Global Competition for Attracting Talents and the World Economy

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1. INTRODUCTION

Two salient features of international labour mobility are that high-skilled people exhibit much greater propensity to emigrate than the less educated and tend to agglomerate in countries with high rewards to skill (Grogger and Hanson, 2011; Docquier and Rapoport, 2012). Positive selection is due to migrants’ self-selection (high-skilled people being more responsive to economic opportunities and political conditions abroad, having more transferable skills, having greater ability to gather information or finance emigration costs, etc.), and to the skill-selective immigration policies conducted in the major destination countries. The global competition to attract talents is tough because inflows of high-skilled workers make immigration not only economically more advantageous, but also politically acceptable in destination countries. The reasons are that high-skilled workers bring valuable knowledge which is key to stimulate productivity levels and growth (Peri, 2012; Peri et al., 2013), do not compete with nationals for the welfare state and other public services (Chojnicki, 2011), integrate faster in the labour market (Miller and Neo, 1997; Amuedo-Dorantes and de la Rica, 2007) and assimilate better into society (Dustmann, 1996; de Palo et al., 2006). So far, the US has been leading the race, attracting PhD candidates and graduates not only from emerging countries, but also from the 15 members of the European Union (EU-15) and other industrialised countries.

There are good reasons to believe that the race to attract talents will get tougher in the coming decades. Intensification will be due to skill-biased technical changes and growing specialisation of developed countries in skill-intensive activities, short supply of knowledge and entrepreneurial skills (translating into greater returns to skill and income inequality), ageing and the resulting pressure on the welfare states. A growing number of countries have already adopted immigration policies specifically aimed at selecting and attracting high-skilled workers (see Boeri et al., 2012). Examples are the recent introduction of a points-based system in the UK (the Swiss, Dutch and German governments are considering the same option), the new immigration act of 2005 in Germany, the adoption of the EU blue card and the increase in the number of H1B visas in the US. This paper investigates the effects of an increased competition to attract talents on the world economy. We assess its impact on the worldwide...
supply of human capital and its geographic distribution. We also quantify the short- and long-run impacts on the worldwide average level of income per capita and on income inequality.

In Section 2, we combine bilateral data on effective and desiring migrants by education level. Effective migrants are those who have already migrated. Desiring migrants are those who have not yet migrated but express the willingness to do so. Adding effective and desiring migrants gives the number of potential migrants. For each country pair, we define the Net Pool of Foreign Talents (NPFT) as the difference between potential entries and potential exits of college-educated workers (i.e. potential immigrants minus potential emigrants). The NPFT is computed at the current economic conditions and can be positive or negative. Expressed as the percentage of the college-educated native labour force, the relative NPFT is considered as a measure of the country’s attractiveness for human capital. We compute the (absolute and relative) NPFT of selected high-income countries. We show that the EU-15 has a large NPFT, although this pool is relatively smaller than the US or Canadian ones. This reflects the fact that Europe is economically less attractive than the US for the highly educated (due to lower skill premium, higher tax rates, etc.). So far, the EU-15 has poorly benefited from its NPFT, partly because European immigration policies have been less selective. On the contrary, the US has mobilised a large portion of it.

We then use a micro-founded model to simulate the effects of a worldwide liberalisation of high-skilled migration, also referred to as an increased competition to attract talents henceforth. Section 3 provides a non-technical description of the model. The model accounts for the key interactions between human capital accumulation and migration. In particular, the increased competition for attracting talents affects the returns to schooling and education decisions in the world by changing expectations about future migration opportunities. This link between emigration prospects and human capital formation has been identified in the recent literature. Identification strategies rely on survey data on the student population,\(^1\) regional heterogeneity in emigration and education patterns,\(^2\) quasi-natural emigration shocks\(^3\) or cross-country regressions. All these studies concur that education decisions are closely connected with the intensity of skill-selection in emigration.\(^4\) Our model is parameterised to match the characteristics of the world economy in the year 2000 and to be compatible with official demographic forecasts.

Short-run and long-run effects of various liberalisation experiments are presented in Section 4. Overall, a worldwide liberalisation of high-skilled migration benefits high-income countries and adversely affects developing countries. It reduces the average income gap between the EU-15 and the US. However, the European gains are unevenly distributed: less attractive countries (i.e. countries with smaller relative NPFT) such as Austria, Belgium, Germany, Greece, Luxembourg and the Netherlands benefit less than the US, Canada or Australia. In developing countries, skill-biased emigration prospects stimulate investments in higher education. However, this incentive mechanism is too small to induce a net brain gain. Hence, human capital and income per worker decrease in poor countries. Emigrants are the

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\(^1\) See Gibson and McKenzie (2011) on Tonga and Papua New Guinea or Kangasniemi et al. (2007) on medical doctors in the UK.
\(^2\) See Batista et al. (2012) on Cape Verde, McKenzie and Rapoport (2011) on Mexico or Ha et al. (2009) on China.
\(^4\) See Beine et al. (2008), Docquier et al. (2008), Easterly and Nyarko (2009) or Beine et al. (2011).
main beneficiaries of a liberalisation policy as shown by a rise in the income per natural in developing regions. Thus, the emigrants’ income gains exceed the losses for those left behind in poor countries. Increasing the race to attract talents increases inequality in economic performance, especially if total factor productivity varies with human capital.

2. POTENTIAL MIGRATION OF COLLEGE GRADUATES

There are several databases documenting the size and structure of effective migration stocks by education level, country of birth and country of destination. In the last decade, there were 111.6 million adult migrants in the world. This included 26 million college graduates, a vast majority of whom were residing in rich countries (see Artuç et al. 2015). Table 1 documents net immigration stocks (i.e. entries minus exits) of college graduates in EU-15 countries, the US, Australia and Canada. They include intra-EU movements, although the latter cancel out at the aggregate EU-15 level.

<table>
<thead>
<tr>
<th>Country</th>
<th>Net Effective Migration Absolute</th>
<th>Net Effective Migration Relative (%)</th>
<th>Net Desired Migration Absolute</th>
<th>Net Desired Migration Relative (%)</th>
<th>Net Pool of Foreign Talents Absolute</th>
<th>Net Pool of Foreign Talents Relative (%)</th>
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<td>1,118,610</td>
<td>+26.1</td>
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<td>15,011,836</td>
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<td>32,240,493</td>
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</tbody>
</table>

Notes:
(ii) ‘Net desired migration’ = Desired entries minus exits of college graduates, based on the desired migration stock data of Docquier et al. (2015).
(iii) ‘Net Pool of Foreign Talents’ = Difference between potential (i.e. effective plus desired) entries and exits of college-educated workers.
(iv) Absolute measures are net stocks of individuals aged 25 and over.
(v) Relative measures are expressed as percentage of the native-born, college-educated population aged 25 and over.

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The first two columns of Table 1 show that migration increased the number of college graduates in the US (+11.6 per cent), Canada (+25.8 per cent) and Australia (+51.9 per cent) in the last decade. On the contrary, the EU-15 attracted fewer college-educated immigrants and was unable to retain its own talents. The EU-15 exhibited a net deficit of 0.571 million workers, representing 1.0 per cent of the college-educated labour force born in Europe. In relative terms, the largest losses were observed in Ireland (−20.8 per cent), Portugal (−12.7 per cent) and Greece (−8.9 per cent). On the contrary, net inflows of college graduates were observed in Luxembourg (+19.8 per cent), Sweden (+6.8 per cent) and the Netherlands (+4.9 per cent).

In parallel, the unique and largely understudied Gallup database identifies the proportion and the characteristics of people who had not yet migrated and expressed a desire to leave their country of birth in the last decade. Around 274.5 million adult workers wanted to leave their country permanently if they were given the opportunity, including 68.1 million college graduates. There are good reasons to believe that ‘having the opportunity’ has not been closely interpreted as ‘being granted a visa’ by many respondents (see Docquier et al., 2014). However, we consider the desired migration stocks, taken at face value, as upper bounds of the demographic shock that a complete liberalisation of high-skilled migration could induce. Columns 3 and 4 in Table 1 show that letting all desiring migrants emigrate would have attenuated human capital disparities between the EU-15 and the US in the 2000s, increasing the number of college graduates by 10.2 per cent in Europe and 6.2 per cent in the US. Net desired migration is positive in the vast majority of high-income countries, implying that the stock of desiring college-educated immigrants exceeds the stock of desiring emigrants. An exception in our sample is Luxembourg, which is rarely reported as a preferred destination by desiring migrants in the Gallup database. In relative terms, the preferred EU-15 destinations are Scandinavian countries, Spain, Ireland and France. On the contrary, net desired migration is lower in countries such as Germany, Italy, Belgium or Portugal. These countries either attract fewer desiring immigrants or have more desiring emigrants. Larger levels are obtained for Canada (57.5 per cent) and Australia (123.1 per cent).

Potential migration is the sum of effective and desiring migrants. Adding up the net stocks of effective and desiring migrants, we identify the Net Pool of Foreign Talents (NPFT) of each country. The NPFT is defined as the difference between potential entries and potential exits of college-educated workers (see column 5). We use it as a proxy for the partial equilibrium change in human capital that would be induced by a worldwide, skill-selective liberalisation of labour mobility. The NPFT is positive in the majority of high-income countries, implying that the stock of potential college-educated immigrants exceeds the stock of potential emigrants. Dividing the NPFT by the college-educated, native-born labour force, we obtain the relative NPFT and consider it as a measure of the country’s attractiveness for human capital. Columns 5 and 6 in Table 1 show that overall, the EU-15 is less attractive than the US, and much less than Canada and Australia. Compared to the autarkic (no migration) situation, letting all potential high-skilled migrants move would have increased the college-educated workforce by 17.8 per cent in the US and by 9.3 per cent in the EU-15 in the last decade. However, the EU-15 has not yet mobilised its potential pool of talents, contrary to the US which has attracted about two-thirds of it.

3. A WORLD ECONOMY MODEL

To predict the effects of an intensification of the race for attracting talents on the world economy, we use a model that accounts for the behavioural and technological responses to

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migration policy reforms. Our model encompasses three channels of transmission of migration shocks. First, as stated above, skill-biased changes in emigration prospects stimulate people to acquire tertiary education. This mechanism will be referred to as the incentive effect henceforth. The literature has shown that it is important in middle-income and poor countries where tertiary education is perceived as increasing the probability to get a visa. Second, newly educated individuals left behind as well as new migrants moving from poor countries (where the access to and quality of the education system are low) to rich countries (where the access and quality are high) change their fertility and their investment in the basic education (primary and secondary levels) of their offspring. This mechanism will be referred to as the access-to-education effect. Finally, movements of human capital can affect cross-country disparities in total factor productivity and wages through the technology effect. Quantitative theory (i.e. properly parameterised, micro-founded, general equilibrium models) is an ideal tool to formalise the above-mentioned mechanisms and to predict the effects of skill-selective liberalisation shocks on human capital formation, geographic concentration of college-educated workers and the world distribution of income.

We provide here a non-technical description of the model; more details can be found in the Online Appendix or in Delogu et al. (2013) and Docquier et al. (2015). Our model assumes two-period lived agents (adults and children) and \( K \) countries \((k = 1, \ldots, K)\). Adults are the only decision-makers. They maximise their well-being and decide where to live, whether to invest in their own (higher) education, how much to consume and how much to invest in the quantity and quality (i.e. basic education) of their children. We distinguish between college-educated adults and the less educated \((s = h, l)\) and assume that preferences are represented by a two-level nested utility function.

The outer utility function has a deterministic and a random component. The utility for a type-\( s \) individual moving from country \( k \) to country \( i \) at time \( t \) can be written as:

\[
U_{ki}^s = \ln v_{it}^s + \ln \left(1 - x_{kit}^s\right) + \ln \left(1 - e_k^s\right) + \epsilon_{ki}^s,
\]

where \( \ln v_{it}^s \) is the deterministic utility in destination \( i \) and \( x_{kit}^s \) is the effort required to migrate from country \( k \) to country \( i \). Individuals are heterogeneous in their ability to acquire higher education and in their preference for alternative locations. The individual-specific level of effort required to be of type \( s = (h, l) \) in country \( k \) is denoted by \( e_k^s \). We have \( e_k^l = 0 \) for those who do not invest in higher education. For those who decide to invest, we assume that \( e_k^h \) follows a Pareto distribution. Basic education is a prerequisite to invest in higher education. The individual-specific random taste shock for moving from country \( k \) to \( i \) is denoted by \( \epsilon_{ki}^s \) and follows a Type I extreme-value distribution. Although \( \epsilon_{ki}^s \) and \( e_k^s \) are individual specific, we omit individual subscripts for notational convenience.

The timing of decision is such that individuals decide whether to acquire higher education or not before discovering their migration taste. They educate if the expected benefits from college education exceed the training effort. Hence, global changes in migration policies (such as a skill-selective decrease in visa costs) affect the expected benefits from higher education and stimulate human capital formation. This formalises the incentive effect. After education, each individual discovers her/his migration type and decides whether to remain in her/his country of birth or emigrate to another destination.

The (after-migration) inner utility function \( v_{it}^s \) is a Cobb-Douglas function of consumption \((c_{it}^s)\), fertility \((n_{it}^s)\) and the proportion of children receiving basic education \((q_{it}^s)\). In logs, we have:
\[ \ln v_{k,t}^s = (1 - \theta) \ln c_{k,t}^s + \theta \ln n_{k,t}^s + \theta \lambda \ln q_{k,t}^s, \]

where \((\theta, \lambda)\) are preference parameters.

Individuals maximise this function subject to a standard budget constraint that accounts for the time cost to raise children, basic education costs and child labour. When within-country wage ratios between workers and education costs (expressed as percentage of high-skilled wages) are constant, optimal fertility rates and basic education investments are exogenous. Only adults who received basic education when they were young can invest in higher education. This formalises the access-to-education effect. When deciding to emigrate or stay in their home country, individuals anticipate the optimal level of utility attainable in all the possible destinations. Hence, destination choices are governed by differences in income and public provision and quality of basic education.

Finally, education and migration decisions affect the size and the structure of the labour force in all the countries. In the benchmark model, we assume that wages are not affected by migration shocks (partial equilibrium). We also consider a variant of the model in which total factor productivity (TFP henceforth) is an increasing and concave function of the proportion of college graduates in the labour force (with an elasticity equal to 0.32), as in Delogu et al. (2013). This formalises the technology effect.\(^5\)

Our model is calibrated to match the characteristics of the world economy in the year 2000 and to be compatible with official demographic projections for the period 2000–75. One period represents 25 years. Country-specific, technological parameters are chosen to perfectly fit the world distribution of income, that is cross-country disparities in GDP per capita and within-country income differences between college graduates and the less educated. In the partial equilibrium model, total factor productivity grows at the same rate in all the countries (+1.5 per cent per year).\(^6\) Parameters of the distribution of education costs are such that we perfectly match data on the skill composition of the native and resident working-age populations. Total migration costs are calibrated as residuals of the ‘migration technology’ so as to match the observed size and structure of each migration corridor. Using the same technique, legal/visa migration costs are identified so as to match the data on potential migration described in Table 1. These migration costs are treated as exogenous and assumed to be time invariant. Other preference parameters are in line with the empirical literature. They are chosen so as to match the empirically estimated levels of the elasticity of migration to income and the average elasticity of college-education investment to high-skilled emigration prospects. Finally, the time path of exogenous variables is calibrated to fit the official population projections of the United Nations for the twenty-first century.

\(^5\) Note that this variant still implies a constant wage ratio between college graduates and less educated workers. In Delogu et al. (2013), we relaxed this assumption and assumed that the production function has a constant-elasticity-of-substitution (CES) form. When the parameters of the CES function are properly calibrated, endogenising wage inequality has a minor effect on the results.

\(^6\) Assuming convergence in TFP or higher growth rates in large emerging countries (such as China or India) would reduce the NPFT of current industrialised countries. Gallup data reveal that China and India are not very attractive despite their growth potential: immigration rates would increase from 0.1 to 0.3 per cent in China and from 1.1 to 1.5 per cent in India if all desiring migrants were allowed to move. However, China and India account for roughly 8.9 per cent of the worldwide stock of college-educated emigrants and 11 per cent of the stock of desiring emigrants. Higher growth rates in these two countries could reduce the number of desiring emigrants to the main destination countries.
Inevitably, such a stylised model omits several important features of the real world (trade, unemployment, redistribution, network externalities, etc.) and badly accounts for the emergence of some developing countries or the effect of the recent economic crisis. However, it accounts for the long-run interactions between human capital accumulation, migration and growth. We believe such a quantitative theory framework is an appropriate tool to predict the medium- and long-run impacts of migration policy reforms.

4. QUANTITATIVE ANALYSIS

We simulate the effects of a complete removal of legal/visa migration costs for college graduates (but not for the less educated). This is equivalent to implementing a points-based system, granting a permanent visa to each applicant with at least one year of college education. We consider a global shock (i.e. applied worldwide to all the countries) or regional shocks (i.e. liberalisation of high-skilled migration to a particular region). We assume the shock occurs in 2025 and is permanent. Implications for high-income countries are discussed in Section 4a. Section 4b presents the effect on income per worker and income per natural in developing countries. Finally, Section 4c discusses the effects on the world distribution of income.

a. Race for Talents and Economic Leadership

We first investigate the effects of skill-selective liberalisation shocks on income per worker in selected high-income countries. Results are presented in Table 2. Three numerical experiments are conducted in this section: a complete removal of legal/visa migration restrictions for college graduates in the EU-15 alone (this scenario is labelled as ‘EU-15’ in column 1), in the United States alone (labelled as ‘USA’ in column 2), or in all the countries of the world (labelled as ‘Global’). For the first two shocks, we only discuss the effects observed after 50 years. For the global liberalisation shock, we compare the short-run (in column 3) and long-run effects (in column 4). Our benchmark model assumes exogenous wage rates, but for the global shock, we also provide results obtained with endogenous TFP (in columns 5 and 6) and identify the technology effect.

If the EU-15 liberalises high-skilled immigration alone (column 1), its average income per worker increases by 12.6 per cent. This long-run effect accounts for the changes in migration, education and fertility in all the countries of the world. Countries benefiting the most (i.e. more than 10 per cent) are the United Kingdom, Ireland, Scandinavian countries, France, Spain and Portugal. The smallest effects are observed in Austria, Belgium, Germany, Greece, Luxembourg and the Netherlands. Gallup data on desired migration reveal that these countries have smaller NPFT. It is worth noticing that income per worker decreases by 1.2 per cent in the US and 1.5 per cent in Canada. This is due to the fact that Europe would attract some college-educated Americans and other migrants who would have emigrated to North America otherwise.

If the US liberalises alone (column 2), its average income per worker increases by 9.0 per cent in the long run. This effect is smaller than in the EU-15 case because the US has already mobilised a larger portion of its NPFT. Income per worker decreases by 1.7 per cent in Canada and 0.8 per cent in Australia and the EU-15. Countries suffering the most in the EU-15 are English-speaking countries (−1.4 per cent in the UK and −1.3 per cent in Ireland) but also Portugal (−1.7 per cent), Italy (−1.1 per cent) and France (−1.0 per cent). The latter countries suffer from an increased brain drain to the US. It is worth noticing that the Gallup
database only documents the preferred destination of desiring migrants and does not permit us
to identify closer substitutes among destinations. Having data on the preferred destinations
would have allowed us to refine the assessment of the negative externality induced by a regio-
nal liberalisation on the other regions.

Columns 3 and 4 give the short-run and long-run impacts of a worldwide liberalisation
shock in the benchmark, partial equilibrium model. We find that a complete liberalisation of
high-skilled migration would benefit more the EU-15 (+8.8 per cent) than the US (+5.9 per
cent) in the long run. However, in line with desired migration numbers provided in Table 1,
the greatest responses are observed for Canada (+16.0 per cent) and Australia (+15.8 per
cent). Gains among European countries are unevenly distributed. They would be smaller than
the US gains in some countries (Austria, Belgium, Germany, Greece, Luxembourg and the
Netherlands) and much greater in others (Scandinavian countries, the UK, Ireland, Portugal
and Spain). Short-run gains are smaller than the long-run ones. The reason is that a skill-
selective liberalisation stimulates basic education and gradually increases the worldwide stock
of college-educated workers, due to the access-to-education effect.

Columns 5 and 6 show that the scale of the effects increases under endogenous TFP. The
difference between the EU-15 and the US becomes even larger in the long run (+16.6 per cent

<table>
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<th>Shock</th>
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<th>USA</th>
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<th>Global - Endog. TFP</th>
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<td>Long Run</td>
<td>Short Run</td>
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<td>+3.0</td>
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Notes:
(i) Effects of eliminating visa costs for college graduates on income per worker as percentage of deviation from the
benchmark.
(ii) Short run: Effect in 2025.
(iii) Long run: Effect in 2075.
(iv) Endogenous TFP: elasticity of TFP and wages to the proportion of college graduates equal to 0.32.
in the EU-15 vs. +7.5 per cent in the US). There are two reasons for this. First, endogenising TFP amplifies the human capital shock, the latter being greater in the EU-15 than in the US in line with Table 1. Second, our specification with endogenous TFP assumes a concave relationship between the TFP level and the proportion of college graduates in the labour force (with an elasticity equal to 0.32). As the EU-15 starts with a lower level of human capital, the marginal TFP response to the shock is greater than in the US. Still, a complete liberalisation of mobility would have a limited impact on the economic disparities across industrialised countries. The average income per worker in the US currently exceeds the average European level by about 60 per cent. Even with endogenous TFP, only a limited portion of this gap (about 9 percentage points) would be curbed if the EU-15 and the US mobilised their entire net pool of foreign talents.

b. Effect on Developing Countries

We now investigate the implications of a global liberalisation of high-skilled migration for developing countries. Column 1 in Table 3 shows that the average emigration rate of college graduates increases by 15.1 percentage points in developing countries (from 11.5 to 26.6 per cent). The largest changes are observed in the poorest regions such as sub-Saharan Africa (+23.1 percentage points) and Middle East and Northern Africa (+18.9 percentage points). The effect is smaller in middle-income or emerging regions such as China and India (+11.0 percentage points) and the Commonwealth of Independent States (+12.4 percentage points). Although we only report long-run changes obtained in the partial equilibrium scenario, very similar changes in emigration rates are obtained in the short run or with endogenous TFP.

Columns 2 to 4 give the long-run effects of the shock on income per worker in the developing world while columns 5 to 7 give the effect on income per natural, defined as the average income of all native-born adults from a given region, wherever they reside. We

| Table 3 |
|-------------------|-------------------|-------------------|
|                  | Income Per Worker | Income Per Natural |
|                  | Bench. (%)        | Cst. Educ. (%)    | End. TFP (%)     | Bench. (%) | Cst. Educ. (%) | End. TFP (%) |
| DEV               | +15.1             | -2.5              | -3.6             | -5.0        | 5.3          | 3.4          | 5.2          |
| CHIND             | +11.0             | -0.8              | -1.5             | -1.7        | 5.3          | 4.1          | 5.8          |
| MENA              | +18.9             | -4.4              | -6.2             | -9.4        | 6.9          | 4.2          | 7.5          |
| ASIA              | +15.9             | -1.7              | -2.7             | -3.3        | 3.9          | 2.4          | 4.2          |
| LAC               | +16.3             | -2.1              | -3.4             | -4.3        | 2.6          | 1.1          | 1.8          |
| SSA               | +23.1             | -0.4              | -2.8             | -2.5        | 12.0         | 7.1          | 13.0         |
| CIS               | +12.4             | -0.5              | -1.1             | -1.8        | 7.6          | 6.6          | 7.7          |

Notes:
(i) aLong-run deviation in high-skilled emigration rates (brain drain) in percentage point.
(ii) bLong-run effects of eliminating visa costs for college graduates on income (per worker or per natural) as percentage of deviation from the benchmark.
(iii) ‘Bench.’: Benchmark, partial equilibrium model; ‘Cst. educ.’: no effect of emigration prospects on investment in higher education; ‘End. TFP’: Elasticity of wages to the proportion of college graduates equal to 0.32.
(iv) Regions: DEV = all developing countries; CHIND = China and India; MENA = Middle East and Northern Africa; ASIA = Rest of Asia; LAC = Latin America and Caribbean; SSA = Sub-Saharan Africa; CIS = Commonwealth of Independent States.

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distinguish between three scenarios, the partial equilibrium one with exogenous TFP and endogenous education choices (‘Bench.’ in Table 3), one with exogenous TFP and constant higher-education investment (‘Cst. educ.’) and one with endogenous TFP and education levels (‘End. TFP’). The second scenario disregards the incentive effect on higher education and only accounts for the access-to-education effect. The third scenario supplements the benchmark with the technology effect.

In the benchmark scenario, the least pessimistic one for developing countries, income per worker in developing countries decreases by 2.5 per cent. The largest effects are obtained in Middle East and Northern Africa and in Latin America and the Caribbean. This scenario accounts for the incentive effect, that is for the fact that skill-biased emigration prospects increase the expected returns to schooling and stimulate ex-ante investments in human capital. We disregard this effect in the second scenario and obtain similar albeit more pessimistic results. Hence, endogenising higher education attenuates the loss for developing countries but does not reverse the effects. Under a worldwide liberalisation of high-skilled migration, the brain drain shock is too large to generate ‘net brain gain’ effects. This is in line with Beine et al. (2008) who show that the brain drain induces exponential losses of human capital when the emigration rate exceeds 10 to 15 per cent. Not surprisingly, the adverse effect on income per worker is magnified under endogenous TFP, as the proportion of college graduates falls in developing countries.

A different picture is obtained when focusing on income per natural. The income gain experienced by the new migrants exceeds the income loss for those left behind. Income per natural increases by 3.4 to 5.3 per cent in the developing world. The rise is important in sub-Saharan Africa. Hence, the inequality and poverty implications of a complete liberalisation of high-skilled migration are a priori uncertain. A Pareto-improving situation could be obtained if new college-educated migrants remitted a large share of the income gain to the less educated left behind. Such an outcome is, however, unlikely to be observed because on average, actual migrants only remit a small percentage of their income, and this propensity to remit could become even smaller as the ratio of emigrant to stayer increases.

c. Effect on the World Distribution of Income

Finally, this section examines the effect of skill-selective liberalisation reforms on the world economy. Results are depicted on Figure 1. Figure 1a shows the impact on the world proportion of migrants while Figure 1b gives the effect on the world proportion of college graduates, both expressed as percentage point of deviation from the baseline. In the benchmark, partial equilibrium model, a global liberalisation of high-skilled migration increases the world proportion of migrants by 1.5 percentage points in the short run and by 2 percentage points in the long run. The worldwide proportion of college graduates increases by 0.5 percentage points in the short run and by 1.0 percentage points in the long run. This is not negligible as the baseline proportions of college-educated are equal to 11.2 per cent in 2025 and 15.8 per cent in 2075. The short-run change in human capital is entirely due to the incentive effect. Then, new educated adults invest more in the basic education of their offspring and have fewer children; this gradually increases the proportion of young adults having access to

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7 A partial liberalisation of college-educated workers’ mobility could also be simulated. As shown in Delogu et al. (2013), even though the effects are non-linear in the liberalisation rate, they are almost proportional to it.

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higher education. With exogenous higher-education decisions, the effect on human capital is negligible and exclusively due to the assimilation of new migrants in terms of investment in basic education of their children; this slightly reduces the effect on the world proportion of migrants. With endogenous TFP, the incentive effect on higher education and the world proportion of migrants are slightly greater as skilled emigration decreases wages in origin countries and increases them in destination countries.

We now focus on the world distribution of income. The effect on the world average level of income *per capita* as percentage of deviation from the baseline (usually referred to as the efficiency effect) is presented in Figure 1c. A skill-selective liberalisation of high-skilled migration increases the worldwide average income per worker by 2.4 per cent in the short run and by 6.2 per cent in the long run. Comparing the benchmark with the constant education scenario in partial equilibrium, about three-quarters of the short-run efficiency gain is due to the reallocation of college-educated workers from low-income to high-income countries and only one-fourth is due to the *incentive effect*. Over time, the *access-to-education effect* gradually increases the stock of college graduates. With endogenous TFP, the productivity gap between poor and rich countries increases. Overall, this boosts efficiency gains (+4.0 per cent in the short run and +8.8 per cent in the long run).

As explained in the previous sections, liberalising high-skilled migration reduces human capital and the pre-transfer level of income per worker in developing countries and increases them in high-income countries. Figure 1d gives the effect on the Theil index of inequality in percentage point deviation from the baseline. In partial equilibrium, the Theil index increases

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by 1 percentage point in the short run and by 1.2 percentage points in the long run. The effect is almost identical if higher-education decisions are exogenous. On the contrary, the effect can be magnified by the technology effect: in the short run, the Theil index increases by 3.5 percentage points with endogenous TFP. The increased mobility raises wages in developed (receiving) countries while it decreases the income of stayers in developing (sending) countries, thereby reinforcing the income gap between poor and rich regions.

5. CONCLUSION

The race to attract talents is likely to get tougher in the future. In this paper, we use a unique database on desired migration to quantify the Net Pool of Foreign Talents (NPFT) of the major industrialised countries. We show that the EU-15 has a large NPFT, although this pool is relatively smaller than the US, Canadian or Australian ones. So far, the EU-15 has poorly benefited from it, while the US has mobilised a large portion of it. We then use a quantitative theory model to simulate the short-run and long-run impacts of skill-selective liberalisation shocks on the world economy. Overall, a worldwide liberalisation of high-skilled migration benefits high-income countries and adversely affects developing countries. It reduces the average income gap between the EU-15 and the US. However, the European gains are unevenly distributed: less attractive countries such as Austria, Belgium, Germany, Greece, Luxembourg and the Netherlands benefit less than the US, Canada or Australia. In developing countries, skill-biased emigration prospects stimulate the investment in higher education. However, this incentive mechanism is too small to induce a net brain gain. Human capital and income per worker thus decrease in developing countries. Still, the income per natural increases for all the developing regions, highlighting the fact that the increase in emigrants’ income exceeds the loss of the stayers. Pareto-improving transfer schemes could be imagined but would be difficult to implement. Increasing the race to attract talents increases inequality, especially if total factor productivity varies with human capital.

SUPPORTING INFORMATION

Additional Supporting Information may be found in the online version of this article:

Appendix S1. Technical details on the model and on the data.

REFERENCES


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