International Student Movements and the Effects of Barriers to Trade in Higher Education Services

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Abstract :
As with many others activities, higher education is undergoing rapid globalisation. It is increasingly also the subject of trade negotiations, both under the General Agreement on Trade in Services (GATS), and in various preferential trade agreements. Yet little is known empirically about what drives trade in higher education services, and even less is known empirically about the role of barriers to that trade. This paper offers contributions on both fronts. It develops and tests a model of international student movements, recognising that higher education in many countries is price-controlled and entry is typically subject to non-price rationing. It investigates the role of trade barriers, and finds significant effects for barriers in both the sending and receiving countries, which in turn are distorting the methods of service delivery. It explores the policy implications, finding that barriers in the receiving country appear not to be covered by the GATS. In addition, the GATS framework appears relatively poorly placed to deal with barriers to the growing trade in higher education delivered via the mobility of programs, providers or projects, rather than students. The paper also explores areas for further research.

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1 Introduction

As with many others activities, higher education is undergoing rapid globalisation. A recent OECD report documents the following trends (OECD 2007). The first is a shift from student mobility to program and provider mobility. The number of students seeking education in foreign countries is still increasing, and is by far the most important method by which higher education services are traded. But increasing emphasis is being placed on delivering foreign academic courses, programs and projects to students in their home country. The second trend is a shift from development cooperation to competitive commerce, or from 'aid to trade'.

The same OECD report notes that the number of foreign students in OECD countries has more than tripled in the last 25 years to 2.3 million in 2004. This represented about 85 per cent of the world's foreign students in that year. Conversely, about 66 per cent of the foreign students studying in OECD countries in 2004 were from outside the OECD area. Asia accounted for about half of those (48 per cent), followed by Europe (27 per cent), Africa (12 per cent), South America (7 per cent), North America (4 per cent) and Oceania (1 per cent). Thus student mobility appears to be truly universal.

The OECD report also notes that the bulk of cross-border post-secondary education delivered through program and institution mobility occurs in the Asia-Pacific region. Singapore, Malaysia and Hong Kong are probably the main importers of cross-border education through institution and program mobility. This type of activity is also increasingly being developed in mainland China, which reported a nine-fold increase between 1995 and 2003 in such programs, all offered in cooperation with local institutions (as required by Chinese legislation). Just over a third of these were at the post-secondary level. Lasanowski and Verbik (2007) report how, by importing institutions and programs, these countries are becoming emerging contenders to export higher education services via the inward movement of foreign students.

Despite the size of, and growth in, international student movements, some commentators argue that there is significant unmet demand:

> Since Yr 2000 there has in reality been very little cross border trade in higher education, despite the hype that exists in the press and in the many OECD countries that compete in similar markets and have become more reliant on the income they earn from foreign students than was the case in past decades. Today barely 2.5 per cent of global tertiary enrolments are students that enrol in foreign universities — and although this number continues to grow, it is very small when one considers the unmet supply and demand that exists in the global higher education sector. (Perkinson 2006, p. 16)

But the growth of program and institution mobility raises the question of whether this is not a more efficient method of trade than via international student movements. It also raises the question of whether the various, and numerous, regulatory barriers to trade in higher education services are skewing service delivery away from more efficient methods. If this is the case, then international negotiations on barriers to trade in higher education services, such as those occurring under the General Agreement on Trade in Services (GATS) as part of the Doha Round, provide a way of redressing the problem.

However, little is known empirically about what drives trade in higher education services, and even less is known empirically about the role of barriers to that trade. Without such empirical insights, trade negotiators have little basis for prioritising their negotiating efforts. This paper offers contributions on both fronts. It develops and tests a model of international student movements, recognising that higher education in many countries is price-controlled and entry is typically subject to non-price rationing. It investigates the role of trade barriers, and finds significant effects for barriers in both the sending and receiving countries, which in turn are distorting the methods of service delivery. It explores the policy implications, finding that barriers in the receiving country appear not to be covered by the GATS. It also explores areas for further research.

The next section summarises the empirical work on barriers to services trade to date, and discusses why trade in higher education services is different. The third section develops the model of international student movements, and compares it to others found in the literature. The fourth section tests the model empirically, and investigates the role of trade barriers, while the concluding section draws out policy implications and areas for further study.

2 Services trade and barriers to that trade

Services are often delivered face to face. This means that trade in services often takes place via the movement of people (consumers or individual producers) or capital (service-producing firms).

Firstly, the consumer may move to the producer's economy. This happens with services such as education and health, when the student or patient moves to another economy for education or treatment. In the language of the General Agreement on Trade in Services (GATS) under the WTO, this mode of services trade is called 'consumption abroad', or mode 2.

Alternatively, the producer may move temporarily to the consumer's economy. This also happens in education, where teachers move to another economy to teach short courses. It is also very common for professionals to travel temporarily to the economy into which

they are delivering professional services. In the language of the GATS, this mode of service delivery is called the 'movement of natural persons' (to distinguish it from the movement of corporate or other legal entities), or mode 4.

Many other services are delivered to other economies via 'commercial presence'. In banking and telecommunications, for example, it is common for companies to set up a permanent corporate presence in another economy and to make their sales from their foreign affiliate. Universities may also establish off-shore campuses. The GATS also recognises commercial presence, or mode 3, as a mode of services delivery.

Finally, services may be traded 'cross-border', at arms length rather than face to face. Services are typically intangible, so that the internet is an important vehicle for such cross-border trade. Distance education and program mobility is one example. So too is internet banking. This is GATS mode 1.

With services traded via the movement of people or capital, the transaction typically occurs behind the border. Even when cross-border trade takes place via the internet, it is not easily observed by customs officials. So services transactions are not amenable to tariff protection. Instead, services trade barriers are typically behind-the-border, non-price regulatory measures.

Since services trade barriers typically operate behind the border, measurement has generally been on some behind-the-border measure of economic performance. Papers that have quantified the effects of regulatory barriers to services trade include Barth, Caprio, and Levine (2004), Boylaud and Nicoletti (2000), Claessens, Demirgüç-Kunt and Huizinga (2001), Clark, Dollar and Micco (2004), Doove et al. (2001), Fink, Mattoo and Neagu (2001), Fink, Mattoo and Rathindran (2002), Gonenc and Nicoletti (2000), Kalirajan (2000), Kalirajan et al. (2000), Kang (2000), Nguyen-Hong (2000), Steiner (2000) and Warren (2000). The literature is summarised and some of the methodological issues canvassed in Dee (2005).

For most of the services trade barriers studied, the predominant mode of service delivery has been via the movement of *producers*:

- through foreign direct investment (banking, distribution, electricity generation, professions, telecommunications); or
- through the temporary movement of individual producers (professions).

Accordingly, most measurement work has concentrated on supply-side effects, behind the border, within the importing country.

In that context, a key issue has been whether the trade barriers create rents (raise markups), or raise real resource costs. The welfare costs of the latter can exceed that of the former by a considerable margin, even of the 'height' of the trade barriers is the same — compare the shaded areas in Figures 1a and 1b.

Theory can provide some guidance on whether barriers are rent-creating or cost-escalating. Rents are likely to be created by quantitative and other barriers that limit entry (or exit, though this is far less common). Some red-tape measures may add to resource costs. There are also many ways in which rents can be dissipated or capitalised. So non-tariff barriers that may once have been rent-creating for the initial incumbent become cost-escalating for subsequent incumbents.[1]

The limited empirical evidence tends to accord with this intuition.[2] In banking and telecommunications, where explicit barriers to entry are rife, barriers appear to create rents. In distribution services, where indirect trade restrictions also apply, barriers appear to increase costs. In air passenger transport and the professions, barriers appear to have both effects. And theoretical arguments suggest that barriers in maritime and electricity generation primarily affect costs.[3]

Higher education is different

Higher education is different in at least three respects:

- the main way in which higher education services are traded is via the movement of *consumers* (international students), although as noted in the introduction, delivery via the movement of capital (off-shore campuses) or individual producers (teachers) is gaining ground rapidly, as is cross-border trade (through program mobility, if not distance education);
- some barriers to trade in higher education restrict the movement of consumers, not producers; and
- some barriers to trade in higher education services affect exports, not imports.

The last two points are illustrated in detail in Tables 1 and 2. These tables give illustrative examples of the types of barriers to trade in higher education services that are found in various countries.

[1] For example, Kalirajan (2000) provides indirect evidence that some of the zoning and other restrictions in the wholesale and retail sector have created rents that are subsequently capitalised into the price of commercial land.
[2] Gregan and Johnson (1999), Kalirajan et al. (2000), Kalirajan (2000), Nguyen-Hong (2000), OECD (2005), Copenhagen Economics (2005).
[3] Steiner (2000), Clark, Dollar and Micco (2004).

Table 1 lists barriers to the *import* of education services under two headings:

- limitations on market access;
- derogations from national treatment.

The key distinguishing feature is that derogations from national treatment imply that foreign service providers are discriminated against, vis a vis domestic suppliers. The discrimination may be de facto or de jure (WTO 2001). By contrast, limitations on market access may affect both foreign and domestic suppliers (WTO 2001).

The GATS disciplines on market access do not cover all non-discriminatory measures. Instead, they are limited to six specific types of measures (GATS Article XVI.1 and XVI.2):

- limits on the number of services suppliers;
- limits on the total value of services transactions;
- limits on the total number of service operations or total quantity of service output;
- limitations on the total number of natural persons employed;
- measures that restrict or require specific types of legal entity or joint venture; and
- limitations on the participation of foreign capital.

Thus not all of the restrictions listed in Table 1 would necessarily appear in a country's GATS schedule. The key policy question is whether countries are required to schedule limitations on market access that limit the entry of new domestic or foreign service providers equally, but which do not take one of the above six forms. According to the Guidelines on Scheduling Specific Commitments (WTO 2001), such measures do not have to be scheduled as limitations on market access, but they may be subject to the GATS disciplines on domestic regulation (GATS Article VI.5(a)). According to these disciplines, in those sectors where a country has made specific commitments, qualification requirements and procedures, technical standards and licensing requirements must not interfere with ('nullify or impair') a country's national treatment or market access commitments by failing to be:

- based on objective and transparent criteria, such as competence and the ability to supply the service;
- not more burdensome than necessary to ensure the quality of the service; and
- in the case of licensing procedures, not in themselves a restriction on the supply of the service.

Thus there are some weak legal sanctions on such measures, even if they do not have to be scheduled.

As noted in table 1, a critical barrier to imports of education services is lack of recognition of the foreign qualifications so obtained. In practice, few if any countries have scheduled lack of recognition as a trade barrier (WTO 1998).

Table 2 lists barriers to the *export* of education services. A key policy question is whether these are subject to GATS disciplines. The GATS guidelines again provide some guidance (WTO 2001). They note first that there is no obligation under the GATS for a Member to take measures outside its territorial jurisdiction. They also note that whatever the mode of supply, obligations and commitments under the Agreement relate directly to the treatment of services and service *suppliers*. They only relate to consumers so far as services or services suppliers of other Members are affected. This has implications for measures affecting education exports via mode 2 (consumption abroad), whereby foreign students come to the home country to be educated. Discrimination against those foreign consumers is only relevant if it somehow implies discrimination against foreign suppliers (wherever their location).

As noted in table 2, restrictions typically affect exports delivered via mode 2 (the inward movement of foreign students to take courses locally) and mode 4 (the outward movement of local teachers to deliver courses overseas). These restrictions could have very real effects on trade in education services. But in most cases, they would not have to be scheduled in a country's GATS schedule, because they do not affect the viability of local service *providers* (either domestic institutions or the local campuses of foreign institutions), nor do they adversely affect offshore service providers.

Thus the GATS framework is limited in its ability to deal with barriers to the movement of international students in two important ways — it has no jurisdiction over barriers that are imposed directly on the students themselves, rather than on the service providers, and it provides only weak sanctions over non-discriminatory barriers that affect both domestic and foreign providers of higher education services, but which fall outside of six specific forms. The extent to which these and other barriers affect international student movements is examined in the next sections.

The GATS framework also appears somewhat poorly placed to deal with barriers to the growing trade in higher education delivered via the mobility of programs, providers or projects. The GATS framework encourages negotiators to negotiate 'mode' by 'mode', but many of the new ways of delivering higher education services involve two or more of the GATS 'modes' at once. For example, higher education *programs* may be delivered (through twinning or franchise arrangements) via distance, face-to-face, or some

combination of the two. In some cases the program and qualification will be awarded by the foreign institution but the teaching will be done by a local institution. In other cases, the foreign institution may also be responsible for the teaching. In either case, representatives from the foreign institution are likely to travel on a regular basis to monitor progress. Thus delivery of a single program may involve 'cross-border' trade, 'commercial presence' and the 'temporary movement of people'.

Similarly, *provider* mobility may be temporary, permanent, or some combination of the two. For example, foreign branch campuses may be established on a permanent basis, but staffed partly by individual teachers on temporary transfer from the home country. Mobility of *projects* involves the international sharing of research and curricula. Here the important barriers may be limits on the protection of intellectual property, rather than barriers under the four GATS modes of supply. The extent to which these and other barriers affect the mobility of programs, providers and projects is an area for further research.

3 A model of international student movements

Because some barriers to trade in higher education affect consumers as well as producers, measurement of the effects of those barriers will need to look at both sides of the higher education market.

Higher education markets differ across countries in many respects. But a key characteristic of the Canadian system identified by Finnie and Usher (2006) also applies in many other countries, particularly in Europe and Oceania. This is that tuition levels are regulated, so the allocation of tertiary education places is subject to non-price rationing (Figure 2). So even though some barriers to services trade affect consumers, the observed 'market' outcomes do not reflect pure demand behaviour, but rather the rationing rule — a mixture of demand and supply effects.

The hypothesis on this paper is that rationing in higher education is a mixture of:

- queuing — the number of students from a particular source country studying in a particular destination country is a function of the total length of the queue, and the proportion of places held in that queue by students from that source country; and
- screening — foreign students also have to meet the admissions criteria.

The numbers of foreign students from various source countries in tertiary institutions around the world will reflect these two influences.

The model is necessarily cast in cross-country terms because barriers to services trade vary on a cross-country basis, and a key aim of the paper is to measure the effects of

trade barriers on the movements of foreign students. So part from the influence of trade barriers, the model of higher education needs to be robust and general enough to fit all the countries in a cross-country sample, providing little opportunity for fine-tuning.

In a cross-country context, the queuing effect means that the number of foreign students from a particular source country enrolled in a particular destination country will depend:

- positively on the population of the destination country — if foreign students were scattered randomly about the population centres of the world, this is how the length of the queues would be determined;
- positively on the population in the source country — on the basis of numbers of applications alone, this is how the proportion of queue places held by a particular source country would be determined;
- positively on the GDP per capita of the source country, since richer countries are more likely to be able to meet the tuition and living costs of overseas study;
- positively on the perceived quality of tertiary education the destination country — the literature consistently suggests that this demand effect is very strong (eg Chapman 1979, Murphy 1981, Tierney 1983, Tremblay 2001, Shackleton 2003, Follari 2004, Knight 2005, Perkinson 2006);
- perhaps negatively on the perceived quality of tertiary education in the source country — since this may mean there is less need to go abroad to get a quality education; and
- positively on the ease with which international students can subsequently gain permanent residency or citizenship in their country of study — this demand effect is well-recognised in the policy literature (eg Lasanowski and Verbik 2007), but is typically ignored in empirical work.

The queuing effect will be further moderated by the operation of barriers to trade in higher education services. Accordingly, the number of foreign students from a particular source country enrolled in a particular destination country will depend:

- positively on restrictions on inward FDI (mode 3 imports) in education in the source country — assuming that inward FDI boosts the quantity and/or quality of tertiary education in the source country, so there is less need for students to go abroad (the concluding section discusses how this assumption may be tested directly);
- positively on restrictions on imports via cross-border trade (mode 1) or temporary movement of teachers (mode 4) in the source country — for similar reasons;
- negatively on restrictions on imports by the source country via the outward movement of students (mode 2 imports);

- negatively on restrictions on the inward movement of foreign students in the destination country (mode 2 exports).

The screening effect will depend on the screening criteria, which typically focus on the quality of the student applicants, and the ability of universities to monitor that quality. Accordingly, the number of foreign students from a particular source country enrolled in a particular destination country will depend:

- positively in the perceived quality of the students from the source country (or the feeder institutions from which they come), relative to the quality of the education on offer in the destination country — exporters want good students, but 'beggars can't be choosers';
- negatively on distance — exports often travel extensively to source countries to assess the quality of the feeder institutions and to pre-screen the candidates, and distance affects the costs of doing so.

Thus the final model is that the number of tertiary students from a particular source country enrolled in a particular destination country will depend on (expected signs in parentheses): population at source (+), population at destination (+), distance (-), GDP per capita at source (+), quality at source (+/- but expect +, ie the screening effect will dominate the demand effect), quality at destination (+/- but expect +, ie the demand effect will dominate the screening effect), the ease of subsequent migration (+), and measures of trade restrictions at both the source and destination.

Kim (1998) develops a similar estimating equation to test a well-articulated model of student choice involving lifetime optimisation of earnings, but his model differs from the one above because he assumes that the market for higher education clears. This implies that the effect of quality at the destination is non-linear, because as quality goes up, tuition fees go up and eventually the price effect on demand dominates. Furthermore, in his empirical implementation he uses GDP per capita as a proxy for the quality of education, whereas in the above formulation the effect of GDP per capita and the quality of education enter separately.

Raychaudri and De (2007) also posit a similar empirical formulation on an ad hoc basis, and ascribe the effects of trade barriers to unobservable country-specific heterogeneity. In the above formulation, the effects of trade barriers will be tested by reference to explicit information about the regulatory policy regimes in each country.

Banks, Olsen and Pearce (2007) present a forecasting model of foreign student enrolments in which population and income are the only two behavioural determinants. They do not examine the role of trade barriers.

The qualitative literature on foreign student movements also emphasises cultural and linguistic factors as affecting student choice (eg Shackleton 2003, Knight 2005). Kim (1998) tests the possibility that a common language may boost foreign student enrolments, but finds that this factor is barely significant. Tremblay (2001) argues instead that foreign students as a proportion of total domestic enrolments tend to be low when the language of instruction is not widely used, suggesting that the influence of language is a little more indirect. Kim also tests whether a common religion boosts foreign student enrolments. Finally, Perkinson (2006) provides circumstantial evidence that tuition fees do not greatly influence student choices. He cites the study by Follari (2004) that Australia was impacted recently by a currency appreciation plus a 12 per cent annual increase in tuition fees and living costs, but continued to maintain the highest growth of foreign students of all OECD countries. He concludes that foreign students perhaps place higher value on other perceived benefits, such as program relevance, qualifications and career pathways. Furthermore, at least some international students are supported by scholarships, so do not face the tuition costs themselves.

Some of the literature has suggested that distance (or geographic remoteness) affects the demand for higher education (eg Tremblay 2001), whereas the above discussion emphasizes its role in determining the cost of successfully applying screening tests. With universities increasingly marketing themselves over the internet, and also using the internet as a medium of internal communication, it is now far easier than ever before for students to obtain information about individual faculty members and about course structure and content. But admissions mistakes are costly, so universities are increasingly supplementing universal screening tests (such as TOEFL scores, which test ability in English as a second language) with their own investigations into the quality of feeder institutions and the abilities of individual student candidates. With the above formulation, it is impossible to test whether distance does now affect the supply side more than the demand side. But this indeterminacy does not matter for the current purpose, which is primarily to test the role of barriers to trade in higher education.

4 Testing the model

The underlying model above is tested on as big a sample as possible, to test its general validity. It is then re-estimated on a smaller sample of countries for which information on trade barriers is available.

Data

In the full sample, data on numbers of foreign tertiary students are taken from the OECD Online Education Database (available at

http://www.oecd.org/document/54/0,3343,en_2649_33723_38082166_1_1_1_1,00.html) for 93 source and 35 destination country pairs for 2000. This provides a maximum of 3255 observations. Corresponding data on population and GDP per capita are taken from World Development Indicators. The GDP per capita data are measured in constant 2000 US dollars converted using market exchange rates rather than purchasing power parity exchange rates, because market exchange rates determine the purchasing power of foreign students in their destination countries. Distance is measured by the great circle distance between capital cities (available at http://gc.kls2.com).

The underlying model requires data on the quality of tertiary student candidates from the source country and the quality of tertiary educational institutions in the destination country. It is assumed possible to proxy the quality of students in the source country by the quality of the feeder institutions in the source country. Arguably, institutions can be vetted more easily than individual candidates, although as noted above, exporting institutions are increasingly testing the quality of individual candidates as well. The assumption will be problematic if significant numbers of candidates have qualifications from third countries. It has not been possible to test this possibility throughout the full sample. But at Australian National University, a major exporter of higher education services, at least 90 per cent of foreign students have prior qualifications from their home country rather than a third country.

It is also assumed here that the feeder institutions in the source countries are themselves tertiary institutions. If large numbers of foreign students are undergraduates, then their feeder institutions will instead be secondary schools. It is not possible to break the OECD data on student numbers down according to whether they are studying at the undergraduate or post-graduate level. At Australian National University over 2002 to 2006, about half of its foreign students were enrolled at the undergraduate level. However, there is likely to be a reasonably high correlation between the quality of high schools and the quality of tertiary institutions across countries.

When it comes to quality in the destination countries, there is some debate in the literature about what drives demand behaviour more — perceived ‘prestige’, or genuine quality (in terms of measurable outcomes for students once they graduate). Massy (2004) argues strongly that the difference matters for welfare outcomes, because it determines whether greater competition among tertiary institutions promotes internal efficiency, or instead creates ‘an arms race in spending without regard to educational value added’ (p. 31). However, the current purpose is to capture selection processes that occur on both the demand and the supply sides of the market. Even if genuine quality is what students are concerned about, it may not be accurately observed, either by students or by those doing the screening. So measures of prestige may be what both sides of the market use as proxies for quality.

The best known 'beauty pageant' rankings of universities are available only for a subset of countries. The Institute of Higher Education of the Shanghai Jiao Tong University only ranks the top 500 universities, while the Times Higher World University Rankings are only available for the top 200 universities.

This study has used data from the Webometrics ranking of world universities, which ranks 4000 universities and other research related institutions around the world (www.webometrics.info). These rankings are compiled by a group from Centro de Informacion y Documentacion (CONDOC), part of the National Research Council (CSIC), the largest public research body in Spain.

The group uses web searches to compile data on four dimensions of university web activity:

- size — the number of pages recovered from four search engines (Google, Yahoo, Live Search and Exalead);
- visibility — the total number of unique external links received (inlinks) by a university site (as obtained from Yahoo, Live Search and Exalead);
- rich files — the number of rich files on the site (.pdf, .ps, .doc and .ppt files, where these formats were evaluated as being most relevant to academic and publication activities); and
- scholar — Google Scholar provides the number of papers and citations for each academic domain.

The chosen measure of quality for this study is visibility (number of inlinks), since this best measures 'revealed' prestige. There are several reasons for preferring this measure. Some of the other measures are more about web use than quality or prestige. The results from Google Scholar have some obvious anomalies. For example, by this measure the second highest ranked university in the world in July 2007 (behind Harvard) was the Universidad de la Rioja. The Webometrics group themselves give visibility by far the greatest weighting in their overall index, and they note a relatively high correlation between their overall index and other ratings.

The disadvantage of the Webometrics rankings is that they have only been complied since 2004, and the ones used here are for July 2007. This does not match the enrolments, data, which are for 2000. Massy (2004) notes that measures of university prestige are stubbornly stable. Nevertheless, to test the sensitivity of the results, an alternative measure of quality is also tried. This is a standard measure of research 'impact', defined as the number of citations per publication for each country. The citations count in the numerator is the number of references made in articles published in 2003 to articles published in 1999-2001. The publication count in the denominator is the number of

articles published in 1999-2001. Both are available from National Science Board (2006), for 34 of the source countries and 30 of the destination countries in the sample.

For both source and destination countries, therefore, the chosen measure of quality is the visibility ranking of the *top* university in that country. On the demand side, the literature stresses that the top universities are the drawcards (eg Tremblay 2001), although Shackleton (2003) notes that the newer universities are increasingly using systems of quality assurance to compete with the reputations of established schools.

Note that quality and quality ranking numbers have an inverse relationship to each other. So while the framework of the previous section suggests that foreign student enrolments will depend positively on quality at both source and destination, the relationship with the associated quality *rankings* is expected to be negative.

For this paper, it has not been possible to collect detailed information on the ease with which international students can subsequently gain permanent entry into their chosen country of study. Instead, numbers of permanent migrants have been used as a crude indicator of the stringency of immigration policy in each destination country. This measure has several major drawbacks. First, it only measures the stringency of immigration policy generally, and does not capture whether local graduates receive any preferential treatment. Secondly, the stringency of immigration policy generally is highly correlated with the extent to which international students face barriers while they are studying — one of the key determinants of interest in this paper. Hence it is not possible to disentangle the separate influences of the two determinants. Nevertheless, at least some of the regressions reported in this paper use data on inflows of foreign population from the OECD's online database International Migration Data 2007 (available at http://www.oecd.org/document/3/0,3343,en_2649_33729_39336771_1_1_1_1,00.html). This is available only for 24 destination countries, all from the OECD.

The data on trade restrictions are taken from Nguyen-Hong and Wells (2003). This paper uses raw information on regulatory barriers to trade in higher education services, of the type described in tables 1 and 2, complied by IDP Education Australia (2002). Because the detailed information was collected to assist Australian in its trade negotiations, it is regarded as 'sensitive' and the IDP report remains unpublished. However, Nguyen-Hong and Wells (2003) have converted the detailed qualitative information into a number of quantitative indices of barriers to trade, by mode of service delivery and also according to whether the restrictions affect higher education imports or exports. Indices of trade restrictions are available for 19 of the source countries and 12 of the destination countries in the full sample (for a maximum of 228 observations). Most of these are from the Asia-Pacific region. The IDP report was completed in 2002 and the barriers that it reports on

are likely to be those applying in 2000 or 2001, closely matching the time frame of the enrolment data.

The data on trade restrictions are shown in table 3. They show that the countries imposing the greatest restrictions on the outward movement of international students (ie restrictions on importing via consumption abroad) are Vietnam and China, followed by Indonesia and Korea. The countries imposing the greatest restrictions on the inward movement of international students (ie restrictions on exporting via consumption abroad) are Hong Kong, Thailand, Vietnam and Chile. Some countries in the sample impose relatively high barriers on other modes of importing higher education services. Malaysia, India and China impose relatively high barriers on foreign universities establishing campuses in their countries (ie importing via commercial presence). Note that these counties are important sources of international students. China also imposes relatively high barriers on importing cross-border, and on allowing the temporary entry of foreign teachers (ie importing via the movement of people).

Results

Theory provides no guidance on the functional form of the estimating equation outlined in the previous section. It has been estimated using a log linear function form, because this form can provide a good first order approximation to an arbitrary functional form.

For the full sample of 93 source and 35 destination countries, there is no data for either trade barriers or for migration levels (the proxy for the stringency of immigration policy generally). So the first results shown in table 4 are for a smaller sample of 24 destination countries in the OECD for which there is migration data (a maximum of 93x24=2232 observations).[4] The results are from estimating this model in log linear form using OLS estimation.

The coefficients on population at source and destination and on distance are of the expected sign and highly significant. The coefficient on GDP per capita at source is also of the expected sign and significant, but its magnitude is low, given the expectation that higher education is in income-elastic demand. One possibility is that the influence of the

[4] As a sensitivity test, the model was also tested on the full sample, without migration data. In this alternative regression, notable outliers were the numbers of foreign students from Oman, Yemen and Malaysia studying in Jordan. These outliers were controlled for using a dummy variable that took a value 1 if both countries had a clear majority of the population being Islamic (as noted in the CIA World Factbook), and zero otherwise. This was a more limited version of the common religion dummy used by Kim (1998). In the resulting regression, the coefficients of the remaining variables were similar to those in table 4, except that the coefficient of population in the destination country was larger. This is not surprising, since population and migration in the destination country are positively correlated with each other.

rationing mechanism is muting the full operation of this demand effect. In particular, GDP per capita at source and quality ranking at source are correlated with each other, so that the separate effect of each is hard to identify in the sample. Indeed, the coefficient of quality ranking at source is also of the expected sign, but is also small in magnitude and not highly significant. By contrast, the coefficient on quality ranking at destination is of the expected sign, of reasonable magnitude and highly significant, confirming the strength of this demand effect. As expected, the coefficient of migration in the destination country is also highly significant. This seems to confirm the importance of permanent migration as a motivation for international student movements, although it may also reflect that countries with generous immigration policies also have few barriers to international students themselves.

The R-squared of 0.57 indicates a reasonable goodness of fit in this purely cross-sectional context. However, diagnostic tests suggested problems of both heteroskedasticity (despite the inclusion of populations as scale variables), and problems with the functional form. The former problem has been addressed by using robust standard errors for the tests of coefficient significance.

Examination of the pattern of residuals suggests the problem of functional form may be associated with some grouping of observations at near-zero levels of enrolments. So despite the fact that observations with zero enrolments have been dropped from the sample (explaining why the number of observations, at 1938, is less than the maximum possible of 2232), the grouping near zero suggests that some other form of estimation may be more appropriate. The Heckman selection model is an obvious candidate.

The Heckman selection model recognises that the influence of at least some screening variables is not likely to be continuous. Instead, these screening variables set a minimum acceptable standard, and only those observations that have passed the screening test appear in the sample of data on which the model of student numbers is estimated. The screening variable whose influence may be non-continuous in this way is the rank of the institutions in the source country. When the model was estimated as a Heckman selection model with the rank at source as the relevant sample selection variable, the coefficient estimates and levels of significance were very close to those reported in Table 4. The results are not reported separately.

In a further sensitivity test, the ranking of institutions in the source and destination countries was replaced with the impact of the research done by universities in each country. The results were broadly similar to those in table 4, given that the sample size was necessarily much smaller (699 observations). The main qualitative difference was that the impact of universities in the source countries was highly insignificant in both the OLS and Heckman formulations. This is not surprising, since destination countries are

much more likely to screen incoming international students according to the quality of teaching in the feeder institutions, rather than according to the quality of research in those institutions. However, there is no generally acceptable measure of the quality of teaching for which data are readily available.

The econometric results from estimating the model with trade restrictions on a limited sample using OLS estimation are shown in table 5. This estimation does not use a measure of migration in the destination country, because migration rates are negatively correlated with barriers to the export of higher education via consumption abroad (ie barriers to the inward movement of international students), and the main policy interest of this paper is in the latter.[5] The comparable Heckman selection model is shown in table 6.

In the restricted sample, coefficients on population at source and distance are similar to those in the full sample, under either method of estimation. The coefficient on GDP per capita at source is larger than in the full sample, and closer to what is expected. The coefficient on the population in the destination country is of the wrong sign and is barely significant. This could reflect the influence of countries such as Australia, which have relatively small populations but have been exporting aggressively in the Asia-Pacific region. The coefficient on quality ranking at destination is also larger than in the full sample, and still highly significant. The coefficient on rank at source is now insignificant. But when the Heckman selection model recognizes that this variable may play a screening role, it becomes highly significant.

Of the various types of trade restrictions, two appear significant (under either method of estimation). Barriers in the source country to importing education services via FDI (the inward movement of foreign campuses) has the effect of boosting the number of students from the source country seeking enrolment in overseas universities. And barriers in the destination country to exporting education services via the inward movement of foreign students have the effect of reducing the numbers of such students. The magnitudes suggest that if a country with sample average barriers to FDI imports were to liberalise completely, it would send about 60 per cent fewer students overseas. If a country with sample average barriers to the inward movement of students were to liberalise completely, it would attract about 250 per cent more students — more than twice as many.

These results are consistent with barriers to education having the effects shown in Figure 3. Barriers to mode 3 imports in the source country have the effects of artificially moving

[5] The separate role of permanent migration as a motive for international student movements is probably better established by examining instances of 'natural experiments' — instances where countries have changed the rules regarding the eligibility of international students graduates for permanent migration, but have left unchanged other aspects of their immigration policy, as well as their treatment of international students while studying.

the demand curve to the right. And barriers to mode 2 exports in the destination country have the effect of artificially moving the supply curve to the left. The finding that barriers to mode 3 imports in the source country promote mode 2 imports in the source country is evidence of inter-modal substitution.

5 Policy conclusions and areas for further research

The key policy issue is to explore the welfare implications of these findings. Do restrictions on mode 2 exports allow higher education providers in exporting countries to earn economic rents, along the lines of Figure 1a? Or are the rents dissipated by the institutions pursuing other activities, along the lines of Figure 1b? Similarly, how exactly do the restrictions on mode 3 imports in the source country affect the quality and/or quantity of higher education services in the source countries? And do the effects manifest themselves via rents or cost changes? These crucial policy questions require further research.

Theory can provide some guidance. Massy (2004) argues that a useful model of the production side of the higher education market is a model of the non-profit organization. Universities can be seen as optimizing the achievement of some non-profit objective, which could be as diverse as offering a diversity of courses, offering courses to students from a diversity of socioeconomic backgrounds, preserving arcane knowledge, or providing professorial employment. They do so subject to the prevailing production technology, and to the constraint that profits must always be zero. In these circumstances, they produce outputs to the point where the marginal revenue from each activity, plus its marginal contribution to the achievement of the non-profit objective, equals its marginal cost. Activities with high marginal revenue but low contribution to the non-profit objective may be exploited so as to cross-subsidize activities with a low marginal revenue but a high marginal contribution to the non-profit objective. Massy (2004) shows that such entities have an incentive to be technically efficient. But by definition, they have an incentive to dissipate any rents on the achievement of their non-profit objective.

As in any other sphere, trade barriers may still have two types of effects. First, trade barriers may allow universities to earn rents, which they will then 'dissipate', but such dissipation is not the same as technical inefficiency. Alternatively, trade barriers may interfere directly with the production technology, causing genuine technical inefficiency. It is easy to imagine that the red tape associated with the 'managed' markets for higher education in some countries could fall into the latter category. But being able to distinguish the two cases empirically will require a productivity measurement technology that takes account of all the relevant inputs and outputs, including those outputs that are associated with the achievement of the non-profit objective. This will be the empirical challenge.

A final policy point is to reiterate that only a fraction of the significant barriers to trade in higher education services are covered by the GATS. Those imposed by exporting countries on the students themselves appear to be totally beyond the scope of the GATS. And many of the significant non-discriminatory barriers are not included if they do not fall within the narrow GATS definition of 'barriers to market access'. The results of this paper suggest that barriers to trade in higher education services have significant quality effects, and possibly significant welfare effects. But most will need to be addressed outside the current GATS framework.

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Figure 1a **Welfare cost of rent-creating non-tariff barriers**

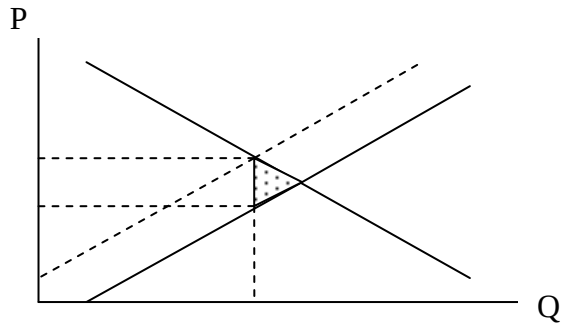

Figure 1b **Welfare cost of cost-escalating non-tariff barriers**

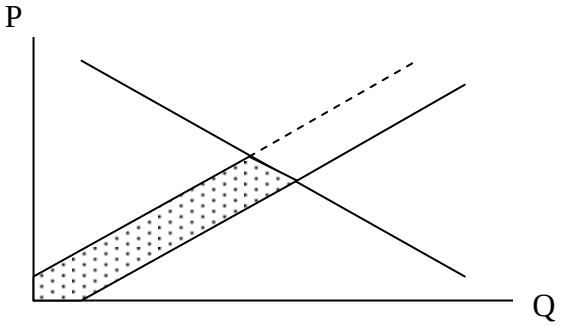

Table 1 **Examples of barriers to *imports* of education services**

Mode	*Limitations on market access*	*Derogations from national treatment*
MODE 1: Cross-border trade, eg downloading course from the internet	Restrictions on downloading educational material from the internet, be it from a domestic or foreign supplier	Restrictions on downloading educational material from foreign internet sites
	Requiring foreign suppliers of internet education courses to be in a partnership or joint venture with a local institution	Restrictions on which courses foreign suppliers of distance education can provide
	An economic needs test attached to registration, authorisation or licensing of all education providers, including those supplying via distance education	Restrictions on the import and distribution of educational materials or software from foreign institutions providing distance education
	Restrictions on the recognition of qualifications obtained from any distance education supplier	Restrictions on the local accreditation of foreign distance education suppliers, or on the recognition of qualifications obtained from a foreign distance education supplier
		Restrictions on cross-border payment or credit card transactions
MODE 2: Consumption abroad, eg home students moving overseas to study	Since the home country has no jurisdiction over the foreign service supplier, it can mostly limit foreign supply only *indirectly* by restricting the local consumer. Such restrictions on consumers are unlikely to also affect local suppliers. Hence it is unlikely that there would be limitations on market access for *imports* of education services delivered via this mode.	Restrictions on foreign education institutions advertising locally or recruiting local students
		Quotas on the number of local students going overseas to study
		Foreign currency restrictions on local students studying abroad
		Restrictions on the recognition of overseas qualifications for institutional credit
		Restrictions on the recognition of overseas qualifications for professional licensing and accreditation

Continued

Table 1 Continued

Mode	*Limitations on market access*	*Derogations from national treatment*
MODE 3: Commercial presence, eg foreign institutions establishing a local campus	An economic needs test attached to registration, authorisation or licensing of all education providers	An economic needs test attached to registration, authorisation or licensing of foreign education providers
	A requirement that the foreign institution incorporate locally	A restriction that prevents foreign tertiary institutions from using the term 'university' in the title of their local campus
	A requirement that the foreign institution operate in a joint venture with a local institution	Restrictions on the scope of services that the local campus of a foreign institution can provide
	Restrictions on the number of foreign teachers that local institutions can employ	Restrictions on the number of students that the local campus of a foreign institution can service
	Limits on foreign equity in local institutions	A residency requirement on the management of the local campus of the foreign institution
		Discriminatory quality assurance requirements on the local campuses of foreign institutions
		Restrictions on the ability of the local campuses of foreign institutions to grant degrees, or restrictions on the recognition of those degrees
		Restrictions on the ability of the local campuses of foreign institutions to charge fees
		Restrictions on the ability of local campuses of foreign institutions to gain access to producer subsidies
		Restrictions on the ability of the students of local campuses of foreign institutions to gain access to consumer subsidies

Continued

Table 1 Continued

Mode	*Limitations on market access*	*Derogations from national treatment*
MODE 4: Movement of natural persons, eg foreign teachers coming to deliver short courses	An economic needs test attached to registration, authorisation or licensing of all education providers, including foreign teachers	Nationality of citizenship requirements to teach locally
	Quotas or economic needs tests on the numbers of temporary staff employed by local institutions	A prior residency requirement to teach locally
	Labour market testing for the contract employment of foreign teachers	Restrictions on the recognition of the qualifications of foreign teachers

Source: WTO (1998), WTO (2001), IDP Education Australia (2002).

Table 2 **Examples of barriers to *exports* of education services**

Mode	Restriction
MODE 2: Consumption abroad, eg foreign students entering to take local courses	Numerical limits on the entry of foreign students
	Limits on what courses foreign students can enrol in
	Discriminatory enrolment criteria for foreign students
	Restrictions on local institutions recruiting foreign students
	Restrictions on foreign students gaining access to local employment while studying
	Restrictions on foreign students gaining access to tuition or other (eg transport) subsidies while studying
MODE 4: Movement of natural persons, eg local teachers moving overseas to deliver courses	Exit restrictions on domestic teachers
	Education or employment bond requiring teachers to serve a minimum term of employment locally before they can go overseas
	Restrictions on funds transfers overseas by domestic teachers

Source: WTO (1998), WTO (2001), IDP Education Australia (2002).

Figure 2 **The 'market' for higher education services**

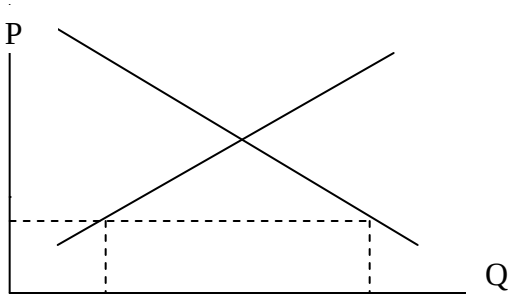

Table 3 **Indexes of restrictions on trade in higher education services**

	Imports via cross-border supply (0–4)	*Imports via consumption abroad (0–5)*	*Imports via commercial presence (0–7)*	*Imports via movement of people (0–3)*	*Exports via consumption abroad (0–6)*
Argentina	0.50	0.83	0.50	0.00	2.10
Australia	0.50	0.25	1.30	0.50	2.05
Brazil	1.25	0.83	1.30	1.25	2.10
Canada	0.50	0.50	1.45	0.50	2.35
Chile	0.50	0.50	1.60	1.00	2.40
China	2.50	2.17	4.00	3.00	1.90
Hong Kong	0.75	1.33	0.60	0.50	3.00
India	1.00	1.17	4.29	1.50	2.30
Indonesia	1.50	1.83	3.76	1.00	1.90
Japan	0.50	0.50	1.40	0.50	1.60
Korea	1.25	1.83	0.80	0.50	1.30
Malaysia	0.75	0.83	4.60	2.00	1.80
Mexico	0.25	0.50	0.61	0.25	1.40
New Zealand	0.50	0.00	1.45	0.25	1.57
Singapore	1.50	1.50	2.45	1.50	2.35
Thailand	1.00	1.00	2.30	0.50	2.80
United Kingdom	0.00	0.25	0.60	1.00	1.30
United States	0.50	0.83	0.60	1.00	2.05
Vietnam	1.50	3.67	3.10	2.00	2.60

Source: Nguyen-Hong and Wells (2003).

Table 4 **Econometric results – model without trade restrictions, with migration levels, OLS estimation**

Dependent variable: Log of number of foreign students from each source country in each destination country in 2000 (1938 observations)

Dependent variable	*Estimated coefficient*	*t score (using robust standard errors)*	*Significance*
Ln pop_dest	0.21	4.86	***
Ln pop_source	0.56	18.33	***
Ln dist	-0.80	-22.93	***
Ln gdppc_source	0.24	4.83	***
Ln rank-dest	-0.64	-21.63	***
Ln rank_source	-0.08	-1.99	**
Ln migration_dest	0.42	10.24	***
R-squared	0.57		

* significant at the 10 per cent level; ** significant at the 5 per cent level; *** significant at the 1 per cent level.

Table 5 **Econometric results – model with trade restrictions, without migration levels, OLS estimation**

Dependent variable: Log of number of foreign students from each source country in each destination country in 2000 (179 observations)

Dependent variable	*Estimated coefficient*	*t score (using robust standard errors)*	*Significance*
Ln pop_dest	-0.17	-1.90	*
Ln pop_source	0.46	3.98	***
Ln dist	-0.83	-4.22	***
Ln gdppc_source	0.70	4.16	***
Ln rank_dest	-1.14	-19.42	***
Ln rank_source	-0.02	-0.12	
Trade restrictiveness index:			
On mode 1 imports at source	0.09	0.25	
On mode 2 imports at source	0.36	1.54	
On mode 3 imports at source	0.50	2.75	***
On mode 4 imports at source	-0.29	-0.61	
On mode 2 exports at destination	-0.61	-2.25	**
R-squared	0.68		

* significant at the 10 per cent level; ** significant at the 5 per cent level; *** significant at the 1 per cent level.

Table 6 **Econometric results – model with trade restrictions, without migration levels, Heckman selection model**

Dependent variable: Log of number of foreign students from each source country in each destination country in 2000

Dependent variable	*Estimated coefficient*	*t score (using robust standard errors)*	*Significance*
Ln pop_dest	-0.17	-1.94	*
Ln pop_source	0.47	5.11	***
Ln dist	-0.83	-4.37	***
Ln gdppc_source	0.72	4.67	***
Ln rank_dest	-1.14	-20.15	***
Trade restrictiveness index:			
On mode 1 imports at source	0.08	0.24	
On mode 2 imports at source	0.35	1.52	
On mode 3 imports at source	0.48	2.92	***
On mode 4 imports at source	-0.23	-0.57	
On mode 2 exports at destination	-0.61	-2.33	**
Sample selection model			
Ln rank_source	-0.41	-17.76	***
Wald chi-squared (10)	553.42		***
Wald test of independent equations chi-squared (1)	0.04		

* significant at the 10 per cent level; ** significant at the 5 per cent level; *** significant at the 1 per cent level.

Figure 3 **The effect of services trade barriers in higher education**