

Can economic factors explain the pattern of cross-border student flows?

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Abstract

The aim of this paper is to explore the factors that encourage foreign students to undertake higher education in 26 OECD countries over a seven year period. The empirical results suggest that the relationship between previous year's proportion of foreign students and current year's proportion of foreign students in a country is positive and significant. This persistence result is as expected, considering multi-year programmes, low drop-out rates of students and lowering of information costs. The growth rate in domestic higher education students also appears to have a positive and significant impact on the proportion of foreign students in a country. Again, this result is consistent with our expectations, because a higher growth rate of students in a country implies additional capacity in educational institutions of that country to accept foreign students; therefore more students are likely to choose that country for study purposes. With the exception of these findings, no other significant relationship was found in the model.

Key words: Student flows, International education, Pull factors

JEL code: F 22, I2, J6

1. Introduction and Context

With the world economies becoming increasingly interconnected, the demand for international education has grown. One way for students to expand their knowledge of other societies and languages, and hence leverage their labour market prospects, is to study in tertiary educational institutions in countries other than their own " (OECD, 2009, p. 310). The pattern of cross border student flows can be explained by a combination of "push and pull" factors that encourage students to study overseas. According to Mazzarol et al. (2002), "push factors operate within the source country and initiate a student's decision to undertake international study," while, "pull factors operate within a host country to make that country relatively attractive to international students". When selecting a destination country, students can be thought of as moving through a three stages process. The first stage involves the process of deciding to study abroad, rather than at home. A lot of push factors within the home country can influence this decision. The second stage includes the decision to select the host country. In this stage, pull factors influence the decision by making a host country more desirable than another. In the third stage, students must choose an institution. A range of pull factors influence the decision here, by making a specific institution more desirable than its competitors. Those factors include an institution's reputation for quality, market profile, range of courses, staff expertise, degree of innovation, and other factors (Mazzarol et al, 2002). With the purpose of explaining the pattern of cross-border student flows, a research question will be answered in this paper. What are the determinants of the proportion of foreign students in a

country? The answer to this question will be informed by a review of theory and previous empirical analyses together with new estimations developed below. This research will attempt to explain the pattern of student mobility using economic analysis, and will try to identify the impact of these factors. The remainder of this paper is organized as follows: section two provides theoretical framework and empirical literature review. Data, model specification and the empirical strategy are discussed in the section three. Section four presents econometric estimation and interpretation of the results and finally section five concludes.

2. Theoretical Framework and Empirical Literature Review

Many studies discussed the motivations of student to undertake higher education abroad and pull factors that influence this mobility on different levels. Among the pull factors influencing the country of choice for cross-border education is cost. The cost of foreign education is determined through the cost of fees, the cost of living and other indirect factors (Mazzarol et al, 2002). Higher education in many of the host countries used to be tuition-free until the 1980s. However, many of the countries, who are net exporters of higher education provision, introduced fees for overseas students. In some countries, like Australia, Canada, New Zealand, the UK and the USA, a higher level of tuition fees is levied on international students than on domestic students. Some countries such as France, Greece, Hungary, Italy and Japan do not differentiate between foreign and domestic students when setting the fees, whilst countries such as Finland, Denmark, Sweden and Norway do not levy tuition fees on

foreign students (OECD, 2006). Another potentially important factor that students may consider besides the cost of fees and living expenses is whether they can work part-time during their period overseas. Many countries offer students the right to work part-time under their visas. This is considered by students as a means to make the cost of attaining a foreign education possible. According to Simington (1989), the rapid increase of students from China to Australian universities during the 1980s was ascribed largely to Australia's student work provisions. Language is another potentially important pull factor influencing the country of choice for cross-border education. This may be an explanation of the high intra-regional flows. A common language may be one of the reasons for the increasing share of intra-regional flows within the Arab region. The increasing flow of cross-border students to English-speaking countries such as the USA, the UK and Australia may be attributable to language familiarity, therefore to take advantage of the increasing international market for cross-border education; many non-English speaking countries have started offering courses in English (Varghese, 2008). Another pull factor that influences students' choice of a particular host country may be the profile and the reputation of the country's higher education institutions where the student is seeking to study (Kinnell, 1989). The more students believe in the high reputation of a country's higher education sector, the more likely they will select it as their study destination. Another reason why the US is so popular as a host country and in attracting foreign students is the knowledge people all over the world have of the US through country's domination of media and news (Mazzarol et al, 2002). Students in general move from countries where the education system is less developed to countries where education system is more developed. This may be due to the perception that the quality of higher education studies offered in more developed countries is superior to what is offered in the country of origin. Universities in the USA and

UK occupy top positions in global ranking, which encourages many to apply to American and British universities. Research by Li and Bray (2007) suggested that the main reason for Chinese students to seek higher education in Hong Kong was because the quality of higher education in Hong Kong was believed to be more superior (Varghese, 2008). Similarly, European students favour OECD countries for cross-border higher education. Erasmus and Socrates programmes have been successful in promoting student mobility within the European countries. A survey of former Erasmus students on the benefits of the programme indicated that "students valued highest the linguistic competency they acquired and cultural familiarity they experienced during the cross-border education" (Varghese, 2008, p. 24). Varghese (2008, p.24) considered programmes of studying abroad prestigious primarily because "they enhance one's academic credentials, offer better-paid employment opportunities and provide entry to influential professional networks." Due to liberalization policies, many developing countries in the 1990s have attracted high levels of direct foreign investment, and this has raised employment opportunities for well paid jobs in international firms and their partners in the home country. The possibility of staying in the host country after finishing studies is another pull factor influencing cross-border higher education. In this situation, cross-border education turns into an opportunity for professional migration. Many countries have revised their visa rules and changed their immigration policies to attract more foreign students and to encourage them to stay and work in the country of study. A large number of students who went to the USA to follow their studies in science and technology remained there (Varghese, 2008). The pattern of cross border student flows has been studied from various perspectives and using different methodologies. Table 1 provides an overview of previous empirical studies on the determinants of cross border student flows.

Authors	Methodology	No. of countries	Dependent Variable	Independent Variables
Van Bouwel & Veugelers (2010)	Gravity model analysis (OLS)	18 European countries	Student flows between 18 countries	Student population (host and sender), distance, border, shared language, higher education expenditure per student (host), tuition fees (host), educational opportunities (sender), relative impact (host), SR top 200 institutions (host), THES top 200 institutions (host), regional dummies
Bessey (2007)	Gravity model analysis (OLS and Poisson)	From 172 countries to Germany	Student inflows to Germany	Distance, student stock, GDP per capita, population, freedom, landlocked, contiguity
Thissen & Ederveen (2006)	Gravity model analysis (OLS)	19 European countries	Number of students with citizenship i enrolled in an entire educational program in country j	Population, GDP per capita, unemployment, quality difference, tuition difference, linguistic distance, religious distance, cultural distance, physical distance
McMahon (1992)	Multiple regression analysis (Least square analysis)	From 18 developing countries to developed countries and to the USA in particular	The pull model: Percentage of all overseas students from county X in the USA	Comparative economic strength, US trade, US aid, US institutional support
Agarwal & Winkler (1985)	Pooled cross section analysis	From 15 developing countries to the USA	Undergraduate foreign students Postgraduate foreign students	Income, educational opportunity, English speaking, French speaking, probability of adjusting status
Cummings (1984)	Cross sectional Analysis	From 34 Asian countries to the world	Sending level	Population, basic human resources capacity, financial capacity, domestic opportunities, number of students studying overseas in 1973, degree of interdependence, Arab community, linguistic and/or political isolation, politically uncertain countries
Lee & Tan (1984)	Cross sectional Analysis	From 103 countries to USA, UK and France	The flow of less developed country students to developed countries	Excess demand, science-based share, staff-student ratio, real cost per student, per capita income, cost of living, GNP growth rate, colonial links, English language, distance

3. Empirical Analysis

The literature review presented in the previous section established the importance of the pattern of cross-border student flows and the determinants of those flows. The aim of this paper is to investigate the impact of economic factors on student inflows. This section will be organized as follows: first, the data and their limitations will be discussed and second the model will be specified and the empirical strategy explained.

Table 2. Variable Description

	Variables	Labels	Data sources
Dependent	Foreign students as a % of total students in country i for the period t	FS	OECD Education at a Glance
Independent	Participation rate in higher education in country i for the period t	PAR	OECD ¹
	GDP per capita in country i for the period t	GDP	OECD Factbook 2009
	Growth rate of higher education in country i for the period t	GRO	Calculated based on OECD data
	Annual expenditure on educational institutions per student	AEX	OECD Education at a Glance
	English as the main language of tuition (dummy variable)	ED	OECD Education at a Glance
	Country being in EU (dummy variable)	EUD	The EU at a Glance ²

¹ <http://www.oecd-ilibrary.org/oecd/content/table/20755120-table2.jsessionid=21f9d2mtqp2fo.delta>

² http://europa.eu/about-eu/27-member-countries/countries/index_en.htm

3.1. Data

This paper will attempt to answer: What are the determinants of the proportion of foreign students in a country? In order to answer the posed questions a dataset of 26 OECD countries will be analysed for a seven year period. The rationale for using the OECD dataset is because of the large and increasing student inflows to OECD member countries. Countries such as the United Kingdom, the United States and Germany are the three major destination countries of foreign students (OECD, 2009). This investigation is based on country level estimation, using data provided by Organisation for Economic Co-operation and Development (OECD) and Eurostat. The OECD publication *Education at a Glance* reports data on international and foreign students that are acquired from enrolments in their country of destination, while Eurostat provides data on foreign students that are obtained from enrolments in their country of origin. The rest of the data used in this investigation are taken from OECD (see Table 2). Data are provided for seven years, from 2001 to 2007. The justification for using the span of seven years is related to the rapid growth of foreign student flows over that period.

The main limitation of the dataset is the size of the sample which is very small; in particular in terms of cross sections (countries) which is expected to cause problems in the estimation of the models. Another limitation is related to missing observations for certain countries in certain years. By holding the assumption that the data are missing at random, this will reduce the sample size available for the analysis but it will not have any statistical effect, meaning that it does not cause biasness in our estimation, if the assumption is accurate (Wooldridge, 2009).

3.2 Model Specification and the Empirical Strategy

This section analyses student flows to 26 OECD countries¹ for a seven year period, from 2001 to 2007. The dependent variable is the foreign students as a proportion of total student in higher education (FS) in country *i* for the period *t*. It has been transformed to logarithmic form, because this form is commonly used and also usually improves the model specification. The review of empirical literature suggested various factors influencing student's choice for a particular country, but this investigation will focus mainly on economic factors as explanatory variables.

MODEL: $LNFS_{it} = f(PAR_{it}, GDP_{it}, GRO_{it}, AEX_{it}, EUD_{it}, ED_{it})$

Where: *i* denotes countries and *t* denotes time

Participation rate in higher education (PAR) in country *i* for the period *t*, is an explanatory variable that is expected to affect foreign students inflows in a country. It is measured by the first entrants as a percentage of the population in the corresponding age group. The relationship between PAR and student inflows in a country is expected to be

positive, because a high participation rate may indicate more superior educational system in a country, therefore will influence incoming students' choice, other things being equal.

Gross domestic product (GDP) per capita in country *i* for the period *t* is another potential factor influencing the country of choice for cross-border education. GDP per capita is a proxy for the standard of living in a country. A higher GDP per capita indicates better living standards and also implies higher returns to education. Therefore, it is expected to have a positive impact on foreign students in a country, other things being equal. Many studies included this variable in their models and it resulted to have a positive impact on student inflows (Thissen & Ederveen 2006, McMahon, 1992, Lee & Tan, 1984).

Growth rate of higher education (GRO) denoting the growth rate of tertiary student enrolments in country *i* for the period *t* is another explanatory variable that is expected to influence students decision for a host country. It is the rate of change of tertiary student enrolments from one year to another and it is expected to have a positive impact on the proportion of foreign students in a country because, a higher growth rate implies that a country has additional educational capacity for accepting foreign students.

The study by Thissen & Ederveen (2006) suggested that ERASMUS and Socrates programmes stimulated international student mobility within Europe and therefore this led to an increase in these flows over the years. Taking this into consideration, an EU dummy variable (EUD) will be included in the model, taking on the value of one for countries that are members of the European Union and zero for countries that are not members. Considering the increasing foreign student inflows to EU area, this variable is expected to have a positive sign, other things being equal.

English as the main language of tuition (ED) in country *i* for the period *t* is another dummy (binary) variable, which is considered as a potential influencing factor, because foreign students would prefer to be taught in English, other things being equal. Recently, many countries have started to provide courses in English making this estimation more complicated, however this analysis will divide countries into two categories (1 and 0). Countries that offer all or nearly all programmes in English will take the value of 1 and countries that offer some or no programmes in English will take the value of 0.

The cost of higher education is another potentially influencing factor on student inflows in a country. The annual expenditure on educational institutions per student in tertiary education in equivalent USD converted using purchasing power parities (PPP) for GDP, based on full-time equivalents is used as a proxy for the cost of education. Consistent with the previous studies (Lee & Tan, 1984, Van Bouwel & Veugelers 2010), it is expected to have a positive effect on student inflows, because more funds spent on higher education, entail better teachers, better infrastructure and more resources for students, other things being equal.

¹ Australia, Austria, Belgium, Czech Republic, Denmark, Finland, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Mexico, Netherlands, New Zealand, Norway, Poland, Slovak Republic, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States

4. Econometric Estimation and Interpretation of the Results

In order to explore the model mentioned above we will use econometric analysis. Taking into consideration the dataset features a more appropriate methodology of estimation will be panel data analysis.

Dynamic modelling is a very common method when analysing panel data and it introduces the effect of the past or the history by including lagged values of the dependent variable. There are economic reasons for including the past in this regression analysis, considering that most students are enrolled on multi-year programmes, we would expect a persistent foreign student flow. General Method of Moments (GMM) is generally argued to be the most suitable method for dealing with dynamic panel models because it has two advantages, "it does not require distributional assumptions, like normality and it can allow for heteroskedasticity of unknown form" (Pugh, 2009, p.27). A set of time dummies has been included in the model to eliminate time shocks from the error term.

The regression results suggest that lagged values of foreign students have a highly significant impact on current values, which implies that foreign student flows are persistent through time. It is estimated on average, holding other factors constant that an increase of 1 percent on the previous year's proportion of foreign student increases the proportion of foreign student in the current year by 0.91 percent. This means that the higher the past rate of foreign students in a country, the more new students are willing to choose that country for studying purposes because that may indicate good reputation and high quality of higher education in that country. Other explanations may be that students are enrolled on multi-year programmes, their drop-out rates are low, and also lowering of information costs might be a potential influencing factor. Similarly, the growth rate of higher education seems to have a positive and significant (at 5% significance level) impact on the proportion of foreign students in a country. An increase of 1 percentage points on growth rate of student enrolments in a host country increases the proportion of foreign students in that country by 0.3 percent, all other things held constant. This result is the as expected considering that a higher growth rate in domestic higher education students in a country implies higher capacity of educational institutions on accepting foreign students, therefore students are more

willing to go and study in that country, holding other things constant. However, the estimated results should be only considered as suggestive due to estimation problems caused by both international and domestic students being included in the growth rate, and also because of missing values generated through the calculation of the percentage changes from one year to another.

Besides these two variables, all other explanatory variables are not statistically different from zero, for that reason we can make inference from the sign of their coefficients but not about their magnitudes. Participation rate in higher education resulted to have a negative sign, which is contrary to our expectations. Even though the rationale for including this variable in our estimation was to measure the impact of domestic participation rates on international student inflows, data on participation rate adjusted for international students could not be obtained, implying that countries that have a very large proportion of international students such as New Zealand and Australia may distort the relationship between participation rate and the depended variable, which makes these results only suggestive. The regression results suggest that the coefficient of GDP per capita has a positive sign as expected and consistent with previous research on this area of study. A high GDP per capita may indicate high post-graduation earnings in that country, but on the other side it also may indicate high cost of living as a student in that country. However considering the nature of our panel data set, OECD countries in general have a high standard of living, measured by GDP per capita, therefore it is not surprising that it does not have a strong impact on students' decision. The coefficients of EU and English dummy variables resulted to have positive signs, which is as expected and consistent with the previous studies. It was expected that students prefer to be taught in English and also to undertake higher education in EU member country, considering that intra-EU student mobility is encouraged through EU funding.

On the other hand the coefficient of annual expenditure on educational institutions per student, as a proxy of the cost of higher education was negative. This is contrary to our expectations, because the more a country invests in education, the better quality of teaching can be offered to students. However, an explanation for this may be that OECD countries in general have a superior educational

Model:

$$Lnfs_{i,t} = \alpha + \beta_1 Ln fs_{i,t-1} + \beta_2 PAR_{i,t} + \beta_3 GDP_{i,t} + \beta_4 GRO_{i,t} + \beta_5 EU_{i,t} + \beta_5 EUD_{i,t} + \beta_7 AEX_{i,t} + \beta_8 TD_t + u_{i,t}$$

Table 3. Estimated Results for Model 1¹

Variables	Coefficients
Dependent Variable: Foreign students as % of total students (LNFS)	
LNFS1 std. errors p-value	0.919*** [0.065] (0.000)
PAR std. errors p-value	-0.001 [0.003] (0.710)
GDP std. errors p-value	0.00001 [0.00002] (0.506)
GRO std. errors p-value	0.003** [0.001] (0.018)
EUD std. errors p-value	0.035 [0.048] (0.462)
ED std. errors p-value	0.099 [0.639] (0.876)
AEX std. errors p-value	-0.000006 [0.00001] (0.730)
DU2002 std. errors p-value	0.034 [0.095] (0.723)
DU2003 std. errors p-value	0.041 [0.091] (0.648)
DU2004 std. errors p-value	-0.008 [0.054] (0.884)
DU2005 std. errors p-value	0.037 [0.041] (0.363)
Constant std. errors p-value	-0.149 [0.657] (0.820)
Observations Instruments	119 24
(***) Significant at 1% significance level (**) Significant at 5% significance level	

system. Also, the missing data on the annual expenditure might have distorted the results. In addition to all other variables, time dummies appeared to have positive coefficients with the exception of year 2004 but not statistically different from zero. The rationale for including time dummies was to eliminate time shocks from the unobserved part of the regression.

5. Conclusions and Recommendation

The increasing number of foreign students and the increasing returns to higher education have emphasised the importance of foreign student flows between countries. Many studies have explored the determinants of foreign student mobility; hence, to extend this exploration further, we used panel data analysis to investigate to what extent economic factors can explain foreign student flows. The results of this investigation indicate that the major and the most significant determinant of the proportion of foreign students in a country is the previous year's proportion of foreign student in that country. Considering that students are enrolled on multi-year programmes and that their drop-out rates are low, this persistent effect was expected. The growth rate of higher education appear to have a positive and significant (at 5 % significance level) impact on the proportion of foreign students. This result was as expected because a higher growth rate in student enrolments indicates higher educational capacities of a country on enrolling foreign students. We have found no evidence of the effects of GDP per capita, participation rate, cost of higher education, EU dummy and English dummy on the proportion of foreign students in a country. In conclusion, these findings can be considered only suggestive due to: our small panel dataset; missing measures of some potentially important "pull" factors and estimation problems. A bigger panel sample that includes more potential influencing factors suggested by the theory might have improved the estimated results. Therefore an investigation taking into account the above suggestions should be considered in the future.

Taking into account the increasing importance of higher education, in terms of education and other development policies, the cross-border higher education has created new challenges for policymakers. Immigration and visa policies play a substantial role on attracting foreign students to a country; therefore their absence from our models may be a further factor accounting for our results. If foreign students are expected to pay tuition fees, than a country should permit students to work during their studies in order to encourage them to come to that country. Additionally, migration policies and strategies pursued by host countries are becoming increasingly related to the pattern of cross-border higher education. Therefore, these migration strategies should facilitate the permanent residence of foreign students after their studies. Many countries already started to work in this aspect because retaining foreign students is a key target for policymakers to satisfy the increasing demand for highly skilled workers (IOM, 2008).

¹ See appendix (C-2)

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