INIMITABLE ELEMENTS IMPACTING STUDENT MOBILITY AMONG DEVELOPING COUNTRIES AND DEVELOPED COUNTRIES

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ABSTRACT

Purpose: The current investigation examines the uniqueness of the determinants that drives students flow to developing countries to study abroad. The study also compares these determinants with the factors influencing student mobility toward the developed world.

The theoretical framework: Various theories and models such as new migration theory, liberalisation & competition, push and pull factor model are taken as theoretical backdrop and for econometric estimation augmented models are developed by selecting relevant variables.

Methodology: Data is collected on variables from distinct sources, and panel data is prepared. Static and dynamic panel estimation is used adopting fixed effects, random effects, conditional fixed effects and Poisson random effects models.

Findings: It is concluded that return on investment, the value of degree, cost of living, and skill orientation make developing a preferred destination. In contrast, factors like seeking employment and a high-income level make them preferred over developing countries. Economic forces drive student mobility globally and within developing countries. It includes opportunities to earn income, employment in host countries (in case of developed host countries) and home countries (in case of developing countries), and cost of living.

Research Policy Implications: The study postulates policy implications in terms of attracting foreign students by understanding the dynamics of their choices, as the factors that influence the decisions to study abroad are distinct when it comes to choose a developed nation as a destination or a developing nation as a destination.

Originality/Value: The study adds to the existing body of knowledge new dimensions on inward student mobility especially towards developing countries. This helps the educators and policymakers to understand the dynamics in more detail and device appropriate strategies to attract foreign students to domestic shores.

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ELEMENTOS INIMITÁVEIS QUE AFETAM A MOBILIDADE ESTUDANTIL ENTRE PAÍSES EM DESENVOLVIMENTO E PAÍSES DESENVOLVIDOS

RESUMO
Objetivo: A presente pesquisa examina a singularidade dos fatores determinantes que impulsionam o fluxo de estudantes para os países em desenvolvimento para estudar no exterior. O estudo também compara esses determinantes com os fatores que influenciam a mobilidade estudantil para o mundo desenvolvido.

A estrutura teórica: Várias teorias e modelos, como a nova teoria da migração, a liberalização e a concorrência, o modelo de fatores de atração e repulsão, são tomados como pano de fundo teórico e, para a estimativa econômica, são desenvolvidos modelos aumentados por meio da seleção de variáveis relevantes.

Metodologia: Os dados são coletados sobre as variáveis de fontes distintas, e os dados de painel são preparados. A estimativa de painel estático e dinâmico é usada adotando efeitos fixos, efeitos aleatórios, efeitos fixos condicionais e modelos de efeitos aleatórios de Poisson.

Resultados: Conclui-se que o retorno sobre o investimento, o valor do diploma, o custo de vida e a orientação por habilidades fazem do desenvolvimento um destino preferido. Por outro lado, fatores como a busca de emprego e um nível de renda alto fazem com que os países em desenvolvimento sejam preferidos. As forças econômicas impulsionam a mobilidade estudantil globalmente e nos países em desenvolvimento. Isso inclui oportunidades de obter renda, emprego nos países anfitriões (no caso dos países anfitriões desenvolvidos) e nos países de origem (no caso dos países em desenvolvimento) e custo de vida.

Implicações da política de pesquisa: O estudo postula implicações para as políticas em termos de atração de estudantes estrangeiros ao compreender a dinâmica de suas escolhas, já que os fatores que influenciam as decisões de estudar no exterior são distintos quando se trata de escolher um país desenvolvido como destino ou um país em desenvolvimento como destino.

Originalidade/valor: O estudo acrescenta ao corpo de conhecimento existente novas dimensões sobre a mobilidade estudantil interna, especialmente para os países em desenvolvimento. Isso ajuda os educadores e os formuladores de políticas a entender a dinâmica com mais detalhes e a criar estratégias apropriadas para atrair estudantes estrangeiros para as costas nacionais.


ELEMENTOS INIMITÁVEIS QUE AFECTAN A LA MOVILIDAD DE LOS ESTUDIANTES ENTRE PAÍSES EN DESARROLLO Y DESARROLLADOS

RESUMEN
Objetivo: Esta investigación examina la singularidad de los determinantes que impulsen el flujo de estudiantes hacia los países en desarrollo para estudiar en el extranjero. El estudio también compara estos determinantes con los factores que influyen en la movilidad estudiantil hacia el mundo desarrollado.

Marco teórico: Se toman como base teórica diversas teorías y modelos, como la nueva teoría de la migración, la liberalización y la competencia, el modelo de factores de atracción y repulsión, y para la estimación econométrica se elaboran modelos aumentados seleccionando las variables pertinentes.

Metodología: Se recopilan datos sobre las variables de distintas fuentes y se preparan datos de panel. Se utiliza la estimación estática y dinámica de panel adoptando modelos de efectos fijos, efectos aleatorios, efectos fijos condicionales y efectos aleatorios de Poisson.

Resultados: Se concluye que la rentabilidad de la inversión, el valor del título, el coste de vida y la orientación por la cualificación hacen del desarrollo un destino preferente. Por otro lado, factores como la búsqueda de empleo y el alto nivel de renta hacen que los países en desarrollo sean los preferidos. Las fuerzas económicas impulsen la movilidad de los estudiantes en todo el mundo y en los países en desarrollo. Esto incluye las oportunidades de obtener ingresos, el empleo en los países de acogida (en el caso de los países de acogida desarrollados) y en los países de origen (en el caso de los países en desarrollo) y el coste de la vida.

Implicaciones políticas de la investigación: El estudio plantea implicaciones para la política en términos de atracción de estudiantes internacionales mediante la comprensión de la dinámica de sus elecciones, ya que los factores que influyen en las decisiones de estudiar en el extranjero son distintos cuando se elige como destino un país desarrollado o un país en desarrollo.

Originalidad/valor: El estudio añade al corpus de conocimientos existente nuevas dimensiones sobre la movilidad de los estudiantes nacionales, especialmente en el caso de los países en desarrollo. Esto ayuda a los educadores y...
a los responsables políticos a comprender la dinámica con más detalle y a crear estrategias adecuadas para atraer a los estudiantes internacionales a las costas nacionales.

**Palabras clave:** Globalización de la Educación Superior, Internacionalización de la Educación Superior, Movilidad Internacional de Estudiantes, Estimación de Panel, Efectos Fijos, Efectos Aleatorios, Efectos Fijos Condicionales, Efectos Aleatorios de Poisson, Estimación Dinámica De Panel.

**INTRODUCTION: RATIONALE AND MOTIVATION**

Student mobility can be observed in terms of students enrolling in full-time degree programs (undergraduate and postgraduate), Diploma programs, and short-term student exchange programs in universities and institutions of a foreign country, which is enormous in size as well as in intensity lies under the umbrella of globalization and Internationalization of higher education (Altbatch & Knight, 2006; De Wit, 2008; Knight 2006, 2011 & 2015). Although developments in each mode are rapid, mode 2 (consumption abroad) dominates when it comes to cross-border trade in education services (Teichler, 2015; Varghese, 2014). Therefore, this study specializes to global student mobility and its related aspects. The study intends to investigate the dynamics of student mobility in different regions. A particular focus has been laid on exploring the changing dynamics of student mobility in developing regions, and it tries to demark it from global patterns.

**LITERATURE REVIEW**

Beine, Noel, and Ragot analyze the factors that influence international students' placement decisions methodically (2014). It is accomplished by gathering data on the student populations of thirteen OECD (Organisation for Economic Cooperation and Development) nations. The authors' research demonstrates the importance of the network effect, cost considerations, housing costs, and rated university quality (Yvonne & Etienne, 2016). On the other hand, university costs are not a significant factor in the study (Yvonne & Etienne, 2016).

Examining the factors that influence the migration of international students to Germany using a gravity model method Despite the widely held belief that student mobility is limitless, Bessey (2012) demonstrates that geographic proximity still plays a significant influence because students from far-off places are still a minority (Bessey, 2012). The study uses "Cosmopolitan Science," a collaboration between the German Academic Exchange Service and the Higher Education Information System that gathers data on "educational foreigners," to analyze student inflow data for STEM fields (Yvonne & Etienne, 2016).

Choudaha and de Witt (2014) try to address how and why patterns of international student mobility have changed in the early years of the twenty-first century by using OECD...
data (Yvonne & Etienne, 2016). Primary source countries (China, India, and Korea) and key
destination countries' movement patterns are contrasted in the study (United States, United
Kingdom, and Australia). The study investigates the variables that affect various kinds of
student mobility. The discussion of student mobility's future directions concludes. First, a
comparative analysis of migration from important source nations and destination countries is
covered, focusing on the influence of the economic climate, immigration laws, and
demographic changes. The study also demonstrates the link between skilled immigration and
the recruitment of international students. Second, a critical examination of the function of
mobility within the context of Internationalization is provided, covering issues like the different
mobility student types, the language factor, mobility by level and field of study, and other
aspects (such as reputation, costs, cross-border delivery, and studying abroad as part of a home
degree). They wrap up by discussing the future of student mobility.

In Perkins and Neumayer, the human capital approach is utilized to analyze variations
in students' reasons for studying abroad (2014). Future wealth, colonial connections, shared
languages, and pre-existing migrant stocks, according to the study, are significantly more
important factors. The study concludes that significant disparities exist between "developed"
and "developing" nations in the factors that influence international student mobility.

In an analysis by Rodríguez González, Bustillo Mesanza, and Mariel (2011), the factors
influencing Erasmus student mobility are examined using a panel data set of bilateral flows for
all participating countries. The findings indicate that geographic distance and variations in the
cost of living are essential factors in explaining student flows. According to the study, there is
a clear correlation between student mobility and family educational background. Additional
effects include other students' behavior, enthusiasm for learning a foreign language, and better
climates.

Based on an online survey (n=5654) and in-depth interviews and focus groups with non-
mobile as well as ex-mobile students (n=71), Van Mol and Timmerman (2014) investigate the
determinants of intra-European student mobility in 6 European countries. The results show that
the decision to move abroad is socially and biographically embedded. They also postulate that
macroeconomic context plays a role in deciding to move abroad.

Within the context of growing globalisation in recruiting students and faculty globally,
Shrivastava (2022) looks on the impact of talent management on the efficiency of the hiring
procedure used in Central Indian higher education institutions. The purpose of talent
management and its importance have been made clear in the study in reflection to globalisation in higher education. It has outlined elements that are crucial for its successful application.

Often behavioural dimensions also play an important role while taking such decisions. The main objective in Cabaron (2022) is to create a theory that may be used to explain the behavioural identity that top management in higher education institutions encounters when transferring between different university contexts.

Gravity models, which describe flows between two nations as increasing functions of their size and decreasing functions of their distance from one another, have emerged as the standard tool for the empirical analysis of international movements of capital (FDI) and goods (trade) (Frankel & Rose, 2002). However, migration studies are also grounded in the logic of the gravity model. One may look at the studies that use the gravity model approach to compute a data panel among many papers dealing with migration. Most research has attempted to explain labor force mobility between nations or regions using the gravity model approach in the migration literature. Most articles have tried to explain the factors that influence overall internal labor force migration flows. For nations like the United States (Ashby, 2007), China (Shen, 1999; Poston & Zhang, 2008), Germany (Bierens & Kontuly, 2008), Hungary (Cseres-Gergely, 2004), Pakistan (Ali, N. A., & Bakar, 2022) and Spain, there are excellent instances of empirical research on this topic (Devillanova & Garcia-Fontes, 2004).

METHODOLOGY FOR ANALYSIS

The literature section in the previous section displays various methodological constructs as adopted in different studies in addition to theoretical foundations. It is noticed that for secondary data analysis, modern statistical tools and techniques are limited to citing. Similarly, the section also shows the different ways descriptive analysis has been conducted and qualitative analysis is carried out. Given the objectives and synthesizing the literature, the following elaborates on the core methodology to achieve the objectives. Before going to the core methodology following conceptual framework is relied on to address the research questions:

While building the models to estimate the determinants of student mobility globally and within developing countries, variables that resemble economic characteristics and prominent variables that explain Internationalization in higher education are included. These variables are selected on the backdrop of two main theoretical perspectives, i.e., competition and neoliberalism and new migration theory. One objective behind estimating the econometric
models will be to explore the influence of economic variables and the factors representing Internationalization in higher education. Following this framework, the figure below mentions the flow of core methodology for the study in specific detail:

Figure 1: Flow of Methodology

1. The paper uses competition and neo-liberalism, and new migration theory as a base to formulate the arguments and approach to achieve the objectives. Therefore, the variables for the analysis are selected, which aptly reflect the above theoretical frameworks.
2. The gravity model is adapted as the foundation for testing the empirical relationship between student mobility and its determinants. Global mobility is tested with a simple linear equation, whereas bilateral mobility among developing countries rests on a gravity model equation in augmented form.

Selection of Countries for Analysis

The study analyses global student mobility at different levels. Firstly, global mobility is examined in totality. For this purpose, 50 top destination countries from the world which host the most international students are selected. The sample includes developed as well as developing destination countries. These countries are selected based on the total number of students received in 2018 from the rest of the world (core database UIS, 2020). Then an analysis of the determinants or the factors influencing this inflow is conducted further. At the second level, the study concentrates on inflow in developing countries. For this top 10 developing destinations from the global database are identified. Further, the inflow from developing
sending countries to these top 10 developing destinations is analyzed. The reason behind this comes from two facts; one, it is evident that developing countries receive a large number of students from developing partners only (almost 90%); two, the study aims to elaborate on determinants of flow between developing countries, with particular reference to India.

Table 1

<table>
<thead>
<tr>
<th>Top 50 countries in Global Range for the Global Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Algeria</td>
</tr>
<tr>
<td>China, Macao</td>
</tr>
<tr>
<td>Ireland</td>
</tr>
<tr>
<td>Norway</td>
</tr>
<tr>
<td>South Africa</td>
</tr>
</tbody>
</table>

Source: Based on UNESCO Institute of Statistics, UIS (2020)

It can be noted that in this selection, 24 countries (highlighted in Blue) are developed countries. The rest 26 countries are developing countries. It gives an important insight; international student mobility is widely spread in all countries; not only do the developed countries receive all the globally mobile students, but developing countries also receive a substantial number and are visible in the league.

The coming section lists the top 10 developing countries that received the maximum number of students in 2016. We also identify their top 5 partner sending countries that are developing in nature as also identified.

Table 2

<table>
<thead>
<tr>
<th>The Top 10 Developing Countries and their Respective Top 5 Developing Sending Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>China-Hong Kong</td>
</tr>
<tr>
<td>China</td>
</tr>
<tr>
<td>Republic of Korea</td>
</tr>
<tr>
<td>India</td>
</tr>
<tr>
<td>Malaysia</td>
</tr>
<tr>
<td>Indonesia</td>
</tr>
</tbody>
</table>

Source: Based on UNESCO Institute of Statistics, UIS (2020)
Selection of Model

Quantitative methods are adopted in most of the studies; however, qualitative methods are equally prevalent. For macro-level analysis, quantitative methods are mainly used. Many studies mentioned in the literature section have used the "gravity model approach" to analyze student flow. Studies have been based on empirical analysis of augmented gravity model equations. Initially, Tinbergen (1962) and Pöyhönen (1963) have shown that the simple gravity equation is empirically highly successful in explaining student flows. One of the most significant advantages of using the model is that it feasibly collaborates arguments of other related theories. Therefore, for this study, an augmented gravity model is adapted with selected variables relevant to the study specifically for bilateral analysis. The following section discusses the rationale and selection of the variables to be included in the model.

Selection of Variables

The dependent variable for global and bilateral analysis remains the recent inflow of students to these countries received. However, given the nature of developed and developing countries, the selection of independent variables will differ slightly. As noted above, the study relies on competition, neo-liberalism, and new migration theory to explain student mobility after selecting independent variables.

• A: Gross Domestic Product (GDP): It is selected to reflect the income levels, which indicate a country's economic size. Higher overall incomes in hosting countries attract more students, whether these are developed or developing countries. It is also apparent that rising income levels in developing countries enable students to afford international education and move across borders. Therefore, inflow countries' GDP per capita (absolute values) is taken as the independent variable for global analysis, and the GDP per capita of outflow countries as the independent variable for bilateral flow analysis.

• B: Employment: Employment is selected as one of the driving forces to go cross-border education as it reflects the returns on investment. Further, it is seen that whether in developed or developing countries, employment in the services sector prevails to be higher than in manufacturing or agriculture & allied. However, the motive for seeking employment in the host country (where students study) and seeking employment in the home country (from where students come to study) depends on the position of the hosting country. If the hosting country is developed, students look into getting absorbed...
in the labor market of developed countries. They look for employment in the country of study. Therefore, in global analysis, the employment rate of inflow countries is selected as the independent variable. On the other hand, if the hosting country is developing, students seek employment in more developed countries or their home country to gain faster ROI. That is why the employment rate home country is taken as an independent variable in bilateral flow analysis within developing countries.

- **C: Purchasing Power Parity (PPP) rates:** Cost of living, whether in a developed or developing country, impacts students' decisions to choose a destination to study. Countries with a higher cost of living can only attract a small number of students as it adds up to the pockets of the students, especially when they are self-funded. The PPP rates in inflow countries, which reflect the cost of living as an independent variable, are included.

- **D: Stock of Migrants:** This variable is selected in connotation with the new migration theory. It is suggested that the more the presence of migrants, the more significant the number of students gets attracted to the region. It also shows a country's openness in absorbing foreign populations, which in turn gives a positive indication of residential norms and environment in the destination country.

- **E: Stock of Students in Previous Year:** Peer influence is also expected to coincide with migration theory as it pulls international students into a country. Many students recommend students in their home countries to choose a destination and even a program of study. Also, there is a technical reason for including this variable, i.e., it controls the autocorrelation in the equation while testing.

- **F: Student-Teacher Ratio:** Students are becoming increasingly cautious about their education quality. Since the education sector has been seen as a service sector (according to GATS norms, institutions and Universities are characterized as Education Service Providers), demand for personal attention, maximization of personal time, investment, and efforts are top considerations of the students. A higher Student-Teacher ratio lowers the perceived quality of an individual student. In this context, higher education is becoming (or already has become) a private good that is excludable and rivalrous.

- **G: Gross Enrolment Ratio:** At the same time, higher enrolment in an institution reflects the capacity to hold students with promising delivery of quality education. Having more prominent faculty per student, added to sound academic and physical
infrastructure, enables attracting a more significant number of international students. Universities and Institutions are becoming increasingly competitive in this aspect of the study.

- **H: RCA Index**: It is to be noted that comparative advantage in exporting a particular good or service gives an edge to the country over others. RCA index reveals, based on exports of a particular country in proportion to the world exports, whether a country has a comparative advantage in exporting that good or service. Although obtaining the RCA index for education services separately is difficult since data availability is a constraint, the study proxies the RCA index of miscellaneous categories of host countries for export in education services.

- **I: Tariff Rates**: Tariffs restrict the movement of goods and services. Although tariff rates have been reduced in many categories, many restrictions exist, especially in developing countries. Again, locating tariffs under the education services category is challenging; the study takes AHS simple average rates in % to see the impact.

- **J: Distance**: This variable is taken as a proxy of trade cost in the primary gravity model (transportation cost). Since student flow involves one time or two times of transportation in a year on average, this shall capture the additional cost in addition to the fee, cost of living, etc. also, since in bilateral flow analysis, we use the gravity equation, distance need to be included as it is embedded in the model.

- **K: Dummy Variables**: To capture the impact of socio-cultural factors, we include dummy variables for common borders, common regions, and common language. In gravity model estimations, these variables serve as instruments to capture the heterogeneity among the countries. Mainly it is proposed to use the dummy variables in the bilateral analysis. These are also justified to be included in the equation looking at the regional developments happening in different regions regarding transnational education and Internationalization of higher education, as seen in the previous section.

**Econometric Modelling**

This section describes the econometric form of the model equation for estimation. Selected variables, their theoretical linkages, associated expected hypothesis, and data sources are mentioned in the following table for global and bilateral analysis. It shall be noted that in this model, five variables represent competition and neoliberalism/migration theory / economic
models. Three factors included as explanatory variables represent the internationalization perspective along with others.

**Econometric Form of the Equation**

The equation for integral analysis is defined as:

\[
\text{Total inflow}_{(it)} = \alpha_{(it)} + \beta_1 \text{Stock}_{it} + \beta_2 \text{Employment}_{it} + \beta_3 \text{GDP PC}_{it} + \beta_4 \text{Migrants}_{it} + \beta_5 \text{PPP}_{it} + \beta_6 \text{STR}_{it} + \beta_7 \text{RCA}_{i} + \beta_8 \text{GER}_{i} + \epsilon_{it}
\]

Where,

- Total inflow is the Total Number of International students in Selected Inflow countries.
- Stock is the number of students in the previous year.
- Employment is Employment Rate.
- GDP PC is GDP Per Capita.
- Migrants are the Total number of Migrants.
- PPP is Purchasing Power Parity.
- STR is Student-Teacher Ratio.
- RCA is Revealed Comparative Advantage Index (Miscellaneous).
- GER is Gross Enrolment Ratio in Higher education.

Subscript \( i \) is 50 Selected inflow countries in Global Range; \( i = 1, 2, 3, \ldots \ldots \ldots \ldots 50 \)

Subscript \( t \) is Time period from 2005 to 2016; \( t = 2005, 2006, 2007, 2008 \ldots \ldots \ldots \ldots 2016 \)

This panel data set gives us 50*12 = 600 data points or observations, consistent with theory and practice for estimation purposes. One important thing to be noted here; since we have not defined the partner outflow courtiers in global / integral analysis (instead, total inflow is considered), the values of dependent variables will be in the context of inflow countries only. This will be different for segregated-level analysis. The equations and the forms for level analysis are discussed in the following section.

**Model for Bilateral Analysis Among Developing Countries**

The following table summarises the model for bilateral analysis. The explanatory variables in the equation represent economic factors and factors representing migration theory and the internationalization perspective.

**Econometric Form of the Equation: Bilateral Analysis Among Developing Countries**

\[
\text{Total inflow}_{(ijt)} = \alpha_{(ijt)} + \beta_{1} \text{Stock}_{it} + \beta_{2} \text{Employment}_{jt} + \beta_{3} \text{GDP PC}_{(jt+)} + \beta_{4} \text{Migrants}_{it} + \beta_{5} \text{PPP}_{it} + \beta_{6} \text{STR}_{it} + \beta_{7} \text{RCA}_{i} + \epsilon_{it}
\]
Inimitable Elements Impacting Student Mobility Among Developing Countries and Developed Countries

\[
\text{Total inflow is the Total Number of International students in Selected Inflow countries from selected Outflow countries.}
\]

\[
\text{Stock is Stock of Students in the previous year in Inflow countries}
\]

\[
\text{Employment is Employment Rate}
\]

\[
\text{GDP PC is GDP per Capita}
\]

\[
\text{A Migrant is a Stock of Migrants}
\]

\[
\text{PPP is Purchasing Power Parity Rates}
\]

\[
\text{STR is Student-Teacher Ratio}
\]

\[
\text{RCA is Revealed Comparative Advantage Index (Miscellaneous)}
\]

\[
\text{Tariff is Tariff rate AHS Simple Average}
\]

\[
\text{GER is Gross Enrolment Ratio}
\]

\[
\text{Distance is the Physical Distance between two sets of countries}
\]

\[
\text{DummyB is Dummy Variable for Common Borders between two countries. It takes value one if countries share a common border 0 otherwise}
\]

\[
\text{DummyR is Dummy Variable for the Common region. It takes value 1 if both countries are in the same region 0 otherwise}
\]

\[
\text{DummyL is Dummy Variable for Common Language. Takes Value 1 if both countries share a common language 0 otherwise}
\]

\[
\text{Subscript i is 10 Selected inflow countries at different levels; i = 1, 2, 3, \ldots, 10}
\]

\[
\text{Subscript j is 5 selected partner outflow countries at different levels; j = 1, 2, 3, \ldots, 5}
\]

\[
\text{Subscript t is Time period from 2005 to 2016; t = 2005, 2006, 2007, 2008, \ldots, 2016}
\]

The panel above will give 10*5*12 = 600 observations for estimation purposes. Again, this is consistent with the theory and practice and shall not lead to any complications in analysis.

**Estimation Methods**

Panel data econometric specification are relied on, with inflow countries as a dependent variable. A dynamic panel estimation model is also used. For bilateral inflow, conditional fixed effect Poisson and random Effect Poisson regression taking inflow as count data, are adopted. The following figure explains the rationale for using panel estimation, its strength over standard OLS regression, and the results' robustness in analyzing student flows.
When using Fixed Effect (FE), we assume that something within the individual may impact or bias the predictor or outcome variables, and we need to control for this. This is the rationale behind the correlation assumption between the entity's error term and predictor variables. FE removes the Effect of those time-invariant characteristics from the predictor variables to assess the predictors' net Effect. Another critical assumption of the FE model is that those time-invariant characteristics are unique to the individual and should not be correlated with other individual characteristics. Each entity is different; therefore, the entity's error term and the constant (which captures individual characteristics) should not be correlated with the others. If the error terms are correlated, then FE is unsuitable since inferences may be incorrect. We need to model that relationship using Random-Effects; this is the primary rationale for the Hausman test. The rationale behind the random effects model is that, unlike the fixed effects model, the variation across entities is assumed to be random and uncorrelated with the predictor or independent variables included in the model.

Unlike static panel data models, dynamic panel data models include lagged levels of the dependent variable as regressors. Since lags of the dependent variable are necessarily correlated with the idiosyncratic error, traditional static panel data model estimators, such as the fixed effects and random effects estimators are inconsistent due to the presence of endogenous regressors. Anderson and Hsaio (1981) proposed a solution using instrumental variables (IV) estimation. By taking the first difference of the regression equation to eliminate the fixed Effect, deeper lags of the dependent variable can be used as instruments for differenced lags of the dependent variable (which are endogenous). Since increasing the number of instruments always increases the asymptotic efficiency of the estimator, it was proposed that all instruments in each period should be used.

Given the above methods following steps are recommended, including testing of assumptions, consistency of models (FE VS RE), and fitting of a model based on the presence of problems identified in the data.
Figure 3: Fitting Appropriate Model

Prepared by Authors (2023)

An appropriate model will be selected and interpreted according to the relevant tests. In addition to this, for bilateral flow analysis, instead of dynamic panel estimation, we use the Conditional Fixed Effect and Random Effect Poisson Regression. It is used considering zero flow among a set of few countries. It is prevalent that student flow among two sets of countries may also be zero at a specific time or negligible. Thus, the Poisson panel model leads to robust outcomes and overcomes the shortcoming of FE and RE models and families.

ANALYSIS & FINDINGS

A: Model for Global Analysis

This model aims to explore determinants of global student flow. As the previous section shows, most regions show economic characteristics embedded in student mobility. This is then framed in academic and socio-economic spaces, influencing student mobility. Also, as a base, the study takes competition and neo-liberalism background for explaining the student flows; it is expected that more economic variables will become dominant in explaining the global student flow. The following table summarizes the variables included in the model.

Looking at the summary and correlation matrix of the variables, the dependent variable is negatively correlated with x5 and x6. For the rest of the variables, the correlation is positive. Therefore, we may expect a negative coefficient for x5 and x6 in the regression model. These variables are Purchasing Power Parity (PPP) and Student-Teacher Ratio (STR). Another observation to be made here is the correlation among all the independent variables. This is important to deduct the problem of multicollinearity in the model. Apart from a few coefficients, the correlation coefficient among all the independent variables is minimal. This
indicates that most of the independent variables are not correlated. This is expected to make the model more robust.

Following the panel estimation approach, the fixed Effect, random effect, and dynamic panel estimation models are performed on the data following the model's assumptions. The following section describes the results of the different models:
Inimitable Elements Impacting Student Mobility Among Developing Countries and Developed Countries

Table 3: Model Results Integral (Global) Analysis

<table>
<thead>
<tr>
<th>Variables</th>
<th>Fixed Effect*</th>
<th>Robust and Autocorrelated Standard Error**</th>
<th>Fixed Effect*</th>
<th>Driscoll and Kraay Standard Error***</th>
<th>Dynamic Panel-Data Estimation One-step difference GMM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient</td>
<td>P-Value</td>
<td>Coefficient</td>
<td>P-Value</td>
<td>Coefficient</td>
</tr>
<tr>
<td>Stock (X1)</td>
<td>0.8461959</td>
<td>0.000</td>
<td>0.8461959</td>
<td>0.000</td>
<td>0.0177589</td>
</tr>
<tr>
<td>Employment (X2)</td>
<td>77.85236</td>
<td>0.678</td>
<td>77.85236</td>
<td>0.269</td>
<td>645.6498</td>
</tr>
<tr>
<td>GDP PC (X3)</td>
<td>0.488691</td>
<td>0.079</td>
<td>0.488691</td>
<td>0.000</td>
<td>0.7744053</td>
</tr>
<tr>
<td>Migrants (X4)</td>
<td>0.0023298</td>
<td>0.192</td>
<td>0.0023298</td>
<td>0.092</td>
<td>0.018566</td>
</tr>
<tr>
<td>PPP (X5)</td>
<td>-22.54108</td>
<td>0.651</td>
<td>-22.54108</td>
<td>0.107</td>
<td>-241.0642</td>
</tr>
<tr>
<td>STR (X6)</td>
<td>-350.9475</td>
<td>0.194</td>
<td>-350.9475</td>
<td>0.000</td>
<td>-885.3837</td>
</tr>
<tr>
<td>RCA (X7)</td>
<td>2.34254</td>
<td>0.213</td>
<td>2.34254</td>
<td>0.014</td>
<td>2.988765</td>
</tr>
<tr>
<td>GER (X8)</td>
<td>214.1569</td>
<td>0.023</td>
<td>214.1569</td>
<td>0.000</td>
<td>548.188</td>
</tr>
<tr>
<td>Constant</td>
<td>-21139.7</td>
<td>0.099</td>
<td>-21139.7</td>
<td>0.004</td>
<td>NA</td>
</tr>
</tbody>
</table>

Time Fixed Effect / Arellano-Bond test for AR (1) & AR (2)

NO (PARM Test Prob > F = 0.8343) / NA

NO (PARM Test Prob > F = 0.8343) / NA

Presence of Autocorrelation in First Difference (Pr > z = 0.006) but No Presence of Autocorrelation at Levels (Pr > z = 0.055)

<table>
<thead>
<tr>
<th>Sargen Test</th>
<th>NA</th>
<th>NA</th>
<th>The Instruments in the Group are not Exogenous (Prob &gt; chi2 = 0.571)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-Squared</td>
<td>0.957</td>
<td>0.8412</td>
<td></td>
</tr>
</tbody>
</table>

*Based on Hausman Test (fixed Vs. random): Prob>chi2 =0.0049

** Presence of serial correlation and heteroskedasticity

*** Presence of serial correlation with MA (10), heteroskedasticity, and contemporaneous correlation

Authors estimation based on STATA

Statistical interpretation of the model

The fixed effect model with no time effect present, presence of serial correlation at 10th lag, presence of heteroskedasticity, and contemporaneous correlation is the best fit among the three models. However, the expected hypothesis for the coefficients of explanatory variables are same for all three models, but the above model's results are robust. The model indicates that nearly 84% of the variation in student mobility is explained by the chosen independent variables in the model (R squared = .8412). At the same time, the coefficients of seven (7) variables are statistically significant at the utmost 10% level, including the constant. Out of the total of eight (8) variables, two negatively impact student mobility, and the other six positively influence student mobility. The ones having a negative impact are PPP rates (which represent the cost of living) and Student Teacher Ratio. Among these two, Student-teacher Ratio has a more considerable impact and is statistically significant at a 1% level. The PPP rate's coefficient is significant at almost 10% level.
Four (4) coefficients are statistically significant among the variables influencing student mobility positively. The most essential variable is Gross Enrolment Ratio, followed by the stock of students in the previous year, GDP Per Capita, RCA Index, and Stock of Migrants. Employment has a positive influence, but the coefficient values are not statistically significant. This indicates that global student mobility is determined predominantly by economic factors. The second dimension is academic factors. The third essential dimension that explains global student mobility is the influence of peers (stock of students and stock of migrants represents that in the model) in a particular country.

**B: Model for Bilateral Analysis among Developing Countries**

Bilateral flows among a set of two countries need to be treated differently. For this purpose, as proposed in the methodology section, the gravity model is adapted to formulate the equation for estimation. Since we have selected the top 10 developing host countries and their top 5 developing partner-sending countries for 2005-2016, the data will again be a panel. A panel estimation of the augmented equation is done depending on the characteristics of the data and the violation of assumptions. A few more variables are included in the model in addition to the equation of global analysis to treat the gravity equation aptly. Particularly conditional fixed Effect and conditional random effect models are used in addition to standard panel estimation models\(^6\). Following are the model results.

\(^6\) It is to be noted that in the series of dependent variables (student inflow), there are no zero observations. Advanced models such as Heckman estimation or Pseudo Poisson Maximum Likelihood estimation are not required.
### Table 4: Model Result in Bilateral Flow Analysis among Developing Countries

<table>
<thead>
<tr>
<th>Model</th>
<th>Fixed Effect* Robust and Autocorrelated Standard Error**</th>
<th>Fixed Effect* Driscoll and Kraay Standard Error***</th>
<th>Conditional Fixed Effect Poisson Regression</th>
<th>Random Effect Poisson Regression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variables</td>
<td>Coefficient</td>
<td>P-Value</td>
<td>Coefficient</td>
<td>P-Value</td>
</tr>
<tr>
<td>Stock (X1)</td>
<td>0.7549581</td>
<td>0.000</td>
<td>0.7549581</td>
<td>0.003</td>
</tr>
<tr>
<td>Employment (X2)</td>
<td>144.2707</td>
<td>0.235</td>
<td>144.2707</td>
<td>0.153</td>
</tr>
<tr>
<td>GDP PC (X3)</td>
<td>0.0668313</td>
<td>0.619</td>
<td>0.0668313</td>
<td>0.496</td>
</tr>
<tr>
<td>Migrant (X4)</td>
<td>0.000057</td>
<td>0.864</td>
<td>0.000057</td>
<td>0.846</td>
</tr>
<tr>
<td>PPP (X5)</td>
<td>-279.185</td>
<td>0.473</td>
<td>-279.185</td>
<td>0.035</td>
</tr>
<tr>
<td>STR (X6)</td>
<td>-81.14528</td>
<td>0.307</td>
<td>-81.14528</td>
<td>0.208</td>
</tr>
<tr>
<td>RCA (X7)</td>
<td>5.334568</td>
<td>0.207</td>
<td>5.334568</td>
<td>0.013</td>
</tr>
<tr>
<td>Tariff Rate (X8)</td>
<td>-27.6653</td>
<td>0.432</td>
<td>-27.6653</td>
<td>0.004</td>
</tr>
<tr>
<td>GER (X9)</td>
<td>47.22898</td>
<td>0.291</td>
<td>47.22898</td>
<td>0.149</td>
</tr>
<tr>
<td>Distance (X10)</td>
<td>Omitted</td>
<td>Omitted</td>
<td>-7.46067</td>
<td>0.011</td>
</tr>
<tr>
<td>Dummy Border (X11)</td>
<td>Omitted</td>
<td>Omitted</td>
<td>Omitted</td>
<td>Omitted</td>
</tr>
<tr>
<td>Dummy Region (X12)</td>
<td>Omitted</td>
<td>Omitted</td>
<td>Omitted</td>
<td>Omitted</td>
</tr>
<tr>
<td>Dummy Language (X13)</td>
<td>Omitted</td>
<td>Omitted</td>
<td>Omitted</td>
<td>Omitted</td>
</tr>
<tr>
<td>Constant</td>
<td>-11321.39</td>
<td>0.099</td>
<td>Omitted</td>
<td>Omitted</td>
</tr>
</tbody>
</table>

**Time Fixed Effect** NO (PARM Test Prob > F = 0.1546) NO (PARM Test Prob > F = 0.1546) NA NA

| R-Squared | 0.7137 | 0.722 | NA | NA |

*Based on Hausman Test: Prob>chi2 = 0.0216

**Presence of serial correlation and heteroskedasticity

***Presence of serial correlation with MA (8), heteroskedasticity and contemporaneous correlation

Authors estimation based on STATA

Statistical interpretation of the model

The dynamics of bilateral flow are indeed different from the global flow. Referring to the same model as the best for global flow (fixed Effect with Driscoll and Kraay Standard rs), the most important factor influencing student mobility among developing countries is the PPP rates (representing the cost of living). The employment rate with the second-highest coefficient follows this. After this, the important ones are the student-teacher ratio (STR) and gross enrolment ratio (GER). RCA index and tariff rates also show a significant impact. Variables such as GDP per capita and migrants have a smaller influence on student mobility within developing countries. 72% of the variation in student flow is explained by these factors included in the model (R-square=.72).
However, it is noted that most of the coefficients are not statistically significant. Also, the dummy variables and distance are omitted from the model. In this case, conditional fixed Effect and conditional random effect models are performed\(^7\). The conditional fixed Effect and random effect model makes all the coefficients statistically significant. The dummy variables, however, are omitted in fixed effect estimation; therefore, the random effect estimation is also performed. The random effect model also estimates the coefficients for all dummy variables and distance. All the coefficients are statistically significant. The results are much more robust than the panel fixed Effect. It is to be noted that the order of variables that influence student mobility among developing countries in this model is similar to the earlier one. In addition, distance negatively influences student mobility, and common border common, language, and common region positively influence student mobility among developing countries.

**DISCISSION & CONCLUSIONS**

The above results indicate important dimensions regarding global student mobility and its determinants. The analysis of global student mobility trends in the previous chapter revealed that internationalization and globalization processes have recently dominated student mobility. The results above support the argument that it is apparent that economic factors are the leading determinants of global student flow. An important feature behind global student mobility remains employment. However, employment characteristics have altered, influencing the demand of prospective employers and students seeking higher education outside their homes. One major aspect of this perspective is skills. It is highly desired by the students that any given program delivers the required skill set which is demanded by the current labor market. This is purely seen from an economic angle, where students evaluate the return on investment. To gain such skills, students look forward to a conducive environment where they can fetch maximum gain from the setups of the Universities and institutions. This environment includes infrastructure, facilities, faculty, and one crucial aspect, the student-teacher ratio. Students prefer individual attention to maximize their gain; a larger student-teacher ratio lowers their satisfaction levels. That is the reason that in the model above, the student-teacher ratio has a negative impact on student flow.

\(^7\) Again it is to be noted that there are no zero observations in the series of dependent variables (student inflow). Advanced models such as Heckman estimation or Pseudo Poisson Maximum Likelihood estimation are not required. Rather than using dynamic panel estimation for robust results, Poisson estimation is suggested in this case as the flow is bilateral, strengthening the fixed and random effect results.
Quality of education by the students is evaluated on the level of satisfaction they get from the University of instruction, in which student-teacher ratio plays an important role.

Another important economic dimension is the opportunities to earn income. In the model above, GDP per capita is selected as an indicator of income levels. The host country's prosperity in generating higher income levels attracts the students to choose a particular country. Along with academic factors such as the reputation of the universities and institutions, students also evaluate the economic benefits by looking at the overall economic prosperity in the host country. This is one of the significant reasons that developed countries are at the top of the list for receiving large international students. Employment opportunities are also linked with a high level of income. The more significant and better the employment opportunities are, the larger the income level, and the better the standard of living. In this many students do carry migration intention also. It is evident from the analysis in the previous section that in countries like the UK, USA, Canada, and Australia, a significant proportion of international students stay longer after their studies in the host country, and many migrate to the host country also. Economic prosperity, thus is one significant factor influencing global student mobility.

Related to this, another critical aspect is the cost of living which significantly influences economic prosperity. The PPP rates in the model indicating the actual value of earnings in a particular country negatively influences the student mobility. In recent times, most of the globally mobile students seeking higher education are self-funded. Scholarships and financial support from the home government or host government are limited. In this case, many students either finance their education from family income or from educational loans. In this case, the cost of living over the program fee becomes an important factor in choosing a particular destination.

In addition to these important economic determinants, the student network and migrants network also influences global student mobility. More prominent the presence of students and migrants from a particular country, the probability of attracting more students from that nation in the host country increases. In the model above, the two indicators also positively influence global student mobility. The reasons are manifold. Foremost students are being used as brand ambassadors by the universities and institutions. A large presence of students from one country can attract more students from their homes. It is also evident that current international students are given various incentives to bring more students from their homes. Students also feel secure and comfortable with their peers. Factors leading to this are cultural and social. On the economic front,
the migrant network helps them to settle down in the host country. It is rooted in cultural aspects to finding suitable employment, accommodation, etc. Larger migrants mean larger opportunities for international students in a given host country.

However, these dynamics may differ in the flow among developing countries. An analysis of the flow among chosen developing countries is presented in the coming section.

The factors influencing student flow within developing countries are centered on economic factors. The case is no different from the global flow; however, the internal dynamics are very different. This has many reasons to it. It is to be noted that the most important factor influencing student flow within developing countries, which is the cost of living, as per the model. This reveals that students are much more conscious about their spending on education while choosing a destination within developing countries. Developing countries have relatively smaller per capita income as compared to developed countries. Furthermore, it is also evident that most students are self-funded either from family income or from education loans, which they need to repay later. In this case, cost of living and tuition fees become a significant factor in choosing a destination. The cost of living also influences global student flow, but the intensity is much lesser in the case of global flow than flow among developing countries.

Related to this, employment is the second most influencing factor determining student flow among developing countries. We have seen that employment is one of the driving forces globally for the students. Overall, students wish to settle in the country where they study. This is particularly true for developed destinations. Different from this case in the case of student flow among developing countries. Developing countries have relatively low employment rates. In fact, some highly populated countries struggle to create employment for the domestic population. It becomes challenging for international students to get absorbed in the host country's labor market. However, a foreign degree is weighted and valued more in their home country's labor market. Therefore, employment at home is a bigger consideration for the students of developing countries rather than employment in host developing countries. Most students seek employment in their home countries after their studies in developing host Universities and institutions.

The value of a degree, quality of education, and skill development are linked to economic considerations in deciding to study abroad. Return on investment is the key for the students. This is indeed true in the case of flow among the developing countries. That is why student-teacher and gross enrolment ratios are the next two important factors influencing student flow among
developing countries. Students seek programs that are skill oriented and can help them to get absorbed in the labor market easily. A lower student-teacher ratio gives students an edge to learn better and maximize their investment. Students also evaluate the quality of the university / institution by looking at its visibility in terms of number of students enrolled in the university. In addition to this, students also look carefully at the enrolment in a particular program to judge the strength of the program. These dynamics are directly related to economic considerations.

RCA index was included from the perspective of international trade in higher education and particularly to see the strength of a country in exporting education services. However, measuring the RCA index for all countries in education services is challenging. RCA index of miscellaneous is taken as a proxy as the data on the RCA index in education services is unavailable. A country with a higher RCA index is expected to attract more students. The relation with student flow is positive but similar to other variables in the model.

Tariff rates and distance were included to capture the cost of trade in education services. Distance is more important as students generally travel to their home country at least once or twice a year. The larger distance makes it more costly and time-consuming for the students. Moreover, the gravity model requires this variable to be included for the consistent estimation. In the model, indeed, it reflects a negative relation among student flow. However, transnational education reduces the relevance of distance; one can say the relevance of distance is zero if other modes of transnational education other than student mobility exist. In the case of student mobility, distance will have some importance as the students have to shift from one location to another.

Cultural and social factors are reported to influence student mobility significantly. This aptly fits in the case of student mobility within developing countries. A stronger migrant network and the presence of peers from their home country give much confidence to the students to choose a host country. In addition, cultural similarities such as food habits, religious setups, social setups, etc., significantly influence becoming comfortable with studying and staying in a given host country. The estimation captures this impact by including dummy variables of common border, region, and language, along with a stock of migrants and students. All the variables have a positive impact on student flow. Countries sharing common borders, regions, and languages tend to have similar cultural and social proximities, boosting student mobility with lesser hesitations among the students.
Policy Implication

Economic forces drive student mobility globally and within developing countries. This includes opportunities to earn income, employment in host countries (in case of developed host countries) and/or home countries (in case of developing countries), and cost of living. However, the internal dynamics are significantly different among global student mobility and student mobility among developing countries. Students' choices are influenced directly by considering return on investment, the value of a degree, and skill orientation. Furthermore, this is reflected in choosing a destination with a conducive learning environment. A good student-teacher ratio and decent enrolment in skill-oriented programs particularly influence student mobility globally and in developing countries. This is becoming more important in the case of mobility within developing countries. Students view this process from an economic perspective. Cultural and social proximities influence student mobility positively. This is more important within mobility among common regions. Students choose destinations with a good presence of peers and similarities in the normal course of life.

REFERENCES


