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International student mobility and poverty reduction: A cross-national analysis of low- and middle-income countries

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ABSTRACT

While educational expansion is often acknowledged as a driving force in poverty reduction, there has been limited scholarly exploration of the influence of international higher education on poverty alleviation. With the dramatic surge of international student mobility, tripling from two million in 1997 to over six million by 2021, previous research has predominantly focused on individual benefits such as skill acquisition and labour market outcomes, overlooking the broader societal effects in students' home countries. This study examines how international higher education influences poverty reduction in the home countries of students from low- and middle-income nations, drawing on a theoretical framework rooted in transnationalism. Employing dynamic panel data analysis with the System Generalised Method of Moments approach on data from 1999 to 2018, this study finds that while the immediate effect of international student mobility on reducing extreme poverty is not significant, its long-term association over a fifteen-year period is significant. These results suggest the transformative potential of international higher education for sustainable development, emphasising its systemic and long-term effects in poverty alleviation. Our research highlights that policy interventions expanding access to international higher education could be an important element of poverty reduction strategies in low- and middle-income countries.

1. Introduction

In recent decades, there has been a significant rise in international student mobility. Back in 1997, the number of students pursuing tertiary education degrees abroad—including both academic and advanced vocational or professional education—stood at two million. By 2021, this number had more than tripled to 6.4 million, despite a temporary stagnation due to the COVID-19 pandemic (UNESCO Institute for Statistics, 2023). This remarkable increase reflects not only the value individuals and families place on overseas education as a means of enhancing socio-economic mobility and cultural capital but also highlights the evolving market dynamics within the global tertiary education sector. Governments and educational institutions worldwide have implemented policies to attract international students, such as offering scholarships, simplifying visa procedures, and expanding English-language programmes. These efforts are part of a broader trend towards a more market-driven approach to internationalisation (Chankseliani, 2017; de Wit & Altbach, 2021).

Much research on the impact of international student mobility has focused on the personal benefits for individuals, such as gaining new skills, improving labour market outcomes, fostering civic engagement, building self-confidence, and enhancing intercultural

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awareness (Gümüş et al., 2020; Netz, 2021). However, there is a noticeable gap in understanding how these individual benefits translate into broader societal implications for students' home countries. While some studies have examined how foreign-educated graduates can support economic growth (Rasamoelison et al., 2021), promote social equality (Campbell et al., 2021), advance higher education and research (Cao et al., 2020), and promote democratic governance (Chankseliani, 2018; Spilimbergo, 2009), there has been limited exploration into how these graduates contribute to poverty reduction in their home countries. A recent review by Wang et al. (2024) highlighted the returnees' impacts across various areas such as firm growth, industrial innovation, higher education, research, social diversity, equity, inclusion, democracy, and civic engagement. However, it also noted a gap in the literature on the impact of international student mobility on poverty reduction.

To address this gap, this study employs a transnationalism framework, supplemented by insights from Transformative Learning Theory and Critical Realism. Transnationalism encompasses not only the physical movement of individuals across borders but also the creation of transnational spaces—symbolic arenas where knowledge and cultural practices are exchanged and adapted (Vertovec, 2009). These spaces facilitate the transfer of skills, knowledge, and social capital that returnees use to drive economic and social development in their home countries. Transformative Learning Theory complements this perspective by explaining how exposure to new environments and ideas abroad can shift consciousness (Mezirow, 1997), enabling returnees to implement innovative solutions to local challenges. Additionally, the concept of morphogenesis from Critical Realism highlights the interplay between structure and agency, providing insights into how international educational experiences can empower individuals to act as agents of change (Archer, 1995).

By framing international student mobility through these lenses, this study seeks to establish if international student mobility contributes to systemic changes in students' home countries. This approach aligns with the UNESCO's definition of education as a global common good (UNESCO, 2015), emphasizing that education is crucial for sustainable development. International higher education is not just about individual gain but is fundamentally about enhancing collective well-being across national borders. It can support a shared understanding and collaborative actions to address global challenges, thus contributing to the global common good by promoting development and reducing poverty where it is most needed.

Does international student mobility contribute to poverty reduction in the home countries of students from low- and middle-income countries? In order to address this research question, our study employs the System Generalised Method of Moments approach to analyse a cross-national time-series dataset from 1999 to 2018, focusing on low- and middle-income countries in Asia, Europe, and South America. Acknowledging the absence of African countries in our sample due to data limitations, we supplement our analysis by examining the correlation between the mean outbound student mobility and poverty at the country level in Africa. This approach allows for exploring whether international higher education influences poverty reduction in students' home countries, offering valuable insights into its societal impact.

2. Theoretical background

2.1. Poverty and education

Poverty is broadly defined as the deprivation of the capabilities that restrict individuals' freedoms and opportunities to lead the lives they value (Sen, 1999). This definition emphasises that measuring poverty extends beyond mere income metrics. Although income is a primary contributor to capability deprivation, education plays a crucial role in enhancing individuals' capabilities by providing them with knowledge, skills, and fundamental norms and cultural values needed for effective social and economic integration within society. The expansion of educational opportunities, in turn, has been considered a key policy for poverty reduction (Colclough, 2012; Hannum & Xie, 2016; Tilak, 2007; World Bank, 2018).

Two key systematic reviews on the connections between tertiary education and development outcomes reveal its varied impacts. The studies summarised by Oketch et al. (2014) suggest that tertiary education significantly boosts the earnings of graduates in low- and lower-middle-income countries. However, these effects are not uniformly distributed, as the impact on income inequality is complex and varies according to the societal context. Similarly, Howell et al. (2020) find that tertiary education enhances lifetime earnings and entrepreneurial activities among those from poor families. These outcomes are more readily observed and explained at the individual level rather than the aggregate level, making it difficult to pinpoint the relationship between educational expansion and poverty reduction at a societal level.

The individual-level explanation linking education to poverty alleviation has limitations when applied to the analysis of the societal impact of international student mobility. One limitation is that students pursuing education abroad are typically from more affluent backgrounds (Aerts & Van Mol, 2023; Di Pietro, 2020). While foreign-educated individuals can significantly improve their economic prospects, international higher education rarely serves as a direct escape route from poverty for poor students, unless they are beneficiaries of substantial scholarships.

In analysing broader societal implications, poverty is often examined through economic and political perspectives. Economic development plays a crucial role in poverty reduction by facilitating job creation, wage growth, urbanisation and overall health improvements (Brady, 2019). Notably, economic development is closely linked with the expansion of education. Education improves labour efficiency and stimulates technological innovation, both essential for economic growth and, by extension, poverty alleviation (Moller et al., 2003). From a political perspective, poverty is influenced by decisions on resource allocation (Brady et al., 2016). Regulations and laws governing electoral systems and welfare policies play a significant role in shaping the distribution of economic resources. For instance, research on the political aspects of poverty suggests that democratisation tends to reduce poverty, as political competition encourages the adoption of more egalitarian social policies (Huber & Stephens, 2012). In this political context, education

can enhance individuals' political knowledge and promote democratic cultural norms (Inglehart & Welzel, 2005; Lipset, 1959), contributing to poverty reduction through increased political engagement. Despite these insights, the role of international student mobility in reducing poverty at the societal level remains underexplored in scholarly research.

2.2. Transnationalism, transformative learning, and critical realism in international student mobility

We draw on the lens of transnationalism, supplemented by Transformative Learning Theory and the morphogenetic approach from Critical Realism, to explore the potential societal impact of international student mobility on poverty reduction in home countries. These theoretical perspectives offer insights into how international student mobility might contribute to poverty alleviation in low- and middle-income countries, aligning with our research question about the broader societal benefits of this mobility.

Transnationalism emphasises the interconnectedness of individuals, institutions and cultures across borders (Vertovec, 2009). According to Brooks and Waters (2022), 'international' typically implies interactions between nation-states, while 'transnational' refers to connections that transcend national boundaries, creating multi-scalar and multi-sited identities that do not necessarily attach to specific nation-states. In the context of international student mobility, transnationalism helps us understand how students and graduates form networks that cross borders, enabling them to bring back not just knowledge but also resources, ideas, and cultural practices that could influence economic and social structures in their home countries. Building on the discussions of internationalisation by Altbach and de Wit (2015), Knight (2013), and Kwak and Chankseliani (2023), which explore cross-border educational exchanges and their role in global cooperation and development, our study specifically applies the concept of transnationalism to international higher education. By doing so, we investigate whether the cross-border connections formed through international education can facilitate the exchange of skills and knowledge that directly contribute to poverty reduction efforts. These connections are facilitated through the movement of people, ideas and resources between countries, positioning international higher education as a driver of societal change.

At the core of this perspective lies the concept of transnational spaces, which are formed and continuously reshaped through cross-national interactions (Faist, 2010; Portes et al., 1999; Vertovec, 2009). Within these intersectional spaces, students and graduates navigate multiple cultural, economic, political, and social influences, developing new transnational identities that redefine existing norms and social structures in their home and host countries. These transnational spaces may serve as arenas for applying new skills and knowledge acquired abroad, potentially leading to innovations in local industries and improvements in governance, which are key factors in poverty alleviation. The ability to drive innovation and support economic and social development upon their return is a key component of how international student mobility might contribute to poverty reduction.

Transformative Learning Theory offers a lens to understand the potential impact of international student mobility on poverty reduction. This theory suggests that exposure to new environments and ideas can lead to a transformation in worldviews (Mezirow, 1997). International students' immersion in diverse cultures and perspectives often challenges their pre-existing beliefs and knowledge, leading to cognitive and perceptual shifts. This process encourages critical reflection on their home country's established perspectives and positions them within a globally interconnected society. Given that international higher education provides an optimal transnational space for such transformation, this study uses Transformative Learning Theory to propose that foreign-educated returnees could become carriers of innovative solutions that can be applied to local challenges, including poverty, upon their return. By transforming their worldviews and acquiring new skills and knowledge, returnees are better equipped to contribute to socioeconomic development in their home countries, aligning with the principles of Critical Realism.

The morphogenetic approach, rooted in Critical Realism, provides a theoretical lens linking individual changes of international students to broader societal transformation within transnational spaces. Archer's morphogenetic approach explains societal changes through three stages (Archer, 1995). Structures condition the agents at T1 (social conditioning); agents influence and are influenced by structures at T2 (social interaction); and these interactions result in either structure changes (morphogenesis) or stability (morphostasis) at T3 (structural elaboration). This approach suggests that the transnational experiences of students, who are empowered by learning abroad—including the acquisition of new ideas, knowledge and reflexive perspectives on their home countries—could lead to structural changes in their societies rather than merely reinforcing existing conditions. The continuous feedback loops between structure and agency, where knowledge and practices acquired in transnational spaces are applied to reform local governance, economic policies, and social norms, help explain how individual transformation can lead to societal changes such as poverty reduction.

By combining these theoretical perspectives—transnationalism, Transformative Learning Theory, and Critical Realism—this study provides a framework for understanding how international student mobility might lead to systemic change in students' home countries. This integrative approach accounts not only for the immediate impacts of international education on individuals but also for its potential to drive long-term societal transformations that contribute to poverty alleviation. Through this lens, in the discussion section of this paper, we explore the potential pathways through which international student mobility can contribute to poverty reduction in the home countries of students from low- and middle-income countries.

3. Data and methods

3.1. Data

This study compiled a panel dataset from 1999 to 2018 to investigate the impact of international student mobility on poverty in low- and middle-income home countries. Data on poverty rates and socio-economic control variables were obtained from public sources such as the World Bank and the Variety of Democracy dataset. The primary source of data for internationally mobile students is

the UNESCO Institute for Statistics (UIS). The UIS dataset offers detailed information on international student mobility, including mutual flows of students in higher education between host and home countries for 210 countries since 1998. The UIS data on student mobility is supplied by host country governments. China, a significant host country, does not report statistics for foreign students enrolled in its higher education institutions to the UIS. To address this limitation, we supplemented the UIS data using statistics from the Concise Statistics on International Students in China, produced by China's Ministry of Education's Department of International Cooperation and Exchanges, which covers the period from 1999 to 2018. This combined dataset offers a comprehensive and complete overview of international student mobility within the specified period.

Our dataset is an unbalanced panel dataset, which means that cases are unevenly distributed across countries due to missing data in specific years. Additionally, we restricted the analysis to countries classified as low- and middle-income countries based on the World Bank's classification by national income level in 1999. Consequently, our sample includes 14 countries in Asia, 16 in Europe, and 13 in Central and South America. Details of these countries and the corresponding number of observations are provided in Table A1 of the Appendix.

Although our analysis does not cover African countries due to sparse and limited data availability during this period, we include an examination of the bivariate relationship between international student mobility and poverty at the country level in Africa at the end of the analysis section. The absence of African nations in our modelling limits the generalisability of our results, particularly given Africa's unique socio-economic and educational contexts, which may differ significantly from the countries included in our analysis. Therefore, our findings should be interpreted with caution regarding their applicability to African settings.

3.2. Dependent variable

Poverty can be defined as a state in which individuals possess limited resources, thereby depriving them of the capabilities necessary for full participation in society (Nussbaum, 2006; Rainwater & Smeeding, 2004; Sen, 1999). Poverty is typically measured by assessing the well-being and basic needs of people using an international poverty line that remains consistent across countries and over time. In this study, we use the World Bank's poverty line set up at $2.15 per day at 2017 purchasing power adjusted price (PPP) to identify individuals living in extreme poverty. Our dependent variable is log *poverty*, which indicates the natural logarithm of the percentage of people who live on less than the poverty line.

3.3. Key independent variable

The key independent variable is *outbound student mobility* (OSM), which represents the magnitude of students studying abroad. OSM is measured by the percentage of degree-seeking students studying abroad in the population of the typical age bracket for tertiary education. After aggregating mutual data on student flows between home and host countries, we implemented linear interpolations to estimate student flows in host-home country pairs over time to compensate for missing data resulting from irregular reporting by government authorities. Subsequently, we created a home country-year level estimate of the total number of students who studied abroad each year. To enable meaningful cross-national comparisons, we then standardised this estimate by the population size in the age group tertiary education of the home country.

3.4. Control variables

We included various country-year-level control variables to account for potential factors affecting poverty.[a] To capture the domestic education level, we create a measure of *secondary educational attainment*, which represents the percentage of people aged 25 to 64 with secondary education degrees. This variable is derived from a five-year panel of the Barro-Lee dataset, with annual values estimated through linear interpolations. *Economic growth* is measured by the annual growth rate in Gross Domestic Products (GDP), serving as a control for the impact of economic context on poverty. To control for shifts in the labour force from agricultural to industrial sector (Alderson & Nielsen, 1999), we include the *percentage of employment in industry*, indicating the proportion of the population working in sectors such as mining, manufacturing, construction, and public utilities (electricity, gas, and water) within the total employment.

Addressing the potential impact of political factors on poverty (Brady, 2005; Brady et al., 2016), we measure democratic political culture using the *electoral democracy* index from the Variety of Democracy dataset. This index evaluates the level of rulers' accountability to citizens through factors such as the scope of suffrage, the freedom of civil society organizations, election integrity, and the presence of free expression and independent media between elections (Coppedge et al., 2022).

We also incorporate measures to control for dimensions of globalisation. *Ratio of emigrants to the population* is the proportion of individuals residing abroad relative to the total population. This variable serves to account for the potential impact of emigration, including those who obtain higher education abroad and do not return to their home countries, on poverty reduction within the internationally mobile students' home countries. *ODA/GNI* represents the net foreign aid received as Official Development Assistance (ODA) as a percentage of Gross National Income (GNI). *Trade/GDP* indicates the amount of exports and imports of all goods and

[a] We examined the issue of multicollinearity among the explanatory variables. The variance inflation factors (VIFs) for all variables are below 2.1, indicating that the correlations between multiple explanatory variables in the model do not adversely affect the regression results. Correlations among the variables and VIF results are provided in the online supplement.

services as a percentage of GDP. In addition, we incorporate time fixed effects to address the changing trend in the relationship between student mobility and poverty, mitigating potential biases arising from uneven observations across different periods. Full details of data sources and measurement for all variables are provided in Table A2 of the Appendix, while Table A3 presents descriptive statistics for the variables used in the analysis.

3.5. Analytical approach

To examine the effect of the foreign-educated graduates on poverty within their home countries, this study employs dynamic panel regression models with the System Generalised Methods of Moments (GMM) estimation (Roodman, 2009). Controlling for the past trajectory of the dependent variable is crucial, especially when analysing variables that exhibit persistence over time, such as poverty. Dynamic panel model addresses this issue by including lagged values of the dependent variable in the right-hand side of the regression equation. While the lagged dependent variable accounts for any omitted dynamics affecting the current value, it can introduce endogeneity due to its correlation with the error term. To mitigate this challenge, the System GMM estimation incorporates lagged levels and first differences of the explanatory variables as internal instruments. These instruments also help alleviate concerns about reverse causality, where it might seem that poverty influences education abroad, contrary to the direction investigated in this paper. Our dynamic panel model with the System GMM estimation for this study can be represented by the following equation:

$$P_{it} = \alpha P_{it-1} + \gamma OSM_{it-d} + \beta X_{it-1} + \delta_t + \varepsilon_{it},$$

where P_{it} represents the logged poverty rates of country i; $OSM_{it\text{-}d}$ is the d-year (5, 10 and 15 years) lagged value of outbound student mobility; $X_{it\text{-}1}$ is the one-year lagged value of control variables; δ_t represents a set of time fixed effects; and ε_{it} is the error term. All the lagged variables excluding time fixed effects are treated as predetermined and instrumented in their levels and differences (Spilimbergo, 2009).

We utilise three different lagged values of OSM, covering periods of 5, 10 and 15 years, to access the short- and long-term effect of OSM. The OSM measure reflects the number of students studying abroad each year, irrespective of their academic progression in higher education. Therefore, we initially set the lag at 5 years, as students typically require at least five years to complete their degrees and return to their home countries. We extend the lag duration to 10 and 15 years, considering the longer time required for returnees to influence societal changes. All other control variables are measured with a one-year lag to address simultaneity bias.

The validity of the system GMM estimation hinges on the appropriate use of instruments. We employ Hansen J-test to assess the validity of the instruments as well as the Difference in Hansen test to evaluate the model fit with the instruments. Additionally, we use the Arellano–Bond autocorrelation test to detect any evidence of second-order autocorrelation. Following Roodman's (2009) guidance, we utilise orthogonal deviations to maximise the sample size, considering the unbalanced panel structure of our dataset. To address finite sample bias derived from numerous instruments, we collapse instruments and employ only two lags for the levels and differences.[b] Furthermore, we employ Windmeijer robust standard errors to correct for finite sample bias (Windmeijer, 2005).

To test the sensitivity of our models to different poverty measures, we conducted tests using higher poverty lines set at $3.65 and $6.85 per day at 2017 PPP. Additionally, we assessed outliers in the OSM measures using the criterion of 1.5 times the interquartile range above the upper and below the lower quartile to address concerns about the influence of outliers on the results. These checks yielded results similar to our main findings and are provided in the online supplement. All models were estimated using xtabond2 in Stata.

In addition, to address the absence of African countries in our analysis, we explore the static association between poverty and OSM in this region. The analysis covers 46 African countries, with a sample size of 150 data pairs, ranging 1 to 6 within each country. Given the limited sample size and unbalanced data structure, we perform a bivariate correlation of the mean poverty and mean OSM for the 46 countries to investigate the country-level general pattern between the two variables.

4. Analysis

4.1. Trends in OSM and poverty

Fig. 1 presents trends in outbound student mobility (OSM) and poverty rates in home countries across 43 middle- and low-income countries in the sample. In 1999, the mean percentage of individuals studying abroad among the tertiary education age group was 0.7 percent, which increased more than fourfold to 3 percent by 2018. Meanwhile, the mean percentage of population living on less than $2.15 per a day was 17.5 percent in 1999. However, the poverty rate plummeted to 2 percent by 2018. These trends observed from 1999 to 2018 highlight a correlation between increased outbound mobility and reduced poverty rates in student countries of origin.

[b] The GMM estimation uses internal instruments derived from the explanatory variables in the model. Therefore, caution is warranted when adding explanatory variables because this generates numerous instruments, potentially leading to overidentification of the endogenous variables. We carefully include an appropriate number of variables verified by diagnostic tests, although this approach may introduce omitted variables bias. We conducted tests with various alternative variables to the selected control variables, including government expenditure on health, freedom house index and foreign direct investment. Importantly, the main findings remain consistent across these alternative variables.

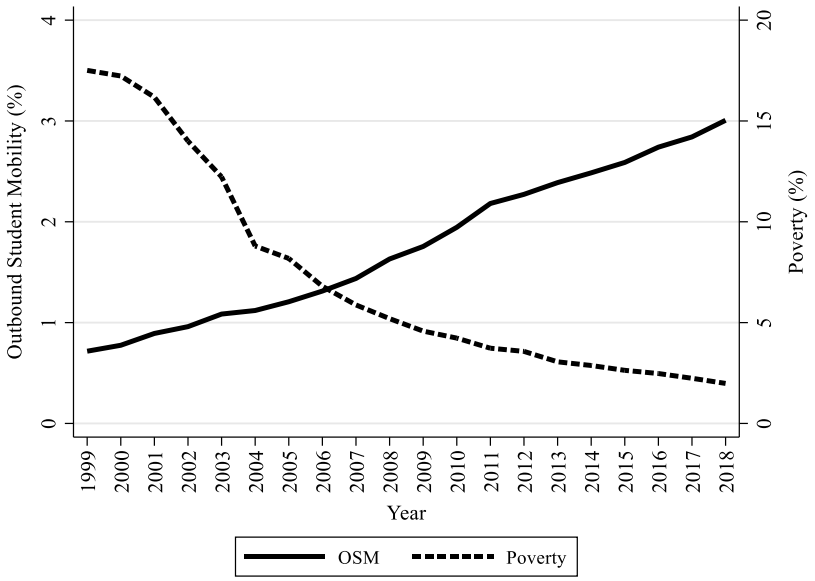

Fig. 1. Outbound Student Mobility and Poverty **($N = 43$ Countries)**.
Notes: Due to missing data, the calculation of mean poverty rates for each year involved a varying number of countries. To reduce bias stemming from unequal sample sizes, poverty rates imputed through linear interpolations were used in the calculation process.

4.2. System GMM dynamic panel analysis of poverty

Table 1 presents the results obtained from the System Generalised Methods of Moments (GMM) dynamic panel models on poverty. In Models 1 to 3, we assess the impact of OSM on logged poverty without other controls except for the lagged dependent variable. Each model incorporates a 5-, 10-, and 15-year lag of OSM independently to investigate the short- and long-term effects of international higher education. The lagged dependent variables explain over 92 percent of the variance in poverty across all three models. This substantial correlation between current and past poverty values underscores a robust historical cumulative influence on poverty, supporting our choice of the dynamic panel model. We also found that the correlation between OSM and poverty is not statistically significant regardless of the lag length, although the directions of all the coefficients are negative. Notable, the effect size of OSM strengthens with longer lags, and the t-ratio for the 15-year lag of OSM exceeds 1.3.

Among the diagnostic tests, p-values for AR(2) indicate a failure to reject the null hypothesis, suggesting that the error term's second-order autocorrelation does not exist. Therefore, the result confirms that the error terms two years apart are not correlated. Regarding the test for the instruments, the null hypothesis of the Hansen J test indicates the validity of instruments, while the null hypothesis of the Difference in Hansen test suggests no improvement in model fit with additional instruments. High p-values in Models 1 and 3 confirm that the instruments are valid and well-fitted. If we consider higher p-vales, such as 0.25, as suggested by Roodman (2009), Model 3 would be the best GMM model in terms of instrument usage. However, diagnostic tests suggest that, overall, Model 2 is poorly estimated using the System GMM estimation method.

In Models 4 through 6, we added various control variables to account for the potential alternative explanations for poverty reduction. Despite the inclusion of these controls, the effects of the lagged dependent variables remain strong across all three models, with a slight reduction in effect size. We found that the effects of the 5- and 10-year lagged OSM remain statistically insignificant in Models 4 and 5. However, the 15-year lagged OSM shows a significant negative correlation with poverty in Model 6. The effect size of -0.186 indicates that one percent increase in OSM might be linked to 17 percent ($= 1 - e^{-0.186}$) reduction in poverty in home countries. These findings suggest that foreign-educated graduates may contribute to long-term alleviation of poverty in their home countries.

Additionally, among the control variables, we found that the historically cumulated population holding a secondary education degree is negatively correlated with poverty in Model 6 ($p < 0.10$), confirming that expanding domestic education contributes to poverty reduction. Economic growth also shows negative correlation with poverty in Model 4 ($p < 0.10$), highlighting the role of economic development in reducing poverty, while its correlation is not significant in the other models. Other factors do not achieve statistical significance across the models. Diagnostic tests confirm the absence of second-order correlation, validate the instruments used, and support overall model specification, except in the case of Model 5.

Table 1
System GMM Dynamic Panel Models on Poverty.

	1	2	3	4	5	6
Log poverty$_{t-1}$	0.934***	0.920***	0.950***	0.856***	0.841***	0.808***
	(0.064)	(0.060)	(0.140)	(0.042)	(0.069)	(0.225)
Outbound student mobility$_{t-5}$	-0.000			-0.016		
	(0.014)			(0.027)		
Outbound student mobility$_{t-10}$		-0.009			-0.021	
		(0.016)			(0.075)	
Outbound student mobility$_{t-15}$			-0.068			-0.186*
			(0.052)			(0.082)
Secondary educational attainment$_{t-1}$				-0.004	-0.004	-0.010†
				(0.004)	(0.004)	(0.006)
Economic growth$_{t-1}$				-0.008†	-0.000	-0.006
				(0.004)	(0.005)	(0.009)
Percentage of employment in industry$_{t-1}$				-0.002	-0.001	0.005
				(0.013)	(0.014)	(0.024)
Electoral democracy$_{t-1}$				-0.111	0.030	1.086
				(0.284)	(0.322)	(0.687)
Ratio of emigration to population$_{t-1}$				-0.004	-0.058	0.001
				(0.031)	(0.046)	(0.053)
ODA/GNI$_{t-1}$				0.818	1.018	1.282
				(0.596)	(1.040)	(1.062)
Trade/GDP$_{t-1}$				0.001	-0.001	-0.001
				(0.001)	(0.002)	(0.002)
Time fixed effect	Y	Y	Y	Y	Y	Y
Constant	-0.022	0.011	0.028	0.317	0.341	0.056
	(0.093)	(0.074)	(0.139)	(0.216)	(0.295)	(0.690)
AR(2)	[0.093]	[0.069]	[0.217]	[0.072]	[0.049]	[0.205]
Hansen J-test	[0.094]	[0.065]	[0.288]	[0.165]	[0.035]	[0.408]
Diff-in-Hansen test	[0.065]	[0.023]	[0.290]	[0.128]	[0.036]	[0.825]
Number of instruments	21	16	11	42	37	32
Number of countries	43	40	38	43	40	38
Observations	484	343	178	484	343	178

Notes: Windmeijer corrected robust standard errors are in parentheses, and p-values in brackets. All explanatory variables are considered predetermined and are instrumented using two lags in levels and differences. AR(2) provide the p-values for the Arellano-Bond test for second-order autocorrelation. The Hansen J-test offers p-values for the null hypothesis of instrument validity, while the Diff-in-Hansen test reports the p-values for the null hypothesis of no improvement in model fit with additional moment restrictions.
*—$p < 0.05$; **—$p < 0.01$; ***—$p < 0.001$; †—$p < 0.10$ (two-tailed tests).

4.3. OSM and poverty in Africa

Due to limited data on poverty, African countries were not included in the dynamic panel model. However, given that extreme poverty is prevalent in Africa, it is crucial to investigate the impact of international higher education on poverty reduction in African nations. To address the absence of African low-income countries in the model, we examined the correlation between OSM and poverty in Africa. Fig. 2 illustrates a scatter plot of the 46 African countries based on the mean poverty and OSM between 1999 and 2018. The country-level correlation between the two measures is −0.677, indicating a strong negative association. Our analysis of country-year level correlation, disregarding country characteristics, also reveals a strong negative correlation between poverty and 5-, 10-, and 15-year lags of OSM, with coefficients of −0.777, −0.790 and −0.784, respectively. While this analysis does not establish a causal direction from OSM to poverty, it highlights the overall trend and the potential contribution of OSM to poverty reduction.[c]

5. Discussion and conclusion

This paper examined the link between international student mobility and poverty reduction in their home countries, emphasizing the systemic, long-term impacts that international educational experiences on broader socioeconomic development. Our study contributes to the literature on international development and higher education, which is based on the premise that human effort invested in higher education has the potential to improve society (Chankseliani, 2022). Our findings from the System GMM dynamic panel models and country-level correlation analysis for Africa suggest that a higher number of internationally educated individuals may be associated with long-term reductions in extreme poverty in low- and middle-income countries.

Our transnational lens provides a compelling explanation for the positive contribution of foreign-educated returnees to poverty

[c] We estimated OLS regression models for the African countries, using the same variables except for the lagged dependent variable and time fixed effects. While interpreting the results requires caution due to the small sample size and lack of consideration for dynamic models and time-invariant country characteristics, the findings align with those presented in Table 1 for countries in other continents. Detailed results are available in the online supplement.

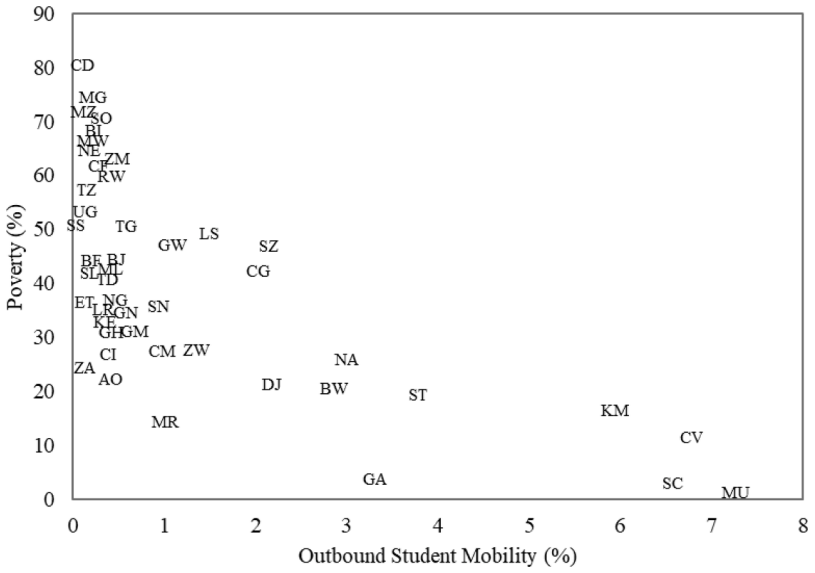

Fig. 2. Mean Outbound Student Mobility and Poverty in African Countries between 1999 and 2018 ($r = -0.677$, $N = 46$ Countries).
Notes: AO=Angola; BJ=Benin; BW=Botswana; BF=Burkina Faso; BI=Burundi; CV=Cabo Verde; CM=Cameroon; CF=Central African Republic; TD=Chad; KM=Comoros; CG=Congo; CI=Côte d'Ivoire; CD=Democratic Republic of the Congo; DJ=Djibouti; SZ=Eswatini; ET=Ethiopia; GA=Gabon; GM=Gambia; GH=Ghana; GN=Guinea; GW=Guinea-Bissau; KE=Kenya; LS=Lesotho; LR=Liberia; MG=Madagascar; MW=Malawi; ML=Mali; MR=Mauritania; MU=Mauritius; MZ=Mozambique; NA=Namibia; NE=Niger; NG=Nigeria; RW=Rwanda; ST=Sao Tome and Principe; SN=Senegal; SC=Seychelles; SL=Sierra Leone; SO=Somalia; ZA=South Africa; SS=South Sudan; TZ=Tanzania; TG=Togo; UG=Uganda; ZM=Zambia; ZW=Zimbabwe.

reduction. By conceptualising international higher education as transnational spaces, we contend that students' exposure to diverse cultures and perspectives abroad leads to a transformation in how they perceive and engage with their home countries, as outlined by Transformative Learning Theory. These transnational spaces also provide returning students with continuous opportunities to employ their human and social capital—such as skills, knowledge, and networks—to facilitate morphogenesis, which refers to the interactive process of societal transformation driven by the ongoing interplay between the structural conditions of home countries and the agency of returnees. Our findings suggest that international student mobility holds the potential to contribute to long-term poverty reduction in home countries through these sustained transnational experiences.

While our data primarily captures the quantitative aspects of international student mobility, it indirectly reflects the transnational exchanges that contribute to poverty reduction. The mobility rates serve as a proxy for the broader socio-economic and cultural interactions occurring within transnational spaces. Although this study does not directly test the pathways through which foreign-educated returnees may influence poverty reduction in their home countries, we propose several pathways based on our theoretical framework to explain the observed correlation: First, returnees can use their connections formed abroad to build bridges between their home countries and global networks of resources, innovation, and knowledge. Through these relationships, they link local communities with international partners, encouraging collaborations that directly help reduce poverty. These global connections enable the exchange of ideas and resources, promoting cooperation and supporting local economic development. For example, returnees can attract investments or support for poverty alleviation projects in their own communities. Campbell (2017) shows how international scholarship recipients use their networks to influence policy and contribute to social and economic development in their home countries. By doing this, returnees not only bring back knowledge but also act as vital links to global resources, creating more effective strategies for reducing poverty. This idea aligns with transnationalism, which stresses how cross-border ties can promote local development.

Second, returnees can contribute to better governance and civic participation after experiencing different political systems and democratic cultures abroad. These experiences can challenge their existing beliefs and give them new perspectives and skills to promote more open and inclusive governance back home (Chankseliani, 2018). Inspired by these experiences, returnees might push for policies that tackle deep-rooted poverty and promote social justice, changing political landscapes in their countries. Some may even join grassroots movements or political reform efforts to make governance more responsive to the needs of the poor. Transformative Learning Theory helps explain how these experiences lead to critical reflection and shifts in worldview, motivating returnees to advocate for fairer and more effective poverty reduction efforts.

Third, returnees can boost economic growth by bringing back specific skills, knowledge, and innovative practices. Armed with technical expertise and an entrepreneurial spirit, they may introduce new technologies and methods to sectors like health, science, and business (Kenney et al., 2013; Wang et al., 2011). By adopting these new practices, returnees can enhance productivity and diversify local economies, which is crucial for poverty reduction. For instance, they might introduce technological solutions that improve agricultural productivity, directly benefiting rural communities by increasing farmers' incomes. This highlights the importance of

knowledge sharing and innovation in driving local economic growth.

Fourth, returnees can do more than just share knowledge—they actively reshape social and institutional structures by introducing new ideas and approaches. Drawing on the morphogenetic approach and Critical Realism, they challenge established norms and offer alternative ways of operating, contributing to structural changes (morphogenesis) rather than maintaining the status quo (morphostasis) (Archer, 1995). For example, returnees might innovate in education by applying new teaching methods learned abroad, developing critical thinking and problem-solving skills among students from disadvantaged backgrounds, helping to break the cycle of poverty. This illustrates how returnees can act as catalysts for change, reshaping institutions to better address local needs and reduce poverty.

Fifth, returnees can drive inclusive economic development and social innovation by leveraging their international experiences and a strong sense of social responsibility. As Jon and Fry (2021) note, studying abroad often increases commitment to social justice and the common good. Motivated by these values, returnees might establish social enterprises or community projects that address systemic inequalities. For example, they could launch businesses that provide jobs and training to marginalized communities, directly contributing to poverty alleviation. This shows the transformative potential of international education to influence returnees' motivations and actions towards inclusive local development.

Sixths, returnees can act as cultural intermediaries, using their international experiences to bridge divides between diverse cultural groups and promote a more united and equitable society. Having been exposed to different cultural settings, they are well-equipped to navigate and connect different socio-cultural environments, enhancing mutual understanding and respect. By drawing on their experiences and offering nuanced perspectives on various societal practices, they may encourage dialogue and collaboration, to support social cohesion and reduces the tensions that often contribute to poverty. For instance, returnees might organise community workshops that promote understanding and cooperation between different social groups, helping to create a more integrated approach to local development and poverty reduction.

However, while these pathways provide credible explanations for the observed correlations, there is a need for further research to deepen our understanding of the mechanisms through which international student mobility affects poverty. Furthermore, adopting a more context-sensitive approach—such as single-country case studies—could provide deeper insights into how specific political, economic, and social conditions shape the impact of returnees on poverty reduction.

Our findings should be considered in light of several methodological limitations. First, the limited availability of poverty data in African countries hampers comprehensive cross-national analysis in low-income countries. Given the prevalence of extreme poverty in Africa, extension of data collection efforts in this region would significantly improve the understanding of the impact of international higher education on poverty. Second, the temporal scope of our research design restricts our ability to analyse long-term changes in the impact of foreign-educated graduates. While our study investigates the 15-year long-term systemic impact of foreign-educated graduates, a longer period of observation would be necessary to fully capture their direct and mediated impact on social change. Third, the measure of international student mobility from the UIS provides a snapshot of student numbers each year, hindering our ability to measure the sustained, cumulative causal impact of foreign-educated individuals on their home countries. Fourth, the limited data do not allow us to control for various features within the group of foreign-educated graduates, such as gender and field of study, which may have distinct influences on home countries. Fifth, we are unable to determine the current country of residence for foreign-educated graduates. While we control for emigration, the precision of the estimation would have been improved with the data on the migration trajectory of these graduates after studying abroad. This would have been especially useful for examining the varying effects that geographical distance from their home countries might have on poverty reduction. Sixth, our analysis does not account for heterogeneous impacts across different host countries' education and poverty contexts. Each host country has unique educational system and cultural and policy approach to poverty, which may shape international students' views on poverty differently. Finally, although our study employs the System GMM dynamic panel models to account for endogeneity, it does not fully eliminate the risk of omitted variable bias or reverse causality. Therefore, these results should be considered as indicative rather than definitive evidence of causality.

Additionally, the use of nation-states as the primary unit of analysis, known as methodological nationalism, has been criticised for potentially oversimplifying the complexities of global interactions and cultural dynamics. However, it remains a practical and relevant approach for certain types of empirical investigation, particularly in studies of international policy impacts and cross-national comparisons. In our research context, focusing on nation-states allows us to systematically examine how variations in internationally educated graduates, while controlling for local conditions, influence poverty outcomes. This approach provides a structured framework for analysing the aggregated effects of international student mobility on poverty, allowing for a clearer understanding of policy implications at the national level. Moreover, such an approach is consistent with the data available from international datasets, which are typically organised and reported by country.

The global surge in international student mobility prompts inquiries into its wider effects on society, particularly how it might change or reinforce existing social structures. While international students often build transnational connections, their movement can have unintended consequences. Some scholars argue that the power dynamics and the way aid is allocated in educational exchanges between the global North and South can perpetuate dependency and inequality rather than encourage genuine development. Rensimer and McCowan (2024) discuss how this allocation of resources can shift focus away from pressing educational needs in students' home

countries. Additionally, as Shields (2019) notes, the environmental impact of increased international travel for education complicates the view of international education as wholly positive.

Critics of international student mobility argue that it can widen social inequalities and contribute to brain drain. Educational opportunities abroad are often more accessible to privileged students, which can exacerbate social disparities both within and across countries, particularly between the global North and South. Waters (2012) suggests that the internationalisation of higher education can commodify education, further entrenching these inequalities. Our study focused on understanding the broader impact of international student mobility beyond just individual gains. By looking at the long-term effects on poverty reduction, we aim to uncover how these experiences can contribute to wider societal progress and help balance out the inequalities that may arise initially. Furthermore, research by Docquier and Rapoport (2012) and Kerr et al. (2016) discusses brain drain, where highly skilled individuals who leave their home countries for education do not return, potentially depleting the human capabilities needed for local development. To addresses these concerns, our study controlled for emigration, allowing us to more accurately isolate the correlation between international education and poverty reduction and providing a clearer picture of the direct impacts of educated returnees on their home economies.

Looking ahead, the rapid move towards online learning, accelerated by the COVID-19 pandemic, has significantly changed the landscape of international higher education. These changes present both challenges and opportunities by potentially democratising access to international education and reducing traditional barriers. However, the shift to digital learning platforms might also exacerbate existing inequalities due to disparities in digital access and literacy. Moreover, with fewer students physically travelling abroad, we might lose some of the traditional benefits of international education, such as direct cultural exchange and networking. Given these changes, there is a need for future research to assess how these shifts are affecting both individual student experiences and the broader impacts on society.

Finally, the current rise in national insularity is becoming a major challenge for international student mobility (Marginson, 2024). Increasing resistance to globalisation in many parts of the world may restrict the flow of knowledge and ideas, potentially altering the landscape of global education. The United Nations' Sustainable Development Goals and much of the literature underscore the need of broaden access to higher education for all, emphasizing its role in building knowledge, skills, and civic engagement for the common good (Chankseliani & McCowan, 2021; Howell et al., 2020). Echoing past studies that have shown how international higher education develops these capacities (Campbell & Neff, 2020; Jamison & Madden, 2021; Selvaratnam, 1985; Zweig & Yang, 2014), our research demonstrates that foreign-educated graduates can play a role in reducing poverty in low- and middle-income countries. Therefore, policies should aim to expand access to international higher education, alongside improving local educational opportunities, for students in these countries. Broadening such opportunities is vital not just for individual success but also for addressing wider societal challenges like poverty. Policymakers and educators need to understand these dynamics, reinforcing the need for ongoing research to fully harness the potential of international education for sustainable development.

CRediT authorship contribution statement

Joonghyun Kwak: Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Conceptualization. **Maia Chankseliani:** Writing – review & editing, Writing – original draft, Funding acquisition, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. Given Maia Chankseliani's role as Editor-in-Chief of IJER, Maia Chankseliani had no involvement in the peer review of this article and has no access to information regarding its peer review. Full responsibility for the editorial process for this article was delegated to Tien-Hui Chiang.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.ijer.2024.102458.

Appendix

Table A1, Table A2, Table A3

Table A1
43 Countries in the Sample.

Country	Number of observations	Country	Number of observations
Albania	4	Latvia	14
Argentina	13	Lithuania	14
Armenia	15	Malta	12
Bolivia	12	Mexico	2
Brazil	3	Moldova	14
Bulgaria	12	Mongolia	2
China	8	Pakistan	2
Colombia	12	Panama	15
Costa Rica	15	Paraguay	15
Croatia	9	Peru	15
Czech Republic	14	Poland	14
Dominican Republic	15	Romania	12
Ecuador	15	Russia	15
El Salvador	15	Serbia	6
Estonia	15	Slovak Republic	14
Honduras	15	Tajikistan	1
Hungary	14	Thailand	12
India	3	Türkiye	15
Indonesia	15	Ukraine	15
Iran	6	Uruguay	12
Kazakhstan	15	Venezuela	3
Kyrgyzstan	15		

Table A2
Variables, Descriptions and Sources.

Variable	Description	Source
Log poverty	Natural logarithm of the percentage of people who live on less than $2.15 per day at 2017 purchasing power adjusted price	World Bank
Outbound student mobility	The percentage of degree-seeking students studying abroad in the population of the typical age bracket for tertiary education	UNESCO Institute for Statistics, Concise Statistics on International Students in China
Secondary educational attainment	The percentage of people aged 25 to 64 with secondary education degrees	Barro and Lee (2013)
Economic growth	The annual growth rate in Gross Domestic Products	World Bank
Percentage of employment in industry	The percentage of the population employed in the industry sector	World Bank
Electoral democracy	The level of rulers' accountability to citizens through factors such as the scope of suffrage, the freedom of civil society organizations, election integrity, and the presence of free expression and independent media between elections	Variety of Democracy
Ratio of emigration to population	The proportion of individuals residing abroad relative to the total population	United Nations
ODA/GNI	Net official development assistance (ODA) as a percentage of Gross National Income (GNI)	World Bank
Trade	The amount of exports and imports of all goods and services as a percentage of GDP	World Bank

Table A3
Descriptive Statistics for Variables Used in the Analysis.

Variables	N	Mean	S.D.	Min.	Max.
Log poverty	484	1.07	0.90	0.00	3.45
Outbound student mobility$_{t-5}$	484	1.45	1.62	0.09	9.32
Outbound student mobility$_{t-10}$	343	1.14	1.18	0.09	7.75
Outbound student mobility$_{t-15}$	178	0.91	0.87	0.07	4.09
Secondary educational attainment$_{t-1}$	484	59.60	25.53	17.35	96.67
Economic growth$_{t-1}$	484	4.10	4.17	−15.14	18.29
Percentage of employment in industry$_{t-1}$	484	23.93	6.02	12.90	40.53
Electoral democracy$_{t-1}$	484	0.63	0.21	0.08	0.92
Proportion of emigration to population$_{t-1}$	484	0.11	0.08	0.01	0.41
ODA/GNI$_{t-1}$	484	0.92	1.94	−0.64	12.07
Trade$_{t-1}$	484	93.05	50.05	24.32	322.68

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