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Education a Good Way to Reduce
Brain Drain? Evidences from
Australia**

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Is Transnational Higher Education a Good Way to Reduce Brain Drain? Evidences from Australia¹

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Abstract

In the last few decades, the higher education sector of many countries has experienced a significant process of Internationalization, which includes not only the physical mobility of students, but also the “offshore” provision of educational services. If the motivation of home institutions is to expand recruitments, the principal motivation for governments opening their higher education market to foreign providers is to increase enrolment in higher education in the country and, in this way, retain student outflow and the potential consequent brain drain. The role of transnational education as a way to decrease skilled emigration from one country is however far from clear. Despite the interest devoted to the phenomenon of skilled migration by policymakers and scholars, and the continuous increase of transnational education, the relationship between these two phenomena has not been empirically investigated yet. This paper provides a first step in the exploration of this issue using aggregate-level data on offshore enrolments in Australian universities and skilled immigration to Australia.

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Introduction

Commonly known as brain drain, skilled migration has been considered a major issue since the Sixties because of the crucial importance of skilled people for the socioeconomic development of a country. In the last fifteen years, after a period of absence in the scholars' and policymakers' agenda, the topic has received renewed attention. The reasons for this interest are connected to the concern of developed countries in recruiting skilled people from abroad in order to deal with the dramatic fall in fertility rates they are experiencing. Whereas the traditional skilled migration's source countries still try to fight against the problem of brain drain, the OECD countries increasingly implement immigration policies to attract young skilled professionals from abroad in order to satisfy their labor market needs and to assure their welfare state sustainability.

In this context, International students are increasingly considered a worthwhile source of highly skilled, potential immigrants to the countries where they have studied. In fact, host-country employers benefit from several advantages when recruiting ex-International students: they have recognizable qualifications from familiar educational entities, they are already integrated into the host society, they know the language they have already established social ties. It is because of these reasons that several OECD countries have eased their immigration policies to allow for International students to remain in the host country after having completed their studies, as well as measures to increasingly attract students from abroad. To further expand recruitment, several higher education institutions of some OECD countries have started to offer educational services 'offshore', i.e. out of their borders, through the establishment of branch campuses and/or the offering of programs in other countries. To these OECD countries, the supply of transnational education services represents an easy way to grow enrolment "while avoiding home campus capacity constraints" (Ziguras, 2008: 5). In comparison, the countries that have opened their markets to foreign institutions aim to satisfy the demand of higher education that "is not being met by existing local providers" and to enhance their higher education system's quality (Wilkins & Huisman, 2011: 300-301) in order to increase tertiary enrolment, to become themselves a destination country for International students and to lower their rates of skilled emigration.

To the extent that student mobility can, in a certain sense, constitute the germ of skilled migration, it is interesting to investigate if and how these recent developments in the higher education industry may reshape the current scenario of skilled migration. This study explores the relationship between transnational higher education and skilled migration, using data on the Australian case.

The paper is organized as follows: Section 2 offers a brief literature review, Section 3 focuses on the methodology and on the data used for the analysis, and Section 4 offers some descriptive evidence. The last section presents and discusses the results.

Theoretical Background

Determinants of Skilled Migration

Although literature on skilled migration has mainly developed on establishing the impact of this type of migration in the countries of origin, several studies have also focused on the determinants of skilled migration. Studies conducted on the so-called “human capital framework” (Sjaastad, 1962) predict that an individual emigrates after having considered costs and benefits. Costs related to migration are normally calculated considering the geographical distance between countries of origin and destination, but also colony links and linguistic proximity, which mean better knowledge of the destination country and its culture and better chances of finding a job.

One theory that helps explain why migration continues to take place is based on migration networks, i.e. the contacts between migrants, former migrants, and non-migrants (Massey et al., 1993). According to this theory, the network is in charge of forwarding all types of useful information about opportunities and changes in the legal framework of the country of destination, but it also materially helps the migrant after the migration is realized (Hatton, 2003; Mitchell & Pain, 2003; Clark et al., 2002; Pedersen et al., 2004). This explains also why new migrants tend to immigrate to destinations where there are already a lot of migrants coming from their countries of origin (Beine et al., 2011; Bertoli, 2010).

Some authors have explained the growth of skilled migration by pointing to the changes of immigration policies introduced in the main countries of destination, which are increasingly selective and favor skilled workers (Abella, 2006; Taran, 2007; Zeugin & Van Dok, 2007). Nevertheless, it could be deduced that the impact of selective immigration policies on the individual’s decision to emigrate is directly bound to the possibility of obtaining information on the visas’ opportunities and on the job market of the main countries of destination. Moreover, as Brücker et al. (2012) suppose, the admission of talented workers may not be enough to attract them, because the volume of skilled migration is not determined solely by the demand. The fact that the variation is so dissimilar among different countries of origin suggests that the main determinants of this variance could be precisely related to differences between countries of origin.

Higher Education and Skilled Migration

The degradation of the higher education system in many developing countries has been generally identified as one of the main “push factors” leading people to emigrate (Agarwal & Winkler, 1985; McMahon, 1992; Mazzarol & Soutar, 2002: 82).

Research has also shown that one of the main motives for permanent expatriation is the fact of having enrolled in higher education abroad. In their analysis on the flow and migration of students, Dreher & Poutvaara (2005) demonstrate how the number of foreign students studying in the United States in 2004 is a good predictor of skilled immigration. Similarly, Rosenzweig

(2008) notes how International students are likely to stay in the host country to work after having completed their studies.

Studies on the causes of non-return of many International students has connected the non-return of ex-International students with the problem of “second acculturation”, i.e. the difficulty many ex-International students have readapting themselves to the home culture after having spent many years abroad (Viguier, 1966). More recently, Coulon and Paivandi (2003: 45) have argued that International students often leave the home country with a “residential strategy”: they study abroad in order to stay there afterwards.

Many traditional origin countries of skilled migrants have opened their educational market to foreign providers, in order to enhance its quality, “to satisfy the demand for higher education not being met by existing local providers” (Wilkins & Huisman, 2011: 300-301). In this way, they also seek to create new job opportunities and a more stimulating academic environment in order to discourage skilled emigration. According to Kapur and Crowley (2008: 28-29) transnational higher education may promote the retention of home country students, who would have otherwise gone overseas and “spent money there” with clear benefits for the country of origin. If this is the case, transnational education could decrease both student emigration and the loss of skills that could result from it. In comparison, Nussbaum and Mollis (2007) argue that people trained within a foreign institution will be more projected in a foreign context, thus easily attracted by the perspective to emigrate. According to Venturini (2012: 304) “the foreign student programs implemented by the U.S., Canada, Australia and the U.K., favour the creation of educated workers that are somewhat connected - at least through knowledge of the language-, to the country where they studied”. This, paired with their selective immigration policies, would increase skilled immigration. This kind of logic could certainly be applied to foreign offshore education, as well.

If we look at the perspective of higher education institutions in developed countries, opening campuses and programs offshore, it seems that more than to retain potential International students in the home countries, transnational education is implemented as a way to expand enrolments. If this is the case, it is possible that their presence in a country may increase the total number of skilled emigrants because it expands the volume of people exposed to a foreign educational experience. In turn, this creates ideological and structural connections with the country that provides the education, and this may influence future decision-making and motivations.

Methodology and Data

Estimation Strategy

In its most elementary form, the gravity equation for International migration can be expressed as

$$migr_{ij} = K \frac{O_i^{\beta_1} D_j^{\beta_2}}{dist_{ij}^{\beta_3}}$$

where K is a proportionality constant, O_i is a function of income and population size of the country of origin, D_j is a function of income and population in the country of destination, whereas $dist_{ij}$ indicates the distance between them. This basic model is often augmented to include other variables that could promote or hinder migration.

The empirical analysis of the relationship of interest of this paper can be considered an augmented version of the gravity equation. “Skilled immigration” is defined as the immigration of people who have already completed at least some tertiary education outside of Australia. The originality of the model is the introduction of an explanatory variable, which measures the enrolment in Australian higher education institutions offshore. This variable indicates the number of students enrolled one year before the year of observation of the dependent variable. A time (at least one year) might actually elapse so that the observed values of this explanatory variable could result in a change in the dependent variable. From the total enrolment, the data I use will permit me to exclude first year students, because it is unlikely that would be eligible for a visa based on skill only one year after commencing their studies.

The model contains some controls, inspired by previous research. Following the example of Dreher and Poutvaara (2005), I consider the source country’s GDP per capita relative to the GDP per capita in Australia in order to capture expected improvements in the income of immigrants. To control for demographic changes and inspired by Pedersen et al. (2004), I will introduce population ratio, i.e. the population in the source country (i) divided by population in destination country (j). A variable measuring ethnic fractionalization will also be introduced, because it may cause emigration if it provokes conflicts. In one model, I will add a control for political stability. In line with the gravity equation approach, the model also contains variables, which influence the cost of student mobility: “geographical distance” between countries of origin and Australia, and “skilled network at destination”, i.e. the stock of migrants with a post-secondary education in Australia in 2000.

The gravity equation is estimated here using the Poisson Pseudo-Maximum Likelihood (PPML) as the more recent developments in the literature have pointed out (Santos Silva & Tenreyro, 2006). The log-linearized version of the estimation is also provided for the sake of completeness.

Data Sources

The data for the analyses were assembled from various sources and cover the time period between 2002 and 2011. As I consider one of the explanatory variables in $t-1$, the empirical analysis concerns only 9 years, starting with the year 2003. As countries of origin, I considered every country of the world with

the exception of New Zealand, because its citizens are not counted in the data on visas granted.

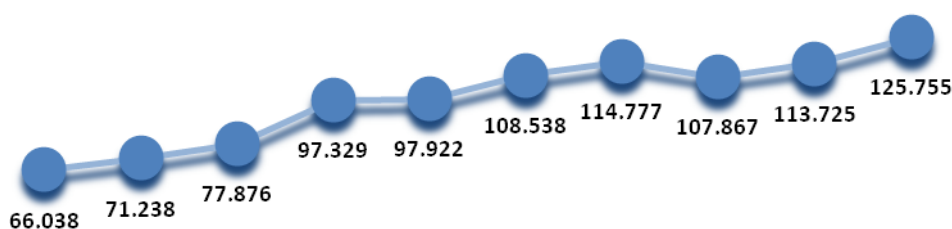
Data on skilled immigration to Australia are provided by the Australian Department of Immigration and Citizenship (DIAC) and concern skilled visas granted offshore. Counting only visas granted offshore can be considered a very accurate measure of skilled immigration because it excludes students already living in Australia, who may change status from a student visa to a skilled migrant visa onshore. In this way, it is ensured that the individuals counted are already “skilled” before they enter Australia and that they were not living there when the visa was granted.

Data on enrolment in Australian higher education institutions are provided by the Australian Department of Industry, Innovation, Science, Research and Tertiary Education. Concerning the other variables, I use the ethnic fractionalization indicator taken from Alesina *et al.* (2003). Data on GDP per capita and population come from the World Bank Development Indicators. Information on geographical distances comes from the CEPII dataset, while data on skilled migrants’ stocks in Australia in 2000 are taken from Defoort (2008). The variable on political stability is taken from the dataset by Kaufmann *et al.* (2010).

Descriptive Evidence

The annual inflow of skilled migrants to Australia has increased in a remarkable manner during the last decade. The total number of skilled visas granted (both offshore and onshore) has nearly doubled from 2002/2003 to 2011/2012.

Figure 1. Total Skilled visa grants from 2002-2003 to 2011-2012



Source: Self elaboration using data from DIAC, December 2012.

Considering only visas granted offshore in the considered decade, the United Kingdom has consistently sent the most skilled migrants to Australia every year. The majority of countries are then Asiatic countries. In ten years, only 16 countries are present in this top-ten list, suggesting a high impact of time-invariant characteristics in shaping skilled migration flows. Therefore, an

analysis on changes within the same country seems more interesting than an analysis of the differences between countries.

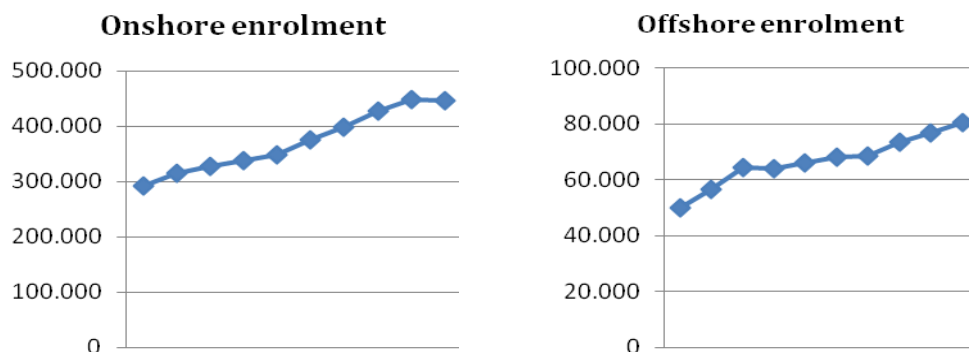
The presence of Australian transnational education is particularly important in Asia, the continent with the largest supply of transnational higher education. According to Huang (2007: 426-427), the role of transnational education varies according to the differing legal arrangements it has in the different Asian countries. Australia recognizes the qualifications delivered offshore as Australian degrees or diploma. This is quite important because, since 1998, immigrants who have an Australian degree received five extra-points in the point systems (Hawthorne, 2005). People who decide to study in an Australian transnational program or degree obtain, in a majority of cases, a degree which is part of their national higher education system, but also recognized by the Australian government, which could make the option of emigrating after completing the degree easier (Hawthorne, 2005).

The whole period considered, only in 14.82% of the observations in the total sample the countries were offering any Australian transnational education, but in 76.26% of cases there were some enrolments in Australian higher education offshore. This may mean that a sizeable portion of individuals attending Australian higher education offshore was enrolled in a country different to its origin country.

In 2011, there were 332.577 international students in Australian higher education institutions. Of these, 80.458 were enrolled offshore in campuses overseas. This represented 24.2% of all higher education international students. The majority of students enrolled in Australian higher education study at an undergraduate level, particularly if enrolled offshore (more than 70%). This suggests that a portion of students who obtain undergraduate higher education offshore may then move to Australia to attend postgraduate programs onshore. This supposition seems to be reinforced by the fact that the majority of offshore international students are normally younger than onshore students. According to a research snapshot issued by the Australian Government (2009), in 2011, for example, the majority of offshore students were aged between 19 and 22, whereas onshore international students tended to be slightly older.

For a descriptive purpose, checking if the increase in offshore enrolment corresponds to a decrease in onshore enrolment is noteworthy. In fact, if the people who attend offshore higher education are the same ones who would emigrate to study directly in Australia, an augmentation of offshore enrolment has to correspond broadly to a decrease in onshore enrolment. If they are only delaying their migration decision, the number of enrolment onshore should remain stable.

Figure 2. Total Enrolment in Australian Higher Education Institution (onshore and offshore), 2002-2011



Note: It excludes enrolment of students born in Australia.

Source: Self elaboration based on Selected Higher Education Statistics, Australia Department of Industry, Innovation, Science, Research and Tertiary Education.

However, as figure 2 shows, in the period between 2002 and 2011, both offshore and onshore enrolment in Australian institutions have augmented.

Results and Discussion

Table 1 reports the results of the PPML estimations. The stock of students enrolled in Australian higher education institutions offshore in $t-1$ is found to have a positive and significant impact on the inflows of skilled migrants to Australia, confirming the main hypothesis of this article. The results also suggest that migration increases with the GDP in the sending countries. The PPML model predicts that the larger the population in the source country relative to the population in Australia is, the lower the skilled migration to Australia. This result is in line with the recent findings of Beine *et al.* (2008) and Docquier and Rapoport (2011), which show that small states are more open than large countries. This result is, however, never significant. Political stability seems to also be positively related to skilled migration (but it is not significant). At first, this result can be surprising, because previous literature has often demonstrated an inverse tendency (Dreher & Poutvaara, 2005). However, the dependent variable in the majority of studies on skilled migration considered “skilled migrants” in general, including in the estimated amount of ex-International students that obtained their qualifications in the destination country. In this research, the dependent variable is dependent on the number of skilled visas granted offshore. Hence, my analysis only includes individuals that have already obtained their academic degrees before to immigrating to Australia. Individuals coming from politically unstable countries may emigrate before to start studying to escape political unrest or because there are no suitable educational opportunities in the origin country due to the political instability itself. Recently, Bessey (2011) also found a significantly positive relationship between political freedom and student migration. She motivated

this finding by arguing that countries experiencing instability may restrict citizens' mobility, lowering their outflow.

Table 1. PPML Estimations

	(1)	(2)
Total offshore enrolment in Australian higher education (excluding first year students) in t-1 (log)	0.190** (0.07)	0.346* (0.15)
Population ratio (log)	-2.313 (2.33)	-1.321 (1.83)
GDP ratio (log)	0.039*** (0.01)	0.054** (0.02)
Political stability (log)		0.42 (0.07)
N. Observations	806	339

***, **, * denote 1%, 5% and 10% significance levels respectively
Robust Standard errors are indicated in parentheses.

For the sake of completeness, I also provide a log-log version of the estimations. This approach represented the standard way of dealing with gravity equations. I run two panel data regressions with fixed effects (FE) using the natural logarithm of total offshore visas granted in the first regression and of total offshore visas granted +1 as the dependent variable (as a common way to deal with many zero values on the dependent variable) in the second one (table 2; columns 1 and 2).

Table 2. Panel Data Analysis

	(1) log	(2) log	(3) log +1	(4) log +1
Total offshore enrolment in Australian universities (excluding first year students) in t-1 (log)	0.146*** (0.02)	0.164*** (0.02)	0.157*** (0.03)	0.189*** (0.02)
Population ratio (log)	-0.895* (0.38)	0.278*** (0.06)	-0.379 (0.36)	0.216*** (0.06)
GDP ratio (log)	0.026** (0.01)	0.026*** (0.01)	0.024** (0.01)	0.028*** (0.01)
Skilled network (log)		0.508*** (0.05)		0.577*** (0.05)
Distance (log)		-0.257 (0.27)		-0.121 (0.25)
Ethnic Fractionalization (log)		-0.023 (0.12)		-0.034 (0.11)
Constant	3.356*** (0.15)	1.903 (2.69)	2.788*** (0.24)	-0.110 (2.47)
Breusch-Pagan Test:				
Value of chi-squared		1597.11		1771.74
Prob.		0.0000		0.0000
Hausman Test:				
Value of chi-squared		18.83		38.28
Prob.		0.0003		0.0000
N. Observations	733	733	887	887

***, **, * denote 1%, 5% and 10% significance levels respectively
Standard errors are indicated in parentheses.

The results of the FE model confirm the findings of the PPML model. The number of visas granted offshore to skilled individuals to enter Australia is positively and significantly (in these models, at 1% level) related to the number of students enrolled in Australian offshore higher education (excluding first year students) in the previous year.

Although I am mainly interested in changes within countries, and FE models are preferred when investigating this kind of issue, I provide the panel data estimations with random effects (RE) for descriptive purposes. This can be regarded as an additional sensitivity analysis permitting the verification of the impact of time-invariant variables, and giving the opportunity to compare the results with those obtained with FE and with those of previous literature on the topic (table 2). The results obtained for the variables enrolment in transnational education and GDP ratio are quite robust through the different forms of estimations. Only the variable which measures population pressure changes sign and becomes significant in the RE models. Concerning time-variant variables, as expected, geographical distance lowered skilled immigration to Australia (but the coefficient is not significant), whereas the stock of skilled migrants already living in the destination country is significantly related to the dependent variable, with a highly significant coefficient. As the result on political stability above, the result (not significant) according to which ethnic fractionalization lowers skilled migration can be explained by the fact that in countries where ethnic discrimination is very high, discriminated people do not have access to higher education and therefore emigrate before studying.

The Breusch-Pagan Test reveals that there is unobservable heterogeneity: the chi-square test statistics is 1597.11 for the model with the log of the dependent variable and 1771.74 in both cases with a P-value of 0.000 indicate that I must reject the null hypothesis of no panel effects. For the sake of robustness, I run a Hausman test (1978) to verify the appropriateness of a FE model for the estimation. In both cases (with log and log+1) the Hausman statistic let me reject the null hypothesis and confirms that the FE specification is the more suitable.

The results of the various estimations that were carried out show a clear close link between skilled immigration and offshore enrolment in Australian higher education in the previous year. These findings suggest that developed countries can successfully use the provision of higher education offshore to enlarge skilled migrants' recruitment. In comparison, it seems that countries that open their educational market to foreign providers should be aware of the possible impact of this choice to their own skilled individuals' outflows. This analysis shows that transnational education does not appear to be a good way of reducing brain drain. However, further research on the topic is needed.

Surely, the study of only one case as a destination country allows for generalizations. Moreover, micro-level information on people attending this kind of offshore higher education institution would be very useful when comparing them with International mobile students who emigrate to study onshore, in order to understand more clearly if it is about two similar types of clientele or if developed countries' higher education institutions are reaching

another segment of students with transnational provision. In the absence of such micro-level data, this paper can be considered a first step in the exploration of an issue of particular importance for both developed and developing countries.

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