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Foreign Education, Gender Legal Rights, and Economic Freedom

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A significant body of literature has established a strong positive association between economic freedom and various economic and human development indicators (Hall and Lawson, 2014; Lawson, 2022). However, despite the overall increase in economic freedom across countries in the past five decades, its benefits have not been uniformly shared among all citizens. Fike (2016, 2017) draws attention to gender disparities in legal rights that specifically impact aspects of economic freedom, such as the legal system and property rights. Accounting for these disparities leads to lower economic freedom scores for several countries. Consequently, it is plausible that if recent increases in economic freedom were distributed more equitably across genders, countries could experience even greater economic and human development gains. In this study, we examine a potential avenue for reducing gender disparity in economic freedom: the role of foreign education for individuals. Our findings indicate that foreign students do respond to the gender legal rights disparities they encounter abroad, but interestingly, their response tends to be more of a backlash. Specifically, when they witness high levels of gender legal rights disparity and its negative impact on economic freedom for women, their reaction tends to be reducing gender legal rights disparity back home.

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I. Introduction

Economic freedom matters. A large literature documents a strong positive relationship between economic freedom as measured by the Fraser Institute's Economic Freedom of the World (EFW) report (Gwartney, Lawson, Hall, & Murphy 2022) and a variety of economic and human development indicators (Hall & Lawson 2014; Lawson 2022). For example, reviewing the literature published between 2011 and 2022 examining the relationship between economic freedom and a variety of socio-economic outcomes, Lawson (2022, p. 196) finds that two-thirds of the papers find a positive relationship between economic freedom and growth in GDP per capita; over 70 percent of the papers find a positive relationship between EFW and GDP per capita, output per worker, or total factor productivity. He also finds that the relationship between EFW and entrepreneurship is positive in over 60 percent of the papers. In almost 60 percent of the papers the relationship between EFW and investment is also positive (Lawson 2022, p. 196).

Over the last 50 years, most countries have seen their EFW scores increase by almost one-and-a-quarter points on average and, as a result, many countries have been able to capture many of the benefits that the literature has documented when evaluating the link between economic freedom and outcomes such as growth in GDP per capita, output per worker, total factor productivity, entrepreneurship, and investment.

However, one can wonder if, despite increasing economic freedom, some benefits are left on the sidewalk to capture if not all groups within some countries have benefitted from the same level of economic freedom. Fike (2016, 2017, 2023) highlights disparities in legal rights by gender that affect specific aspects of economic freedom, including legal system and property rights, the freedom to trade internationally, and regulation of credit, labor, and business. For example, in many countries, women face more restrictions than men on the ability to own property, start a business, or open a bank account. When adjusting for gender disparties, Fike (2016) finds that many countries' economic freedom scores are lower. This result presents a challenge, but also an opportunity: if recent increases in economic freedom could be distributed more equally across men and women, these countries might reap even larger economic and human development benefits, as women are empowered to allocate their resources and human capital in more efficient ways. In

addition, equal access to legal and financial institutions may also encourage the further acquisition of human capital for women, increasing economic growth in the future (Grier, 2023).

Why would a country be motivated to promote gender equality by ensuring equal opportunities for men and women to benefit from the advantages of increased economic freedom? Although there has been growing research on the effects of gender disparities in economic freedom (Fike 2017, Fike 2022), there is relatively less exploration into the factors that contribute to these disparities or the catalysts for reducing them, particularly, as it relates to capturing the benefits of economic freedom.

Several possible channels might positively influence levels of gender disparities in legal rights within a country: outside political pressure, trends in gobal media, or even remittances sent home by migrants that may earn women respect or more bargaining poswer within the household (Antman 2011; Escribà-Folch, Meseguer, & Wright 2022; Ferrant & Tuccio 2015; Peleah 2007). Immigration may play a role as well. Immigrants get exposed to different cultural and social institutions and norms at destination countries, which they might transfer back home once they recognize the benefits of adopting such cultural and social institutions and norms. For example, ccSimilarly, Beine, Docquier, and Schiff (2013) and Bertoli and Marchetta (2015) find evidence of transfer of fertility norms by migrants to their home countries. In terms of political institutions, increased levels of emigration to highly democratic and well-governed countries appear to promote better democratic institutions, increased political accountability, and higher voter participation rates at home (Batista & Vicente 2011; Beine & Sekkat 2013; Chauvet & Mercier 2014; Docquier, Lodigiani, Rapoport, & Schiff 2016). Moreover, Lodigiani & Salomone (2020) show that international migration rate has a positive and significant effect on female political empowerment measured by the share of women in the lower chamber of National Parliaments in countries of origin.

In this paper, we investigate a different channel to reduce gender disparity in economic freedom: foreign education of individuals. Using UNESCO data, we investigate whether students who leave home to study in universities abroad may return to their home countries with the adopted attitudes of their destination countries. They may then promote these changed attitudes toward gender disparities in economic freedom within their home countries, subsequently affecting change in the gender distribution of legal rights.

In fact, foreign education has long been explicitly promoted by many countries around the world with specific policy aims in mind. For example, the United States strives to promote democratic ideals among foreign students who attend universities there, and it has been argued that foreign education helped bring about the end of the Soviet Union (Spilimbergo, 2009, pp. 528-529). Indeed, Spilimbergo (2009) provides empirical evidence that countries that send a larger share of students to study in democratic countries subsequently experience an increase in levels of democracy at home. Similarly Mercier (2016) find that political leaders in developing countries who studied abroad in high-income OECD countries and reached power in initially autocratic settings promote democracy in their home countries during their tenure.

A plausible mechanism for these effects is that repeated interactions between groups may encourage the transfer of ideas, behaviors, identities, and social capital from one group to another. Levitt (1998, p. 936) labels these transfers "social remittances," which can take place "when migrants return to live in or visit their communities of origin; when nonmigrants visit their migrant family members; or through interchanges of letters, videos, cassettes and telephone calls." In our case, as foreign students are exposed abroad to different behaviors, institutions, and social norms including norms for interpersonal behavior, gender roles, and gender relationships, if these foreign students recognize the benefits of these institutions and social norms, they will promote these new ideas about appropriate institutions and norms return back home.

Section 2 discuss our model and the data we use for our model. Section 3 presents the results from our model testing foreign education as a potential channel through which women could capture a greater share of the benefits of increases in economic freedom by reducing the disparities in gender legal rights. Section 4 provides some discussion of our results including the limitation of our empirical strategy. Section 5 offers some concluding remarks.

II. Model and Data

Our paper hypothesizes that attitudes toward equality in gender rights to economic freedom among foreign-educated individuals may spread in the same manner as those about democratic ideals. To study the relationship between foreign education and gender equality in economic freedom, we adopt the same empirical strategies utilized by Spilimbergo (2009) and Lodigiani and Salomone (2020): dynamic panel regressions.

The data on foreign students used in this study are sourced from two distinct datasets.[1] For the period between 1970 and 2000, we obtained the data from the UNESCO Statistical Yearbook, which was compiled and cleaned by Spilimbergo (2009) who generously shared the raw data with us. To extend our analysis to the years 2000-2020, we accessed the data from the UNESCO's Institute for Statistics database. Both datasets provide information on bilateral student flows at the tertiary level from 1970 to 2020. [2]

Fike (2017, p. 190) develops a Gender Disparity Index (GDI) that measures legal rights disparity between genders to adjust "the index published in Economic Freedom of the World to account for the fact that women and men do not always have equal access to the economic institutions measured in the index." The GDI, which is published by the Fraser Institute's *Women and Economic Progress 2023 report* (Fike, 2023) is built using data from the World Bank (2020)'s *Women, Business, and the Law* (WBL) report. The WBL report (World Bank 2023, pp. 87-88) is built using 35 questions to evaluate legal and regulatory differences between men and women across eight indicators: mobility, workplace, pay, marriage, parenthood, entrepreneurship, assets, and pension.[3] However, unlike the WBL report that also tracks gender-equality mandates and other forms of positive entitlements, the GDI only tracks freedom to questions that are consistent with a conception of negative freedom, thus building its index on 17 out of the 35 questions on which the WBL report builts its WBL score (Fike, 2023, p. 2).[4]

Since most of the questions used to build the GDI focus on whether men and women are treated equally under the law, Fike (2017, pp. 198-199) uses the GDI scores to reevaluate the country's EFW scores focusing on the area 2 – legal system and property rights – of the EFW report using the following formula:

[1] Due to the unavailability of gender-disaggregated data, our study does not provide a breakdown of students abroad based on gender. Even if such data were accessible, it is unclear whether efforts to improve females' legal rights and subsequently enhance their economic freedom are solely pursued by female migrants (Lodigiani & Salomone, 2020, p. 439). Additionally, Doepke and Tertilt (2009) demonstrate that men also have incentives to share power with women, highlighting the trade-off they face between advocating for rights for their own wives (typically none) and the rights of women in the broader economy.

[2] Foreign students are defined as students enrolled in an education program in a country where they are not permanent residents. Tertiary education is defined as the educational level following the completion of a school providing a secondary education, such as a high school; tertiary education includes levels 5 and 6 of the International Standard Classification of Education (ISCED).

[3] The answer to each 35 questions is a simple "yes" or "no", which is then coded into a dummy variable. For each question, "yes" receives a "1" and "no" receives a "0". There are 4 or 5 questions per indicator and each indicator-level score is obtained by calculating the unweighted average of responses to the questions within that indicator and scaling the result to 100. Overall scores are then calculated by taking the average of each indicator, with 100 representing the highest possible score (World Bank, 2023, p. 88).

[4] In addition, to obtain the GDI scores, Fike (2022) calculates the unweighted average of responses to the 17 questions to obtain a score ranging from 0 to 1 where 1 indicates that there is no *de rule* gender legal rights disparity.

$$Adjusted\ Area\ 2\ score_{it} = \frac{(Area\ 2\ Score_{it} + Gender\ Disparity\ Index_{it} \times Area\ 2\ Score_{it})}{2} \quad (1)$$

*w*here *i* indicates the country and *t* denotes the year.[5]

While it would be reasonable to use the gender disparity score as our dependent variable, our main interest is not exclusively about gender legal rights disparity. It is about gender disparity as it pertains to economic freedom and how it affects the ability of women to capture the benefits of economic freedom and, more specifically, the benefits of economic freedom in the area 2, particularly, when economic freedom is increasing.

As noted by Fike (2016, p. 196), there are quite a few countries, particularly, from countries with a socialist legal system and from Latin America that have a GDI score ranging between 0.85 and 1.00, but where their EFW scores put them more than three standard deviations below the top scoring countries in terms of EFW scores. Therefore, the GDI scores alone do not help us see how whether foreign education is a potential channel through which women's economic freedom will improve. To account for both the decrease in gender legal rights disparity and the increase in economic freedom, particularly, in area 2, our main specification features the difference between unadjusted EFW area 2 and adjusted for gender disparity EFW area 2:

$$diffefw_{a2} = rawefw_{a2} - efw_{a2} \quad (2)$$

Where $rawefw_{a2}$ is the EFW area 2 score that is not adjusted for gender disparity and efw_{a2} is the EFW area 2 score that is adjusted for gender disparity.[6] If the EFW score for area 2 increases from one period to another, but gender legal rights disparity remains the same, then women still capture some of that increase. If the EFW score for area 2 does not increase from one period to another, but gender legal rights disparity decreases, women will capture a greater share of

[5] One core assumption behind this formula is that, on average, the female population of countries in the dataset is 50 percent and this assumption is usually correct. However, a few countries due to high level of male immigration have a female population on average below 45 percent: Kuwait (42.4 percent), Oman (43.7 percent), Qatar (31.6 percent), and Saudi Arabia (44 percent).

[6] The EFW report (Gwartney, Lawson, Hall, & Murphy, 2022) dataset provides EFW area 2 score adjusted for gender disparity. Therefore, to find the unadjusted EFW area 2, we rely on Fike (2017)'s formula to calculate the adjusted EFW area 2: $rawefw\_a2 = \frac{(2 \times adjusted\ efw\_a2)}{(1+GDI\ score)}$.

economic freedom. If both EFW score area 2 increases and gender legal rights disparity decreases, women will be able to capitalize on that increase in economic freedom more than men had in the previous period. Our data on EFW scores come from the Fraser Institute's 2022 Economic Freedom of the World annual report (Gwartney, Lawson, Hall, & Murphy, 2022).

The explanatory variables are as follows: past levels of difference between unadjusted EFW area 2 and adjusted for gender disparity EFW area, number of students abroad as a share of total population of sending countries, average level of difference between adjusted and unadjusted EFW area 2 in destination countries, and the interaction between the last two terms. All explanatory variables are lagged five years, the sample comprises 164 countries and spans the period 1970 to 2020.[7] In addition, all regressions have time and country effects, except when otherwise specified.

The number of students abroad as a share of total population of sending countries lagged five years is meant to capture the effect of foreign education. We use the average level of difference between adjusted and unadjusted EFW area 2 – legal system and property rights – in destination countries to capture the type of economic institutions and the type of gender legal rights that foreign students are exposed to.[8] The interaction term between those three variables measures if the marginal effect of foreign students depends on the level of economic freedom area 2 and gender legal rights disparity in host countries.

To calculate the average level of difference between adjusted and unadjusted EFW area 2 in destination countries, which is defined as the weighted average of difference between adjusted and unadjusted EFW area 2 in host countries where a country's weight is the share of students going to that country over all foreign students from the origin country. This score lies between 0 and 2.647; the score is 0 if all students abroad are in countries where there is no gender legal rights disparity and, therefore, there is no difference between adjusted and unadjusted EFW area 2 score and 2.647 if students abroad are in countries where there is the GDI score is high enough that the difference between adjusted and unadjusted EFW area 2 score is 2.647. On average, foreign students go to countries where the difference between the adjusted and adjusted EFW area 2 score is lower than in home countries:

[7] Given that institutional change takes time, we also run the regressions using ten-year intervals.

[8] We also run an alternate set of regressions using the average level of GDI-adjusted EFW area 2 score at destination countries when looking at impact on the difference between adjusted and unadjusted EFW area 2.

$$Average\ level\ of\ difference\ between\ adjusted\ and\ unadjusted\ EFW\ area\ 2\ in\ host\ countries_{it}$$

$$\overline{diffefw_{area2}}_{it} \equiv \sum_j \frac{S_{ijt}}{\sum_i S_{ijt}} \times diffefw_{area\ 2_{jt}} \quad (3)$$

where $diffefw_{area\ 2_{jt}}$ is the difference between adjusted and unadjusted EFW area 2 at destination countries, and S_{ijt} is the number of students from country i to country j in year t. By construction, these indices lie between 0 and 2.647. To avoid problems of a small sample, this variable is used only if there are at least ten students abroad.

The basic specification is as follows:

$$diffefw_{a2_{it}} = \alpha diffefw_{a2_{it-5}} + \beta \text{students abroad}_{it-5} + +\gamma \overline{diffefw_{area2}}_{it-5} + \eta(\text{students abroad}_{it-5} * \overline{diffefw_{area2}}_{it-5}) + \rho X_{it-5} + \mu_t + \delta_i + \varepsilon_{it} \quad (4)$$

Where $diffefw_{a2_{it}}$ is the difference between unadjusted and adjusted for gender disparity economic freedom area 2 in country *i* in period *t*. The 5-year lagged value of that difference in our specification is included to capture the various long-run historical, cultural, economic, political, and other factors that influence that difference. Our main variable of interest, $\text{students abroad}_{it-5}$, is the 5-year lagged value of the share of students abroad from a sending country *i*. Therefore, the parameter β measures the effect of foreign students originating from a country *i* at period *t-5* on the difference between adjusted and unadjusted EFW area 2 score at period *t* (that is, 5 years later). Our potential covariates are included in the vector X_{it-5}.

We use three different estimation techniques: pooled OLS, fixed-effects OLS, and two-step system GMM (SYS-GMM). The pooled OLS provide a first idea of how the data are correlated without controlling for country fixed effects, and therefore overestimate the coefficient on the lag dependent variable. Second, as Nickell (1981) demonstrates, in presence of a lagged dependent variable with small T, controlling for fixed effects biases the estimates because a correlation exists between the regressor ($diffefw_{a2_{it-5}}$) and the error term (ε_{it}) (Baum 2013, p. 3). We use two-step SYS-GMM estimators to obtain consistent and unbiased estimates as suggested by Arellano

and Bover (1995) and Blundell and Bond (1998).[9] The SYS-GMM estimator uses both lagged levels and lagged differences to estimate the coefficients, with the assumption that the first-differenced instrumental variables are not correlated with the unobserved fixed effects in the model. We use SYS-GMM as opposed to the difference GMM estimator (Arellano & Bond, 1991).

In addition, instead of using an external instrument such as the "shift-share" instrument described in Card (2007, 2001), we use internal instruments.[10] We treat Students abroad, economic freedom area 2 in hosting countries, and all other control variables excluding time fixed effects, as predetermined and are instrumented for using their own lags in level and difference.[11]

III. Results

The results of the baseline regressions are reported in columns 1 through 3 and column 9 in **tables 2** and **3**. **Table 2** reports the results of our regressions with 5-year lag; **table** 3 reports the results of the regressions with 10-year lag. As expected, gender legal rights disparity as it is reflected in the difference between the unadjusted and adjusted-for-GDI EFW scores for area 2 is persistent through time; the coefficient on past differences in EFW scores for area 2 ranges between 0.884 in pooled OLS and 0.592 for the fixed effects with the lagged dependent variable with the unbiased SYS-GMM estimator (0.592) within this range.[12]

Our results are not consistent across the board and depend largely on how much gender legal rights disparity is affecting women's economic freedom at destination countries and how many foreign students are exposed to that institutional environment when studying abroad. On the one hand, total effect of average difference between adjusted and unadjusted-for-GDI EFW scores at destination countries is positive and statistically significant at least at 5 percent in our baseline SYS-GMM and baseline fixed-effects regression without lagged dependent variable. When a

[9] We also run fixed effects regressions without the lagged dependent variable. Since fixed effects control for any time-invariant unobserved heterogeneity between the countries —which, among other things, includes the initial level of difference between adjusted and unadjusted economic freedom area 2 — running fixed effects regressions without the lagged dependent variable should eliminate the Nickell bias.

[10] The main reason for using the internal instrument instead of the "shift-share" instrument (as we often see used in the immigration literature) is this: an important assumption behind the shift-share instrument is that the size of the past settlement of immigrants from an origin country is the sole determinant of migration to a specific state by immigrants from the same origin country. However, given that the past location of immigrants across destinations is likely correlated with past institutions, which themselves tend to be persistent and correlated over time, the exclusion restriction of the shift-share instrument such as the one developed by Card (2007) becomes invalid.

[11] Following Roodman (2009)'s recommendations, we limit the number of lags to keep the number of instruments below the number of groups, doing so avoid biasing the GMM estimation results and weakening the Hansen test of the instruments' joint validity.

[12] In **table 3**, the range is between 0.810 (pooled OLS) and 0.316 (fixed effects with lagged dependent variable) with an unbiased SYS-GMM estimator at 0.697.

country sends less than two-thirds of a percent of students to study abroad, the effect of the difference between adjusted-for-GDI and unadjusted EFW scores is 0.154, meaning that when a country sends fewer than two-thirds of a percent of students to study abroad, the difference between adjusted for GDI and unadjusted EFW scores increases by 0.154 (almost two-thirds of a standard deviation). However, countries for which the share of students they send abroad is greater than two-thirds of a percent, the total effect, -0.108, is negative and statistically significant at 5 percent level.[13]

Our results for the total effect of students abroad also indicate that fewer gender legal rights disparity abroad does not reduce gender legal rights disparity at home; it is the opposite. This is particularly apparent in our baseline fixed-effects regressions with and without the lagged dependent variable when comparing total effect of students abroad at minimum of average difference between adjusted and unadjusted EFW scores at destination countries and total effect of students abroad at maximum of average difference between adjusted and unadjusted EFW scores at destination countries.[14] When gender disparity is zero, the effect, positive or negative, is not statistically significant in our baseline fixed-effects regressions. When average difference between adjusted and unadjusted EFW scores at destination countries is very large (maximum = 2.647), one standard-deviation increase in share of population studying in these countries decreases difference between adjusted and unadjusted EFW scores at home by a range between 0.07 point (statistically significant at 5 percent level in fixed-effects regression with lagged dependent variable) and 0.17 point (statistically significant at 1 percent level in fixed-effects regression without lagged dependent variable).[15]

IV. Robustness Checks

In principle, the relationship between foreign education in countries with lower gender legal rights disparity and gender legal rights disparity at home and how it affects women's economic freedom as it relates to legal system and property rights could be spurious because of third factors that might affect both hosting and sending countries. Our regressions included time dummies to

[13] We obtain similar results in the 10-year lag fixed-effects regressions (see **table 3**).

[14] In our baseline SYS-GMM, the total effect of students abroad is not statistically significant regardless of the average level of difference between adjusted and unadjusted-for-GDI EFW scores for area 2.

[15] We obtain similar results in the 10-year lag fixed-effects regressions (see **table 3**).

allow to control for global trends. However, country-specific-time-varying trends could be at play as well.

To address the issue of possible spurious correlation, we replicate the basic regressions (column 3 in table 2 and table 3) adding third possible factors:

(1) level of democracy at source countries as measured in the Polity Project Polity 5's (Marshall & Gurr, 2018) revised combined polity score, *polity2*;[16]

(2) Educational attainment, that is, the average years of total schooling, age 15+ from the Barro-Lee dataset, which we obtained through the *World Bank Database's Education Statistics*;

(3) tertiary enrollment as the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education shown from the World Bank's *World Development Indicators* (WDI);

(4) natural log of real GDP per capita, which we obtained from *Penn World Table 10.01* (Feenstra, Inklaar, & Timmer, 2015).

Columns 4 to 7 present results introducing one control at the time in **Table 2** and **Table 3**. Columns 8 and 9 present results with all the control variables. Except for natural of real GDP per capita, all the other explanatory variables are negatively correlated and statistically significant at the 1 percent level with difference between adjusted-for-GDI and unadjusted EFW scores. One standard-deviation increase in the polity2 score decreases the difference between unadjusted-for-GDI and adjusted EFW score for area 2 by 0.13 point. Similarly, one standard-deviation increase in the average number of years of total schooling decreases that difference by 0.12 point.

Comparing the SYS-GMM regression with all the control variables being added with our fixed-effects regression without lagged dependent variable but all the control variables being added, our results are inconsistent with the most likely explanation that SYS-GMM does not specifically has country effects because by using first-differences, system GMM is assumed to control for time-invariant unobservable country-specific effects.[17] In our fixed-effect regressions without lagged

[16] We also run the regressions using the V-Dem's measure of electoral democracy (v2x_polyarchy) and V-Dem's measure of liberal democracy (v2x_libdem) as alternative control variables for Polity 2 (Varieties of Democracy Institute 2023; (Pemstein, et al. 2023).

[17] We ran a set of SYS-GMM adding country effects and the signs of the coefficient are consistent with the sign of the fixed-effect regressions without lagged dependent variables with all the control variables added. However, adding country effects into our SYS-GMM regressions significantly increases the number of instruments even after using the **collapse** command to one instrument for each variable and lag distance, rather than one for each period, variable, and lag distance, which overfit instrumented variables and reduce instrument validity (Roodman, 2009, pp. 139-142). It is also important to note that technically SYS-GMM approach inherently controls for country-level fixed effects by differencing the data. Alternatively, we also ran a set of two-step difference GMM regressions and our results seem more consistent with our fixed-effect regressions

dependent variables and all control variables added, one standard-deviation increase in the share of students abroad going to countries where the average difference between unadjusted and adjusted-for-GDI EFW scores for area 2 at destination country is very high (maximum = 2.647) reduces the difference between these two scores are home by almost 0.25 point (statistically significant at the 1 percent level).[18] For countries sending their students to countries where the average difference between unadjusted and GDI-adjusted EFW scores is about a standard deviation, one standard deviation increase in the share of students going to these countries decrease the difference at home by 0.08 point. These results point to the backlash effect where students who are temporarily exposed to significant gender legal rights disparity and how it affects economic freedom for women return home and push for policies reducing gender legal rights disparity at home and thus increase economic freedom for women.

A. First differences

To further investigate the issue of omitted variables, we estimate the baseline specification in first differences. The rationale for this specification is to take out all possible country specific effects. we test the following specifications:

$$\Delta diffefw_{a2\,it} = \alpha \Delta \text{students abroad}_{it-5} + \beta \Delta \overline{diffefw_{area2}}_{it-5} + \gamma(\Delta \text{students abroad}_{it-5} * \Delta \overline{diffefw_{area2}}_{it-5} + \rho \Delta X_{it-1} + \mu_t + \varepsilon_{it} \quad (6)$$

Second, we control for country-specific trends with fixed effects in differences:

$$\Delta diffefw_{a2\,it} = \alpha \Delta \text{students abroad}_{it-5} + \beta \Delta \overline{diffefw_{area2}}_{it-5} + \gamma(\Delta \text{students abroad}_{it-5} * \Delta \overline{diffefw_{area2}}_{it-5} + \rho \Delta X_{it-1} + \mu_t + \delta_i + \varepsilon_{it} \quad (7)$$

(**Table 2A** and **Table3A**). However, using the standard first-differenced GMM estimator in panel data with short sample periods and persistent series could cause the estimates of the coefficients to suffer from biases and imprecision (Blundell and Bond 1998, p. 138). We also present these results in the appendix.

[18] Even if we must take those results with a grain a salt, when running the SYS-GMM with country effects, sending students to foreign country where the average difference between unadjusted and GDI-adjusted EFW scores is very large reduces 0.07 point (statistically significant a 5 percent level).

The first specification attempts to control for country fixed effects by taking first differences. The second specification also controls for country-specific trends (the fixed effects in differences). We try differences in 5 and 10 years. To avoid simultaneity bias, this specification has explanatory variables lagged five (ten) years in the five-year (ten-year) specifications as well. The results are reported in **Table 4**.

Our results show negative coefficients in five and ten-year lags specifications, but these coefficients are not statistically significant or are weakly significant.

B. Long-run differences

The relationship between foreign education and gender legal rights disparity and how it affects women's economic freedom in the area 2 of the EFW report could operate over long periods. The underlying idea is that it takes time for institutions to change. We test the relationship between foreign education and gender legal rights disparity and its effects on the difference between adjusted and unadjusted EFW area 2 over long periods by examining long-run differences. Even though we cannot control for country fixed effects with long-run differences, we expect idiosyncratic state shocks to be less relevant in the long run. We test the longest difference possible with the available data using the following specification[19]:

$$\Delta diffefw_{a2\,i1970-2020} = \alpha \Delta \text{students abroad}_{i1970-2020} + \beta \Delta \overline{diffefw_{area2}}_{1970-2020} + \gamma(\Delta \text{students abroad}_{i1970-2020} * \Delta \overline{diffefw_{area2}}_{i1970-2020} + \rho \Delta X_{i1970-2020} + \varepsilon_{it} \quad (8)$$

The results for 50-year differences are reported in columns 1 to 4 of **Table 5**. Our most consistent results are for countries that have experienced a relatively large increase of students sent

[19] We also run 40-year differences, which allow us to include the 40-year change in educational attainment as an additional control variable. The results for 40-year differences are reported in columns 5 to 9.

abroad (max ≈ 1.5 percent) and for countries that sent their students to countries that experienced a large decline in gender legal rights disparity (min change in average difference between unadjusted and GDI-adjusted EFW scores for area 2 = -1.561575). Countries that have experienced over 50-years a large increase in the share of foreign students experienced an increase over 50 years of the difference between unadjusted and adjusted-for-GDI EFW scores in the area of legal system and property rights slightly over a point. When considering countries that experienced a one standard-deviation increase in the share of students sent abroad saw an increase in the difference between adjusted and unadjusted EFW scores of about three-quarters of a standard deviation or slightly over one-third of a point.

On the other hand, the countries with a one standard-deviation increase over 50 years in share of students abroad and send these students to countries that experienced on average a decline in the difference between unadjusted and GDI-adjusted EFW scores for area 2 by 1.56 points saw a decrease of the difference between unadjusted and GDI-adjusted EFW scores for area 2 by about 0.2 point (about one-third of a standard deviation; statistically significant at the 1 percent level). On average though it is worth noting that the total effect of 50-year change in students abroad on the difference between adjusted and unadjusted EFW scores for area 2 are not statistically significant.

V. Discussion and Conclusion

When considering the possible channels through which economic freedom for women could be improved, looking at foreign education provides some mixed results. On the one hand, our results are consistent with previous research that shows that when migrants, temporary (such as foreign students tend to be) or permanent, are exposed to a particular set of institutions, they tend to absorb them and promote them back at home, particularly, if they see how such set of institutions can benefit them. When students are exposed to some gender legal rights disparity as it manifests through the difference between unadjusted and adjusted-for-GDI EFW scores for area 2, we observe an increase in that difference 5 and 10 years later in their home countries.

On the other hand, our results also show that when students are exposed to an institutional environment where the average difference between unadjusted and adjusted-for-GDI at destination countries is very large, we observe the opposite effect where some sort of backlash effect takes place where 5 and 10 years later the difference between adjusted and unadjusted-for-GDI EFW

scores decreases. Similarly, over the long run, we observe that countries, which send an increasing number of students to countries that experienced over that same period a large decrease in the average difference between unadjusted and adjusted EFW scores for area 2, experience a decrease in the gender legal rights disparity, which itself is reflected in a decrease in the difference between adjusted and unadjusted EFW scores for area 2.[20]

Despite these results, we should also not forget that our study does not show that being educated in countries with lower gender legal rights disparity causes a decrease in gender legal rights disparity back home. Endogeneity problems abound. While foreign education might affect gender legal rights and economic freedom for women, foreign education might also be the results of changes in economic freedom and gender legal rights.

Another concern is that linear regression models such as the one in our study assume that the marginal effect of a regressor is constant. Whether we examine the marginal effect of foreign education or the marginal effect of average level of difference between unadjusted and GDI-adjusted EFW scores at destination countries, the assumption is that these marginal effects are constant or a continuous function of the share of foreign students or the level of between unadjusted and GDI-adjusted EFW scores at destination countries. There might be a threshold of share of foreign students that needs to be reached before the effect of students need to take place. Similarly, there might be a threshold of gender legal rights disparity and its impact on economic freedom for women at home that must be reached before it triggers any incentives, even from foreign students, to promote changes toward reducing gender legal rights disparity to help women also capture the gains from economic freedom.[21]

As we discussed our results are not consistent across the board. We do find that exposure to gender disparity while studying in foreign countries might bring about more gender disparity at home and diminish the ability for women to capture the benefits associated with greater economic freedom, but how much gender disparity and how many students are exposed to such disparity also matter. Therefore, we must be cautious before jumping to the conclusion that exposure to a lack of gender legal rights disparity and greater economic freedom for women through foreign

[20] As noted above, when running two-step difference GMM yields results that are more consistent with the fixed-effect regressions, particularly, those without the lagged dependent variable.

[21] One could argue that the threshold required to trigger any incentives for foreign students to push for reducing gender legal rights disparity and increase economic freedom for women largely depends of how large is the difference between the difference between unadjusted and GDI-adjusted EFW scores for area 2 at home and the average level of difference between unadjusted and GDI-adjusted EFW scores for area 2 at destination countries.

education might be a channel through which gender legal rights disparity could be reduced leading to women better able to capture the benefits of increasing economic freedom.

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Table 1 Descriptive Statistics

Variables	(1) N	(2) Mean	(3) S.D.	(4) Min	(5) Max
Percentage of population studying abroad	1,804	0.00111	0.00203	0	0.0232
Difference between adjusted and unadjusted EFW area 2	1,377	0.512	0.518	0	2.647
Average difference b/w adjusted-unadjusted EFW area 2 at destination countries	1,677	0.300	0.299	0	1.694
Barro-Lee: Average years of total schooling, age 15+, total	1,251	6.392	3.056	0.0600	13.18
School enrollment, tertiary (% gross)	1,131	0.265	0.256	0	1.509
Polity 2	1,572	1.860	7.171	-10	10
Log GDP per capita, PPP (constant 2017 international $)	1,643	8.934	1.236	6.131	12.56
Countries	164	164	164	164	164

Table 2 Foreign education and difference between unadjusted and GDI-adjusted EFW scores for area 2: levels (5-year lag)

Lagged variables (5-year lag)	(1) Pooled OLS	(2) Fixed effects OLS	(3) System GMM	(4) System GMM	(5) System GMM	(6) System GMM	(7) System GMM	(8) System GMM	(9) Fixed effects OLS	(10) Fixed effects OLS
Difference between adjusted and unadjusted EFW area 2	0.884***	0.592***	0.748***	0.712***	0.683***	0.735***	0.671***	0.791***		
	(0.0211)	(0.0478)	(0.0645)	(0.0620)	(0.0854)	(0.0638)	(0.0509)	(0.0615)		
Percentage of population studying abroad	1.715	0.264	4.632	14.70**	0.288	8.917	7.713	2.254	-17.36	-19.82
	(2.782)	(6.355)	(5.235)	(7.144)	(3.730)	(5.460)	(5.028)	(3.491)	(11.80)	(16.81)
Average difference b/w adjusted-unadjusted EFW area 2 at destination countries	0.0724***	0.0615**	0.155***	-0.0176	0.123*	0.127***	0.0417	-0.0165	0.188***	0.200**
	(0.0242)	(0.0307)	(0.0501)	(0.0373)	(0.0703)	(0.0398)	(0.0415)	(0.0545)	(0.0655)	(0.0806)
Percentage of population studying abroad x Average difference b/w adjusted-unadjusted EFW area 2 at destination countries	-0.553	-25.73***	-0.837	7.466	37.86	-2.893	6.380	23.48*	-46.34***	-61.31***
	(16.37)	(7.257)	(19.43)	(17.11)	(29.97)	(21.06)	(15.83)	(12.77)	(14.54)	(19.37)
Barro-Lee: Average years of total schooling, age 15+, total				-0.0391***				0.00676		-0.0414
				(0.00969)				(0.0110)		(0.0471)
School enrollment, tertiary (% gross)					-0.247***			-0.0863		-0.0634
					(0.0829)			(0.0848)		(0.138)
Log GDP per capita, PPP (constant 2017 international $)						-0.0274		0.00815		-0.0545
						(0.0186)		(0.0254)		(0.0595)
Polity 2							-0.0186***	-0.0124***		-0.00384
							(0.00245)	(0.00452)		(0.00350)
Total effect of difference b/w adjusted-unadjusted EFW area 2 at destination countries at mean	0.0717***	0.0308	0.154***	-0.00871	0.168**	0.123***	0.0493	0.0115	0.132**	0.127*
	(0.0273)	(0.0308)	(0.0455)	(0.0427)	(0.0663)	(0.0377)	(0.0405)	(0.0541)	(0.0642)	(0.0752)
Total effect of students abroad at mean	1.621	-4.125	4.489	15.97**	6.746	8.424	8.802**	6.260**	-25.27**	-30.28*
	(1.706)	(6.228)	(4.666)	(7.650)	(4.768)	(5.232)	(3.940)	(3.133)	(11.61)	(17.57)
Total effect of difference b/w adjusted-unadjusted EFW area 2 at destination countries at SD	0.0712*	0.00781	0.153***	-0.00205	0.202***	0.121***	0.0550	0.0324	0.0910	0.0724
	(0.0370)	(0.0325)	(0.0494)	(0.0519)	(0.0752)	(0.0460)	(0.0452)	(0.0565)	(0.0663)	(0.0757)

Total effect of students abroad at SD	1.561 (2.808)	-6.892 (6.274)	4.399 (5.432)	16.77** (8.484)	10.82 (7.427)	8.113 (6.253)	9.487** (4.107)	8.784** (3.632)	-30.25** (11.77)	-36.87** (18.35)
Total effect of difference b/w adjusted-unadjusted EFW area 2 at destination countries at max	0.0596 (0.375)	-0.535*** (0.167)	0.136 (0.432)	0.155 (0.399)	1.000 (0.672)	0.0597 (0.474)	0.190 (0.358)	0.528* (0.292)	-0.886*** (0.330)	-1.221*** (0.426)
Total effect of students abroad at min	1.715 (2.772)	0.245 (6.354)	4.632 (5.228)	14.70** (7.144)	0.317 (3.720)	8.915 (5.454)	7.718 (5.020)	2.272 (3.486)	-17.40 (11.79)	-19.87 (16.82)
Total effect of students abroad at max	0.928 (21.10)	-36.36*** (11.00)	3.441 (25.56)	25.32 (25.21)	54.17 (41.10)	4.800 (28.29)	16.79 (19.77)	35.68** (16.83)	-83.32*** (21.92)	-107.1*** (34.20)
Observations	1,204	1,204	1,204	980	852	1,178	1,142	640	1,277	662
R-squared	0.862	0.552							0.266	0.327
Adjusted R-squared	0.861	0.547							0.260	0.312
Number of countries		158	158	134	150	157	149	122	164	125
AR(1) test			0.0873	0.0302	0.0463	0.0961	0.0221	0.513		
AR(2) test			0.0389	0.0169	0.0256	0.0512	0.00609	0.601		
Hansen's J. test			0.243	0.528	0.512	0.334	0.414	0.447		
Number of instruments			136	133	150	150	150	121		

Notes: Robust standard errors clustered by country in parentheses. AR(1) and AR(2) are Arellano-Bond test for serial correlations. The sample is an unbalanced panel, comprising data at five-year intervals between 1970 and 2010. Students abroad, Average difference b/w adjusted-unadjusted EFW area 2 at destination countries, and all other control variables are treated as predetermined and are instrumented for using their lags in level and differences. The total effect of difference between adjusted-unadjusted EFW area 2 at destination countries at **mean** is calculated summing the coefficients on "average difference between adjusted-unadjusted EFW area 2 at destination countries" and on the interaction between "students abroad" and "average difference between adjusted-unadjusted EFW area 2 at destination countries," evaluated at average level of students abroad. The total effect of students abroad at **mean** is calculated summing the coefficient on "students abroad' and on the interaction term, evaluated at average difference between adjusted-unadjusted EFW area 2 at destination countries. The total effect of difference between adjusted-unadjusted EFW area 2 at destination countries at **standard deviation** is calculated summing the coefficients on "average difference between adjusted-unadjusted EFW area 2 at destination countries" and on the interaction between "students abroad" and "average difference between adjusted-unadjusted EFW area 2 at destination countries," evaluated at standard deviation of students abroad. The total effect of students abroad at **standard deviation** is calculated summing the coefficient on "students abroad' and on the interaction term, evaluated at standard deviation of the difference between adjusted-unadjusted EFW area 2 at destination countries. The total effect of difference between adjusted-unadjusted EFW area 2 at destination countries at **max** is calculated summing the coefficients on "average difference between adjusted-unadjusted EFW area 2 at destination countries" and on the interaction between "students abroad" and "average difference between adjusted-unadjusted EFW area 2 at destination countries," evaluated at max of students abroad. The total effect of students abroad at **min** is calculated summing the coefficient on "students abroad' and on the interaction term, evaluated at the **min** of the difference between adjusted-unadjusted EFW area 2 at destination countries. The total effect of students abroad at **max** is calculated summing the coefficient on "students abroad' and on the interaction term, evaluated at the **max** of the difference between adjusted-unadjusted EFW area 2 at destination countries.

*** Significant at the 1 percent level; ** Significant at the 5 percent level; * Significant at the 10 percent level.

Table 3 Foreign education and difference between unadjusted and GDI-adjusted EFW scores for area 2: levels (10-year lag)

Lagged variables (10-year lag)	(1) Pooled OLS	(2) Fixed effects OLS	(3) System GMM	(4) System GMM	(5) System GMM	(6) System GMM	(7) System GMM	(8) System GMM	(9) Fixed effects OLS	(10) Fixed effects OLS
Difference between adjusted and unadjusted EFW area 2	0.810***	0.316***	0.697***	0.656***	0.644***	0.689***	0.604***	0.719***		
	(0.0393)	(0.0560)	(0.0777)	(0.0743)	(0.0990)	(0.0802)	(0.0642)	(0.0814)		
Percentage of population studying abroad	4.205	6.559	1.861	23.10**	1.582	10.20	10.80*	6.285	-9.494	-13.86
	(4.225)	(8.105)	(6.516)	(9.912)	(3.804)	(6.694)	(6.435)	(4.245)	(11.75)	(13.25)
Average difference b/w adjusted-unadjusted EFW area 2 at destination countries	0.104**	0.109**	0.150**	0.000775	0.137*	0.125**	0.0281	0.0103	0.176***	0.216***
	(0.0470)	(0.0451)	(0.0586)	(0.0499)	(0.0762)	(0.0493)	(0.0511)	(0.0683)	(0.0581)	(0.0692)
Percentage of population studying abroad x Average difference b/w adjusted-unadjusted EFW area 2 at destination countries	10.91	-27.50***	28.72	17.35	43.16	21.00	30.66	25.13**	-40.68***	-54.11***
	(24.43)	(9.567)	(28.53)	(21.08)	(29.47)	(27.46)	(21.66)	(12.43)	(12.95)	(18.28)
Barro-Lee: Average years of total schooling, age 15+, total				-0.0491***				0.00317		-0.0735
				(0.0105)				(0.0136)		(0.0507)
School enrollment, tertiary (% gross)					-0.285***			-0.0390		0.115
					(0.0984)			(0.104)		(0.126)
Log GDP per capita, PPP (constant 2017 international $)						-0.0375		0.0106		-0.0500
						(0.0239)		(0.0322)		(0.0609)
Polity 2							-0.0208***	-0.0172***		-0.00151
							(0.00317)	(0.00463)		(0.00274)
Total effect of difference b/w adjusted-unadjusted EFW area 2 at destination countries at mean	0.115**	0.0834*	0.177***	0.0169	0.178**	0.145***	0.0566	0.0337	0.139**	0.166**
	(0.0487)	(0.0436)	(0.0612)	(0.0502)	(0.0755)	(0.0502)	(0.0531)	(0.0670)	(0.0561)	(0.0659)
Total effect of students abroad at mean	8.033	-3.090	11.94	29.19**	16.72*	17.56*	21.55***	15.10***	-23.76**	-32.84*
	(6.316)	(9.231)	(8.848)	(12.87)	(9.879)	(10.23)	(7.334)	(5.226)	(11.99)	(16.82)
Total effect of difference b/w adjusted-unadjusted EFW area 2 at destination countries at SD	0.127**	0.0526	0.209***	0.0364	0.226***	0.168**	0.0910	0.0619	0.0929	0.105
	(0.0628)	(0.0441)	(0.0775)	(0.0599)	(0.0870)	(0.0661)	(0.0644)	(0.0681)	(0.0571)	(0.0675)

Total effect of students abroad at SD	7.594 (5.469)	-1.983 (9.046)	10.78 (8.000)	28.49** (12.35)	14.99* (8.787)	16.72* (9.396)	20.32*** (6.820)	14.09*** (4.931)	-22.13* (11.88)	-30.67* (16.33)
Total effect of difference b/w adjusted-unadjusted EFW area 2 at destination countries at max	0.327 (0.492)	-0.451** (0.188)	0.735 (0.576)	0.354 (0.423)	1.016* (0.589)	0.553 (0.550)	0.652 (0.439)	0.522** (0.249)	-0.652** (0.254)	-0.885** (0.356)
Total effect of students abroad at min	4.213 (4.211)	6.537 (8.106)	1.883 (6.505)	23.11** (9.913)	1.616 (3.797)	10.22 (6.689)	10.82* (6.427)	6.305 (4.242)	-9.526 (11.75)	-13.90 (13.26)
Total effect of students abroad at max	22.60 (38.29)	-39.80** (19.12)	50.28 (45.23)	52.35 (37.72)	74.33 (48.67)	45.59 (45.04)	62.48* (34.01)	48.65** (20.26)	-78.07*** (23.30)	-105.1*** (37.99)
Observations	1,046	1,046	1,046	980	727	1,023	993	640	1,161	679
R-squared	0.764	0.361							0.236	0.305
Adjusted R-squared	0.761	0.353							0.229	0.289
Number of countries		152	152	134	144	151	144	122	164	126
AR(1) test			0.0000	0.0000	0.0001	0.0000	0.0000	0.0001		
AR(2) test			0.0743	0.0448	0.110	0.130	0.131	0.693		
Hansen's J. test			0.271	0.455	0.355	0.392	0.211	0.399		
Number of instruments			120	133	133	133	133	121		

Notes: Robust standard errors clustered by country in parentheses. AR(1) and AR(2) are Arellano-Bond test for serial correlations. The sample is an unbalanced panel, comprising data at ten-year intervals between 1970 and 2010. Students abroad, Average difference b/w adjusted-unadjusted EFW area 2 at destination countries, and all other control variables are treated as predetermined and are instrumented for using their lags in level and differences. The total effect of difference between adjusted-unadjusted EFW area 2 at destination countries at **mean** is calculated summing the coefficients on "average difference between adjusted-unadjusted EFW area 2 at destination countries" and on the interaction between "students abroad" and "average difference between adjusted-unadjusted EFW area 2 at destination countries," evaluated at average level of students abroad. The total effect of students abroad at **mean** is calculated summing the coefficient on "students abroad' and on the interaction term, evaluated at average difference between adjusted-unadjusted EFW area 2 at destination countries. The total effect of difference between adjusted-unadjusted EFW area 2 at destination countries at **standard deviation** is calculated summing the coefficients on "average difference between adjusted-unadjusted EFW area 2 at destination countries" and on the interaction between "students abroad" and "average difference between adjusted-unadjusted EFW area 2 at destination countries," evaluated at standard deviation of students abroad. The total effect of students abroad at **standard deviation** is calculated summing the coefficient on "students abroad' and on the interaction term, evaluated at standard deviation of the difference between adjusted-unadjusted EFW area 2 at destination countries. The total effect of difference between adjusted-unadjusted EFW area 2 at destination countries at **max** is calculated summing the coefficients on "average difference between adjusted-unadjusted EFW area 2 at destination countries" and on the interaction between "students abroad" and "average difference between adjusted-unadjusted EFW area 2 at destination countries," evaluated at max of students abroad. The total effect of students abroad at **min** is calculated summing the coefficient on "students abroad' and on the interaction term, evaluated at the min of the difference between adjusted-unadjusted EFW area 2 at destination countries. The total effect of students abroad at **max** is calculated summing the coefficient on "students abroad' and on the interaction term, evaluated at the **max** of the difference between adjusted-unadjusted EFW area 2 at destination countries.

*** Significant at the 1 percent level; ** Significant at the 5 percent level; * Significant at the 10 percent level.

Table 4 Foreign education and difference between unadjusted and GDI-adjusted EFW scores for area 2: differences

5-year and 10-year lagged variables	(1) OLS (5 years)	(2) Fixed effects OLS (5 years)	(3) Fixed effects OLS (5 years)	(4) OLS (10 years)	(5) Fixed effects OLS (10 years)	(6) Fixed effects OLS (10 years)
Five-year change in students abroad	-12.37*	-10.17	-11.37*			
	(6.620)	(6.247)	(6.357)			
Five-year difference b/w unadjusted & adjusted EFW_A2 at destination countries (D5diffefw_a2dc)	0.0219	-0.0423	-0.0355			
	(0.0381)	(0.0376)	(0.0954)			
Five-year change in students abroad x D5diffefw_a2dc	-15.43	-23.38	-41.10			
	(33.53)	(40.84)	(35.15)			
Five-year change in average years of total schooling, age 15+, total			0.00387			
			(0.0218)			
Five-year change in school enrollment, tertiary (% gross)			0.00771			
			(0.131)			
Five-year change in real GDP per capita = L,			0.0674			
			(0.0526)			
Five-year change in polity 2			-0.00691***			
			(0.00244)			
Ten-year change in students abroad				-14.58	12.50	-14.92
				(11.42)	(12.61)	(25.53)
Ten-year difference b/w unadjusted & adjusted EFW_A2 at destination countries (D10diffefw_a2dc)				0.0841*	-0.00815	0.0508
				(0.0445)	(0.0620)	(0.107)
Ten-year change in students abroad x D10diffefw_a2dc				-49.59	42.61	-20.64
				(32.66)	(41.42)	(82.06)
Ten-year change in average years of total schooling, age 15+, total						-0.0329
						(0.0386)
Ten-year change in school enrollment, tertiary (% gross)						0.0654
						(0.142)
Ten-year change in real GDP per capita						0.0221
						(0.0499)
Ten-year change in polity 2						-0.000079
						(0.00393)
Total effect of change in difference b/w adjusted-unadjusted EFW area 2 at destination countries at mean	0.0206	-0.0443	-0.0390	0.0802*	-0.00474	0.0777
	(0.0391)	(0.0383)	(0.0959)	(0.0439)	(0.0610)	(0.116)
Total effect of change in students abroad at mean	-11.43*	-8.746	-8.862*	-6.906	5.901	-10.01
	(6.903)	(5.560)	(4.939)	(7.400)	(7.699)	(15.68)

Total effect of change in difference b/w adjusted-unadjusted EFW area 2 at destination countries at SD	0.00876 (0.0542)	-0.0622 (0.0552)	-0.0705 (0.104)	0.0358 (0.0477)	0.0334 (0.0617)	0.0819 (0.165)
Total effect of change in students abroad at SD	-14.74* (8.433)	-13.75 (10.68)	-17.67 (11.01)	-23.37 (16.72)	20.05 (19.34)	-8.420 (47.95)
Total effect of change in difference b/w adjusted-unadjusted EFW area 2 at destination countries at max	-0.174 (0.440)	-0.340 (0.527)	-0.558 (0.472)	-0.235 (0.204)	0.266 (0.253)	0.108 (0.678)
Total effect of change in students abroad at min	-3.035 (21.27)	3.981 (22.54)	13.51 (16.99)	29.91 (20.07)	-25.73 (26.91)	-13.56 (60.05)
Total effect of change in students abroad at max	-26.25 (30.96)	-31.20 (39.99)	-48.33 (36.66)	-43.79 (29.75)	37.59 (35.92)	-6.450 (88.86)
Observations	1,113	1,113	471	840	840	393
R-squared	0.012	0.014	0.072	0.010	0.010	0.045
Adjusted R-squared	0.00186	0.00422	0.0433	-0.00102	-0.000580	0.0127
Number of countries		158	110		150	109

Notes: Robust standard errors clustered by country in parentheses. The sample is an unbalanced panel, comprising data at five-year and ten-year intervals between 1970 and 2010. Students abroad, Average difference b/w adjusted-unadjusted EFW area 2 at destination countries, and all other control variables are treated as predetermined and are instrumented for using their lags in level and differences. The total effect of difference between adjusted-unadjusted EFW area 2 at destination countries at mean is calculated summing the coefficients on "average difference between adjusted-unadjusted EFW area 2 at destination countries" and on the interaction between "students abroad" and "average difference between adjusted-unadjusted EFW area 2 at destination countries," evaluated at average level of students abroad. The total effect of students abroad at mean is calculated summing the coefficient on "students abroad' and on the interaction term, evaluated at average difference between adjusted-unadjusted EFW area 2 at destination countries. The total effect of difference between adjusted-unadjusted EFW area 2 at destination countries at standard deviation is calculated summing the coefficients on "average difference between adjusted-unadjusted EFW area 2 at destination countries" and on the interaction between "students abroad" and "average difference between adjusted-unadjusted EFW area 2 at destination countries," evaluated at standard deviation of students abroad. The total effect of students abroad at standard deviation is calculated summing the coefficient on "students abroad' and on the interaction term, evaluated at standard deviation of the difference between adjusted-unadjusted EFW area 2 at destination countries. The total effect of difference between adjusted-unadjusted EFW area 2 at destination countries at max is calculated summing the coefficients on "average difference between adjusted-unadjusted EFW area 2 at destination countries" and on the interaction between "students abroad" and "average difference between adjusted-unadjusted EFW area 2 at destination countries," evaluated at max of students abroad. The total effect of students abroad at min is calculated summing the coefficient on "students abroad' and on the interaction term, evaluated at the min of the difference between adjusted-unadjusted EFW area 2 at destination countries. The total effect of students abroad at max is calculated summing the coefficient on "students abroad' and on the interaction term, evaluated at the max of the difference between adjusted-unadjusted EFW area 2 at destination countries.

*** Significant at the 1 percent level; ** Significant at the 5 percent level; * Significant at the 10 percent level.

Table 5 Foreign education and difference between unadjusted and GDI-adjusted EFW scores for area 2: long-run differences

Variables	(1) OLS (50 years)	(2) OLS (50 years)	(3) OLS (50 years)	(4) OLS (50 years)	(5) OLS (40 years)	(6) OLS (40 years)	(7) OLS (40 years)	(8) OLS (40 years)	(9) OLS (40 years)
Fifty-year change in students abroad	14.66	10.34	5.197	1.820					
	(24.00)	(24.20)	(21.73)	(22.20)					
Fifty-year difference b/w unadjusted & adjusted EFW_A2 at destination countries (D50diffefw_a2dc)	0.260*	0.217	0.229	0.201					
	(0.149)	(0.173)	(0.152)	(0.178)					
Fifty-year change in students abroad x D50diffefw_a2dc	62.34***	61.01***	57.81***	55.54***					
	(20.90)	(20.09)	(17.29)	(17.23)					
Fifty-year change in real GDP per capita		0.0228		0.00419					
		(0.0692)		(0.0726)					
Fifty-year change in polity 2			-0.00307	-0.00209					
			(0.00792)	(0.00873)					
Forty-year change in students abroad					-5.977	-5.638	-10.25	-10.17	-8.391
					(12.04)	(12.71)	(11.56)	(14.65)	(18.01)
Forty-year difference b/w unadjusted & adjusted EFW_A2 at destination countries (D40diffefw_a2dc)					0.289***	0.283***	0.277***	0.321**	0.342**
					(0.0934)	(0.102)	(0.0966)	(0.150)	(0.163)
Forty-year change in students abroad x D40diffefw_a2dc					-22.20*	-24.97*	-22.26*	-37.14	-44.26
					(13.04)	(14.60)	(12.17)	(71.54)	(73.61)
Forty-year change in real GDP per capita						-0.0289			-0.159
						(0.0551)			(0.108)
Forty-year change in polity 2							-0.00116		-0.000509
							(0.00534)		(0.00924)
Forty-year change in educational attainment								-0.00475	0.0182
								(0.0499)	(0.0617)
Total effect of 50-year change in difference b/w adjusted-unadjusted EFW area 2 at destination countries at mean	0.32**	0.27	0.28*	0.25	0.28***	0.27***	0.27***	0.31*	0.33*
	(0.15)	(0.17)	(0.15)	(0.18)	(0.09)	(0.10)	(0.10)	(0.16)	(0.17)
Total effect of 50-year change in students abroad at mean	-20.06	-24.17	-27.15	-29.76	3.34	5.15	-0.77	9.58	15.72
	(19.20)	(20.36)	(19.20)	(20.41)	(10.08)	(10.33)	(9.83)	(41.89)	(46.84)
Total effect of 50-year change in difference b/w adjusted-unadjusted EFW area 2 at destination countries at SD	0.42***	0.37**	0.38**	0.34*	0.25**	0.23**	0.23**	0.24	0.24
	(0.15)	(0.17)	(0.15)	(0.17)	(0.10)	(0.11)	(0.10)	(0.24)	(0.24)
Total effect of 50-year change in students abroad at SD	36.89	32.06	26.15	21.93	-14.80	-15.38	-11.15	-25.25	-26.45
	(29.18)	(28.74)	(25.28)	(25.33)	(15.54)	(16.72)	(11.83)	(31.43)	(32.10)

Total effect of 50-year change in difference b/w adjusted-unadjusted EFW area 2 at destination countries at max	1.18***	1.12***	1.08***	1.02***	0.03	-0.01	0.02	-0.09	-0.14
	(0.31)	(0.31)	(0.27)	(0.27)	(0.19)	(0.20)	(0.18)	(0.82)	(0.84)
Total effect of 50-year change in students abroad at min	-82.69***	-84.94***	-85.08***	-84.91***	30.54*	35.42*	26.35	50.91	64.40
	(26.07)	(27.21)	(25.50)	(27.27)	(17.82)	(19.45)	(16.96)	(119.75)	(125.57)
Total effect of 50-year change in students abroad at max	16.77	12.41	7.16	3.71	-29.11	-26.26	-33.44	-11.66	-26.13
	(24.44)	(24.58)	(22.01)	(22.44)	(22.63)	(22.09)	(21.24)	(14.69)	(31.66)
Observations	80	78	77	75	291	281	277	78	73
R-squared	0.101	0.094	0.103	0.095	0.056	0.050	0.056	0.064	0.076
Adjusted R-squared	0.0658	0.0448	0.0528	0.0291	0.0464	0.0362	0.0418	0.0126	-0.00770

Notes: Robust standard errors clustered by country in parentheses. The sample is an unbalanced panel, comprising data at fifty-year and forty-year intervals between 1970 and 2010. Students abroad, Average difference b/w adjusted-unadjusted EFW area 2 at destination countries, and all other control variables are treated as predetermined and are instrumented for using their lags in level and differences. The total effect of difference between adjusted-unadjusted EFW area 2 at destination countries at mean is calculated summing the coefficients on "average difference between adjusted-unadjusted EFW area 2 at destination countries" and on the interaction between "students abroad" and "average difference between adjusted-unadjusted EFW area 2 at destination countries," evaluated at average level of students abroad. The total effect of students abroad at mean is calculated summing the coefficient on "students abroad' and on the interaction term, evaluated at average difference between adjusted-unadjusted EFW area 2 at destination countries. The total effect of difference between adjusted-unadjusted EFW area 2 at destination countries at standard deviation is calculated summing the coefficients on "average difference between adjusted-unadjusted EFW area 2 at destination countries" and on the interaction between "students abroad" and "average difference between adjusted-unadjusted EFW area 2 at destination countries," evaluated at standard deviation of students abroad. The total effect of students abroad at standard deviation is calculated summing the coefficient on "students abroad' and on the interaction term, evaluated at standard deviation of the difference between adjusted-unadjusted EFW area 2 at destination countries. The total effect of difference between adjusted-unadjusted EFW area 2 at destination countries at max is calculated summing the coefficients on "average difference between adjusted-unadjusted EFW area 2 at destination countries" and on the interaction between "students abroad" and "average difference between adjusted-unadjusted EFW area 2 at destination countries," evaluated at max of students abroad. The total effect of students abroad at min is calculated summing the coefficient on "students abroad' and on the interaction term, evaluated at the min of the difference between adjusted-unadjusted EFW area 2 at destination countries. The total effect of students abroad at max is calculated summing the coefficient on "students abroad' and on the interaction term, evaluated at the max of the difference between adjusted-unadjusted EFW area 2 at destination countries.

*** Significant at the 1 percent level; ** Significant at the 5 percent level; * Significant at the 10 percent level.

APPENDIX

Table 2A Foreign education & difference between unadjusted and GDI-adjusted EFW scores for area 2: 5-year lag with two-step difference GMM

Lagged variables (5-year lag)	(1) Pooled OLS	(2) Fixed effects OLS	(3) System GMM	(4) System GMM	(5) System GMM	(6) System GMM	(7) System GMM	(8) System GMM	(9) Fixed effects OLS	(10) Fixed effects OLS
Difference between adjusted and unadjusted EFW area 2	0.884***	0.592***	0.755***	0.211***	0.484***	0.175***	0.710***	0.278**		
	(0.0211)	(0.0478)	(0.0907)	(0.0581)	(0.130)	(0.0587)	(0.103)	(0.123)		
Percentage of population studying abroad	1.715	0.264	-3.801	8.524	-5.718	3.370	-9.501	-1.521	-17.36	-19.82
	(2.782)	(6.355)	(5.786)	(8.652)	(4.008)	(6.913)	(8.730)	(8.751)	(11.80)	(16.81)
Average difference b/w adjusted-unadjusted EFW area 2 at destination countries	0.0724***	0.0615**	-0.0120	0.0319	0.107	-0.0105	-0.0591	-0.123	0.188***	0.200**
	(0.0242)	(0.0307)	(0.0533)	(0.0717)	(0.0837)	(0.0723)	(0.0671)	(0.147)	(0.0655)	(0.0806)
Percentage of population studying abroad x Average difference b/w adjusted-unadjusted EFW area 2 at destination countries	-0.553	-25.73***	-22.77*	-53.30**	-41.92***	-63.86***	-14.59	-13.09	-46.34***	-61.31***
	(16.37)	(7.257)	(12.87)	(22.44)	(15.71)	(21.45)	(11.66)	(32.16)	(14.54)	(19.37)
Barro-Lee: Average years of total schooling, age 15+, total				-0.0407*				-0.212***		-0.0414
				(0.0230)				(0.0820)		(0.0471)
School enrollment, tertiary (% gross)					-0.154			-0.259		-0.0634
					(0.146)			(0.192)		(0.138)
Log GDP per capita, PPP (constant 2017 international $)						0.0187		0.0583		-0.0545
						(0.0285)		(0.0833)		(0.0595)
Polity 2							-0.00455*	-0.0172***		-0.00384
							(0.00261)	(0.00486)		(0.00350)
Total effect of difference b/w adjusted-unadjusted EFW area 2 at destination countries at mean	0.0717**	0.0292	-0.0405	-0.0349	0.0541	-0.0905	-0.0774	-0.139	0.130**	0.123
	(0.0278)	(0.0309)	(0.0547)	(0.0658)	(0.0760)	(0.0729)	(0.0697)	(0.129)	(0.0643)	(0.0751)
Total effect of students abroad at mean	1.579	-6.068	-9.405*	-4.592	-16.03***	-12.34	-13.09	-9.850	-28.76**	-34.91*
	(2.399)	(6.250)	(5.168)	(10.11)	(5.912)	(7.899)	(8.762)	(8.007)	(11.70)	(18.09)
Total effect of difference b/w adjusted-unadjusted EFW area 2 at destination countries at SD	0.0712*	0.00781	-0.0594	-0.0792	0.0192	-0.144*	-0.0895	-0.150	0.0910	0.0724
	(0.0370)	(0.0325)	(0.0581)	(0.0683)	(0.0733)	(0.0785)	(0.0730)	(0.123)	(0.0663)	(0.0757)

Total effect of students abroad at SD	1.561 (2.808)	-6.892 (6.274)	-10.13* (5.225)	-6.299 (10.50)	-17.37*** (6.293)	-14.39* (8.269)	-13.56 (8.835)	-10.06 (8.153)	-30.25** (11.77)	-36.87** (18.35)
Total effect of difference b/w adjusted-unadjusted EFW area 2 at destination countries at max	0.0596 (0.375)	-0.535*** (0.167)	-0.540* (0.299)	-1.203** (0.496)	-0.865*** (0.331)	-1.491*** (0.491)	-0.397 (0.283)	-0.426 (0.675)	-0.886*** (0.330)	-1.221*** (0.426)
Total effect of students abroad at min	1.715 (2.772)	0.245 (6.354)	-3.819 (5.781)	8.483 (8.651)	-5.750 (4.009)	3.321 (6.910)	-9.512 (8.728)	-8.266 (7.932)	-17.40 (11.79)	-19.87 (16.82)
Total effect of students abroad at max	0.928 (21.10)	-36.36*** (11.00)	-36.21** (16.48)	-67.34** (32.82)	-76.08*** (25.12)	-87.52*** (30.05)	-30.26* (17.53)	-17.45 (22.09)	-83.32*** (21.92)	-107.1*** (34.20)
Observations	1,204	1,204	1,046	846	610	1,016	992	453	1,277	662
R-squared	0.862	0.552							0.266	0.327
Adjusted R-squared	0.861	0.547							0.260	0.312
Number of countries		158	152	126	131	151	144	105	164	125
AR(1) test			0.00006	0.00977	0.00397	0.0220	0.000186	0.0466		
AR(2) test			0.0752	0.112	0.131	0.0412	0.0520	0.680		
Hansen's J. test			0.176	0.198	0.160	0.291	0.153	0.263		
Number of instruments			114	100	105	141	105	64		

Notes: Robust standard errors clustered by country in parentheses. AR(1) and AR(2) are Arellano-Bond test for serial correlations. The sample is an unbalanced panel, comprising data at five-year intervals between 1970 and 2010. Students abroad, Average difference b/w adjusted-unadjusted EFW area 2 at destination countries, and all other control variables are treated as predetermined and are instrumented for using their lags in level and differences. The total effect of difference between adjusted-unadjusted EFW area 2 at destination countries at mean is calculated summing the coefficients on "average difference between adjusted-unadjusted EFW area 2 at destination countries" and on the interaction between "students abroad" and "average difference between adjusted-unadjusted EFW area 2 at destination countries," evaluated at average level of students abroad. The total effect of students abroad at mean is calculated summing the coefficient on "students abroad' and on the interaction term, evaluated at average difference between adjusted-unadjusted EFW area 2 at destination countries. The total effect of difference between adjusted-unadjusted EFW area 2 at destination countries at standard deviation is calculated summing the coefficients on "average difference between adjusted-unadjusted EFW area 2 at destination countries" and on the interaction between "students abroad" and "average difference between adjusted-unadjusted EFW area 2 at destination countries," evaluated at standard deviation of students abroad. The total effect of students abroad at standard deviation is calculated summing the coefficient on "students abroad' and on the interaction term, evaluated at standard deviation of the difference between adjusted-unadjusted EFW area 2 at destination countries. The total effect of difference between adjusted-unadjusted EFW area 2 at destination countries at max is calculated summing the coefficients on "average difference between adjusted-unadjusted EFW area 2 at destination countries" and on the interaction between "students abroad" and "average difference between adjusted-unadjusted EFW area 2 at destination countries," evaluated at max of students abroad. The total effect of students abroad at min is calculated summing the coefficient on "students abroad' and on the interaction term, evaluated at the min of the difference between adjusted-unadjusted EFW area 2 at destination countries. The total effect of students abroad at max is calculated summing the coefficient on "students abroad' and on the interaction term, evaluated at the max of the difference between adjusted-unadjusted EFW area 2 at destination countries.

*** Significant at the 1 percent level; ** Significant at 5 percent level; * Significant at 1 percent level.

Table 3A Foreign education & difference between unadjusted & GDI-adjusted EFW scores for area 2: 10-year lag with two-step difference GMM

Lagged variables (10-year lag)	(1) Pooled OLS	(2) Fixed effects OLS	(3) System GMM	(4) System GMM	(5) System GMM	(6) System GMM	(7) System GMM	(8) System GMM	(9) Fixed effects OLS	(10) Fixed effects OLS
Difference between adjusted and unadjusted EFW area 2	0.810***	0.316***	0.560***	0.479***	0.236**	0.515***	0.524***	0.218*		
	(0.0393)	(0.0560)	(0.126)	(0.0929)	(0.103)	(0.0978)	(0.118)	(0.113)		
Percentage of population studying abroad	4.205	6.559	5.048	13.28	-1.153	8.578	4.073	7.339	-9.494	-13.86
	(4.225)	(8.105)	(10.73)	(13.97)	(6.038)	(13.88)	(12.82)	(9.822)	(11.75)	(13.25)
Average difference b/w adjusted-unadjusted EFW area 2 at destination countries	0.104**	0.109**	0.0513	0.112	0.183**	0.0281	-0.00332	0.0743	0.176***	0.216***
	(0.0470)	(0.0451)	(0.0549)	(0.0775)	(0.0733)	(0.0804)	(0.0736)	(0.0937)	(0.0581)	(0.0692)
Percentage of population studying abroad x Average difference b/w adjusted-unadjusted EFW area 2 at destination countries	10.91	-27.50***	-16.03	-42.12*	-30.71***	-25.79	-13.54	-29.55	-40.68***	-54.11***
	(24.43)	(9.567)	(12.66)	(22.09)	(11.66)	(16.41)	(13.33)	(23.31)	(12.95)	(18.28)
Barro-Lee: Average years of total schooling, age 15+, total				-0.0712				0.0362		-0.0735
				(0.0595)				(0.0424)		(0.0507)
School enrollment, tertiary (% gross)					0.0127			0.0992		0.115
					(0.135)			(0.138)		(0.126)
Log GDP per capita, PPP (constant 2017 international $)						-0.0677		-0.0147		-0.0500
						(0.0833)		(0.0558)		(0.0609)
Polity 2							-0.00550	-0.00110		-0.00151
							(0.00388)	(0.00339)		(0.00274)
Total effect of difference b/w adjusted-unadjusted EFW area 2 at destination countries at mean	0.116**	0.0788*	0.0337	0.0658	0.149**	-0.000339	-0.0182	0.0417	0.132**	0.157**
	(0.0502)	(0.0435)	(0.0505)	(0.0666)	(0.0718)	(0.0729)	(0.0671)	(0.0852)	(0.0560)	(0.0657)
Total effect of students abroad at mean	7.094	-0.723	0.803	2.131	-9.285	1.748	0.487	-0.485	-20.26*	-28.19*
	(4.571)	(8.851)	(9.315)	(14.39)	(6.692)	(12.93)	(12.27)	(8.379)	(11.77)	(15.78)
Total effect of difference b/w adjusted-unadjusted EFW area 2 at destination countries at SD	0.128**	0.0506	0.0173	0.0226	0.118	-0.0268	-0.0321	0.0115	0.0900	0.101
	(0.0640)	(0.0442)	(0.0497)	(0.0636)	(0.0725)	(0.0694)	(0.0636)	(0.0839)	(0.0573)	(0.0678)
Total effect of students abroad at SD	7.134	-0.823	0.744	1.977	-9.397	1.654	0.438	-0.593	-20.41*	-28.39*
	(4.639)	(8.866)	(9.302)	(14.41)	(6.710)	(12.93)	(12.27)	(8.389)	(11.78)	(15.82)
Total effect of difference b/w adjusted-unadjusted EFW area 2 at destination countries at max	0.357	-0.528**	-0.320	-0.864*	-0.529**	-0.570*	-0.317	-0.611	-0.766***	-1.038**
	(0.560)	(0.214)	(0.274)	(0.472)	(0.265)	(0.346)	(0.278)	(0.505)	(0.290)	(0.407)

Total effect of students abroad at min	4.208 (4.220)	6.551 (8.105)	5.044 (10.72)	13.27 (13.97)	-1.161 (6.038)	8.571 (13.88)	4.069 (12.82)	7.331 (9.818)	-9.505 (11.75)	-13.88 (13.25)
Total effect of students abroad at max	19.74 (31.90)	-32.58* (16.87)	-17.77 (15.07)	-46.67 (32.61)	-44.87** (17.47)	-28.13 (22.34)	-15.20 (19.57)	-34.72 (29.18)	-67.39*** (20.42)	-90.87*** (33.48)
Observations	1,046	1,046	894	846	509	867	848	453	1,161	679
R-squared	0.764	0.361							0.236	0.305
Adjusted R-squared	0.761	0.353							0.229	0.289
Number of countries		152	139	126	121	139	132	105	164	126
AR(1) test			0.689	0.678	0.537	0.748	0.713	0.992		
AR(2) test			0.00161	0.000625	0.0301	0.000656	0.00150	0.0612		
Hansen's J. test			0.197	0.293	0.270	0.257	0.160	0.282		
Number of instruments			86	112	112	128	112	64		

Notes: Robust standard errors clustered by country in parentheses. AR(1) and AR(2) are Arellano-Bond test for serial correlations. The sample is an unbalanced panel, comprising data at ten-year intervals between 1970 and 2010. Students abroad, Average difference b/w adjusted-unadjusted EFW area 2 at destination countries, and all other control variables are treated as predetermined and are instrumented for using their lags in level and differences. The total effect of difference between adjusted-unadjusted EFW area 2 at destination countries at mean is calculated summing the coefficients on "average difference between adjusted-unadjusted EFW area 2 at destination countries" and on the interaction between "students abroad" and "average difference between adjusted-unadjusted EFW area 2 at destination countries," evaluated at average level of students abroad. The total effect of students abroad at mean is calculated summing the coefficient on "students abroad' and on the interaction term, evaluated at average difference between adjusted-unadjusted EFW area 2 at destination countries. The total effect of difference between adjusted-unadjusted EFW area 2 at destination countries at standard deviation is calculated summing the coefficients on "average difference between adjusted-unadjusted EFW area 2 at destination countries" and on the interaction between "students abroad" and "average difference between adjusted-unadjusted EFW area 2 at destination countries," evaluated at standard deviation of students abroad. The total effect of students abroad at standard deviation is calculated summing the coefficient on "students abroad' and on the interaction term, evaluated at standard deviation of the difference between adjusted-unadjusted EFW area 2 at destination countries. The total effect of difference between adjusted-unadjusted EFW area 2 at destination countries at max is calculated summing the coefficients on "average difference between adjusted-unadjusted EFW area 2 at destination countries" and on the interaction between "students abroad" and "average difference between adjusted-unadjusted EFW area 2 at destination countries," evaluated at max of students abroad. The total effect of students abroad at min is calculated summing the coefficient on "students abroad' and on the interaction term, evaluated at the min of the difference between adjusted-unadjusted EFW area 2 at destination countries. The total effect of students abroad at max is calculated summing the coefficient on "students abroad' and on the interaction term, evaluated at the max of the difference between adjusted-unadjusted EFW area 2 at destination countries.

*** Significant at the 1 percent level; ** Significant at 5 percent level; * Significant at 1 percent level.