(10) report counterfactual differences for each variable separately, but allowing the effects to work through both equations. Column (4) shows the effect of the low wage differential, which works only through country composition. The effects look surprisingly small. Although wage gaps between countries have substantial effects on the source country composition of immigration the effect of these compositional shifts on the overall educational mix is relatively modest. High wage countries such as the US and Luxembourg benefit slightly from their ability to attract migrants from relatively rich countries while Mexico does not.

Not surprisingly the effects of differences in destination skill premia are more important, and they operate largely through the selection equation rather than the composition equation. For Australia, Denmark, Japan Norway and Sweden, with relatively low skill premia, the share high educated is reduced by at least two percentage points. Consistent with other studies that we find that the effect is positive for Mexico, where the large skill premium raises the high educated share by 7 percentage points. There are also modest positive effects for countries such as Portugal and New Zealand. However the effects are generally fairly small relative to the overall gap in the share of high educated. Thus even though we find strong support for the Roy model in our regressions once we allow for poverty, differences in wage premium make only a modest contribution to the overall share of high educated between destinations--even though they include the composition effect as well as the selection effect.

As columns (6), (7) and (8) show, for most countries cultural differences have larger effects, but not always in the way that might have been anticipated. The effects of colonial links are surprisingly small. Although they work negatively through the education selection equation, the effects on composition are generally offsetting. Thus for former colonial powers such France Portugal and the UK, the colonial legacy shifts the composition towards countries with higher than average skills but selects negatively from those countries.

By contrast, the net effect of sharing a common language has much larger effects. As we have seen sharing a common language has a positive effect on educational selectivity and on the share of migrants drawn from the source country. This effect is positive and large for English speaking countries and again it is largely driven by educational selection rather than by source country composition. Former British colonies such as Australia, Canada and New Zealand might have been expected to benefit from having a large share of migrants from the UK, but for these the composition effects are small and negative. The selection effects of a common language are strongest for countries that share a common language with a number of source countries—either English-speaking or multilingual destination countries such as Belgium, Luxembourg and Switzerland. By contrast the effects are negative for countries such as Denmark, Japan, Norway and Turkey.

The effects of linguistic proximity are also moderately large but they work negatively through the educational selection equation and positively through the composition equation. Overall, the former channel tends to be more important and hence the effect of linguistic proximity largely offset the common language effect on the overall share of high educated. Mexico and the US are the only two countries for which common language and linguistic proximity both have positive effects. For both these countries the effect of source country composition on linguistic proximity outweighs the direct effect of educational selection.   The result for the US contrasts sharply with the other English speaking countries where the compositional effects of linguistic distance are strongly negative.

Geographic distance works positively through the education selection equation but it has ambiguous effects in the composition equation as a result of the interaction with the source country high education share. Some of the effects are quite large and, because of the non-linearity of the model the absolute values should be treated with caution. However the magnitudes are as might have been expected, with large positive effects for Australia, Japan and New Zealand, which are distant from the main sources of immigration. For Australia and New Zealand and also for Canada, both educational selection and composition contribute strongly to the overall positive effect of distance. With the exception of these countries and the US the other countries are relatively close to their sources of immigration and as a result the educational selectivity from a given source is much less positive.

Because of the non-linearity of the equations that are used to construct the counterfactuals, the individual effects cannot be added up. Hence it is difficult to measure residual effects that might be associated with policy. However, we can examine the effects of the destination country dummies working through the educational selection equation (column (10)). It is difficult to see patterns in these effects that can easily be associated with policy. For example, among those countries with skill-selective points systems the country effect is strongly positive for Canada, close to zero for Australia and strongly negative for New Zealand. Similarly, the open borders within the EU might be expected to lead to less positive selection than where immigration is subject to controls. Yet here too there is no obvious pattern, with large negative effects for Austria, Italy, Luxembourg and Portugal and large positive effects for Denmark, Ireland, Sweden and the UK.

One interesting possibility is that countries that 'export' higher education tend to convert some proportion of their foreign students into highly educated permanent migrants. Rosenzeweig (2006) finds that the inflow of students to the US five times as large as the flow of immigrants admitted on employment based visas, and that a significant proportion (perhaps as large as 30 percent), stay on after their studies. Furthermore there is evidence that student flows respond to skill premia as the Roy model would suggest. But there is little evidence that this can account for differences in the high educated share of immigrants between destination countries. The correlation across OECD countries of a measure of 'foreign student intensity' and the shares of high educated in column (1) of Table 7 is 0.05.[3] And the correlation between this measure and the dummies in column (10) is –0.07. Thus there is little evidence that differences in the recruitment of foreign students can explain the *ex post* skills of immigrants across the OECD.

Conclusion

In this paper we have examined, and attempted to explain, the selection by education of immigrants from a wide variety of source countries into the countries of the OECD. Since the labour market quality of immigrants is of increasing concern to developed-country governments, it is important to know what are the key forces determining the educational selectivity of immigration. Although considerable research has been devoted to differences in selection and outcomes for immigrants to a given destination (usually the US) there have been few attempts to analyse this selection across source and destination countries. As a result it has not been possible to fully explore the predictions of standard migration theory.

Broadly speaking our results contain two main findings. The first relates to the Roy model, which predicts that the greater the return to skills in the destination as compared to the source country, the stronger will be the positive selection of immigrants by skill-level. This effect is not observed in the simplest model but it reappears once we

[3] The measure of foreign student intensity is the share of foreign-born among students enrolled in a university programmes divided by the share of foreign-born in the population aged over 15. The foreign-born share of students (for 1998) in OECD countries was obtained from: www.allcountries.org/uscensus/comparative_international _statistics.html.

allow for the fact that many potential immigrants in poor counties are constrained from migrating by poverty. This explains the paradox that migrants from poor countries, where the returns to education and skills are large, are strongly positively selected from among the source country populations. It also has implications for the future of migration from poor countries. As they develop, and the poverty constraint erodes, there will be more potential migrants who will be less positively selected from the source population.

The second main finding is that other factors matter just as much as the relative return to skills and poverty in source countries. Important among these are cultural differences, as reflected by linguistic affinity, and geographic distance. These variables are key determinants both of the selection of migrants from a given source and the composition of migrants at a given destination. We find that these variables contribute substantially to differences in the education content of migration across OECD destinations. However there remain large unexplained components that do not seem to correlate with obvious policy differences.

There are a number of shortcomings in this study that need to be addressed in future work. One is the limitation of using data on immigrant stocks that are composed of different cohorts of migrants. Observing flows of immigrants over periods of, say a decade would allow a better temporal matching of variables. Perhaps an even more pressing need is to develop quantitative measures of the policy stance of different host countries that are independent of the actual flows of migrants.

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Table1: Immigration to the OECD

Host Country	Code	Percent of OECD Migrant Stock	Percent Foreign-born	Percent of Foreign-born Hi-Educated	Adjusted Foreign-born Percent Hi-Educated	Weighted Source Country Hi-Educated
Australia	AUS	5.1	26.9	37.9	33.1	16.4
Austria	AUT	1.2	13.8	11.3	20.0	11.6
Belgium	BEL	1.3	12.0	17.4	24.2	12.7
Canada	CAN	7.0	22.4	38.0	32.2	13.5
Switzerland	CHE	2.0	24.7	18.6	21.0	13.7
Czech Republic	CZE	0.6	5.2	12.5	18.6	11.5
Germany	DEU	10.4	13.4	14.9	17.4	11.4
Denmark	DNK	0.4	7.5	19.4	27.6	13.2
Spain	ESP	2.4	5.9	21.8	24.8	12.8
Finland	FIN	0.1	2.7	18.9	31.4	15.9
France	FRA	7.4	11.7	18.1	18.7	9.2
United Kingdom	GBR	5.9	9.5	30.5	33.0	12.3
Greece	GRC	1.3	10.8	15.3	22.1	13.9
Hungary	HUN	0.4	3.2	19.8	23.0	10.1
Ireland	IRL	0.4	11.0	38.7	37.7	18.8
Italy	ITA	2.7	4.1	12.2	25.9	13.0
Japan	JPN	1.5	1.1	24.2	34.6	17.6
South Korea	KOR	0.2	0.4	32.2	38.1	11.7
Luxembourg	LUX	0.2	36.6	18.3	20.4	15.3
Mexico	MEX	0.3	0.4	37.1	33.9	29.3
Netherlands	NLD	1.6	9.6	17.6	20.6	9.9
Norway	NOR	0.4	8.1	22.3	30.5	14.2
New Zealand	NZL	0.8	22.5	27.3	34.9	15.4
Poland	POL	1.0	2.4	11.7	27.9	15.8
Portugal	PRT	0.8	6.7	19.3	24.6	7.8
Slovak Republic	SVK	0.2	2.7	14.7	25.6	11.6
Sweden	SWE	1.2	14.4	22.3	26.8	13.9
Turkey	TUR	1.5	2.4	14.3	20.4	15.9
United States	USA	41.7	14.3	25.9	22.8	12.6

Notes: Cols 1-4 based on data underlying Dumont and Lemaître (2004); Col 5 calculated from Barro and Lee (2000). The high education share of countries missing in the Barro and Lee data are imputed as the (population weighted) average of the other countries in the region.

Table 2: Migrants to the OECD by Region

World Region	Percent of Migrants to OECD	Percent High Educated Migrants	Source Region Percent High Educated
North America	2.7	43.1	51.5
Central America	14.8	6.9	10.2
Caribbean	7.0	19.8	7.8
South America	5.0	25.9	12.9
Scandinavia	1.1	31.9	21.4
UK and Ireland	5.7	36.0	19.9
Western Europe	8.5	29.5	17.1
Southern Europe	7.4	12.6	14.4
Eastern Europe	9.5	17.7	10.6
Former Soviet Union	3.1	32.5	16.3
East Asia	7.0	41.0	14.6
Southeast Asia	6.9	34.3	12.0
South Asia	4.9	41.8	3.4
Middle East	5.6	21.2	9.7
North Africa	5.1	18.1	4.7
Sub-Saharan Africa	4.2	32.7	2.4
Pacific Islands	0.5	18.7	4.6
Australia and New Zealand	1.0	41.4	37.7

Notes: Cols 1-2 based on data underlying Dumont and Lemaitre (2004); data classified only by regions that are broader than those in the table or are classified as Other are excluded. Col 3 calculated from Barro and Lee (2000); the high education share of countries missing in the Barro and Lee data are imputed as the (population weighted) average of the other countries in the region.

Table 3: Determinants of skill selection
Dependent variable: Log (share of high skilled migrants / share of high skilled)

	(1)	(2)	(3)	(4) (poverty imputed)
Log wage premium differential	-0.003	0.062	0.369	0.334
(destination – source)	(0.055)	(0.054)	(0.052)**	(0.048)**
Common official or primary	0.670	0.802	0.647	0.665
language	(0.089)**	(0.087)**	(0.076)**	(0.071)**
Linguistic proximity	-0.087	-0.128	-0.128	-0.117
	(0.016)**	(0.016)**	(0.014)**	(0.013)**
Colonial relationship post 1945	0.284	-0.030	-0.512	-0.432
	(0.098)**	(0.105)	(0.095)**	(0.086)**
Distance (most populated cities,	0.102	0.124	0.053	0.054
1,000 km)	(0.005)**	(0.006)**	(0.007)**	(0.006)**
Share of poverty			0.006	0.008
			(0.002)*	(0.002)*
Distance × share in poverty			0.002	0.002
			(0.000)**	(0.000)**
Constant	-0.173	-0.824	0.102	0.093
	(0.043)**	(0.130)**	(0.130)	(0.119)
Observations	1438	1438	1438	1719
R-squared	0.30	0.39	0.55	0.54
Country of destination dummies	NO	YES	YES	YES

Note: Standard errors in parentheses. * significant at 5%; ** significant at 1%. In column (4) the poverty rate is imputed from the share of the labour force in agriculture. The dependent variable is weighted by the corresponding total number of migrants from the source country to the destination country.

Table 4: Determinants of skill selection – Poor versus rich countries
Dependent variable: Log (share of high skilled migrants / share of high skilled)

	(1) Rich countries (poverty rate < 5%)	(2) Poor countries (poverty rate >10%)	(3) Poor countries (poverty rate >10%)	(4) Poor countries (poverty rate >10%)
Log wage premium differential	0.373	0.226	0.389	0.386
(destination – source)	(0.104)**	(0.072)**	(0.058)**	(0.052)**
Common official or primary	0.589	1.326	0.831	0.953
language	(0.088)**	(0.184)**	(0.161)**	(0.137)**
Linguistic proximity	-0.186	-0.104	-0.175	-0.149
	(0.020)**	(0.034)**	(0.028)**	(0.024)**
Colonial relationship post 1945	-	-1.346	-0.953	-0.973
		(0.157)**	(0.129)**	(0.107)**
Distance (most populated cities,	0.029	0.176	0.094	0.105
1,000 km)	(0.007)**	(0.011)**	(0.018)**	(0.016)**
Share of poverty			0.034	0.036
			(0.004)**	(0.003)**
Distance × share in poverty			0.0002	-0.0003
			(0.0005)	(0.0004)
Constant	0.671	0.099	-0.478	-0.387
	(0.134)**	(0.232)	(0.220)*	(0.186)*
Observations	563	738	768	977
R-squared	0.46	0.61	0.75	0.73
Country of destination dummies	YES	YES	YES	YES

Note: Standard errors in parentheses. * significant at 5%; ** significant at 1%. In column (4) the poverty rate is imputed from the share of the labour force in agriculture. The dependent variable is weighted by the corresponding total number of migrants from the source country to the destination country.

Table 5: Determinants of skill selection – Small versus large countries.
Dependent variable: Log (share of high skilled migrants / share of high skilled)

	(1) small countries	(2) small countries	(3) large countries	(4) large countries
Log wage premium differential (destination – source)	-0.444 (0.066)**	-0.075 (0.070)	0.133 (0.082)	0.369 (0.080)**
Common official or primary language	0.040 (0.063)	-0.568 (0.122)**	0.881 (0.146)**	0.703 (0.126)**
Linguistic proximity	0.024 (0.012)	0.186 (0.030)**	-0.138 (0.027)**	-0.145 (0.025)**
Colonial relationship post 1945	0.770 (0.088)**	0.742 (0.089)**	-0.431 (0.159)**	-0.782 (0.141)**
Distance (most populated cities, 1,000 km)	0.041 (0.005)**	0.039 (0.006)**	0.138 (0.010)**	0.043 (0.011)**
Share in poverty		0.009 (0.002)**		-0.005 (0.004)
Distance × share in poverty		0.001 (0.0003)**		0.003 (0.000)**
Constant	-0.053 (0.088)	-0.405 (0.110)**	-1.105 (0.207)**	0.311 (0.221)
Observations	665	571	664	664
R-squared	0.53	0.63	0.42	0.58
Country of destination dummies	YES	YES	YES	YES

Note: Standard errors in parentheses. * significant at 5%; ** significant at 1%. In columns (3) and (4) the poverty rate is imputed from the share of the labour force in agriculture. The dependent variable is weighted by the corresponding total number of migrants from the source country to the destination country.

Table 6: Determinants of source country shares in destination immigration
Dependent variable: Log (source country migrants/total migrants to destination)

	(1)	(2)	(3) (poverty imputed)	(4) (poverty imputed)
Log unskilled wage differential (destination – source)	0.386 (0.092)**		0.420 (0.086)**	
Log wage premium differential (destination – source)	-0.095 (0.596)		-0.120 (0.562)	
Log unskilled wage differential + log wage premium differential		0.416 (0.089)**		0.442 (0.084)**
Common official or primary language	0.656 (0.239)**	0.537 (0.151)**	0.737 (0.215)**	0.614 (0.137)**
Common language × high education share	-1.118 (1.416)		-1.183 (1.364)	
Linguistic proximity	0.194 (0.045)**	0.241 (0.026)**	0.214 (0.041)**	0.247 (0.025)**
Linguistic proximity × high education share	0.400 (0.292)		0.303 (0.280)	
Colonial relationship post 1945	2.489 (0.400)**	2.347 (0.321)**	2.317 (0.339)**	2.163 (0.244)**
Colonial relationship × high education share	-2.424 (5.981)		0.796 (3.737)	
High education share	-2.230 (1.145)	-0.914 (0.819)	-2.111 (1.116)	-0.782 (0.788)
Distance (most populated cities, 1,000 km)	-0.169 (0.022)**	-0.154 (0.015)**	-0.191 (0.020)**	-0.166 (0.013)**
Distance × high education share	0.258 (0.094)**	0.203 (0.074)**	0.328 (0.090)**	0.235 (0.069)**
Share in poverty × low education share	-0.042 (0.004)**	-0.039 (0.002)**	-0.042 (0.003)**	-0.037 (0.002)**
Distance × share of poverty × low education share	0.000 (0.000)		0.001 (0.000)	
Source country population	0.808 (0.026)**	0.814 (0.026)**	0.858 (0.022)**	0.861 (0.021)**
Constant	-18.604 (0.468)**	-18.905 (0.441)**	-19.463 (0.402)**	-19.746 (0.370)**
Observations	1438	1438	1719	1719
R-squared	0.63	0.63	0.66	0.66

Note: Standard errors in parentheses. * significant at 5%; ** significant at 1%. In column (4) the poverty rate is imputed from the share of the labour force in agriculture. The standard errors are clustered by source countries.

Table 7: Counterfactual analysis of Proportion of High-Educated Immigrants in OECD Countries

	(1) Actual Hi-Ed share	(2) Education selectivity	(3) Source country composition	(4) Low wage differential	(5) Premium differential	(6) Colonial links	(7) Common language	(8) Linguistic proximity	(9) Distance	(10) Destination Country Dummy	(11) Share sample in total migration
Australia	39.34	5.69	2.37	0.01	-2.38	0.07	8.62	-5.21	18.85	0.62	73.62
Austria	14.61	-7.68	0.97	0.04	0.49	0.02	1.58	-0.18	-2.75	-6.18	52.47
Belgium	16.58	-4.50	0.84	0.01	-0.03	0.15	3.15	-3.40	-2.97	-1.76	75.39
Canada	37.08	12.21	1.59	0.04	-1.95	0.09	7.58	-6.88	7.78	9.30	69.97
Denmark	22.22	-1.96	-0.28	0.05	-2.44	0.10	-1.82	-0.14	-2.97	5.29	61.38
France	16.77	-0.59	-3.71	0.03	-0.09	-0.62	1.85	-1.75	-3.51	2.20	75.44
Hungary	18.50	6.71	-0.37	0.00	0.68	0.00	-0.58	3.26	-4.80	6.71	61.28
Ireland	38.21	14.37	-3.50	0.01	-1.85	-0.04	8.90	-12.04	-6.04	16.04	87.62
Italy	12.90	-10.89	-0.63	-0.01	0.05	0.10	-1.14	-0.23	-1.60	-7.30	65.73
Japan	27.85	-7.49	-0.33	0.05	-2.85	0.10	-2.59	2.94	6.22	6.04	53.12
Luxembourg	19.26	-9.51	0.78	0.12	0.43	0.00	4.49	-4.79	-3.35	-6.53	88.17
Mexico	38.91	-7.36	7.90	-0.05	7.06	0.02	1.96	6.20	-2.08	-12.62	80.73
New Zealand	30.13	-4.03	1.68	0.02	2.67	0.05	8.18	-7.57	16.11	-22.18	69.97
Norway	27.06	1.69	-0.86	0.04	-2.24	0.12	-2.38	-0.19	-2.99	8.81	64.62
Portugal	21.42	8.54	-0.18	0.00	2.83	0.79	1.64	-3.90	-3.62	10.60	52.21
Spain	25.34	0.47	-0.53	0.01	0.40	0.08	0.84	-2.22	-2.81	3.22	66.16
Sweden	23.23	0.35	-2.47	0.00	-3.18	0.03	-1.09	-2.56	-3.16	5.92	64.51
Switzerland	21.76	-2.40	-2.97	0.06	0.16	0.04	3.15	-8.28	-3.76	0.45	68.78
Turkey	14.58	-7.13	-5.71	-0.02	-0.48	0.15	-1.41	-1.96	-3.08	-3.00	78.12
United Kingdom	31.52	7.86	-2.43	0.00	1.42	-2.31	4.33	-4.50	-3.83	10.94	66.49
United States	24.68	-4.95	7.62	0.23	1.08	1.05	4.12	4.37	-2.75	-9.06	66.82

Note: the percentage of immigrants with high education reported in column (1) differs from that reported in Table 1 because the latter covers only immigrants from source countries that are represented in our regression analysis. The percentage of all immigrants represented by these countries is reported in column (11).

Data Appendix

Migrant skills. The data that we use for immigrants is that constructed at the OECD by Dumont and Lemaître (2004), as noted in the text. Our measure of migrant skills is the share of the foreign born aged 15 and above having some tertiary education. Education is classified into four levels: high, medium, low and unknown. We take the high educated as a share of the total, assuming that those for whom education is unknown would be either low or medium educated. Taking the high educated as a share of those for whom the education level is known makes very little difference to the results reported above. This share is available by source country for each OECD destination although in a few cases some of the source countries are aggregated together by region. In the regression analysis we use only the observations for individual source countries.

Source country skills. In order to calculate the share of high educated in each source country we take the number aged 15 and over with some post-secondary education in the year 2000 from Barro and Lee (2000), available at: http://www.cid.harvard.edu/ciddata/ciddata.html. For those source countries that are represented in the data on migrants but not in the Barro and Lee data, we have imputed the number of high educated by applying the average ratio of high educated in other countries in the same region, using the regions listed in Table 2. The countries omitted in Barro and Lee are generally very small and are not likely to affect our results. In order to obtain the population at risk we add back the emigrants by skill level so that the base population for each source country includes those who have emigrated. This assumes that emigration of the highly educated does not generate more education among those who did not emigrate. If there is an educational response, as some of the recent literature suggests, then our calculation will overestimate the counterfactual no-migration skill ratio in the base population. If on the other hand we assume complete offset then the appropriate ratio would be the same as in the unadjusted Barro and Lee data (although the absolute numbers would differ).

Skill premium. We use data from the Occupation Wages around the World database, constructed by Freeman and Oostendorp (2000), available at http://www.nber.org/oww/. The data include standardized wage information for 161 occupations in over 150 countries from 1983 to 2003 and is based on the ILO October Inquiry that asks governments to yearly report wages for a wide range of occupations. The ILO dataset is not directly usable because of the lack of comparability in reported wage formats across countries and over time. Freeman and Oostendorp corrected the data in such a way that wages could be made comparable across occupations, countries and over time.

Given that occupations may differ in their skill requirements across countries, we choose to construct a skill premium measure based on occupations that are either highly-skilled (and do require at least some tertiary education) and unskilled occupations, which according to the ILO description "require a minimum of training or no previous experience". We calculated a premium for each country and year, based on the average wages in all available occupations in each skill level. We use the country average over the period 1983-2003 as a measure of the skill premium. While this goes some way towards capturing the skill premium over the longer run, it must be noted that there are missing values for certain country/years. For Belgium, the Czech Republic, France, Japan, Switzerland and the Slovak Republic, where insufficient observations are available we used the predicted value of the premium based on a regression of the premium on the gini coefficient in 20 OECD destination countries.

Poverty. The proportion of the source country population living on less than $2 per day comes from the World Bank's *World Development Indicators, 2006* at: http://devdata.worldbank.org/wdi2006/contents/Section2.htm. These measures are for a single year between 1995 and 2003. The imputed poverty measure corresponds to the predicted value of poverty from a linear regression of poverty on the average share of agriculture in GDP over 1950-2000. Share of Agriculture in GDP from World Bank, average share for the years 1950-2000.

Distance. Distance in kilometres between capital cities, taken from Centre d'Etudes Prospectives et d'Informations Internationales, at: http://www.cepii.fr/anglaisgraph/bdd/distances.htm.

Common language dummy. Dummy equal to 1 for pairs of countries sharing a common official language. Source: Centre d'Etudes Prospectives et d'Informations Internationales

Language proximity. Values from 1 to 5 calculated from the number of common nodes in the linguistic tree between the closest official languages of pairs of countries (based on the language classification tree of the Ethnologue).

Colonial Links. Dummy equal to 1 for pairs sharing a colonial link after 1945. Source : Centre d'Etudes Prospectives et d'Informations Internationales.

Figure 1

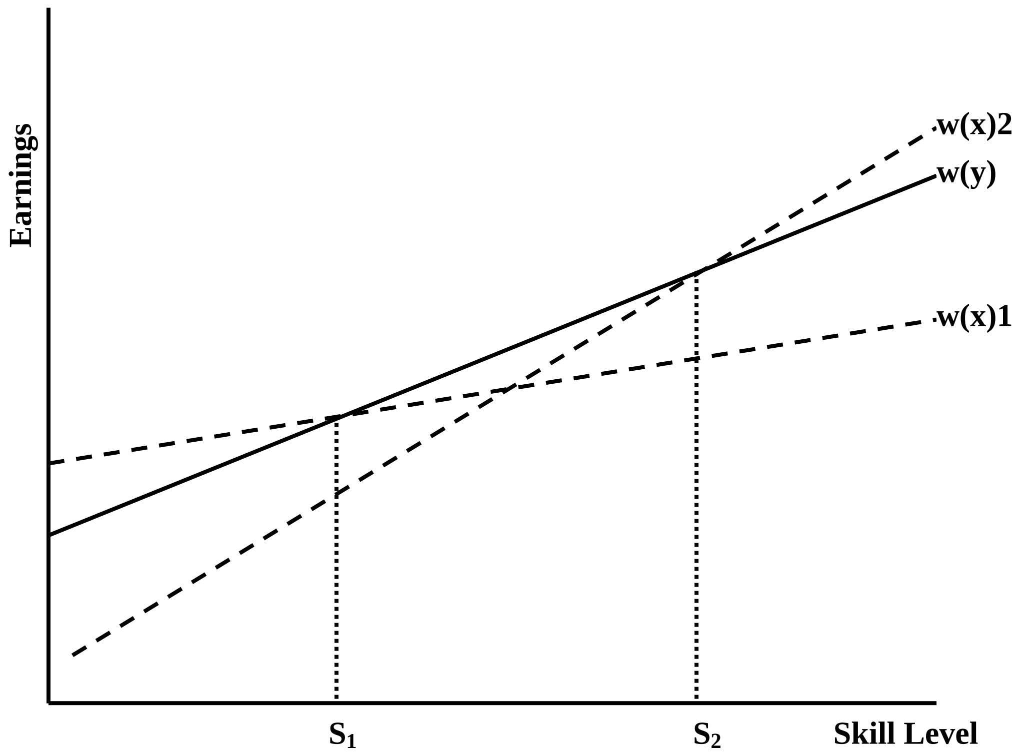
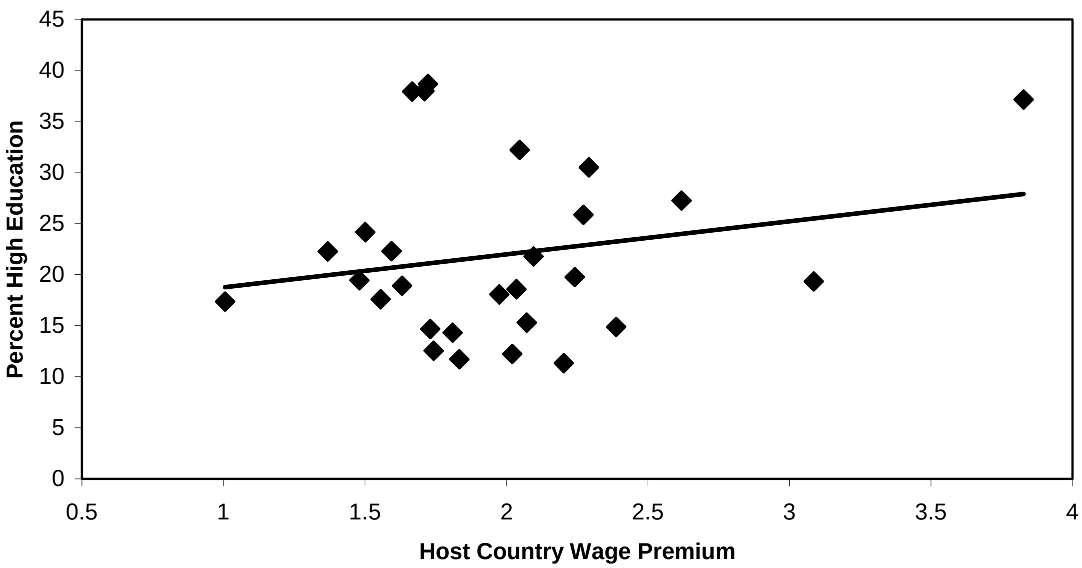
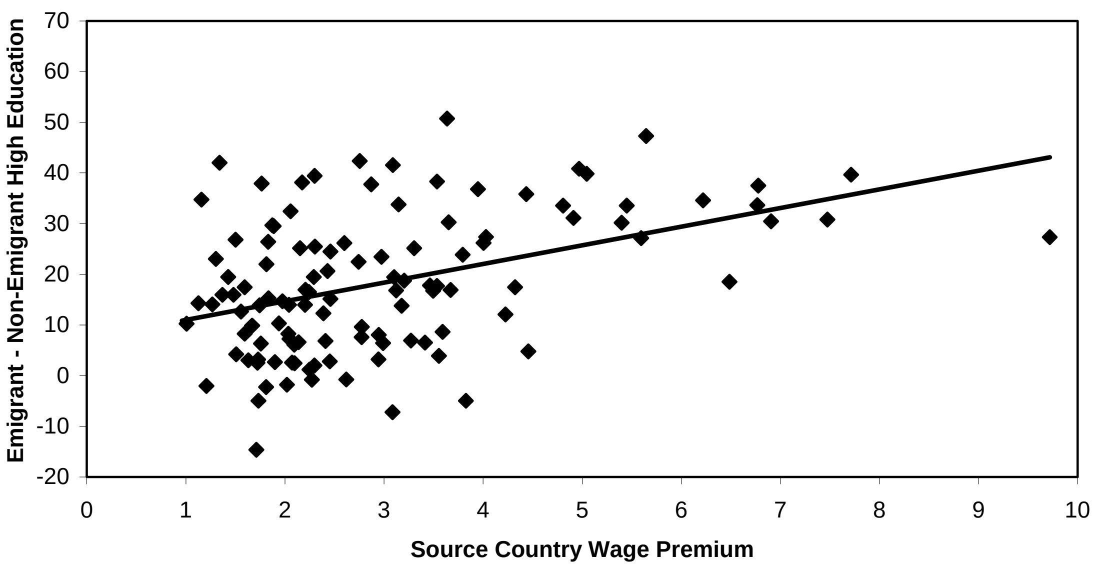


Fig 2: Percent of Immigrants High Educated and Wage Premium, OECD Countries 2001



Source: See text.

Figure 3: Difference between High Education Percent for Emigrants and Non-Emigrants and Wage Premium, Source Countries 2001



Source: See text