



Connecting Universities, the Labour Market and Professionals

AlmaLaurea Working Papers - ISSN 2239-9453

ALMA LAUREA WORKING PAPERS no. 25

September 2011

Why do Students Migrate? Where do they Migrate to?

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by

Elise S. Brezis*, Ariel Soueri**

Abstract

The flow of students has grown very rapidly these last decades, and in some regions, has become twice as important as the flows of those seeking work. The purpose of this study is to explore the elements affecting students' decision on migration. The two main elements affecting migration are wages, and quality of education. It should be stressed that the countries with the highest-quality education are not necessarily those with high wages. Therefore there is a need to explore whether it is quality of higher education or wage levels that determine the direction of student flows.

First, we develop a simple two-stage model relating decisions on educational choices to those on job search. Our model shows that student migration is towards countries with the highest quality of higher education.

In the second part of this study, we empirically investigate our theoretical model using a panel data on European OECD countries. We use the Bologna process to outline which of the elements, wages or educational quality, determines the direction of flows. We find strong evidence of concentration of students in countries with high-quality education and not in high-wage countries.

Keywords: Migration, Human capital, Students, higher education, Bologna process, Brain drain.

JEL: F22, I23, J24

I. Introduction

In the past decade, mobility of young people has grown rapidly, and interestingly this flow is not homogenous. On one hand is the flow of individuals who are already skilled and who emigrate to work. On the other hand, are young individuals migrating to acquire education, and this flow is growing rapidly this last decade. In 2006, the flow of individuals who obtain education outside their country of citizenship was nearly five times what it was in 1975. Over time, this flow became larger

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than the flow of workers. More specifically, from 1999 to 2006, the growth rate of student flow to the OECD countries was twice that of flows for the purpose of finding employment.¹

The reason why individuals migrate is usually tied to economic opportunities. Therefore countries with high wages are magnets for migrants, and indeed the literature has focused mainly on the magnet of high wages. When analyzing migrant flows, we therefore face the question: Does a high-wage country also attract those who migrate in order to acquire education? This question is interesting because the data show that the countries with the highest-quality education are not those with high wages. So do students migrate to countries with high quality of education or to those with high wages?

The aim of this paper is to identify the reasons why students emigrate and to elucidate the pattern of flows between countries. The main question this paper deals is to explore whether it is quality of higher education or wage levels that determines the direction of student flows.

The previous literature on migration has focused on two subjects in total dichotomy. On one hand, there is the literature analyzing the cost-benefits of students. On the other hand, there is the literature analyzing the labor market, and the migration of already skilled labor. Unlike previous studies, which have analyzed student migration and workers separately, we combine these two migration decisions into a unique model. We develop a simple two-step model that describes the decisions of an individual vis-à-vis migration and education. In the first step, individuals decide where to study (i.e., in country of origin or in a foreign country); and in the second step, they decide where to work.

This model will allow us to pinpoint the optimal decision of young people, as well as to analyze the effects of wages and quality of education on the decision making of students. We show that under reasonable assumptions, the main variable affecting the decision on the country of emigration is its quality of education.

The second part of the paper is empirical, and tests the variables affecting student migration. Our empirical work will show two main results: the first is that quality of higher education, and not wages, as was previously believed, affects the probability of migration. Our paper indicates that young people move to countries with high quality of education rather than to those with high wages.

The second main result is that there is a concentration effect. We find that not only does high education quality -- not wages -- affect migration, but when we focus on the top countries in terms of education quality and wages, we see that the movement will be to countries with higher education quality.

This paper is organized as follows: In the next section, we present a short overview of the literature. In section III we develop the model of migration. In the fourth section we present the data, and explain the methodology. In the fifth section, we present the empirical results, and section six concludes.

¹ The flow of workers has increased by 27% while that of students by 52%.

II. Facts and Related Literature

Our research focuses on decisions made by young people vis-à-vis migration. The possibilities facing them are either to attend university in their home countries, or migrate abroad to attend university. This decision cannot be disentangled from the decision regarding the countries wherein they would like to work. Therefore, we will present in brief the literature on student migration, as well as that related to migration of skilled workers. We begin with some facts about migration. In Table 1, we present the data on student migration in general and from OECD countries in particular, along with data for some Mediterranean countries. Regarding the literature, we should note that almost no studies relate decisions of where to study with those of where to work. An exception is Kwok and Leland (1982), who developed a multiple equilibria model of migration based on asymmetric information, wherein students prefer to remain in the country where they attended university, due to a lack of information on the “value” of their degrees. So due to signaling, good students find it more valuable to remain in the host study countries to work. In consequence, students with less “internal information”, i.e., those with lower abilities, will be those who decide to return to their countries of origin.² We turn now to the literature focusing on student migration.

1. Student Migration

The literature on student flow is not large, and is mainly empirical. The studies mainly outline the elements affecting the costs and benefits of migration for students who decide whether to acquire education abroad (see Kyung, 1996; Bessey, 2006; and Agasisti and Dal Bianco, 2007). Heaton and Throsby (1998) analyzes the determinants of flows in a cost-benefits framework.³

The literature has stressed that wage level is one of the main elements affecting the decision to migrate as a student. On one hand, Mac and Moncur (2001) found that higher wages in the country of origin positively affect the rate of out-migration. It is so, because agents with higher income can bear the costs of migration more easily and have better possibilities to invest in high quality of education. On the other hand, wage differences between the host country and the country of origin are used to explain the patterns of migration. These studies show that flows of students are from low-wage to high-wage countries because students are motivated by the wish to exploit the opportunity to acquire employment in the country wherein they acquired their education (see Rosenzweig, 2006).

There is also a literature which focuses on the macro effects of migration. Papatista (2005) argued that studying overseas enhance the social and cultural development of migrants and therefore leads to human capital gains. Moreover, she stresses that migration could be a political means to foster technological transfers and economic integration of Europe.

² Few models with multiple equilibria can be found in the literature on migration. Brezis and Krugman (1996) also presented a multiple equilibria migration model, yet without learning decisions and wherein the focus is on the host country, and not on the country of origin.

³ See also Altbach, 1998.

Some scholars emphasize also the negative effects of migration on the stock of human capital. Poutvaara (2004) argued that while migration fosters private investment in human capital, it will lead to a reduction of public investment in education, due to free riding.

Following this line of reasoning, Mechtenberg and Strausz (2008) underlined the tradeoff facing government, i.e., competition versus free riding. On one hand, a central planner may decide to invest in quality of higher education in order to attract foreign students, and due to more competition, increases the amount of investment. On the other hand, the central planner might encourage local students to obtain education overseas free of charge. This free-riding on the account of another country reduces the total amount of investment in higher education.

There are also studies on the effects of migration on the social environment as more migration will lead to a reduction in cultural differences over time (see Putvaara, 2004 and Mechtenberg and Strausz, 2008). We now turn to the literature on the migration of workers.

2. Migration of workers

In contrast to the literature on student migration, the literature on workers' migration is vast. From Sjaastad (1962) on, the optimal behavior of migrants has been found to be a function of income differences and migration costs.⁴ The main elements that have been emphasized are those affecting migration costs, as for instance, geographical distance, family size, and previous migration. A summary of the empirical work in this field is presented in Table 2, where we have outlined the main papers.⁵ This literature did not focus on skilled workers.

The literature on the migration of skilled workers is coined the "brain drain" literature which emphasizes the negative effects of the flight of skilled workers on the country of origin. These studies claim that the flight of skilled workers towards countries with higher standards of living lead to impoverishment of developing countries, due to increasing returns and externalities in the level of human capital. These papers conclude that migration of skilled labor has negative effects on human capital and economic growth of the country of origin.⁶

Lately, a number of authors have shown that the possibility of migration might create some positive effects on the country of origin, termed the "brain gain" effect. This line of research has been engaged in by Mountford (1997), Stark, et al. (1997, 1998) and Stark (2004). They focus on the fact that the incentive to migrate could increase the investment in education, and on average would increase the level of human capital. Beine, et al. (2001) and Easterly and Nyarko (2008) both derive the theoretical effects of migration on human capital creation, and test these effects empirically.

⁴ See Borjas (1987, 1989) and Chiswick (1999). The seminal work of Harris and Todaro (1970) adds to previous work the possibility of unemployment, and therefore focuses on the net expected present value as the element that explains migration.

⁵ As shown in Table 2, the main empirical papers in this literature are those of Greenwood (1969), Bowles (1970), Kaluzny (1975), Lee and Roseman (1999), and Ahn et al. (1999). The variables on which they focus are mainly income, age, and distance unemployment.

⁶ See Hacque and Kim, 1995 and Docquier, 2006. Early articles in this direction are notably Grubel and Scott (1966) and Bhagwati and Hamada (1974).

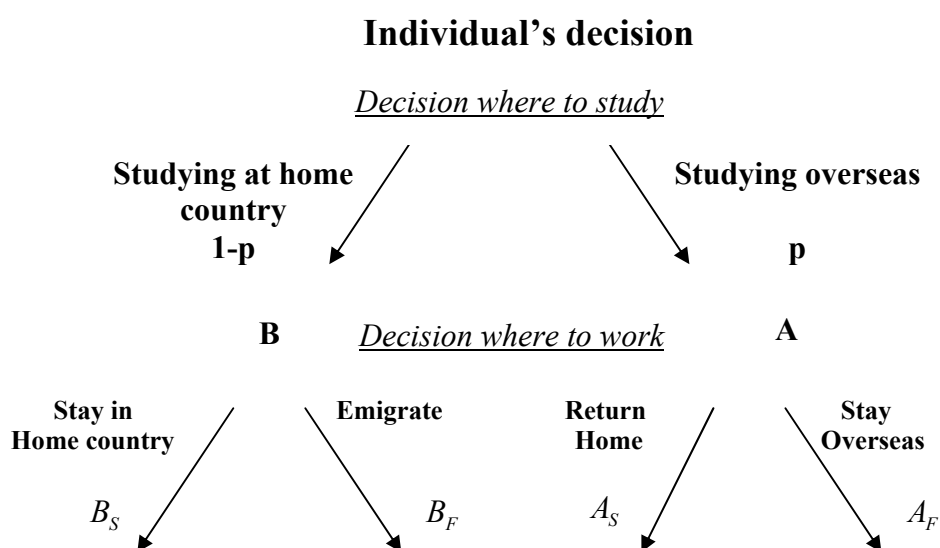
This paper will not draw a dichotomy between decisions on education and those on employment. Instead, it will combine these two into a one and single model. Let us now turn to presenting the model.

III. The Model

In this study, we develop a model that allows us to develop a cost-benefit analysis of migration decisions. Unlike previous studies, which have analyzed migration of students and workers separately, we combine these two decisions into a unique model.

We develop a simple two-step model that describes the decisions of an individual vis-à-vis education investment. In the first step, individuals decide where to study (i.e., in country of origin or in a foreign country); and in the second step, they decide where to work. It should be noted that there are two main variables which determine the optimal decision. The first one is the difference in wages and the second is the quality of higher education. Indeed, higher education is not homogenous between countries; there are main significant differences of quality between countries. In Chart 1, we show the elements affecting the decisions at each stage.

Chart 1



In the first period, individuals invest in acquiring human capital, h , and decide whether to study overseas in country F, or in his home country, in country S. Their decision is a function of the costs and the returns from acquiring human capital.

1. Returns from Migration

One main element which affects the future income of students is the accumulated human capital. This accumulated human capital is a function of the quality of higher education they have acquired. Students are aware that quality of higher education, Q is heterogeneous and varies across countries, and the higher the quality, the higher the human capital they are acquiring.

The second element which influences the future income of students is the wages paid for a given amount of human capital, w . So, individual's earning is a function of three factors: (i) the quality of higher education, Q_i which affects the accumulated human capital (where j is the index of the country in which he gets an education), (ii) a idiosyncratic factor specific to the individual, λ , and in this section, we take λ constant for all students, assumption which will be removed, when we will develop the macro equation of migration. (iii) The third element is the wage per unit of human capital, w_j where j is the index of the country in which the individual decides to work (country S or country F).

Therefore, individual's earning, W_{ij} is a function of Q_i , w_j and λ , and the income of individual is taking the four possible forms:

(i) Migration as student and staying to work – strategy A_F .

Agents migrate in the first stage to country F in order to obtain education and remain there after graduation. We ignore the whole present value of income, and focus on the earning of a specific year, since discount factor will affect all incomes in the same way.

The income in this specific strategy is a function of Q_F and w_F and for sake of simplicity, we adopt this specific functional form:

$$W_{FF} = \lambda \psi(Q_F, w_F) = \lambda w_F Q_F^\alpha. \quad (1)$$

where W_{FF} are the earnings of an individual that obtains education and works in country F. (In chart 1, T represents the number of working years). The second possible strategy is:

(ii) Temporary migration – strategy A_S .

individual migrates as student but returns to his home country after graduation. The earnings under this strategy is a function of quality of education overseas, Q_F and wages at home, w_S :

$$W_{FS} = \lambda \psi(Q_F, w_S) = \lambda w_S Q_F^\alpha. \quad (2)$$

(iii) Permanent migration only as worker – strategy, B_F

The third possible strategy is that an individual will obtain education in his home country and migrate in order to work, following graduation. This is the regular “brain drain” strategy. The value

of earnings under this strategy is a function of quality of education at home, Q_S and wages overseas, w_F :

$$W_{SF} = \lambda \psi(Q_S, w_F) = \lambda w_F Q_S^\alpha. \quad (3)$$

(iv) No migration – strategy, B_S .

Individual obtains education in his home country and remains to work there following graduation. The present value of earnings over time under this strategy is:

$$W_{SS} = \lambda \psi(Q_S, w_S) = \lambda w_S Q_S^\alpha. \quad (4)$$

So all four strategies present different returns depending on where the student learns and where he works. We now turn to the main costs related to learning and migration.

2. Costs of Migration

The literature of migration stresses two types of costs that individual bears during migration: financial costs and psychological costs. When migrating as a student, we assume that the main financial costs of migration are tuition fees. Therefore, if the individual obtains education in his home country, the amount of tuition fees that he pays are F_S and if he obtains education overseas he pays tuition fees which are charged in the host country, F_F .

(i) *Psychological costs*

Sjaastad (1962) argued that migrants bear costs which results from separation from family and friends. This definition of costs is known in the literature as psychological costs. The new literature developed by Akerlof and Cranton (2010) also put an emphasis on identity. This new literature takes into account that one of the main element people care about is their identity, or in other word, their culture.

In consequence, when a person leaves home, he has the cost of leaving his own culture and adapting to the new one.⁷ These costs are positively affected by the cultural differences between the sending and the receiving countries.

This phenomenon of adapting to a new culture is coined as acculturation (see, Narchal, 2007). Theories of acculturation stress that the interaction between different cultures and adaptation to the majority's culture, lead to a process in which the migrants are losing their own cultural identity. This process bears psychological cost, Ps , which depends on the cultural differences between the origin and the destination countries. To leave the function as general as possible, we define:

⁷ Some psychologist will also emphasize the costs of loneliness and isolation; Others argued that as a result of changes in the identity of the individual, mental illness might appear (see Bhugra, 2004)

$$P_s = \beta C_u . \quad (5)$$

where C_u is the differences between the culture of the migrant and the culture of the majority in the destination country, and β is a positive parameter.

Psychological costs are not the only costs faced by migrants. Students face also some compatibility costs.

(ii) Compatibility Costs

The structure of higher education is heterogeneous. In some countries, the structure of higher education is typically of two cycles, while in others it is of three cycles. Furthermore, there are also main differences in the curriculum and language of teaching. This heterogeneity creates barriers which prevents movements of students. It is important to note that the Bologna process removes these barriers through harmonization of higher education in Europe.

In consequence, we assume that the compatibility costs are function of the differences between the systems of higher education. The compatibility costs, C_c are either zero when the two countries have the same system, or a positive amount K .

In summary, the costs migrants bear, and the net income under each of the strategies are as follows:

$$\text{In strategy } A_F, \text{ the total costs, } C, \text{ are: } F_F + P_s + C_c \quad (\text{Ci})$$

$$\text{and net returns are: } NV_F = \lambda w_F Q_F^\alpha - (F_F + P_s + C_c) \quad (6)$$

(Cii)

$$\text{In strategy } A_S, \text{ the total costs, } C, \text{ are: } F_F + P_s + C_c$$

$$\text{and net returns are: } \lambda w_S Q_F^\alpha - (F_F + P_s + C_c) \quad (7)$$

(Ciii)

$$\text{In strategy } B_F, \text{ the total costs, } C, \text{ are: } F_S + P_s$$

$$\text{and net returns are: } \lambda w_F Q_S^\alpha - (F_S + P_s) \quad (8)$$

$$\text{In strategy } B_S, \text{ the total costs, } C, \text{ are: } F_S \quad (\text{Civ})$$

$$\text{and net returns are: } \lambda w_S Q_S^\alpha - F_S \quad (9)$$

3. Optimization

Individual decides whether to migrate for education purpose or later on as skilled worker according to the net return under each of the strategies. From comparison of the net returns under each of the strategies we get the following lemmas:

Lemma 1: *The choice between strategies A_F and A_S depends exclusively on the wage per unit of human capital, ω .*

For both strategies A_F and A_S , the costs of migration (Ci) and (Cii) are equal. It follows that the differences between these two strategies is due to the difference in wages per unit of human capital in the location in which the individual chooses to work following graduation.

Let us now compare the other two strategies, B_F and B_S .

Lemma 2: *The choice between strategies B_F and B_S depends exclusively on the wage per unit of human capital, ω and the psychological costs.*

From equations (8) and (9), it follows that decision between these two strategies depends on the wage per unit of human capital and the psychological costs. This two-step model permits us to discuss the consequences of the Bologna process on migration of students.

4. The Bologna Process

The main goal of the Bologna process is to increase mobility of students within Europe in order to promote European citizens employability and the international competitiveness of the European higher education system. Since there are main differences among countries in their system of higher education, the aim of the Bologna process was to harmonize them. The main instruments for harmonization were:

- *Adoption of a system of easily readable and comparable degrees, through the implementation of the Diploma Supplement.*
- *Adoption of a system essentially based on two main cycles, undergraduate and graduate. Access to the second cycle shall require successful completion of first cycle studies, lasting a minimum of three years. (Bologna Process, 1999)*

In fact, the Bologna process reduces compatibility and psychological costs, and eliminates tuition fees for European students in most countries. Therefore, we get that due to the Bologna Process, migration of students will concentrate itself into the countries with the highest quality of higher education. The reason for this effect is quite intuitive. When comparing the different net returns, it is easy to show that whatever the relative wages, the final decision to stay home or to learn abroad will be a function of the quality of education.

In consequence, this model emphasizes that it is quality of higher education which is the main element conducive of migration and not the level of wages. We turn now to the section which permits to relate this macro result to the empirical analysis.

5. The Migration equation

In this section, we develop the migration equation, which will permit to relate the theoretic model to the empirical investigation which will be presented in the next section.

The previous lemmas lead to the conclusion that under some plausible assumptions, the only two optimal strategies are strategy A_F i.e., to migrate as student and remain in the host country; or

strategy, B_S , i.e., not to migrate at any stage, recalling that the net returns under these two strategies are:

$$A_F : NV_F = \lambda_F w_F Q_F^\alpha - (F_F + \beta C_u + C_c) \quad (10)$$

$$B_S : NV_S = \lambda_S w_S Q_S^\alpha - F_S \quad (11)$$

In this part, we assume that λ is not anymore constant for all migrants, but is different among countries, as assumed in the model of self selection developed by Borjas (1987). We define λ_F and λ_S the returns on personal characteristics in country F and country S respectively. In consequence, we get the condition that:

- If $I > 0$, then individuals migrate;
- and if $I < 0$, then individuals do not migrate,

where I is:

$$I = \ln\left[\frac{A_F}{B_S}\right] = \ln\left[\frac{\lambda_F w_F Q_F^\alpha - (F_F + \beta C_u + C_c)}{\lambda_S w_S Q_S^\alpha - F_S}\right]. \quad (12)$$

It follows from equation (12) that:

$$I \approx [W + q + E] + X \quad (13)$$

where

$$W = \ln w_F - \ln w_S \quad (14)$$

$$q = \ln Q_F^\alpha - \ln Q_S^\alpha \quad (15)$$

$$E = \ln F_S - \ln F_F - \ln \beta C_u + \ln C_c \quad (16)$$

$$X = \ln \lambda_F - \ln \lambda_S \quad (17)$$

Therefore the probability, P, of emigration from country S to country F is

$$P = \Pr[X > -(W + q + E)] = \Pr\left[\frac{X}{\sigma_X} > \frac{-(W + q + E)}{\sigma_X}\right] = 1 - \phi(Z) \quad (18)$$

where $Z = -(W + q + E)$, σ_x is the standard deviation of X, and ϕ is the CDF function of the normal distribution. From equation (18) it follows that the emigration equation from country S to country F is therefore:

$$P = 1 - \phi \left[\frac{-[\ln w_F - \ln w_S + \ln Q_F^\alpha - \ln Q_S^\alpha + \ln F_S - \ln F_F - \ln(\beta C_u + C_c)]}{\sigma_x} \right] \quad (19)$$

Let us now turn to the empirical section of this paper.

IV. Empirical analysis

Equation (19) permits us to present the specification of the empirical equation. We first present the equation, and later on discuss the data.

1. The specification of the model

In this empirical part, we regress the probability of migration as a function of the elements that appears in equation (19) of the previous section. In consequence, we estimate the following equation:

$$Pmig = \alpha + \beta_1 \Delta Wage + \beta_2 \Delta Cu + \beta_3 \Delta Tuition + \beta_4 \Delta Tuitionsq + \beta_5 EU_F + \beta_6 \Delta Quality \quad (20) \\ + \beta_7 Distance + \beta_8 Similarity + \beta_9 Language + \beta_{10} Top5 + \beta_{11} Wage5 + u + \varepsilon$$

We investigate this equation with a country fixed effect, u and analyze a panel data of students' flow published by the OECD on the years 2001-2006. In this version of the paper, we focus on a sub-sample of the European OECD countries.⁸

The decision on migration is a qualitative variable, based on macro-data, therefore, we use a logistic transformation when estimating equation (20). Let us recall that in our theoretical model we used, as Borjas, the normal distribution while in this analysis we use the logistic distribution. Since the normal distribution and the logistic distribution are similar in their Bell curve and in their practical uses, the results are similar. Let us now describe the variables in equation (20).

⁸ The Bologna process provides a unique opportunity to explore the respective role of wages and quality of higher education in the decision on student's migration, since the Bologna process reduces the costs of migration between countries. Therefore, we use two samples: the first is the overall sample which contains data on migration of students from the EU27, Switzerland and Norway towards twenty one European OECD countries. The second sample is the EU15 which contains data on migration within the EU15 area.

2. The variables of the model

$Pmig$ is the dependent variable which is a logistic transformation of the probability to emigrate from country S to country F. The dependent variable is therefore:

$$Pmig = \ln \frac{P_{SF}}{1 - P_{SF}} \quad (21)$$

where P_{SF} is the probability to migrate from country S to country F, calculated by dividing the number of foreign students from country S in country F, by the total number of students in country S.

$\Delta Wage$ is the difference in the monthly average manufacturing wage between country F and country S, based on the ILO database.

ΔCu is an index of cultural differences between countries. We developed this index based on World Values Survey which publishes data at an interval of five years.⁹

$\Delta Tuition$ is the difference in tuition fees between the origin and host countries. The data on tuition fees are based on the report by CESifo Dice for the year 2005. We should note that tuition fees in Europe are very low and in many countries students obtain education free of charge.¹⁰

$\Delta Tuitionsq$ is the square difference in tuition fees between the sending and receiving countries.

EU_F is a dummy variable which receives the value 1 if the destination country is a member of the EU.

$\Delta Quality$ measures the differences in quality of higher education between the sending and the receiving countries. Our quality index defines the quality of higher education in a country according to the number of universities in this country which are ranked among the world's top 100 universities. Therefore the quality of country is higher when it has more universities which are ranked in the top 100. There are two main ranking of universities in the world – the THES and the SJTU (Shanghai Jiao Tong University). We have chosen to use the SJTU ranking since it uses criteria of research quality, research productivity, quality of the faculty and quality of teaching. Some previous work (Mac and Moncur, 2001) uses instead the expenditure on education, but OECD research has shown that the correlation between budgets and quality is weak.¹¹

$Distance$ measures the geographical distance between the capital cities of the origin and the destination countries. The series are based on the Gleditsch and Ward (2001) database. This variable is part of the compatibility costs included in the theoretical model.

⁹ We use the survey done in 2000.

¹⁰ It is important to note that the EU forbids discrimination regarding tuition fees that are charged from EU, EEA citizens and citizens of countries which have special agreements with the EU. Since all the countries in our data are either EU countries or countries which have agreement with the EU, tuition fees are the same for local student as well as for overseas student.

¹¹ It should be noted that our own index has also some weakness, because many countries don't have universities which are ranked in the world top 100. As a result this index provides information on a limited set of countries.

Similarity is a dummy variable which get the value 1 if the structures of higher education in the host and origin countries were similar prior to the adoption of the Bologna process. We divided the countries into two different groups. The first group includes the countries which, prior to Bologna process, had the three cycles system, and the second group includes countries with structure similar to the German system. As we will show, this element is important for analyzing migration in Europe. Table 3 displays the percent of students who migrate to countries which has the same system as in their country of origin.

For example, Table 3, row 1 shows that 81.3% of the Austrian students, who studied in 2001 out of Austria, chose to study in destination country which had, prior to the Bologna process, the same structure of higher education as in Austria. It should be noted that this variable is part of the compatibility costs presented in the theoretical model.

Language is a dummy variable that gets the value 1 if the official language in the origin and the destination country is the same.

Top5 education is a dummy variable which gets the value 1 if the destination country is one of the five countries with the highest quality of education according to top100 index of quality. In fact, we use this variable to measure concentration by quality. The top five countries are France, Germany, UK, Switzerland and Sweden.

Wage5 is a dummy variable which get the value 1 if the destination country is one of the five OECD countries with the highest manufacturing wage. The top five countries are: Austria, Denmark, Holland, Norway and Switzerland.

Finally, u represent a fixed country effect and ε is the random error.

V. Empirical results

The results of our analysis are presented in Table 4. In all regressions, the dependent variable *Pmig* represents the transformation of the probability to emigrate from country S to country F according to the logistic distribution.

In the first and third columns of table 4 we present the regression in the overall sample and in the second and forth columns we present the regressions for the EU15 sample. We divide our empirical results in two groups: the main results, and some more interesting results.

1. Main results

(i) Wages and Quality of Education

Table 4, columns 1 and 2, present the results when we include as endogenous variables quality of university and the gap in wages between the country of origin and the host country.

We find that in both samples (total sample and the EU15), there are significant negative effects of wage differences on migration of students (see columns 1 and 2). This result is interesting because the literature stresses that wages are a positive and significant element in the decision of student migration (see Rosenzweig 2006). Our paper shows that this is not so. The element which is important and positive on migration is the quality of higher education.

$\Delta Quality$ - Following our theoretical model, positive quality differences between the receiving and the sending countries is expected to encourage students to migrate. Indeed, we find a positive and significant effect of the quality of higher education on the probability of students' migration (see columns 1 and 2).

In conclusion, we find negative and significant effect of wage differences on migration of students and positive and significant positive effect of quality of education on migration. In other words, in contrast to previous studies, we find that the migration of students results from quality differences rather than wage differences.

(ii) Top Wages and Top Quality of education

We intend to check whether quality of higher education or wage lead to some concentration effect. In order to explore this effect, we add two dummy variables in columns 3 and 4 of Table 4. The first one is *Top5* education. This variable gets the value 1 if the destination country is one of the top five countries in quality of higher education. This variable measures concentration of students in top quality countries.

Similarly, we add the variable *Wage5* which measures whether the destination country is one of the five countries with the highest wage. In other words, this variable measures concentration of students in high wage countries.

The results show positive and significant effect of the *top5* education variable and negative and significant effect of the *wage5* variable. Therefore we find significant evidence that the pattern of flows is to countries with high quality of universities and not in countries with high wage.

These results are interesting because there is a comprehensive literature on the impact of quality of higher education on labor outcomes, which have found positive effect of quality on wages. Therefore a priori, there is a common belief that countries with high quality of education are also countries with high wages.

Is there a high correlation between wages and quality of education? In table 5, we present the correlation between wages and quality of higher education. We find that the correlation between wages in manufacturing in each country and its number of universities in the world's top100, top 200 and top500 universities is around 0.35. Therefore the countries with the highest quality of education are not necessary the countries with high wages, as we have shown in table 4 that there is a concentration by quality and not by wages.

The concentration effect stressed in Table 4 can be presented in a different manner in Tables 6a and 6b, in which we present the distribution of student flows according to quality of higher education (in Table 6a), and according to wages (in Table 6b).

Table 6a shows that in all the years 2001 to 2006, around 67 percents of student flows in the OECD and EU countries concentrated into the top five countries in quality of higher education.¹² Are these flows also concentrated in the top five countries in wage?

In table 6b we measures concentration in countries with the highest wage. We show that more than 80 percent of the student flows went to the low wage countries. Therefore, unlike the concentration of students in high quality countries, we don't find concentration in high wage countries. This is the picture we got from the regressions presented in table 4.

2. Some more interesting results

ΔCu - Following our theoretical model, wider cultural gap leads to higher psychological costs which reduce migration. The results we get support this relationship: Table 4, row 3 shows that higher cultural differences, as reflected by the cultural index, reduces significantly the rate of migration in all four regressions.

$\Delta Tuition$ - A priori, we expected to find negative effect of tuition fees gap on migration, but we found a positive one. Already Mak and Moncur (2001) found positive effect of tuition fees on migration of students, while Bessey (2007) found insignificant effect. In this paper we also find a significant and positive effect of tuition fees gap on migration in both samples, meaning that students migrate to countries with higher tuition fees. This positive sign could be due to a signaling effect of the level of tuition fees on the quality of education.

$\Delta Tuitionsq$ - The positive sign of tuition fees on migration led us to check whether there is a non linear relation between tuition fees and migration. The results are not clear cut.

EU_F - We get a positive and significant effect of the host country being a member of the EU. There is clearly a club effect since migration to the EU area could raise the returns on migration.

Distance – Similar to previous studies on migration, we find negative effect of distance between countries on migration.

The next two variables, *similarity and language*, are related to the compatibility costs presented in the theoretical part.

Similarity - measures similarity between the structure of higher education in the host and origin countries. When the structure of the systems is more similar the compatibility costs are lower. In our empirical investigation, this variable was not significant.

Language – In all regressions, we find a positive effect of the same language in the host and the origin countries on migration. Note that this positive relation was also found in previous studies.

¹² More specifically, around 19 percent of students went from low quality countries to low quality countries. Around 48 percent went from low quality countries to the top five countries, 14 percent from the top five countries to the low quality countries, and 19 percent were between the top five countries.

V. Conclusion

This past decade, cross-national migration of young people has become an important issue in the policy arena for two main reasons. The first is that the European Union has decided upon establishment of a European Higher Education Area, thereby allowing and even encouraging free movement of students between European Union countries.

The second issue related to migration of students is the increasing global competition on talents. In the past, the elite of most countries were educated in their own countries. Today, an element common to many of the elites is that they share a common education and for many of them, they have attended the same elite universities, which are not in their home countries. In consequence, the issue of social mobility has become linked to the international movement of students. An obvious question is then what determines the direction of student mobility? This is the topic of this paper.

In this paper, we investigate whether it is wage levels or quality of higher education that determines mobility of students. We also investigate many other elements of the migration decision, for instance language and distance, both of which we found influence migration. We also developed a cultural gap index that shows that a gap in culture reduces migration. Nonetheless, the main purpose of this paper is to analyze the relationship between migration, education quality, and wages.

The first contribution of this paper is that it has stressed that to answer these types of questions, we cannot use a conventional model of migration which naturally limits itself either to student migration, or to migration of workers. We developed a two-stage model of migration that merges the decision to migrate as a student with the decision to migrate as a worker. Under some reasonable assumptions, we show that young people move to countries with higher quality of education.

This issue might appear redundant, since *a priori*, countries with high wages will also be countries with high education quality. Yet among the empirical regularities exposed herein, we show that this is not the case: The correlation between wages and education quality is only 35%.

The empirical analysis shows that while quality of education affects positively migration, wages do not affect positively migration. This is not our main result. We have tried to test whether there is concentration in specific countries. The answer is clear: Young people travel to the top five countries in terms of education quality. Our indices show a concentration of students in the top-quality education countries, and not into countries with the highest wages.

Nobel Prize Laureate Robert Lucas raised a famous query in his paper: “Why doesn’t capital flow from rich to poor countries?” Paraphrasing Lucas in our paper, we find that students’ emigration is motivated by quality of education and not by wages. Human capital doesn’t flow from poor to rich countries, but rather from countries of low-quality education to those of high-quality education.

These are not good news for the Bologna Process. These are even worse news for developing countries in the border of the European Union, especially for the Mediterranean countries. Young

people will try to acquire higher education in the top countries in terms of quality of education, and brain drain will increase.

However there is also some good news. In order to develop, countries need bright people at the helm of the political and economic leadership. Countries do not develop if their elite is not well educated. The Bologna Process leads to low tuition fees for all countries in the area. So the bright people from developing countries in which higher education is not of high quality can move and attend the best universities. Yet, will they return to their home countries?

Some other good news is that the market for education is much more open and competitive than that for labor. The literature has stressed the lack of mobility in the European labor market. This paper shows that the Bologna process has succeeded in stimulating mobility. Is this good for Europe? The answer is mitigated.

In conclusion, the Bologna process is leading to significant changes, not only in the market for education, but also in the labor market. The effects on the neighborhood countries are not clear. On one hand, it can lead to an increase in the loss of young bright people. On the other hand, it could enable providing a good education to the next generation of leaders. The new literature on migration (see Benassy and Brezis, 2010) has emphasized that migration of young people can lead to multiple equilibria: Either there are some forces which will lead the young people to return to their countries of origin, be a source of economic growth, and become the next elite. Or, if there is no exogenous shock leading to this optimistic possibility, the flow of young people will increase and the home country can be caught in a vicious circle leading to some form of poverty trap.

One possible shock that could lead to this improved equilibrium would be the requirement for exiting students to go back for a few years to their home countries. If all return, it would alter the existence of multiple equilibria, and over time the only equilibrium would be one of high wages, high growth; and overtime this exogenous shock would no longer be necessary. Therefore, this paper strongly recommends that with the creation of the European Higher education Area, and free flow of students, the EU place some restrictions on these free flows from countries neighboring Europe.

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Annex

TABLE 1
EMIGRATION OF STUDENTS TO OECD COUNTRIES IN 2008

OECD countries	No. of emigrants	% from total students	Non OECD countries	No. of emigrants	% from total students
Australia	9 777	0.87	Afghanistan	3 451	
Austria	12 043	4.23	Albania	21 762	
Belgium	11 179	2.78	Algeria	22 356	
Canada	44 185	3.11	Argentina	9 996	
Chile	6 909	0.86	Brazil	24 066	0.40
Czech Republic	10 109	2.58	Bulgaria	24 945	
Denmark	5 810	2.52	China	437 003	2.32
Finland	8 001	2.58	Croatia	9 244	
France	62 264	2.88	Cyprus	26 259	
Germany	92 391	4.12	Egypt	8 313	
Greece	30 985	4.86	Hong Kong, China	34 210	
Hungary	7 735	1.87	India	173 114	
Iceland	3 625	21.80	Iran	25 264	
Ireland	18 483	10.35	Iraq	3 735	
Israel	9 789	3.01	Jordan	6 073	
Italy	41 577	2.06	Kuwait	4 357	
Japan	51 648	1.31	Latvia	3 642	
Korea	112 142	3.50	Lebanon	12 705	10.1
Luxembourg	7 676	99	Morocco	48 868	14.15
Mexico	26 657	1.02	Pakistan	27 609	
Netherlands	13 670	2.27	Palau	51	
New Zealand	4152	1.70	Palestinian Authority	1 256	
Norway	13 373	6.29	Qatar	1 328	
Poland	38 033	1.76	Russian Federation	37 241	0.37
Portugal	14 561	3.86	Saudi Arabia	17 315	
Slovak Republic	26 995	11.76	Syrian Arab Republic	7 030	
Spain	24 658	1.38			
Sweden	14 942	3.67			
Switzerland	10 813	4.82			
Turkey	48 324	1.91			
United Kingdom	27 901	1.20			
United States	47 803	0.26			

Source: OECD education at glance 2010

TABLE 2
DETERMINANTS OF LABOR MOBILITY

<u>Dependent Variable</u> ^c	Greenwood (1969)	Bowles (1970)	Kaluzny (1975)	Lee&Roseman (1999)	Ahn et al. (1999)
	<u>Interstate migration</u>	<u>Net out migration</u>	<u>Migration</u>	<u>Interstate migration</u>	<u>Willingness to emigrate for work</u>
<i>Dependent variable: M_{SF} - Migration from country S to country F</i>					
<i>Income_F 1)</i>	+*	---	---	+*	---
<i>Income_S 1)</i>	---	-* ^a	---	---	+
^b <i>Earnings_i 2+9)</i>	---	---	+*	---	---
<i>Age 3+5)</i>	---	-*	-*	-*	-*
<i>Distance 4)</i>	-*	---	---	---	---
<i>Education_i 6)</i>	+*	+*	+*	+*	+*
<i>Unemployment_F 7)</i>	-	---	---	-*	---
<i>Unemployment_S 7)</i>	+*	---	---	---	+*
<i>Family – size 8)</i>	---	---	-*	+*&-*	+
<i>Prv - migration_i 10)</i>	---	---	(+)*	(+)*	---
<i>Mstock 11)</i>	+*	---	---	---	---

Notes: * represents significance level of 10%.
a. Proportion of workers with earnings that are less than 1000\$.
b. Earnings affect both costs and returns, See text.
Definitions of variables are: M_{SF} is immigration between countries S and F, $Income_F$ is income in country F, $Income_S$ is income in country S, $Earnings_i$ are the earnings of emigrant i, Age is the age of the emigrant, Age is the age of the emigrant, $Distance$ is the geographical distance between

countries S and F, $Education_i$ is the education of emigrant i, $Unemployment_F$ is the rate of unemployment in country F, $Unemployment_S$ is the rate of unemployment in country S, $Family - size$ is the size of the emigrant's family, $Prv - migration_i$ is previous emigrants of emigrant I, $Mstock_F$ is stock of emigrants from country S in country F.

TABLE 3

THE EFFECT OF SIMILARITY ON STUDENTS EMIGRATION

	<u>2001</u>	<u>2002</u>	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>
	Rate of migration to European OECD countries with similar structure of higher education (%)					
Austria	81.34	82.10	81.04	85.55	84.60	84.53
Belgium	59.42	61.15	63.11	70.60	70.68	70.28
Czech	79.57	81.22	81.62	87.93	83.37	79.06
Denmark	57.03	59.87	60.06	65.23	63.63	63.93
Finland	65.57	67.64	69.29	75.57	76.37	75.54
France	55.79	57.02	57.62	67.81	68.71	69.05
Germany	58.26	59.61	61.97	69.61	71.69	73.96
Greece	56.68	55.84	53.08	54.67	53.94	52.76
Hungary	90.12	89.61	89.58	91.89	88.66	86.13
Iceland	12.77	12.96	12.65	12.85	12.27	12.01
Ireland	89.22	89.47	88.71	90.74	90.84	91.23
Italy	70.31	69.28	68.93	79.39	76.95	76.03
Luxembourg	86.95	88.15	87.52	87.36	87.99	88.19
Netherlands	64.83	66.22	66.64	72.14	59.90	70.63
Norway	51.47	52.43	54.63	55.63	59.00	60.61
Poland	6.71	6.99	7.33	6.12	10.19	16.41
Portugal	61.92	60.69	58.77	59.47	57.25	57.25
Slovakia	96.65	96.74	96.60	97.61	96.63	95.79
Spain	33.64	34.09	32.50	28.39	29.34	29.93
Sweden	50.94	51.21	53.01	57.07	56.84	57.73
Switzerland	73.66	74.83	76.67	74.78	76.53	75.10
UK	33.44	34.16	33.51	24.61	17.82	18.67

Source: Own calculation.

TABLE 4

REGRESSION RESULTS: DETERMINANTS OF STUDENTS EMIGRATION

<i>Variable</i>	<i>Overall panel</i>	<i>Square EU15</i>	<i>Overall panel</i>	<i>Square EU15</i>
Dependent variable: <i>Pmig</i> - Probability of emigration from country S to country F				
<i>Constant</i>	-7.182035 (-60.24)	-6.435478 (-46.77)	-7.95478 (-73.18)	-6.244323 (-42.02)
Δ <i>Quality</i>	1090795 (10.35)	.1303641 (9.73)	.1028747 (5.67)	.006896 (0.22)
Δ <i>Wage</i>	-.0000999 (-4.61)	-.000155 (-3.31)	.0003671 (9.61)	.000042 (0.61)
Δ <i>Cu</i>	-.1115142 (-3.00)	-.2533198 (-3.62)	-.1654175 (-4.12)	-.2716306 (-4.11)
Δ <i>Tuition</i>	.0006905 (13.22)	.0007624 (8.25)	.0006239 (10.24)	.0011574 (9.21)
Δ <i>Tuitionsq</i>	2.94e-07 (6.85)	4.23e-07 (5.40)	-7.26e-08 (-1.57)	-1.57e-07 (-2.19)
<i>EU_F</i>	.4820245 (4.34)	-----	1.02883 (14.39)	-----
<i>Distance</i>	-.0014917 (-20.54)	-.0011801 (-9.13)	-.0014072 (-18.90)	-.0015966 (-13.06)
<i>Similarity</i>	-.0560596 (-1.08)	.0369502 (0.41)	.0221401 (0.39)	.0580827 (0.68)
<i>Language</i>	1.75015 (14.58)	1.929312 (11.99)	1.455952 (11.23)	1.315127 (8.95)
<i>Top5-education</i>	-----	-----	1.4821480 (13.49)	2.243006 (10.59)
<i>Wage5</i>	-----	-----	-.4348655 (-4.24)	-.5718809 (-4.15)
<i>R</i> ²	0.3194	0.4603	0.4303	0.5421
<i>Obs</i>	3030	1131	3030	1131

Note: t-values are in parenthesis.

TABLE 5

CORRELATION BETWEEN WAGES AND QUALITY OF HIGHER EDUCATION

	<u>Top100</u>	<u>Top200</u>	<u>Top500</u>
Average wage	0.34	0.37	0.33

Sources: Shanghai Jiao Tong University, World university ranking, 2007, and International Labor Organization, 2001-2006.

TABLE 6A

CONCENTRATION EFFECT – PERCENTAGE OF MIGRANTS BETWEEN LOW AND HIGH QUALITY COUNTRIES

	<u>Low to Low</u>	<u>Low to High</u>	<u>High to Low</u>	<u>High to High</u>
2001	19	48	14	19
2002	19	48	14	19
2003	19	47	15	19
2004	18	49	14	19
2005	19	47	15	19
2006	20	45	17	18

Source: Own calculation.

Notes: “High” represents the top 5 countries according to the quality index of the top 100. According to this index the top 5 countries are France, Germany, Sweden, Switzerland and United Kingdom. “Low” represents all the other countries.

TABLE 6B

CONCENTRATION EFFECT – PERCENTAGE OF MIGRANTS BETWEEN LOW AND HIGH WAGES COUNTRIES

	<u>Low to Low</u>	<u>Low to High</u>	<u>High to Low</u>	<u>High to High</u>
2001	73	15	11	1
2002	73	15	11	1
2003	74	15	10	1
2004	72	16	11	1
2005	71	18	9	2
2006	70	19	10	1

Source: Own calculation.

Notes: “High” represents the top 5 countries in wages. The top 5 countries are Austria, Denmark, Netherlands, Norway and Switzerland. “Low” represents all the other countries.

APPENDIX TABLE 1

MEMBERS OF THE “EUROPEAN HIGHER EDUCATION AREA”

Albania	Latvia
Andorra	Liechtenstein
Armenia	Lithuania
Austria	Luxembourg
Azerbaijan	Malta
Belgium	Moldova
Bosnia and Herzegovina	Montenegro
Bulgaria	Netherlands
Croatia	Norway
Cyprus	Poland
Czech Republic	Portugal
Denmark	Romania
Estonia	Russian Federation
Finland	Serbia
France	Slovak Republic
Georgia	Slovenia
Germany	Spain
Greece	Sweden
The Holy See	Switzerland
Hungary	Former Yugoslav Republic of Macedonia
Iceland	Turkey
Ireland	Ukraine
Italy	United Kingdom
Kazakhstan	

Source: Bologna Process. <http://www.ond.vlaanderen.be/hogeronderwijs/bologna/aboutthiswebsite>
