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THE INTERNATIONAL FLOW OF THIRD LEVEL LESSER DEVELOPED COUNTRY STUDENTS TO DEVELOPED COUNTRIES: DETERMINANTS AND IMPLICATIONS

KIONG HOCK LEE and JEE PENG TAN*
The Research Unit, Education Department, The World Bank, 1818 H Street NW, Washington, DC 20433, U.S.A.

ABSTRACT

This study analyses the international flow of third level developing country students to advanced countries from the perspective of sending authorities in developing countries. The magnitude of this flow can hardly be overemphasized; on the basis of a conservative estimate made in the article, the annual loss of foreign exchange entailed by this flow amounted to 17 percent of the interest repayment on total external debts of the lesser developed countries (LDCs) in 1979, a sum which the developing countries themselves can hardly ignore.

On an aggregate basis, our principal hypothesis is that the outflow of students is determined primarily by excess demand for third level education in developing countries. The empirical results support this hypothesis, while pointing to the importance of other factors. Excess demand for third level education in the developing countries is one of the most important determinants of the flow of developing country students to the advanced countries.

On the whole, expansion of developing country tertiary education, at the national or regional levels, could effectively divert some of the flow to local institutions. Aside from this, expansion can also be argued on the basis of the high returns to third level education in developing countries compared to the returns to physical capital, as well as the considerable economies of scale associated with this level of instruction. Further, given the willingness/ability of the students to pay, as witnessed by the fact that the vast majority of developing country students finance privately their education abroad, the expansion of third level education in LDCs could be funded substantially via user charges and student loan schemes.

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I. Introduction

Although study abroad is a phenomenon that dates from antiquity, the explosion in student flow across national boundaries really occurred in the twentieth century. This expansion reflects in part the worldwide spread of education, the ease of modern communication, and the availability of mass rapid international travel. More notably, it also reflects the development of mechanisms for arranging and funding study abroad.

Typically involving third level students, the direction of flow today is largely from developing to developed countries. This growing traffic raises several concerns, not least because of the sheer numbers involved. Beyond the interests of private individuals and admitting institutions, authorities in sending and host countries tend also to assess the movement, albeit with differing emphasis, in terms of "interstate relations involving claims on resources, questions of foreign exchange, issues of (social) costs and benefits, of return home, of relevance" (Williams, 1983, p. 2; see also Blaug, 1981, p. 47 ff). The issue of returning home is highly important since foreign study is often associated with the "brain drain", i.e. the graduate stays on in the DC instead of returning home.

Important as the different interests of the main parties involved are, this article is nevertheless primarily concerned with the issues from the perspective of developing country authorities. In particular, this article does not deal with the issue of an individual's choice whether to enroll in institutions in the home country or abroad, which involves an evaluation of the expected benefits and costs. The principal focus here is on those characteristics of the LDCs, in particular the supply of higher education, which may have an important influence on the outflow of students from the LDCs to the DCs. No assessment of this nature has appeared as yet in the literature. The nearest to the present analysis seems to have been Oxenham's (1981, p. 159) product-moment correlations between overseas students in Britain and their home countries' per capita GNP and its growth rate. Touching on the same problem, although from a different perspective, is a study by Smith et al. (1981, p. 165 ff) in which the main focus is on trends rather than determinants of international student flows.

Whether the outflow of students or the loss in foreign exchange implied by it is important from a national perspective remains a matter of judgement in particular country contexts. Each country must evaluate the benefits derived from foreign as compared to local education in the form of human capital formation, as well as the loss in foreign exchange and the cost of educating the students at home. In any event, a curb in student outflow would imply a need to expand local facilities to absorb the demand for higher education. Some writers have also identified other arguments favoring the expansion of local facilities. For one, it would allow third level institutions to achieve reduction in unit costs, since economies of scale generally exist for higher education in developing countries

(Psacharopoulos, 1980, pp. 27–31). On an ideological level, it has also been argued that expansion would permit the development of indigenous educational systems appropriate to and serving national needs. Further, the argument continues, it would reduce cultural, political, educational and economic dependency of LDCs on DCs (Watson, 1982, p. 181 ff).

Important as the above considerations are, we shall nevertheless leave them aside in the following discussion since they are secondary to our main purpose. The remainder of this article is organized as follows: Section II provides information on the magnitude of student flows, both in terms of student numbers, as well as the implied outflow of foreign exchange from sending LDCs; Section III discusses a model of international student flow relating the outflow of students to the characteristics of the LDC which could influence it, while Section IV describes the data used in estimating it; the empirical results are presented in Section V; finally, Section VI discusses the implications of the analysis.

II. Orders of Magnitude

The number of third level students studying in foreign countries grew at the phenomenal rate of nearly 7 percent annually since 1969, almost equivalent to the rate of growth in domestic third level enrollment. A decade later, it is estimated that there were over 836,000 students studying outside their own country, nearly 574,000 or 69 percent of whom originate from less developed countries. Of these, 65 percent were studying in the United States, France and the U.K. (Unesco, 1971, Table 2.22; UNESCO, 1982, Table 3.16).

From the viewpoint of LDCs, this large outflow of students implies a substantial loss of foreign exchange. To illustrate, consider the following calculations. Of the three developed countries listed above, fees are charged in the U.S.A. and U.K. As a conservative estimate, in 1979 the average fee paid per student in the U.S.A. amounted to US $986 (see Grant and Eden, 1982, pp. 19, 84) and the average fee paid per overseas student in the U.K. to US $1,860 (see Williams, 1982, pp. 165,200; see also Appendix Table A1). Since a majority of LDC students abroad are either financed by their own government or through private funds (Oxenham, 1981, pp. 160–161), the outflow of foreign exchange from LDCs to these two countries for fee payment alone amounted to over US $317 million in 1979 [1]. This figure is, however, almost certainly grossly underestimated since an overseas student must bear, on top of his fees, the cost of board and lodging. The British Council, for example, reckons that a one-year stay in Britain costs US $5250 for board and lodging (Williams, 1983, p. 6). If this figure is assumed for all the host countries, the outflow for board and lodging alone would have amounted to well over US $2.6 billion in 1979. Therefore the total loss in foreign exchange inclusive of fees would have been US $2.9 billion

[2]. Viewed in another perspective, this loss of foreign exchange represented over 17 percent of the interest payment on total LDC external debt in 1979 [3].

The issue then is whether or not and by how much the outflow can be reduced by expanding facilities to absorb the demand for higher education within LDCs themselves. Clearly, the expansion of local facilities will not persuade all students to remain behind. For a variety of reasons, such as better facilities at overseas institutions, and their greater prestige, some students will continue to study abroad despite the (large) cost difference. Nevertheless expansion will permit absorption of a sizeable group of students who enroll overseas because they fail to gain entrance at local facilities. Moreover, since these students already exhibit willingness to pay for their education by virtue of the fact that most of them finance their (expensive) overseas education privately, the cost of operating local facilities could probably be substantially recovered via appropriate user charges. In addition, if steps are taken to improve academic standards, local institutions will over time be able to capture an increasingly larger proportion of the demand for higher education within the country, thereby further reducing the potential loss in foreign exchange. The aim of course is not to curtail overseas education altogether, for some amount of it is certainly desirable, at least in terms of acquiring technical "knowhow". Rather, it is to divert the traffic to local institutions where the social cost of loss in foreign exchange is likely to exceed the corresponding benefits of overseas education.

III. A Model of International Student Flow

The underlying hypothesis is that LDC third level students undertake their education in the DCs primarily because of the shortage of similar facilities in their own countries. In other words, the flow of LDC third level students to the DCs is a direct function of the excess demand for third level education in the LDCs.

Specifically, excess demand in a given country is defined as follows:

$$E = (S_A + S_F)/S_E \tag{3.1}$$

where E = excess demand; S_A = the number of applicants; S_F = the number of frustrated aspirants; and S_E = the number of first-year third level entrants [4].

The flow of LDC students to DCs, standardized for differences in the absolute number of third level students in the country of origin, i.e., the propensity to study abroad, can thus be specified by the following simple linear form:

$$S_D/(S_L + S_0) = a + b.E \quad b>0 \tag{3.2}$$

where S_D = the number of third level students from a LDC in any given DC(s); S_L = the number of third level LDC students in the LDC itself; and S_0 = the total number of third level students from a LDC studying abroad including both students in DCs and other LDCs [5].

However excess demand may not be the only factor which influences or dictates the flow of LDC students to DCs. A more complete model of the students flow should account for all other factors which can exert an influence. On a priori reasoning, an expanded student flow function would then be specified as:

$$S_D/(S_L + S_0) = a + b \cdot E + c \cdot \boldsymbol{C} + d \cdot W + e \cdot M + f \cdot \boldsymbol{H} + g \cdot R \qquad (3.3)$$

where $\boldsymbol{C}$ = a vector reflecting the characteristics of local third level education; W = a variable showing the relative wealth of the LDC; M = a variable reflecting the demand for high level manpower in the LDC; $\boldsymbol{H}$ = a vector showing the historical and language links between the LDC and the DC; and R = a variable showing the relative remoteness of the DC from the LDC.

IV. The Data

Data on S_A and S_E are not easy to come by, while data on S_F are virtually non-existent (see Psacharopoulos, 1977, p. 73). As a second best solution a proxy must be used to measure the extent of excess demand. The best available is the ratio of total upper secondary level enrollment to total third level enrollment [6].

The characteristics of local third level education in LDCs is defined by three variables in this article: (1) the availability of the relatively more expensive science-based courses, as proxied by the proportion of third level students enrolled in such courses (C_1); (2) the staff student ratio (C_2); and (3) the real expenditure per third level student, or economic burden of local education, as proxied by the unit cost of third level study deflated by the GNP per capita (C_3).

The relative wealth of the country and the relative ability and/or willingness of its citizens to pay for third level education in a DC is measured by GNP per capita (W_1) and an index indicating the cost of living in an LDC relative to a DC (W_2). The average annual rate of growth of GNP in the 1970s serves as a proxy for the demand for high level manpower (M) on the basis that the more rapidly a country is growing the greater will be its demand and usage of high level manpower. Historical and language links are represented by dummy variables, H_1 and H_2, respectively reflecting the colonial status of the LDC and usage of English language as the first or second language of the LDC. Finally, distance of an LDC from a DC is proxied by air miles between the capital city of the LDC and the capital city of the DC (R).

TABLE I

Expected Relationship Between Dependent Variable and Independent Variable

Independent variable	Expected effect on foreign study
Excess demand (E)	+
Science-based share (C_1)	-
Staff-student ratio (C_2)	+
Real cost per student (C_3)	+
Per capita income (W_1)	+
Cost of living (W_2)	+
GNP growth rate (M)	+
Colonial links (H_1)	+
English language (H_2)	(+, -)*
Distance (R)	-

* Positive if DC is English speaking, negative if DC is non-English speaking.

The independent variables described above are further defined in Appendix Table A2; together with the sources of the data. Their expected relationships to the dependent variable are shown in Table I.

The principal limitation in this data set is the fact that the ratio of upper secondary level enrollment to third level enrollment may only be a second best, if not a third best, measure of the extent of excess demand for third level education in the LDC. However, a comparison between this measure and another ratio defined by (S_A/S_E) - which is itself an underestimate of the ideal - shows that the former is probably a reasonable approximation. The mean value of the ratio used here for the group of 103 LDCs is 4.16 compared with a mean value of 3.28 for a group of nine LDCs using (S_A/S_E) [7].

Similar limitations apply to all the other independent variables in the sense that these do not fully reflect the facilities, quality, wealth, or manpower demands of the LDCs, or the historical links and remoteness between the LDCs and the DCs. However, for want of better data, and in the absence of any micro- or individual-level study, we maintain that the relationships between these variables and the flow of LDC students to DCs provide valuable insights which have significant policy implications for the LDCs, DCs, and international agencies in the future development of third level education in the LDCs.

The complete cross-sectional data set covers a total of 103 LDCs, mainly for the year 1979 though in a few cases it was necessary to resort to earlier data. Appendix Table A3 shows the actual flows for 1979 and the estimated excess demand ratio for each LDC in the data set.

V. Regression Results

The principal regression results of the student flow model are shown in Table II. Odd numbered equations are simple linear regressions of the basic student-flow model while the even numbered equations are the regression results for the expanded model. The analysis here covers the flow of third level LDC students to all DCs in 1979, and the flow to the principal DCs – the U.S.A. (which absorbed 41 percent of the total flow), France (16 percent) and the U.K. (8 percent) – which together absorbed about 74 percent of the total flow.

Consider first the results of the simple linear regressions, i.e., the odd numbered equations. Equation (1) shows that excess demand for tertiary education in the LDCs is clearly a significant determinant of the flow of LDC third level students to the DCs. This accounts for 9 percent of the variance in the international flow of students from LDCs to DCs.

Equations (3), (5) and (7) show the results of the simple linear regressions for the flow of LDC third level students to the U.S.A., France, and the U.K., respectively. The excess demand coefficients are significant at the 1 percent level for the U.S.A. and U.K. but not significant in the case of France. The explanatory power of the independent variable ranges from a mere 0.002 in the case of France to 0.338 in the case of the U.K. And, as was expected, the magnitude of the coefficients declined.

The simple linear model does not provide an adequate picture so it is necessary to turn to the expanded model. A glance at the results of the even numbered equations in Table II shows that they generally confirm a priori expectations. The relative importance of individual independent variables on the basis of ranking by their standardized betas, is indicated by the square-bracketed number beside the corresponding coefficient [8].

The first point to note from these regressions is the significant increase in the values of the adjusted coefficients of determination. For eqn. (2), reflecting the flow of LDC third level students to all DCs taken collectively, $\bar{R}^2$ increases from 0.088 to 0.416, showing the importance of the other independent variables in determining the flow of LDC third level students. In the country equations the $\bar{R}^2$ improves dramatically for France from a low of 0.002 to 0.877. For the U.S.A. $\bar{R}^2$ is now 0.710, and for the U.K. it is 0.827 or 0.834. In all cases then, over 70 percent of the variance in the flow of LDC third level students is explained by the set of independent variables.

Though not all the coefficients in eqn. (2) are significant they are all of the expected signs. However, the most important finding from eqn. (2), which refers to all DCs taken together, is the significance of excess demand. The coefficient is positive and significant at the 1 percent level. Moreover, it ranks among all the statistically significant variables as the most important determinant of the flow of LDC third level students to the DCs.

TABLE II

Determinants of the Flow of LDC Students to DCs, circa 1979

Variable	All DCs		U.S.A.		France		U.K.		
	(Eqn. 1)	(Eqn. 2)	(Eqn. 3)	(Eqn. 4)	(Eqn. 5)	(Eqn. 6)	(Eqn. 7)	(Eqn. 8a)	(Eqn. 8b)
Constant	0.114[a]	-0.222[a]	0.068[a]	-0.045	0.102[a]	-0.042	-0.001	-0.207[a]	-0.208[a]
	(6.200)	(3.012)	(4.850)	(1.333)	(5.587)	(0.879)	(0.084)	(6.248)	(6.412)
Excess demand (E)	0.014[a]	0.032[a] [1]	0.009[a]	0.010[a] [4]	0.006	0.015[a] [5]	0.019[a]	0.018[a] [1]	0.017[a] [1]
	(3.241)	(4.349)	(3.038)	(3.006)	(1.097)	(2.838)	(7.136)	(6.434)	(6.598)
System characteristics									
Science-based share (C_1)	–	-0.056	–	-0.111[a] [3]	–	-0.124[a] [3]	–	0.074[b] [6]	0.078[b] [7]
		(0.728)		(3.278)		(3.251)		(2.272)	(2.447)
Staff-student ratio (C_2)	–	-0.691[c] [3]	–	0.575[a] [2]	–	0.016	–	0.597[a] [2]	0.583[a] [2]
		(1.924)		(2.788)		(1.167)		(3.148)	(3.130)
Real cost per student (US \$ × 100) (C_3)	–	0.258	–	-0.001	–	0.272[a] [2]	–	-0.093	-0.092
		(1.234)		(0.004)		(3.983)		(1.095)	(1.111)
Country wealth									
Per capita income (US \$ × 1000) (W_1)	–	0.005	–	0.004[a] [5]	–	-0.001	–	-0.001	-0.001
		(1.241)		(3.405)		(0.327)		(0.488)	(0.486)

Cost of living (W_2)	–	0.002[a] [2] (3.235)	–	0.001[b] [7] (2.531)	–	0.001 (1.598)	–	0.001[c] [7] (1.705)	0.001[c] [6] (1.766)
Manpower demand									
GNP growth rate (M)	–	0.007 (1.523)	–	–0.001 (0.512)	–	0.007[b] [4] (2.556)	–	0.007[a] [4] (4.407)	0.007[a] [4] (4.428)
Historical links									
English language (H_2)	–	0.022 (0.908)	–	0.048[a] [1] (4.539)	–	–0.032 (1.553)	–	0.028[b] [5] (2.542)	–
Colonial links (H_1)	–	–	–	–	–	0.111[a] [1] (5.951)	–	–	0.031[a] [5] (2.945)
Distance									
Distance to DC (× 1000 air miles) (R)	–	–	–	–0.005[c] [6] (1.978)	–	–0.002 (0.628)	–	0.010[a] [3] (3.581)	0.009[a] [3] (3.523)
$\bar{R}^2$	0.088	0.416	0.078	0.710	0.002	0.877	0.338	0.827	0.834
F	10.504[a]	6.351[a]	9.229[a]	17.319[a]	1.204	42.430[a]	50.926[a]	32.939[a]	34.422[a]
N	100	61	98	61	95	59	99	61	61

a = significant at 1%; b = significant at 5%; c = significant at 10%.

Figures in parenthesis are t-ratios; numbers in square brackets indicate ranking on the basis of standardized Betas in which the smaller the number, the more important the variable.

Next in the ranking order comes the relative cost of living in the LDC compared with the DCs (W_2). In this equation reference is made to the cost of living index of the LDC relative to the average cost of living index for the U.S.A., France, and the U.K. Clearly, *ceteris paribus,* the higher the cost of living in the LDC relative to the DCs, the more able and willing the students (or their families) are to bear the high costs of third level education abroad.

The third most important determinant of the flow is the staff–student ratio (C_2), which has a positive coefficient significant at the 10 percent level. This implies that the higher the quality of education in the LDC the larger the propensity to study abroad. The best explanation for this is that higher quality education in the LDC means that its third level students will be better qualified to gain access to postgraduate or even undergraduate education in the DCs.

The regression eqn. (4) shows the determinants of the propensity to study in the U.S.A. The U.S.A. accounts for 46 percent of all LDC third level students studying in the DCs.

The most important determinant of this propensity is commonality of language. LDCs with English as a first or second language of the country, have, *ceteris paribus,* a larger flow of third level students to the U.S.A. than those which do not. The quality of education in the LDC comes next in the rank ordering. Defined in terms of staff–student ratio, higher quality education implies a greater propensity to study in the U.S.A. The explanation again rests on the argument that students who are better prepared are more likely to gain access to undergraduate and postgraduate education in the U.S.A. Facilities offerings in the LDC come next, showing that LDCs with more facilities for science-based training experience a lower flow of students to the U.S.A. Excess demand ranks as the fourth most important determinant of the propensity to study in the U.S.A. Per capita income and cost of living index both have the expected positive influence on the propensity to study in the U.S.A. The richer the country and the higher the cost of living in the country relative to the U.S.A., the higher the propensity to study in the U.S.A. Finally, distance has the expected negative influence which is significant at the 10 percent level. Distance of the LDC from the U.S.A. implies remoteness from the U.S.A. in terms of communications, familiarity with the U.S.A., and possibly even family ties.

Next consider eqns. (6), (8a) and (8b), which show the determinants of the flow to the two major colonial powers of the twentieth century, that explicitly or otherwise still maintain links today with their former colonies. For reasons of multicollinearity the dummy variable for colonial links with the U.K., and English as a first or second language of the country, are not entered together. Instead two separate regressions are estimated for the U.K. The regression eqn. (8a) includes all the independent variables together with the dummy variable for the English language while excluding the dummy variable for colonial links. In the regression eqn. (8b) the latter is included and the former excluded.

Former colonial ties are clearly very important determinants of the flow of LDC third level students to France and to the U.K. In both cases (see the regression eqns. (6) and (8b)) the coefficients are positive and significant at the 1 percent level. However, while colonial links rank as the most important determinant in the case of France, exceeding excess demand in the ranking order, excess demand is the most important determinant of the flow of students to the U.K. [9].

In the regression eqn. (6), the other significant variables are the real cost per student which also has a positive coefficient significant at the 1 percent level, the offerings of science-based courses in the LDCs which has the expected negative sign, and GNP growth rate, reflecting the demand for high level manpower in the LDC, with the expected positive sign.

Distance has the expected negative sign but the coefficient is not significant. Links between the LDCs and France established through colonialism reduce cultural barriers and increase similarities in educational systems and familiarity or knowledge such that physical distance is no longer a deterrent to study in France even for the far-flung former French colonies. In fact, over 20 percent of the LDCs in the data set were former French colonies of which over four-fifths are African nations. The former colonies account for 62 percent of third level LDC students in France.

For the U.K., excess demand, as stated above, is clearly the most important determinant. Six other factors have a significant positive impact on the flow of LDC students into the U.K.: the staff–student ratio, distance, average annual growth rate of GNP, language, the share of science-based courses in total third level enrollment in the LDC, and the cost of living. Except for the variables denoting distance and share of science based courses, these results are consistent with a priori expectations.

The unexpected positive and significant coefficient of the distance variable in the U.K. regression deserves further explanation. This result in fact reflects the importance of another factor not included in the analysis, namely the educational base of the LDC defined in terms of the level of development of the formal education system and the tradition for formal education. If all LDCs have the same educational base, then distance would have the expected negative influence on the propensity to study abroad. However, if nations differ in this aspect those with weaker bases would "send" fewer students even if they are physically nearer the host country. For the U.K., her further-flung former colonies, e.g., India, Pakistan, Malaysia and Singapore, are in fact nations with stronger educational bases than her other former colonies. This relationship results in the positive significance of the distance variable. In this the U.K. differs greatly from France. The former French colonies represent a more homogeneous group but the former British colonies – accounting for 69 percent of third level LDC students in the U.K. – are reasonably well distributed across Asia, Africa and Central

America (including the Caribbean) representing a more diverse grouping of nations.

The unexpected positive coefficient of the variable reflecting the LDC's offerings of science-based programs also calls for some explanation. One plausible explanation is that LDCs with larger offerings of science-based programs have a larger number of students who are better prepared and who have a higher propensity to pursue further science-related education in the U.K. The higher propensity may be related to the availability of U.K. scientific and technical awards, scholarships, and fellowships.

To summarize, the regression estimates indicate that, apart from excess demand, several other factors affect the flow of LDC third level students to the DCs. These include historical links, commonality of language, availability of science-based programs, quality of third level education in the LDC, differences in the cost of living and the relative wealth of the LDC and its citizens, GNP growth rate in the LDC, and the distance of the LDC from the DC. However, none of these can detract attention from the importance of excess demand; the significance of the other factors merely suggests that easing excess demand alone would not curb the entire outflow of students from the LDCs.

VI. Implications

The empirical results support the underlying hypothesis of the international student flow model. The propensity to study abroad is negatively related to excess demand for local tertiary education. These results indicate that an expansion of tertiary facilities in the LDCs, with a slight bias favoring science-based programs, might reduce the outflow of students from LDCs to DCs. This policy could potentially moderate the foreign exchange cost associated with the student outflow, and possibly also reduce the brain drain. The impact of an expansionary policy would, however, be small, as illustrated by a simple simulation based on the regression results above. Using the sample mean values of the propensity of study abroad, and the excess demand ratio, a 50 percent expansion in local tertiary level facilities which increases the number of places from say 1000 to 1500 would reduce the outflow of students by only 37 students, from 149 to 112 [10]. Thus, a very substantial quantitative expansion of local higher education would be required to attract some of the students now going abroad to study locally. This result implies that changes in addition to an increase in the supply of local higher education might be necessary to achieve a sizable reduction in student outflow.

The expansion of local tertiary education is not clearly advocated for all LDCs. Thresholds in enrollments exist below which expansion is not called for on grounds of priorities, costs and manpower demand. For instance, LDCs

which have yet to meet their basic educational needs might do better concentrating on first and second levels of education. Further, LDCs with a low outflow of students and low current and potential enrollments might still remain as high cost suppliers of tertiary education even if the entire demand for tertiary education is met within the country. LDCs with low stocks of high level manpower might also face practical staffing problems in the attempt to expand. For these LDCs it might indeed by sound economic policy for them to continue allowing their third level students to study abroad.

All these considered, individual LDCs with established systems of first and second level education experiencing huge outflows of students may nevertheless seriously consider expanding domestic tertiary facilities. In their circumstances expansion is favored by the probable existence of economies of scale, high private and social returns of education, and of course the apparent responsiveness of this outflow of students to a reduction in excess demand. Economies of scale imply room for domestic production of graduates at lower costs than could be achieved by sending these students abroad where the average costs are clearly higher (see Psacharopoulos, 1980 and 1982). Moreover, high private returns to tertiary education imply that students (and their families) can be induced to pay for their education. The large flow of students to DCs is evidence of the ability to pay, at least on the part of those who are now abroad. Much of the expansion can therefore be financed, at least partially, through an appropriate system of user charges, student loans, and scholarships (particularly for the poor but able aspirants).

A third alternative policy might be considered for a grouping of LDCs which individually have low enrollment ratios and low outflow of third level students. This alternative rests on the concept of regional institutions such as the former University of East Africa and the existing Asian Institute of Technology in Thailand (see Phillips, 1976). However, this calls for greater resolve in regional cooperation among the LDCs.

In this undertaking, DCs and the international agencies have an important role to play, namely, fostering the proper development of tertiary education within individual LDCs or regionally, depending on the constraints stated above. This entails considerable cooperation designed to help the LDCs save precious foreign exchange and at the same time develop the infrastructure required for long-term development of tertiary education in the LDCs. The forms of such cooperation are innumerable but the challenge, as Williams argues, "is to find a balance between various types of provision, and even to find compromise solutions" (Williams, 1983, p. 11).

Notes

1 The number of third level LDC foreign students in 1979 in the U.S.A. and U.K. were 235,111 and 45,891, respectively (UNESCO, 1982, Table 3.16).

2 The actual loss in foreign exchange would be smaller than this if grants in the form of fellowships and scholarships, and also student earnings from employment are taken into account.

3 Interest payment on LDC external debt in 1979 was US $16.97 billion (World Bank, 1983, p. 2).

4 See Psacharopoulos (1977) for a similar measure of imbalance in the demand and supply of third level education. Following his definition, *applicants* are defined as those who have successfully completed second level schooling and are financially prepared for third level education; by contrast, *frustrated aspirants* have the academic but not the financial qualification to apply for third level education; and *entrants* are those who survive the selection process and enroll at the first-year of third level education.

5 For a similar specification and analysis applied to the determinants of emigration from LDCs to DCs, see Psacharopoulos (1975).

6 For countries where the education system makes no distinction between the lower and the upper segments of second level education, a distinction is also not made in this study; but these are isolated cases.

7 Calculated from Table I, p. 74 of Psacharopoulos (1977).

8 The smaller this number, the more important the variable.

9 Given the importance of colonial links, an attempt was made to include a dummy variable for LDCs which were former colonies of France or the U.K. in the regression eqn. (2). The attempt failed with the existing data set because the corresponding matrix was of less than full rank. However, three separate regression equations, one with the dummy variable "colonial link with France", the second including "colonial link with U.K.", and the third with both dummy variables are estimated. These produced results which do not detract from the relative importance of "excess demand", though the rank ordering between "excess demand" and "colonial link with France" are reversed; see Appendix Table A4.

10 The sample mean value of the propensity to study abroad is 0.13; and the excess demand ratio is 3. A 50 percent increase in local facilities, which raises the number of student places from 1000 to 1500, implies that the excess demand ratio would decline to 2, leading to a drop of 0.032 in the propensity to study abroad, according to eqn. (2) in Table II. Applying this drop to a pool of 1149 students, of whom 149 went abroad before the local expansion, the implied reduction in student outflow is 37 ($= 0.032 \times 1149$) students; the corresponding percentage drop is 25 percent ($= 37 \times 100/149$).

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Appendix

TABLE A.1

Fees Chargeable to Tertiary Level Foreign Students in Selected Host Countries – circa. 1979–83

Country	Tuition
Australia	An overseas student charge is levied, equivalent to approximately 40 percent of recurrent costs. In 1981/83 it amounted to A $1,700 (=US $2,007) for undergraduate studies (for medicine, it was A $2,150 = US $2,539); and A $2,500 (=US $2,592) for postgraduate studies. Students from New Zealand, Papua New Guinea and some other part of the region are exempt.
Canada	Overseas students pay the Canadian level of fees in British Columbia, Manitoba, Newfoundland and Saskatchewan. In the other nine provinces, they pay one and a half times as much as Canadian students. In 1981/82, the highest fee for foreigners was charged in Quebec where the fee was C $4,128 (=US $3,455), or about 60% of recurrent cost.
France	Like Frenchmen, foreigners pay no fees. There is however a small registration fee, which together with other minor charges may amount to FF 300–400 (=US $52–70, at 1982 exchange rates).
W. Germany	No tuition fees for foreigners or Germans. About DM200 (=US $89 at 1982 exchange rate) is required for social security subscriptions.
United Kingdom	In 1979/80, fees for overseas students were £940 (=US $2,190) for undergraduates and £1,230 (=US $2,866) for postgraduates. By 1982/83, fees are expected to be £1,485 (=US $2,833) and £1,929 (=US $3,681) respectively for continuing students. The corresponding fees for new arrivals are expected to be £2,700 (=US $5,152) for Arts, £3,600 (=US $6,869) for Science, and £1,600 (=US $1,259) for Medicine.
United States	Tuition fees vary according to whether the institution is private or public, and also by level. In public institutions in 1981/82, the average fees paid by U.S. citizens in 2-year colleges were US $469, and in 4-year colleges US $819. Overseas students pay an additional out-of-state supplement of about US $2,000–3,000 at more prestigious universities. At private institutions, fees are the same for Americans and foreigners, and are commonly in the US $4,500–6,000 range. At well known private universities, however, these were as high as US $7,000–7,500 in 1981/82.

Source: Williams, 1981, pp. 80–81, 197.

TABLE A.2

Definitions of Regression Variables

Variables	Definition
Dependent variable	
1. Student flow	The number of third level students abroad from a given LDC standardized for the absolute number of third level students of the country.
Independent variables	
2. Excess demand	The ratio of total upper secondary level enrollment to total tertiary enrollment in the LDC.
3. Science-based share	The ratio of total third level enrollment in science-based fields to total third level enrollment in the LDC.
4. Real cost per student	Average current cost per third level student in the LDC, deflated by GNP per capita (US$).
5. Cost of living	Retail price index relating to living expenditures compiled by the International Civil Service Commission, with the average index for the U.S.A., France, and the U.K., or for the relevant DC serving as the base.
6. GNP per capita	1979 GNP per capita (US$).
7. GNP growth rate	Average annual real growth rate of GNP for the 1970–1979 period.
8. English language	Dummy variable = 1 if the first or second language of the LDC is English; 0 otherwise.
9. Colonial links	Dummy variable = 1 if the LDC was or is a colony of France or the U.K.
10. Distance to DC	Shortest distance by air from the LDC capital city to the capital city of the relevant DC.

Sources: Variables 1–4, from UNESCO (1982); Variable 5, from United Nations (1980); Variables 6–7, from World Bank (1981 and 1982); Variables 8–9, from AEP World Bank; Variable 10, from American Express, Travel Division, World Bank Unit.

TABLE A.3

The Basic Data Set

Country	Number of Third Level Students				Excess demand ratio
	All DCs	U.S.A.	France	U.K.	
Algeria	12,728	1,560	9,096	716	2.59
Benin	1,357	5	1,252	1	4.29
Botswana	196	79	1	86	2.66
Burundi	405	12	126	7	2.92
C. African Rep.	740	9	672	2	3.13
Chad	498	23	438	0	3.43
Congo	1,937	9	1,820	1	3.28
Egypt	5,034	1,650	1,127	522	1.19
Ethiopia	2,292	1,340	115	102	7.73
Gabon	1,077	14	945	6	2.99
Ghana	3,148	1,810	94	549	3.08
Guinea	424	16	279	3	1.47
Ivory Coast	3,624	310	2,813	46	1.65
Kenya	3,053	1,850	34	845	1.51
Lesotho	260	61	1	40	1.99
Liberia	1,091	980	8	20	5.33
Libya	3,759	3,030	143	297	2.56
Madagascar	2,445	30	2,258	8	1.09
Malawi	343	75	9	222	3.30
Mali	1,188	62	927	22	2.93
Mauritania	324	5	264	4	9.76
Mauritius	1,706	40	895	627	28.96
Morocco	18,900	220	16,010	43	2.38
Nigeria	22,877	16,360	724	3,875	0.48
Senegal	2,671	61	2,312	10	1.20
Seychelles	66	5	20	35	4.11
Sierra Leone	1,117	740	61	212	0.79
Somalia	658	220	36	36	7.82
Sudan	2,196	680	129	741	3.58
Swaziland	117	53	53	47	3.16
Togo	1,464	19	1,253	9	3.91
Tunisia	9,677	68	8,616	13	2.89
Uganda	822	430	34	158	1.01
Cameroon	4,757	770	3,626	99	4.21
Tanzania	1,233	480	9	441	1.18
Upper Volta	1,127	22	960	2	3.86
Zaire	3,189	210	1,270	23	3.43
Zambia	877	270	14	503	2.29
Zimbabwe	2,074	740	3	1,191	35.07
Barbados	458	260	7	114	11.11
Bermuda	699	440	0	29	8.87

TABLE A.3 (continued)

Country	Number of Third Level Students				Excess demand ratio
	All DCs	U.S.A.	France	U.K.	
Costa Rica	1,035	670	88	35	0.65
Cuba	7,151	1,130	20	3	1.10
El Salvador	1,149	1,020	32	11	2.21
Guatemala	642	500	26	9	0.23
Haiti	1,525	540	306	2	5.52
Honduras	906	810	26	6	0.44
Jamaica	2,595	2,510	16	136	16.04
Mexico	7,856	5,650	761	399	1.24
Nicaragua	1,385	1,170	39	3	0.62
Panama	1,494	1,200	67	13	1.20
Puerto Rico	67	0	0	3	2.11
Trinidad	1,906	1,030	23	246	5.49
Argentina	2,665	910	719	82	0.88
Bolivia*	1,412	870	122	10	3.80
Brazil*	6,458	2,910	1,414	498	2.03
Chile*	3,568	1,910	771	270	4.21
Colombia	4,853	3,200	641	116	1.51
Ecuador	1,444	1,000	148	22	0.60
Guyana	1,422	850	10	190	3.00
Paraguay	181	80	32	4	1.62
Peru	3,089	1,740	448	66	1.64
Uruguay	687	190	220	17	1.19
Venezuela	13,487	9,860	703	629	0.71
Afghanistan*	1,186	270	178	29	5.80
Bahrain	623	260	11	177	5.78
Bangladesh	1,656	980	24	278	0.90
Bhutan	23	6	1	10	1.12
Brunei	516	9	0	487	13.09
Burma	182	67	4	43	1.31
China	23,048	18,560	601	214	10.04
Cyprus	3,156	420	924	1,086	9.43
Hong Kong	18,879	9,900	49	2,839	3.10
India	12,260	8,760	333	868	1.01
Indonesia	8,378	2,440	184	330	2.85
Iran	68,671	51,310	5,002	3,547	4.95
Iraq	4,674	1,220	572	1,738	2.41
Israel*	5,546	2,730	355	212	2.18
Jordan	8,729	4,720	284	725	2.73
Korea, South	7,064	4,890	349	79	2.12
Kuwait	3,094	2,670	58	252	4.47

TABLE A.3 (continued)

Country	Number of Third Level Students				Excess demand ratio
	All DCs	U.S.A.	France	U.K.	
Laos	2,330	410	357	5	10.37
Malaysia	17,048	3,660	78	9,613	4.92
Mongolia	5,157	0	2	3	2.81
Nepal	294	180	9	48	1.85
Pakistan	4,215	2,660	83	690	5.00
Philippines	3,337	2,890	24	49	1.06
Qatar	687	630	9	28	2.51
Saudi Arabia	10,065	9,540	31	275	1.06
Singapore	3,840	1,010	67	1,576	0.81
Sri Lanka	2,132	490	61	1,152	4.44
Syria	4,654	840	1,358	174	1.46
Thailand	8,127	6,500	298	261	1.38
Turkey	12,069	2,210	1,286	928	1.40
U.A.E.	839	740	13	72	4.49
Vietnam	12,250	5,050	1,519	22	4.60
Yemen	488	190	60	43	2.27
Fiji	673	57	0	40	4.13
Papua New Guinea	296	9	0	25	0.63
Samoa	161	56	56	5	1.04
Tonga	114	37	37	6	35.18
Greece	29,982	3,000	4,386	2,283	1.15
Portugal	3,259	400	1,572	257	1.31

* Country for which no distinction is made between lower and upper secondary cycle.

TABLE A.4

Determinants of the Flow of LDC Students to all DCs, c. 1979

Variable	All DCs		
	(Eqn. A.1)	(Eqn. A.2)	(Eqn. A.3)
Constant	-0.192[a]	-0.229[a]	-0.194[a]
	(2.718)	(3.149)	(2.792)
Excess demand	0.023[a] [1]	0.032[a] [1]	0.024[a] [1]
	(2.979)	(4.404)	(3.135)
System characteristics			
Science-based share	-0.008	-0.045	0.003
	(0.103)	(0.590)	(0.036)
Staff–student ratio	0.670[c] [5]	0.638[c] [3]	0.612[c] [6]
	(1.971)	(1.768)	(1.798)
Real cost per student (US $ × 1000)	0.195	0.258	0.195
	(0.974)	(1.239)	(0.985)
Country wealth			
Cost of living	0.001[b] [4]	0.002[a] [2]	0.001[b] [4]
	(2.195)	(3.373)	(2.266)
Per capita income (US $ × 1000)	0.008[b] [6]	0.005	0.008[b] [5]
	(2.052)	(1.223)	(2.033)
Manpower demand			
GNP growth rate	0.008[c] [7]	0.006	0.007[c] [7]
	(1.818)	(1.448)	(1.728)
Historical links			
English language	0.052[b] [3]	-	-
	(2.026)		
Colonial link with France	0.083[b] [2]	-	0.084[a] [3]
	(2.642)		(2.748)
Colonial link with U.K.	-	0.031 [4]	0.059[b] [2]
		(1.265)	(2.338)
$\bar{R}^2$	0.477	0.425	0.489
F	7.070[a]	6.540[a]	7.385[a]
N	61	61	61

a = significant at 1%; b = significant at 5%; c = significant at 10%.

Figures in parentheses are t-ratios; numbers in squares brackets indicate ranking on the basis of standardized Betas in which the smaller the number the higher the ranking.