IMF Working Paper

Democracy and Foreign Education

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Research Department

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Authorized for distribution by Arvind Subramanian

March 2007

Abstract

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Do foreign-educated individuals play a role in promoting democracy in their home countries? Despite the large amount of private and public resources spent on foreign education, there is no systematic evidence that foreign-educated individuals foster democracy in their home countries. Using a unique panel dataset on foreign students starting from 1950, I show that, indeed, foreign-educated individuals promote democracy in their home country, but only if the foreign education is acquired in democratic countries. The results are robust to reverse causality, country-specific omitted variables, and inclusion of a variety of control variables. The results are stronger for small countries.

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I. INTRODUCTION

Do foreign-educated individuals play an important role in fostering democracy in their home countries? Despite the large amount of resources spent on financing foreign education, there is no systematic study on the effects of foreign education on democracy. This paper fills this gap using a large dataset of foreign students that includes almost all receiving and sending countries and spans over 50 years.

The idea that foreign-educated students promote democracy in their countries of origin has motivated a number of important policy initiatives and large investment in the United States and elsewhere. Through the Fulbright Program, the U.S. government has financed more than 158,000 foreigners studying in the United States.[2] With an endowment of over $12 billion, the Ford Foundation has similarly pursued the goal of "strengthening democratic values, reducing poverty and injustice, promoting international cooperation, and advancing human achievement," since 1936.[3]

The U.S. government not only actively finances the education of foreign students in the United States but also annually issues more than 600,000 nonimmigrant visas for foreign students, which provides one of the main ways of entering the country; more than five million individuals have received visas to study in the United States since 1971.[4] The U.S. efforts to educate foreign students (and future leaders) have produced impressive results. It is estimated that 46 current and 165 former heads of governments are products of U.S. higher education.[5]

In addition to the United States, a number of other Western countries fund foreign students. For instance, the German Academic Exchange Service (or DAAD), which was founded in 1925, "currently awards more than 65,000 fellowships a year and is the largest grantor of international academic mobility support in the world." Its goals include "to enable young academic elites from around the world to become leaders in the fields of science, culture, economics, and politics—as well as friends and partners of Germany" and "to support the

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[2] "The Fulbright Program supports educational exchanges that strengthen understanding and communication between the United States and over 140 countries. *It is an effective and prestigious form of public diplomacy*." "Many Fulbrighters are young professionals who will return to responsible positions in their home countries. *They often are involved in building institutions and government service when they return home*." Excerpts from the Fulbright program website (*http://exchanges.state.gov/education/fulbright/*). (italics added by the author.)

[3] From the Ford Foundation website (*http://www.fordfound.org/*).

[4] The U.S. Immigration and Naturalization Service (INS) estimates that in any given day in 2004 more than 600,000 foreign students were present in the United States; from the INS website *http://www.uscis.gov/graphics/shared/statistics/publications/NIM_2004.pdf*.

[5] From the website of the American Immigration Law Foundation (*http://www.ailf.org/*). Well-known foreign leaders who studied in the United States include, among many others, Benazir Bhutto (Pakistan), Carlos Salinas de Gortari and Vicente Fox (Mexico), Ehud Barak (Israel), Corazon Aquino (Philippines), Hamid Karzai (Afghanistan), and Michelle Bachelet (Chile).

process of economic and democratic reform in developing countries and in the transition countries of Middle and Eastern Europe by supporting their academic research and progress."[6]

Besides those of Western countries, many governments have actively financed foreign education in the hope of molding future ruling classes and spreading specific ideas. Socialist countries had an active policy to attract and indoctrinate future leaders (Bollag, 1990); the Moscow-based People's Friendship University (formerly known as Patrice Lumumba University) was founded in 1960 with the explicit mandate to prepare future socialist leaders in Africa, Asia, and Latin America. South African President Thabo Mbeki considers hosting foreign students from other African countries as a primary way to spread his vision of "African Renaissance" (Malan, 2001). Finally, several Arab scholars see Islamic education as a way to form future leaders in Islamic countries.

The large amount of resources invested in foreign education and the anecdotic evidence on foreign-educated leaders suggest that, indeed, foreign education plays an important role in many aspects of the economic and political life of the sending countries. Although there are many issues involved in foreign education, this paper focuses only on the question of whether foreign education is associated with the spreading of democracy in sending countries.[7]

This paper also makes a contribution to the literature on the role of leaders in nations' economic and political outcomes. Foreign-educated individuals are, at best, a small minority of the population—in recent years, foreign students have been between 2 and 3 individuals per million of their native populations on average (see Figure1); nevertheless, they seem to matter in the transition toward democracy (see Table 10). Similarly, Jones and Olken (2005) have shown that even individual leaders matter for economic growth. The present paper represents a contribution to this literature because it investigates the role of a very restricted but influential minority in changing political regimes.

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[6] From the DAAD website (Deutscher Akademischer Austauch Dienst, German Academic Exchange Service); *http://www.daad.de/en/index.html*. Among world leaders who have been benefited from DAAD funds are Mahmoud Hamdi Zakzouk (minister of religion, Egypt), Amin Farhang (minister for reconstruction, Afghanistan), Luc Ferry (minister of education, France), Vassilios Skuris (president of the Court of Justice of the European Communities), Andrei Marga (minister of education, Romania), Leoluca Orlando (mayor of Palermo, Italy), Wladyslaw Bartoszewski (foreign minister, Poland), and Wangari Maathai (deputy-secretary for environment, Kenya).

[7] Foreign education sometimes may have the opposite effect of rejection of modern values of the host country. For instance, Sayyid Qutb, the spiritual leader of the Islamic fundamentalism, who studied between 1948 and 1950 in the Colorado State College of Education on a scholarship to study educational systems, concluded that major aspects of American life were "primitive" and shocking, including the mixing of the sexes, the enthusiasm for sports, and the love for jazz. He, in particular, argued that Western freedom and democracy were manifestation of "Jahiliyya" (ignorance of divine guidance). Armstrong (2000) argues that religious fundamentalisms are the consequence of dramatic contacts between modernity and traditional society. Foreign education may provide the opportunities for these dramatic contacts. This paper does not deal with this issue.

The rest of the paper is organized as follows. Section II provides an overview of the literature, with a focus on the current debate on the relationship between democracy and education. Section III presents stylized facts on foreign education and democracy. Section IV shows econometric evidence on the relationship between education and democracy. Section V explores the determinants of the choice of destination countries for foreign students and analyzes the issue of reverse causality. Section VI presents several robustness tests, including the presence of omitted variables that could explain the correlation between democracy and foreign education, heterogeneity of the sample, and stay rates of foreign students. Section VII discusses the results and concludes.

II. LITERATURE REVIEW

The relationship between education and democracy has been studied for a long time. At least since Lipset (1959), political scientists have speculated that education leads to more democratic regimes. Starting with Barro (1999), economists have found a strong empirical correlation between levels of education and democracy. While nobody disputes the strong positive correlation between democracy and education, there has been disagreement on the methodology to control for other factors that may influence both education and democracy and, consequently, on the interpretation of this correlation.

Glaeser, Ponzetto, and Shleifer (2006) claim that there is a good deal of empirical support showing that higher level of education attainment leads to more democratic politics.[8] According to Glaeser, Ponzetto, and Shliefer, (2006), the real question is to understand which specific mechanisms explain the causal link from education to democracy. They argue that schooling teaches people to interact with others; therefore, education, by lowering the cost of interaction and political engagement, enlarges the constituency for democracy. For the present paper, which focuses on foreign education, two aspects of this view are important. First, for Glaeser, Ponzetto, and Shliefer, (2006) the content of education (e.g. democratic values, technical knowledge, or political indoctrination) matters less than the socializing experience of studying together and learning how to interact. Second, *average* education and not the level of education of the elites matters.[9]

Acemoglu, Jonhson, Robinson, and Yared (2005a) claims that the strong cross-sectional correlation between democracy and education is due to omitted factors more than to a causal relationship. In a companion paper, Acemoglu and others (2005b) argues that long-term parallel evolution of democracy and education may be explained by institutional developments, including settlers' mortality in the colonies, density of indigenous population

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[8] See also Glaeser, La Porta, Lopes-de-Silanes, and Shleifer (2004), and Papaioannou and Siourounis (2005).

[9] Castelló-Climent (2006) finds evidence that an increase in the average years of schooling of the *majority* of population matters more for democracy than the average yours of schooling of *total* population. This reinforces the view that the education level of the median voter is more relevant for democracy than the generic level of education. Milligan, Moretti, and Oreopoulos, and Dee (2004) also find evidence that education increases participation in election and support for free speech.

and early experiences with democracy. Beside the specific conclusions, these papers make some important methodological points that are relevant for this paper. First, showing the correlation between level of democracy and (lagged) level of education attainment is not enough to claim causation if underlying third variables are not properly controlled for. Second, a panel regression of democracy on education should always contain time variables to control for common trend which cause spurious correlations. Third, that long-run difference may also be used to explore causation.

Despite their different conclusions, both Glaeser, Ponzetto, and Shliefer (2006) and Acemoglu, Johnson, Robinson, and Yared (2005a) share some common features. First, both studies assume that the quality of education is the same in all countries (so educational attainment or enrollments are sufficient statistics for the level of education). However, the quality of education, especially at tertiary level, is heterogeneous across countries, creating a problem of error in variables (Hanushek and Kimko, 2000). Second, even leaving education quality aside, another source of measurement error is due to the fact that the primary sources for international data on education are national agencies. These agencies are not all equally reliable and may have bias in providing education data. Third, the data on educational attainment supply the average years of education and provide no information on the distribution of education; therefore, we do not know if a restricted group of highly educated individuals is more influential than a large mass of moderately educated individuals.

Data on foreign students can solve these issues. First, the quality of tertiary education, especially in universities where foreign students go, is presumably more homogeneous than tertiary education at home. Second, data on international students are collected by host universities and countries, which often require visa to admit foreign students; this leads to better quality data. In addition, host countries do not have any incentive to misreport data from any particular country. Finally, the data on international students is for tertiary education, a relatively homogenous group.

In addition to the literature on democracy and education, there is a growing interest in foreign education. The United States being the largest recipient country of foreign students, most studies focus on the United States (for a recent review, see Aslambeigui and Montecinos, 1998). The increasing number of foreign students has also its critics. Borjas (2002) has argued that the foreign student visa program is "littered with corruption and fraud" and that the economic "benefits from the program are greatly exaggerated, and the program may well generate a net economic loss for the country." The present paper does not deal with these issues but shows that there are some clear benefits from foreign education in terms of increasing the spreading of democracy in home countries.

III. STYLIZED FACTS ON FOREIGN EDUCATION AND DEMOCRACY

Democracy is a difficult concept to define and several indices have been proposed to measure it. For the purpose of this study, I consider three indices currently used: the Freedom House Index, the polity II index, and the index proposed by Przeworski, Alvarez, Cheibub, and

Limongi (1990). For the sake of space, I will not discuss the advantages and the limits of various indices or the vast literature which uses them here.[10] The only point that is important to make here is that the trend toward more democratic regimes has not been linear. There was significant retrenchment of democracy not only in single countries but also in several regions of the world. For instance, there was a general decrease in democracy in Asia in the 1950s and 1960s, a marked decline in Latin America in 1960s and 1970s, and a prolonged stasis in Africa since the 1960s (Acemoglu and Robinson, 2005). The unequal march toward democracy begs the question of which factors explain the different paths.

The most complete dataset on foreign education comes from the United Nations Educational, Scientific, and Cultural Organization (UNESCO) database on foreign students.[11] This database reports the bilateral students' flows at the tertiary level from 1950 to 2003. Some industrialized countries are covered from 1950 and almost all countries are represented as sending or receiving starting in 1960. The data are gathered from host countries' authorities, which, in turn, get the primary data from local universities and/or immigration databases.

The total number of foreign students has increased substantially in the last 50 years from about 50,000 to more than 2 million in 2002. The number of students abroad has grown more than the population, though it has declined slightly as share of enrollment in tertiary education (Figure1).

The steady increase in the aggregate data masks some noticeable heterogeneity in the origin and host countries (Figure 2). The United States has traditionally been the main host country with a share of approximately 30 percent. The second tier destination countries includes France, Germany, and United Kingdom, each with a share of about 10 percent; in the last 20 years, there was a marked increase in the shares of Germany and United Kingdom , accompanied by a relative decline of France's share. The share of students going to predominantly Muslim countries, which was over 10 percent in 1970, has steadily declined in the last 30 years. Finally, the countries belonging to the former Soviet bloc commanded a share of almost 10 percent between 1970 and 1990, but this has disappeared since the fall of the Soviet Union.

The source countries also show considerable heterogeneity. The top panels of Figures 3 to 6 show the total number of foreign students for a selected number of countries from different continents and very different experiences with democracy. The number of foreign students is quite different from country to country. For instance, the number of Chilean foreign students

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[10] The data appendix describes them in more details. For an exhaustive discussion of these indices, see Przeworski, Alvarez, Cheibub, and Limongi (2000) or Acemoglu and Robinson (2005).

[11] The UNESCO database has been used before only as a cross-section or as a panel with two cross-sections but not for the entire period which starts in the 1950s. Part of the problem is that the database is available only in hard copy except for the last few years. The other reason is that the database requires a considerable amount of preparatory work to clear it from evident mistakes (see data appendix for description). Note also that there are occasional discrepancies with the data for the U.S. provided by *Open doors*.

only recently surpassed 6,000 while Iranian students abroad reached almost 80,000 at their peak in 1978 but it was below 18,000 in 2000.

As argued in the previous section, the number of students abroad (normalized by population) may be a misleading indicator of exposure to democratic ideas if students go to countries with undemocratic regimes. For instance, students going to Patrice Lumumba University in the 1970s were taught a quite different concept of democracy than students going to Western Europe. In order to capture this heterogeneity, I construct an index of average democracy in host countries, which is defined as the weighted average of democracy indices 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 (see data appendix for formula and details). By construction, this index lies between 0 and 1; the index is 1 if all students abroad are in democratic countries and 0 if all students abroad are in dictatorial regimes.[12] On average, the level of democracy in host countries is much higher than in home countries, a sign that on average democratic countries attract more students (Table 9). Trade seems more concentrated in relatively more democratic partners than in host countries (compare average democracy in trading partner and in students' host countries in Table 9).

The bottom panels of Figures 3−6 show the index of democracy at home and in host countries for Chile, Argentina, Iran, and the Republic of Korea. These countries have very different profiles with respect to democracy. Chile started as a very democratic country until the coup d'état in 1973; after that, democracy was gradually restored in the late 1980s. It is interesting that the average democracy in foreign countries seems to anticipate domestic democracy. Chilean students tended to go to relatively undemocratic countries in the late 1960s, a possible sign of a polarized society at home; immediately after the coup d'état, there was a large surge in foreign students, especially to democratic countries, an indication that many students were unhappy with the new regime and preferred to study abroad, especially in democratic countries. After that, the total number of students abroad remained constant until 2000 but the composition shifted even more toward democratic countries. In the early 1980s, five years before the change of regime at home, Chilean students started going to more democratic countries. A similar pattern happened in Argentina and the Republic of Korea; in both cases, the change in the composition of student destination toward more democratic regimes clearly anticipated the introduction of democracy at home while the total number of students does not seem to anticipate the domestic change. Finally, the average democracy in host countries of students from Iran seems to accompany (and slightly anticipate) the downward trend in democracy at home. It is peculiar that, despite major changes in the number of Iranian students abroad, the downward trend of democracy in host countries has remained unaltered in the last 50 years.

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[12] The assumption that foreign students in democratic countries absorb democratic ideas is a first approximation; there are unfortunate examples of the contrary. Saloth Sar, better known as Pol Pot, the Communist dictator of Cambodia, studied engineering in France between 1949 and 1952. Moreover, Gregory H. Stanton wrote that "key officials of Pol Pot's regime had read André Gunder Frank's Marxist theory that cities are parasitic on the countryside" and this provided the theoretical basis for the genocide. Another example is Sayyid Qutb, the influential Islamic thinker, who studied for two years in Colorado (see note 7). In conclusion, foreign education, even in democratic countries, does not always lead to democratic ideas.

The experiences of the four countries discussed previously strongly suggest that the number of foreign students and especially the level of democracy in host countries predict future changes in the level of democracy at home. In order to study this correlation more systematically, the following section presents econometric evidence from all countries.

IV. RESULTS

In order to study the correlation between democracy and foreign education, I use mainly dynamic panel regressions. As in previous studies on democracy and education, including Barro (1999), Acemoglu et al., (2005a), and Glaeser et al., (2006), my main specification features level of democracy as the dependent variable. The explanatory variables are: past level of democracy, number of students abroad as a share of total population in the sending country, average level of democracy in the host countries, and the interaction between the two latter terms.[13] All explanatory variables are lagged five years.[14] In addition, all regressions have time and country fixed effects except when otherwise specified. The sources of the data are explained in the data appendix. The normalized number of students lagged five years is meant to capture the effect of foreign education. Following the discussion in the previous section, I use as a control the average index of democracy in host countries, which is meant to capture the type of democracy to which foreign students are exposed. Finally, the interaction term measures if the marginal effect of foreign students depends on the level of democracy in host countries. This specification while parsimonious allows to investigate the different channels through which foreign education may have an impact on democracy.[15] The basic specification is as follows:

$$d_{it} = \alpha d_{it-5} + \beta \; students \; abroad_{it-5} + \gamma \; index \; of \; democracy \; in \; receiving \; countries_{it-5}$$
$$+ \delta \, (students \; abroad_{it-5} * index \; of \; democracy \; in \; receiving \; countries_{it-5})$$
$$+ country \; fixed \; effects_i + time \; fixed \; effects_t + \varepsilon_{it}$$

Where d_{it} is the index of democracy in time t in country *i*. The same specification is estimated for three different indices of democracy: the Freedom House's Political Rights

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[13] In principle, the number of students should be normalized using the number of "potential foreign students," i.e. the number of people in the relevant cohort or with a secondary education or tertiary education. However, using these data would limit the sample considerably.

[14] I choose the 5-year interval to follow the previous literature on education and democracy. However, I also tried a 10-year interval. While the number of observation sample in the sample is halved, the results discussed below are all confirmed; interestingly, the coefficients on democracy in host countries are usually larger in magnitude.

[15] I try different specifications in the robustness section.

Index, the composite polity index from the Polity IV dataset, and democracy index proposed by Przeworski, Alvarez, Cheibub, and Limongi (1990).

I use three different estimation techniques: pooled OLS, fixed effects OLS, and system GMM. The pooled OLS give a first idea of how the data are correlated without controlling for country fixed effects and, therefore, overestimates the coefficient on the lag dependent variable. The fixed effects estimator controls for country effects but biases downward the coefficients on the lagged dependent variable. The GMM estimators provide consistent and unbiased estimates but depend on the particular set of instruments used; in this particular case, with very persistent dependent variables (democracy is constant for long period), system GMM should be used (Blundell and Bond, 1998; Bond, 2002).[16]

The first three columns of Table 1a present the results for the Freedom House's index of political freedom using the techniques described above. As expected, democracy is very persistent; the coefficient on past democracy ranges between .847 in pooled OLS, which usually has upward bias, and .442 for the fixed effects, which usually displays downward bias. As expected, the unbiased GMM estimator .541 is within this range. The coefficients on student abroad are insignificant in all the specifications. Democracy in host countries is always positive and highly significant across different estimation techniques. Moreover, the interaction between democracy in host country and foreign is positive and highly significant in the GMM specification, which is consistent and unbiased.

These results do not depend on the specific index of democracy. The results discussed above are based on the Freedom House index of democracy, which has the wider coverage. Regressions that use Polity II and the Przeworski et al. indices of democracy gives the same results (see the first three columns of Tables 2a and 3a).[17]

All specifications, except the pooled OLS, include fixed country and fixed time effects; therefore, the results are robust to all county-specific time-invariant characteristics, including ethnic composition, religions, language, colonial ties, geographical variables, and many other unobservable characteristics, and to all world-wide trends, including higher income, trade, and education.

In conclusion, the results from these regressions show that (lagged) total number of students abroad (normalized by the population) has no clear impact on democracy at home; however,

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[16] In unreported regressions, I also experimented with difference GMM with qualitatively similar results.

[17] Glaeser et al., (2004) notes that several measures of democracy, including the polity II index from polity IV database, are in fact 'outcome' measures, which do not properly measure the constraint on government, which is the feature the 'institutionalists' would like to measure (North, 1981). To address this issue, I try also the variable 'constraint on the executive' from the polity IV database in unreported regressions; the results are confirmed.

quality of democracy in host countries has a strong a significant impact on domestic democracy; moreover, this positive effect increases with the number of students abroad.[18]

V. DETERMINANTS OF FOREIGN EDUCATION AND REVERSE CAUSALITY

The result that (lag) quality of institutions in host countries is correlated with democracy at home could be explained by reverse causality if the choice of destination country is endogenous. For instance, students from a dictatorial country may start going to more democratic countries in anticipation of more democracy at home. Chilean students in the early 1980s started going predominantly to democratic countries before the Pinochet regime was dismissed, also in anticipation of future regime changes. Likewise, some eastern European students could have taken advantage of the move of their countries toward a more democratic regime in the late 1980s to go abroad in anticipation of the return of democracy at home.[19] Note that the case for reverse causality must rely on students' anticipation of future democratic development at home, i.e. future changes in democracy change the destination chosen by (or allowed to) students.

My strategy to address the issue of reverse causality is to use instruments based on predicted student flows; crucially, the predictions are obtained in a way that is independent of political variables and is not influenced by common factors (exclusion criterion for instruments). Before constructing these instruments, the determinants of bilateral students' flows are discussed.

The issue of reverse causality depends ultimately on the reasons as to why students go abroad and on the reasons behind the choice of the destination countries. Several studies point out at several explanations for student destination choices. Using two cross-sections of student data for 1969 and 1985, Kim (1998) finds a nonlinear relationship between foreign students and difference in income, and that bilateral students' flows are larger when countries share the same religion or language. Using two cross-sections of student data for 1970 and 1989, Barnett and Wu (1995) find the existence of changing clusters in students' destinations; while "some western developed countries have remained at the center of the network, Asian and Middle Eastern countries have become more central." These studies show that the choice of destination countries is quite complex and seems mostly motivated by long-term time-invariant bilateral links, including colonial ties, language in common, distance, and proximity. Unfortunately, these variables cannot be used to build good instruments for students because these variables may also have a direct impact on (change in) democracy; moreover these factors are time invariant and are ill-suited to construct time-varying instruments.

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[18] Note that the coefficient of total number of students abroad becomes positive and significant if the interaction term is excluded from the regressions.

[19] The average quality of institutions in host countries is a weighted average of the index of democracy in the host countries so it changes also if the destination of students abroad changes.

Focusing more on cyclical fluctuations, Sakellaris and Spilimbergo (2000) find that the enrollment of foreign students from low-income countries is *positively* correlated with the business cycle in home countries while enrollment from rich countries is *negatively* correlated with the business cycle in home countries. This suggests that the decision to study abroad is conditioned by economic factors as much as by political views. This study also shows that availability of grants is a crucial factor limiting the movement of students from low-income countries. This point constitutes the crucial motivation for the instrumental variable strategy as described below.

Note that the literature has focused only on long-term bilateral determinants or on economic fluctuations while political reasons for studying abroad have not studied, probably because it was perceived less relevant.

To understand the reasons behind bilateral student flows and to address the issue of reverse causality in a systematic way, I run the following regression:

$$\ln(Bilateral\ students\ flows_{ijt}) = \alpha \ln(Population_{it}) + \beta \ln(Population_{jt}) + \gamma \ln(Distance_{ij})$$
$$+ \delta\ Contiguity_{ij} + \phi\ Colonial\ ties_{ij} + \phi\ Official\ language\ in\ common_{ij}$$
$$+ \phi\ de\ facto\ language\ in\ common_{ij} + \lambda\ institutions\ in\ receiving\ countries_{it}$$
$$+ \mu\ institutions\ in\ sending\ countries_{jt} + \nu\ Difference\ in\ institutional\ quality_{ijt}$$
$$+ receiving\ country\ fixed\ effects_j + time\ fixed\ effects_t + \varepsilon_{ijt}$$

The control variables, which are suggested by the papers mentioned above, belong to four groups. A first set of variables, including distance, contiguity, colonial ties, and official language in common, language in common spoken by more than 9 percent of the population, measure long term bilateral ties. A second set of variable—populations in both countries— are included as scale variables. Finally, a third set of variable are included to measure how political considerations play in the students' destination preferences: democracy in the sending country, democracy in the receiving country, and the absolute difference in democracy indices between the two countries. Fourth, in order to capture how open a country is to foreign students, I include a variable defined as the (log of) total students coming to country j, excluding students from country i $\left[\equiv \ln\left(\sum_{s \neq i} Students_{sjt} \right) \right]$. This variable measures the popularity of country j, which may include the availability of grants, the easiness to enter the country, and the tradition in local universities, but avoids any tautological definition excluding bilateral student from i to j. Finally, I control for year and receiving country fixed effects to capture common trend and long-term time invariant characteristics of destination countries.

The equation above is estimated using bilateral student flow database described in the appendix, which comprises more than 140,000 yearly bilateral observations. The results are reported in column 1 of Table 4.[20] All variables have the expected sign as in a trade gravity

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[20] Note that the large number of observations reduces significantly the size of the standard errors

equation. The three variables measuring political factors are particularly interesting for this paper. Less democratic countries send and receive fewer students; this captures the fact that the nondemocratic countries, especially the former soviet bloc, discouraged migration in general and, in particular, student flows.[21] The coefficient on 'political distance,' measured by the absolute difference in democratic indices in sending and receiving countries, is strongly negative, indicating that students tend to go to countries with similar degrees of democracy as at home. Finally, the variable measuring the popularity of countries is positive and significant as expected. The R-squared of this gravity equation is .54, which is somewhat lower than what is commonly found in gravity equations in trade, but it is still quite high

Column (2) reports the same specification excluding the three variables that are directly related to political preferences—levels of democracy in sending and receiving countries and absolute difference in the level of democracy. The sign and the significance of all coefficients do not change and the R-squared decreases only marginally, showing that the political variables, even if significant, do not play a main role in explaining bilateral student flows. This is an indication that the problem of reverse causality is, in practice, limited.

Beside political variables, a set of other bilateral variables, including distance, colonial ties, language in common, are possible determinants of democracy and bilateral students flows. For this reason, these variables cannot be used to construct the 'predicted student flows' to be used to explain democracy—their inclusion would violate the exclusion principle for instruments. The last column of Table 4 presents a minimal specification in which only variables that have no impact on democracy at home, including population in the sending and receiving countries and the popularity of receiving countries among foreign students. In addition, I control for receiving country and year fixed effects. The R-squared decreases substantially to .30. I use the predicted bilateral student flows from this specification to construct two variables: the predicted total annual students abroad, which is simply a sum over country of destination of the predicted bilateral flows, and the average democracy in receiving countries, which uses the *actual* democracy in host country weighted by *predicted* students according to the following formula:

$$\text{Predicted } \textit{democracy in host countries}_{ot} \equiv \Sigma d \frac{\widehat{S}_{odt}}{\Sigma_o \widehat{S}_{odt}} D_{dt},$$

where $\widehat{S}_{odt}$ is the predicted bilateral student flow from country o to country d at time t, using the specification of Table 4 column c; D_{dt} is the degree of democracy in host countries. Note that this is the same formula used to calculate actual democracy in host countries with the only innovation of predicted bilateral student flows rather than actual.

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[21] The fact that dictators have traditionally discouraged (or impeded) the migration of students to democratic countries suggests that indeed dictators were fully aware of the `destructive' power of foreign education, even before reading the robustness tests in this paper!

These two predicted variables are used in the GMM regressions as instruments for student flows and democracy in the host countries. Column 4 of Table 1a reports the result of the freedom house index. Despite the fact that the instruments are only weakly correlated with the instrumented variable, (lagged) average democracy in host countries has an impact on democracy at home.[22] This result is robust to different indices of democracy (see column 4 in Tables 2a and 3a). In conclusion, these regressions, which use constructed students' flow in a way that only exogenous variations are considered, show that political changes at home follow foreign education and not vice versa.

As a further robustness test, I tried another set of instrumental variables using the fact that student flows tend to be persistent over time. I constructed the variable average democracy in host country using as weights student flows 20 years before. This is not a perfect instrument because, for instance, a certain colonial heritage could determine both the distribution of students abroad and the (change in) democracy home. In addition, using a variable so lagged reduces substantially the number of observations. I use this variable both as an instrument for current democracy in host countries and directly in the baseline regression with the same results that (lagged) democracy in host countries remains strongly correlated with democracy at home.

Overall, there is no evidence from the previous literature and from the student gravity regressions presented in this paper that destination of students abroad is determined mostly by political considerations. In addition, the quality of education in host countries is strongly significant even in an equation using instrumental variables. This suggests that possibility of reverse causality is limited.

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[22] Note that in unreported regressions, I replicate the exercise using the predicted students flows based on the specification of column 2 Table 4, which has many more bilateral variables to explain bilateral student flows. The significance of the coefficients but the Hansen's specification test is lowered confirming that these instruments may be correlated with the dependent variable directly.

VI. ROBUSTNESS

The robustness tests focus on eight areas: omitted variables, first difference, long-run differences, alternative specification for the student variables, country size, heterogeneity of the sample, and stay rates of foreign students.

A. Omitted Variables

The strong correlation between (past) level of democracy in host countries and democracy in the sending country is surprising and begs the question of whether omitted variables may be responsible for this correlation. To address this issue, I include various plausible control variables that could cause a spurious correlation between foreign education and democracy at home.

Regional patterns in democracy are well known. For instance, Asian countries displayed less democracy in the 1950s and 1960s, Latin American countries had a wave of dictatorships in the 1960s and 1970s, and African countries have had a long period of undemocratic regimes starting in the 1960s (Acemoglu and Robinson, 2005). The existence of regional trends begs the question of whether the variable democracy in host is mainly capturing regional trend; the question is even more justified given that bilateral student flows are strongly dependent on distance and contiguity (see Table 4). In order to address this issue, I add to the baseline regression (column 3 in Table 1a) a variable measuring democracy in neighboring countries (see appendix for the construction of this variable). The results, which are shown in column 5 Table 1a for the freedom house index, show that democracy in neighboring countries is indeed significant but democracy in host countries remains positive and strongly significant. Similar results are obtained using the other two indices of democracy, polity II and Przeworski et al. (Tables 2a and 3a).

Column 6 includes the variable **educational attainment**, which is available only for a sub-sample of countries for which students abroad are available. As a consequence, the sample decreases substantially. Education attainment is the variable on which the previous literature on domestic education and democracy (e.g. Acemoglu et al., 2005a, and Glaeser et al., 2006) has focused. In this specification, the variables measuring the quality of democracy in host country and education attainment are both positive and strongly significant. These results are similar using the polity II and the Przeworski et al. indices of democracy (results reported in Tables 2a and 3a respectively). This is partly because these measures of democracy reduce the sample and partly because of differences in the construction of the indices (see Acemoglu and Robinson, 2005).

One possible omitted variable may be **trade** and, generally, long-term relationships with other nations. The idea that economic and political integration and democracy are intertwined has been suggested previously but has received only mixed empirical confirmation (Li and Reuvey, 2003; Rigobón and Rodrik. 2005; and López-Córdova and Meissner, 2005). If studying abroad especially in democratic countries is only a particular aspect of globalization, the significance of the coefficient on lagged democracy of host countries could be due to a spurious correlation. In order to check this hypothesis, I construct the variable

"democracy in trading partner," which is an average of the democracy index in the trading partners using as weight export share. Column 7 of Table 1a presents the results of a regression in which this variable is added as a control. Despite the high correlation between democracy in trading partners and democracy in host countries (the correlation between democracy in trading partners and democracy in host countries is about .45 in the sample), average democracy in host countries and the interaction term remains highly significant, indicating that foreign education plays a role even controlling for international trading ties.[23] Another possible concern is that foreign students are really proxying for the *flow* of domestic students with **tertiary education**. Usually, the studies on democracy and education, including Acemoglu et al., (2004) and Glaeser et al., (2006), use a stock variable such as average attainment as a proxy for education because the theoretical explanations on the link between democracy and education emphasize that the stock of education is important (e.g. Lipset, 1959). In line with these papers, specification 8 of Tables 1 to 3 controls only for the *stock* of education (education attainment) and not for the *flow* (tertiary enrollment).[24] The coefficients on democracy in host countries and interaction term remain positive and highly significant when including domestic enrollment while enrollment is generally significant.

Another important omitted could be **income per capita**. Several authors (Barro, 1999) have found that income and democracy appear to be correlated at least in the long run; however, the interpretation on this correlation is controversial (Acemoglu et al., 2005). Even controlling for income per capita, the results do not change (column 9 of Table 1a). The same results hold using the other definition of democracy (Tables 2 and 3).

As a further robustness test, specification 10 in Tables 1 to 3 includes **all of the control variables** mentioned above (democracy in neighboring countries, education attainment, democracy in trading partners, tertiary enrollment, and GDP per capita). The coefficient on level of democracy in host countries remains positive and significant. In this specification the number of observations is more than halved with respect to the baseline and many explanatory variables are highly correlated; the reason the coefficients on GDP per capita and tertiary enrollment become insignificant is most likely multicollinearity.

While the existence of *country-specific time-varying* omitted variables cannot be ruled out, the correlation is robust to a variety of tests, including the use of variables controlling for geographic proximity, commercial ties, tertiary enrollment, country specific trends, income per capita.

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[23] Note that López-Córdova and Meissner (2005) using the polity IV dataset finds an effect of globalization of trade on democracy especially in the period before World War II; the evidence after World War II is more nuanced. In an unreported regression, I ran democracy against democracy in trading partners controlling only for domestic education using system GMM and I found that democracy in trading partners becomes significant.

[24] I use domestic tertiary enrollment so that domestic data are comparable to the variable for foreign students, which refers only to tertiary education.

B. First Differences

In order to further investigate the issue of omitted variable, I estimate the baseline specification in differences:[25]

$$\Delta d_{it} = \gamma\ \Delta students\ abroad_{it-10} + \delta\ \Delta quality\ of\ institutions\ in\ receiving\ countries_{it-10} + \varepsilon_{it}$$

and

$$\Delta d_{it} = \gamma\ \Delta students\ abroad_{it-10} + \delta\ \Delta quality\ of\ institutions\ in\ receiving\ countries_{it-10}$$
$$+ country\ fixed\ effects_i + \varepsilon_{it}$$

The first specification controls for country fixed effects by taking differences; the second specification also controls for country specific trends (the fixed effects in differences). In addition, I try differences of 5 and 10 years. To avoid simultaneity bias, in this specification has explanatory variables lagged five years in the 5-year specifications as well. The results are displayed in the first four columns Table 1b. The coefficients on democracy in host countries remain positive and significant but the interaction term loses significance. Note that specifications 2 and 4 are quite demanding given that they are in difference *and* with country specific effects.

C. Long-Run Differences

Acemoglu et al., (2005) discusses the possibility that the link between education and democracy operates only with very long lags and suggests looking at long-run differences to find evidence of these effects. With long-run differences it is not possible to control for country fixed effects. However, idiosyncratic country shocks should be less relevant in the long-run. I try the longest difference available with the present data using the following specification:

$$\Delta d_{i,2000-1965} = \alpha + \gamma\ \Delta students\ abroad_{i,2005-1965}$$
$$+ \delta\ \Delta quality\ of\ democ\ in\ receiving\ countries_{i,2005-1965} + \varepsilon_{it}$$

The results for this specification are reported in column (5) of Table 1b; column (6) reports the same regression with the inclusion of (changes in) educational attainment. The coefficient on (changes in) democracy in host countries is always positive; when education attainment is introduced, the sample is reduced but the coefficient on democracy remains significant.

Figure 7, presents the scatter plot of changes in domestic democracy and changes in host countries' average democracy. The figure confirms that the significant correlation found in the regressions is not due to outliers.

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[25] Note that fixed effects estimator assumes that the error terms are serially uncorrelated; in this case, the fixed effect estimators is more efficient than the first difference estimator. However, if only the first differences in the errors are uncorrelated, the first difference estimator should be used (Wooldridge, 2002).

D. Alternative Specification for Foreign Students

So far, I have used three variables measuring the effects of students abroad on democracy at home—the number of students abroad, the average level of democracy in host countries and an interaction term. While this is a way to summarize the plethora of data on bilateral student flows, other aggregation are possible. In particular, foreign students could be classified into two categories: students going to fully democratic countries (for which the democracy index is 1) and students going to less than democratic countries (for which the index is less than 1). To check if my results depend on the specification proposed, I try this two-group specification.[26]

Using this classification, I replicate the baseline regression. Table 5 reports the results for various indices of democracy; in addition, I replicate the regression using the instruments discussed above for the number of students.[27] All regressions confirm my basic results: democracy is positively associated with the number of students going to democratic countries but is clearly unrelated to the number of students going to non-democratic countries.

Note that this classification has the serious drawback that it does not distinguish between different degrees of democracy. The Freedom House and the Polity II indices provide a detail range of democracy, which is lost by aggregating foreign students into two categories. For instance, a student going to an almost democratic country with a score slightly below 1 is grouped together with a student going to a clearly dictatorial regime. For this reason, I prefer to use a weighted average of democracy in host countries rather than a category based on an arbitrary cut-off.

E. Heterogeneity in Sample: Time

Before the eighties, when the cold war was raging, foreign education had a large political component (Richmond, 2003); while after the fall of Soviet Union, foreign education has lost the strong political association. In order to check for a structural break, I run the benchmark regression for the sub-periods before and after 1985. The results are in Table 6.

For the years before 1985, the coefficients on democracy in host countries and the interaction terms are positive and highly significant. On the other hand, for the years after 1985 these coefficients lose significance when using the freedom house and the Przeworski et al., index.

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[26] As before, in order to make the number comparable among countries, the number of students is normalized by population.

[27] The instruments for students to democratic and non democratic countries are constructed as before using predicted bilateral flows in a regression based on the specification in column 3 Table 4. The predicted bilateral flows are aggregated in two groups; students going to democratic and students going to non-democratic countries.

These results suggest that the role foreign education on democracy was more important before 1985. [28] This is not surprising given that the political component of foreign education was more important during the cold war period. This result should also be put in the framework of general trends in democracy. In the most recent decade, democratic status has been more stable (i.e., democratic countries remain democratic and dictatorships remain dictatorships) as it is clear comparing the coefficients on lagged democracy before and after 1985. In this context of relatively stability, foreign education is less relevant.

F. Heterogeneity in Sample: Country Size

Foreign education may be more relevant in small countries in which few individuals can make the difference than in large countries. Table 7 reports the results using 2 million as a cut-off figure. The evidence on country size and the effects of foreign education on democracy is unclear: using the Freedom house and the Przeworski indices, there is evidence that foreign education is more important in small countries while using the polity II index, the evidence is inconclusive.

G. Stay Rates

Foreign-educated students may have an impact on the democracy of their home country both if they stay abroad and if they return home. For instance, expatriate communities have played a large role in the politics of Iraq or Afghanistan. However, the effect of foreign-educated students on the democracy of their home countries is probably larger when students come back to their own countries. For this reason, I take a closer look at stay rates of foreign students.

Unfortunately, there is no systematic dataset on return rates of foreign students, but several sources may help. Usually, host countries give foreign students only temporary visas, which are not automatically converted in other types of visa, and this limits the legal stay rate; for instance, Borjas (2002) reports that between 1971 and 1991, over 3 million people receive student visas but only 393,000 received permanent visa status at the end of the studying period.[29] These estimates are probably the most accurate available.

In addition to the visa counting, there are three methods to estimate stay rates, although they have several limitations. The first method is looking at the level of education of foreign-born individuals in the U.S. census data (Carrington and Detragiache, 1998); this method, however, has the drawback that the census does not specify where the individuals were educated and so cannot be used in the present study. The second method uses data from tax

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[28] Note that the number of observations considerably smaller in the two sub-samples, especially for the Polity II and Przeworski indices after 1985. The reduced time dimension also reduces the feasibility of GMM; most of the specifications do not pass the Hansen's J test.

[29] Borjas (2002) also observes that many student visa recipients could have stayed illegally. For instance, about 300,000 illegal aliens who received amnesty after IRCA had temporary visas, including student visas.

authorities on foreign graduates who pay social security after graduation; using this methodology, Baker and Finn (2003) estimate that 51 percent of the foreigners who graduated in the United States in 1994/95 paid taxes in 1999, with a peak at 63 percent for students in computer science and engineering and much less for other disciplines. Using this method, Finn (2001) provides estimates of stay rates by country of origin (see Table 8). China and India, the two most populous countries, have by far the highest rates of stay; excluding China and India, the stay rate for graduates' decreases from 53 to 39 percent. The third method uses a survey of students' future plans (Doctorate Recipients from U.S. Universities, 2004) and is likely the most imprecise because it is based on stated intentions. Column 3 of Table 8 reports the staying intentions of non-U.S. citizen doctorate recipients from different countries. Despite the fact that intentions to stay are always higher than actual stay rates, the broad patterns across countries are reproduced—students from India and China have a disproportionate staying rate. Note that the data using the last two methods cover only graduate students. Finally, there is evidence that the stay rate was increasing until the mid-1990s and has leveled off since (Finn, 2003). For instance, Glaser (1979) noted that "...the commitment to home country is very strong. Most students from developing countries plan to return home."

One interesting observation from Table 8 is that the stay rates seem to be much higher for students coming from very populous countries such as China and India. This suggests that graduating students have more incentives to go back to relatively small countries where they can 'make the difference' participating in the political life, while there may only be an economic incentive to go back to a very large country. The third largest stay rate is for Canada, for which returning students do not make a difference given the established democratic tradition. I take this as a further evidence that foreign-educated students return especially to countries in which they "make the difference."

In conclusion, even in the United States, with a relatively flexible labor market and with a buoyant demand for highly skilled individuals, the stay rates have not surpassed 50 percent for the majority of sending countries. Other receiving countries probably have much lower stay rates.

VII. INTERPRETATION AND CONCLUSIONS

A large amount of resources are spent on foreign education with the explicit goal of educating individuals and fostering a particular system of values: Western countries have hoped to foster democracy; Socialist countries have educated future socialist leaders; and Muslim countries have financed schools with Islamic values. Were these resources spent usefully?

This paper answers this question by looking at the most comprehensive existing dataset on foreign students, which spans 50 years and covers the entire world. Using this dataset and three different indices of democracy, I have found a very strong correlation between the lagged average indices of democracy in host countries and the current level of democracy in the origin country while there is only mixed evidence on the lagged total number of students abroad and the level of democracy at home.

These correlations are robust to the inclusion of several control variables, including education attainment at home, average level of democracy in trading partners, GDP per capita, country fixed effects, time fixed effects, different definitions of democracy, country-specific trends, and exclusion of socialist countries or particular regions. Moreover, these correlations cannot be interpreted as reverse causality, because students do not appear to select the destination countries in anticipation of changes in democracy in their own countries. Finally, these correlations generally hold even in differences with country-specific trends.

The robustness of these correlations suggests that there is, in fact, a causal relationship between what students study in the host countries and democratic development at home. This finding begs three questions: 1) how a small minority can be so influential, especially considering that many foreign students do not go back to their home country?: 2) how does this paper contribute to the current debate on the relationship between education and democracy?; and 3) what are the specific mechanisms through which foreign-educated individuals bring about changes in democracy at home?

The answer to the first question is part of the more general debate on the role of single leaders or restricted elites in history. The idea that elites are responsible for important changes has a long tradition in sociology; for instance, Parsons (1960) writes that "... within the existing elites, such people are most likely to be found among intellectuals, especially those who have direct contacts with the west, particularly through *education abroad* or under western auspices at home" (italics added). Lipset (1960) looks at the specific case of elites in Latin America.[30] More recently, Jones and Olken (2005) have found that leaders do matter for countries' income growth. This paper adds another piece of evidence to this intellectual tradition showing how foreign education of the elites may explain the course of history. Table 10 presents the levels of education and the locations where individuals who were world leaders in 1990 studied.[31] Out of 115 world leaders, 66 studied abroad at a certain point; the percentage of foreign-educated leaders' increases to more than two-thirds if one is considering only developing countries. These numbers show clearly that foreign-educated individuals do play an overwhelming role in their own home countries.

The second issue is how my findings contribute to the current debate on the relationship between domestic education and democracy (see Glaeser, Ponzetto, and Shliefer, 2006, and Acemoglu and others, 2005). The evidence presented shows that quality of foreign education

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[30] For an interesting discussion and convincing case on how a small group of foreign-educated economists had a huge impact on Chile, see Valdés (1995).

[31] Table 10 presents the level of education of world leaders in 1990. The world leaders are as identified by Jones and Olken (2005). The information was collected by checking biography of each leader. If no information was available, a missing value is indicated. Therefore, the numbers in Table 10 are a lower bound for the actual number of foreign-educated leaders.

matters for democracy. I have also shown, by incorporating fixed effects and showing long-run differences that foreign education is not due to long-term omitted variables. Is this the ultimate proof that education matters for democracy? No, because foreign education is very different from domestic education on which this debate is focused. First, foreign-educated people are only a restricted minority of the population, by far less numerous than domestically educated people. Second, I have shown that quality of foreign education matters, so I do not find evidence for the hypothesis that education per se matters because it teaches the value cooperation and lowers the cost of organization of civil society. This leaves open the question of how important the educational level of the elites is in explaining economic and political outcomes.

The third issue is understanding through which specific mechanisms foreign-educated individuals bring about changes in democracy at home. Many hypotheses are possible and are compatible with the available evidence. First, foreign-educated technocrats are such a scarce resource in many countries that they can impose their own preferences in favor of democratic regimes; in other words, there may be no alternatives to hiring a foreign-educated minister who will accept the job only if a country has a reasonable level of democracy.[32] In addition, a foreign-educated minister could give confidence to foreign investors. Second, foreign-educated leaders seem to be extremely motivated to introduce democracy and to keep up with the more developed countries where they studied; in general, the leaders' educational levels seem to be associated with the probability of introducing structural reforms (Dreher and others, 2006).[33] Third, foreign-educated individuals make it more difficult for the dictatorial regimes to maintain repression by spreading new ideas at home. Fourth, foreign-educated individuals can make repressive activities more costly for a dictatorial regime since they have easier access to external media; in addition, foreign-educated individuals may lobby foreign governments to press for changes at home. Fifth, education abroad may inculcate a sense of common identity with the international democratic community; this sense of common identity has proven to be a very powerful motivating factor (see Akerlof and Kranton, 2005).[34] Future work should study which specific channels are at work.

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[32] In some sense, this happened where Mikhail Gorbachev decided to reform the Soviet system and during the Boris Yeltsin era. The old soviet bureaucrats simply were unable to handle the new economic challenges while the new "technocrats" were available only if democracy were introduced.

[33] Based on a survey on the reasons for pursuing a Ph.D. in the United States, Aslambeigui and Montecinos (1998) find that "the significance attributed to a Ph.D. in careers in politics seemed especially strong among students from Latin America, where economists are currently playing very important political roles."

[34] Several studies have found that foreign students develop a sense of identification for the country where they study (see Sellitz and others, 1963). For instance, Ye (2001) describes how "Chinese by studying at American universities played pivotal roles in Chinese intellectual, economic, and diplomatic life upon their return to China. These former students exemplified key aspects of Chinese "modernity," introducing new social customs, new kinds of interpersonal relationships, new ways of associating in groups, and a new way of life in general."

The paper also contributes to the debate on what political power is in the twenty-first century. Influential scholars in international relations theory have argued that "soft power," defined as the ability of a political body to influence indirectly the behavior of other political bodies through ideological or cultural means without the use of coercion, will play an important role (Nye, 2004). Foreign education is listed as one of the main instruments to exert "soft power." Despite its popularity and appeal, "soft power" has proven remarkably difficult to test empirically. This paper provides a first quantification of an important component of "soft power."

Finally, this paper has argued that foreign education, which is only one aspect of education of the elites, matters for the type of regime. This begs the question of whether other characteristics of the elites matter for the development of countries. Future research should focus on the elites' general educational levels and, more generally, other characteristics, including attitudes toward markets, religion, and values.

Appendix I. Data

As dependent variable, I use three measures of democracy. The **Freedom House's Political Rights Index** ranges between 1 and 7, with 1 representing the most freedom.[35] The index summarizes a number of dimensions, including the existence of free elections, of competitive parties. Following Barro (1999) and Acemoglu et al. (2004), I supplement this index with data from Bollen (1990, 2001) for 1960 and 1965. As a second measure of democracy I use the **composite polity index from the Polity IV dataset**, which is the difference between the Polity's democracy and autocracy indices.[36] Polity IV contains coded annual information on regime and authority characteristics for all independent states (with greater than 500,000 total population) in the global state system and covers the years 1800-2003. The third measure of democracy is the dichotomous **democracy index proposed by Przeworski, Alvarez, Cheibub, and Limongi** (1990) and extended by Boix and Rosato (2001); a key aspect of this index is that a country is not considered a democracy unless a political party has lost power. This index is appealing for this paper because the dichotomous nature of the index makes is clear the year of transition. In order to make the results easier to interpret, I normalize the indices so that 1 corresponds to the maximum degree of democracy and 0 to the least.

My main explanatory variables—**share of foreign students over population and average quality of institutions in host countries**—are constructed from the **cross country student migration** database as reported in the UNESCO Statistical Yearbook. The database covers the time period 1950 to 2003 and refers to students' migration at the third tier of education (university education and higher). The data are produced by the receiving countries, which typically collect information from local institutions. In the 1950s, the data are available for only few receiving countries including Australia, Austria, Belgium, Egypt, France, Germany, India, Japan, Netherlands, Spain, Switzerland, United Kingdom, and United States— countries that cover traditionally receive the majority of students- and for the 50 main sending countries. Starting with 1960, the data are available for almost all receiving countries and the majority of sending countries. Data were purged of evident outliers;[37] missing data for bilateral flows for which there was sufficient non missing years were interpolated. Figure 1 shows total foreign students and foreign students normalized by world population and by tertiary enrollment.

The **population** and the **real income per capita** data come from the World Bank's WDI augmented with national sources whenever there are missing values.

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[35] The data updated to 2005 are available from the Freedom House's website (http://www.freedomhouse.org/).

[36] The data are available from the Polity IV's website (http://www.cidcm.umd.edu/inscr/polity/).

[37] e.g. if the number of students from country A to country B was 10000 in one year when the average for the preceding and following decades was 10.

The variable **average democracy index in host countries** is constructed as the weighted average of the institution in the host countries where the weights are given by the share of students from country j to country I over all students from country j:

$$Democracy\ in\ host\ countries_{ot} \equiv \Sigma_d \frac{S_{odt}}{\Sigma_o S_{odt}} D_{dt}$$

Where D_{dt} is one of the three democracy indices described above; S_{odt} is the number of students from country o to country d in year t. By construction, the three indices so constructed lies between 0 and 1; the index is 1 if all students abroad are democratic countries and 0 if all students abroad are in dictatorial regimes. In order to avoid problems of small sample, this variable is used only of there are at least 10 students abroad. Note that the countries weights are calculated for each year so the index for a specific country may change from year to year for two reasons: 1) if the level of democracy in host countries changes or 2) if the combination of students abroad changes.

The other control variables include: **education attainment** from the Barro-Lee (2000) dataset, **tertiary enrollment** from the World Bank's WDI, **democracy in trading partners**, and **democracy in neighboring partners**. The variable **democracy in trading partners** is constructed as the weighted average of the institution in the trading partners where the weights are given by the share of exports from country d to country o over all exports from country d:

$$Democracy\ in\ trading\ partners_{ot} \equiv \Sigma_d \frac{EXP_{odt}}{\Sigma_o EXP_{odt}} D_{dt}$$

Where D_{dt} is one of the three democracy indices described above; EXP_{odt} is the value of exports from country o to country d in year t. The Data on trade come from the UN's COMTRADE database. The variable **democracy in neighboring partners** is constructed as the weighted average of the institution in the neighboring countries where the weights are given by the population of country i divided by the distance from country j to country i:

$$Democracy\ in\ neighboring\ countries_{ot} \equiv \Sigma_d \frac{Pop_{dt}}{Distance_{od}} D_{dt}$$

Where D_{dt} is one of the three democracy indices described above; $Distance_{od}$ is the distance between country o and country d.

The sample include all countries for which the data are available, which were independent for at least 5 years.

Table 9 presents the summary statistics.

Figure 1. Total Foreign Students
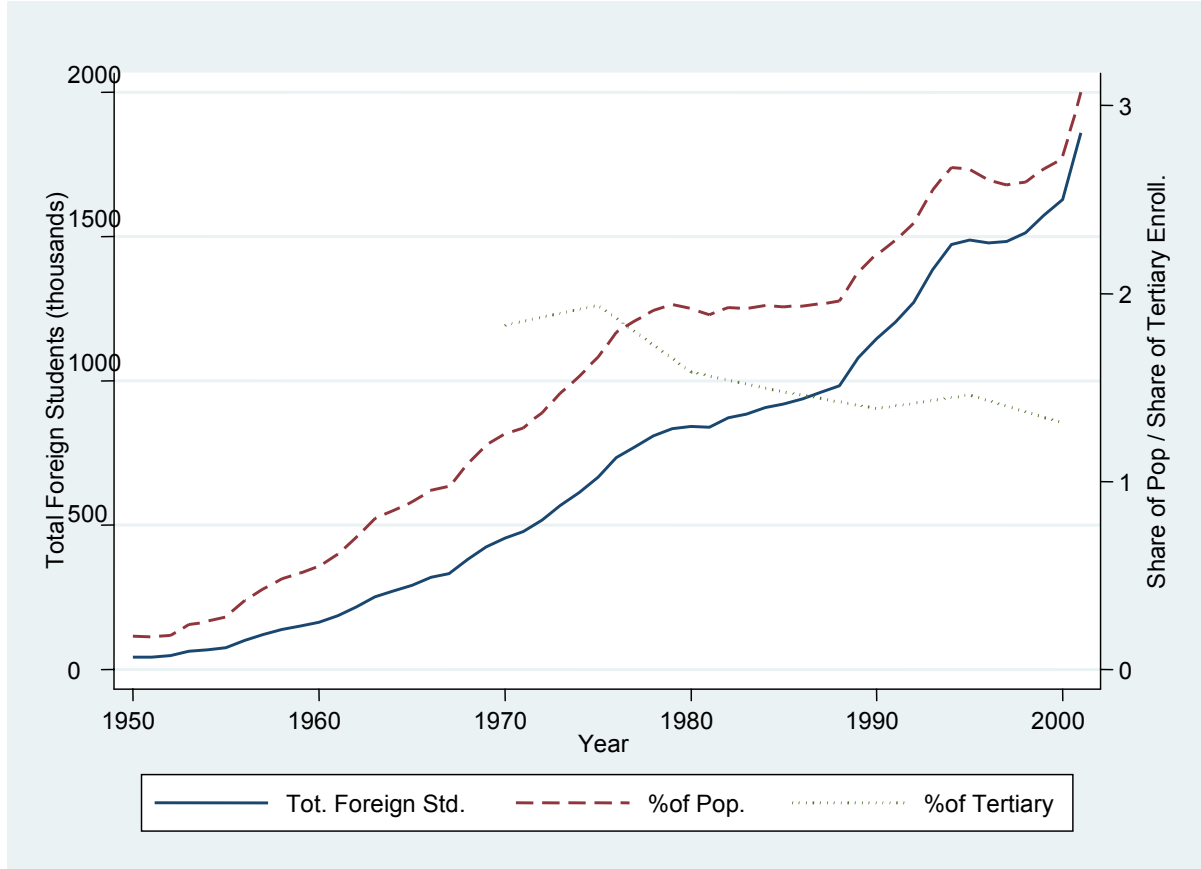
Note: the original data come from the UNESCO dataset revised as described in the Data Appendix. The solid line represents the total number of students abroad. The dashed line represents students abroad normalized by (millions of) individuals in the origin countries; the dotted line represents students abroad normalized by (tens of millions) of people getting tertiary education in the origin countries.

Figure 2. Host Countries
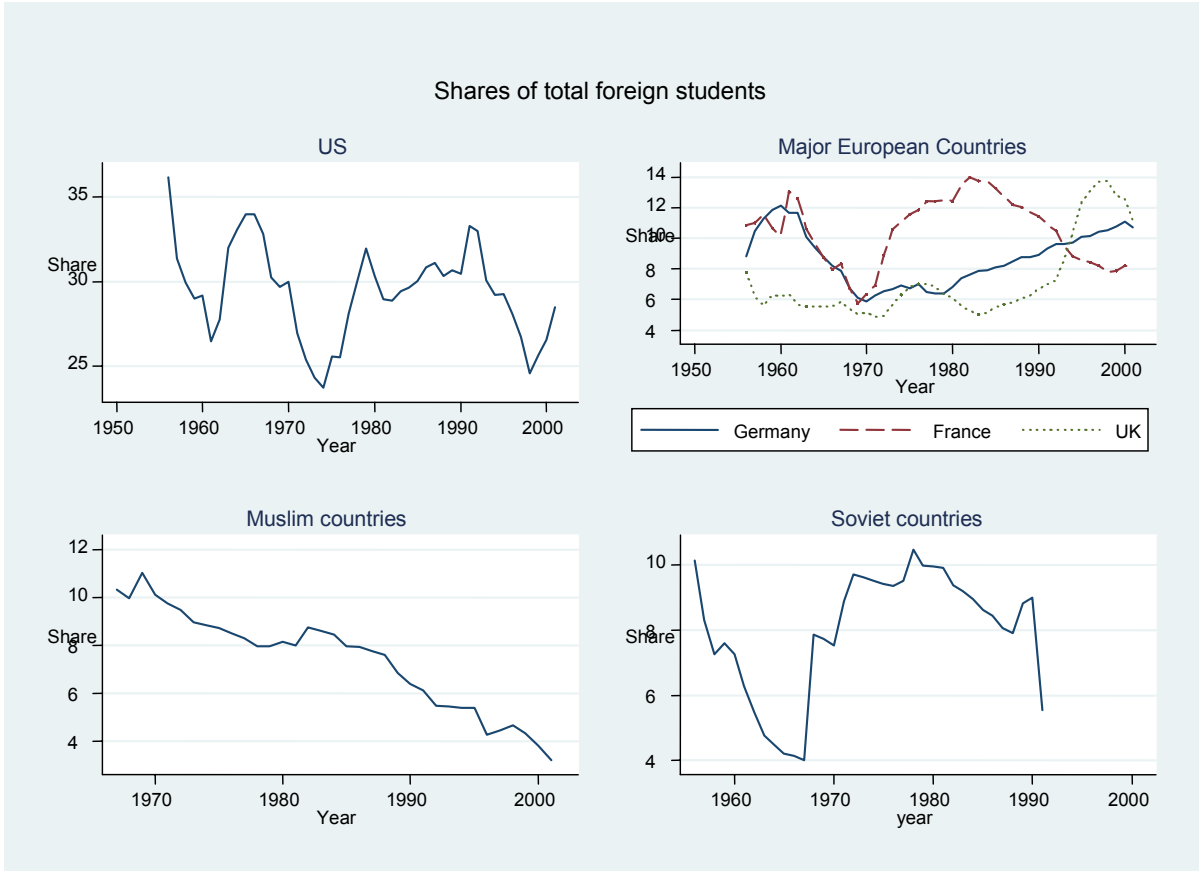
Shares of total foreign students

Note: the original data come from the UNESCO dataset revised as described in the Data Appendix.

Figure 3. Chile
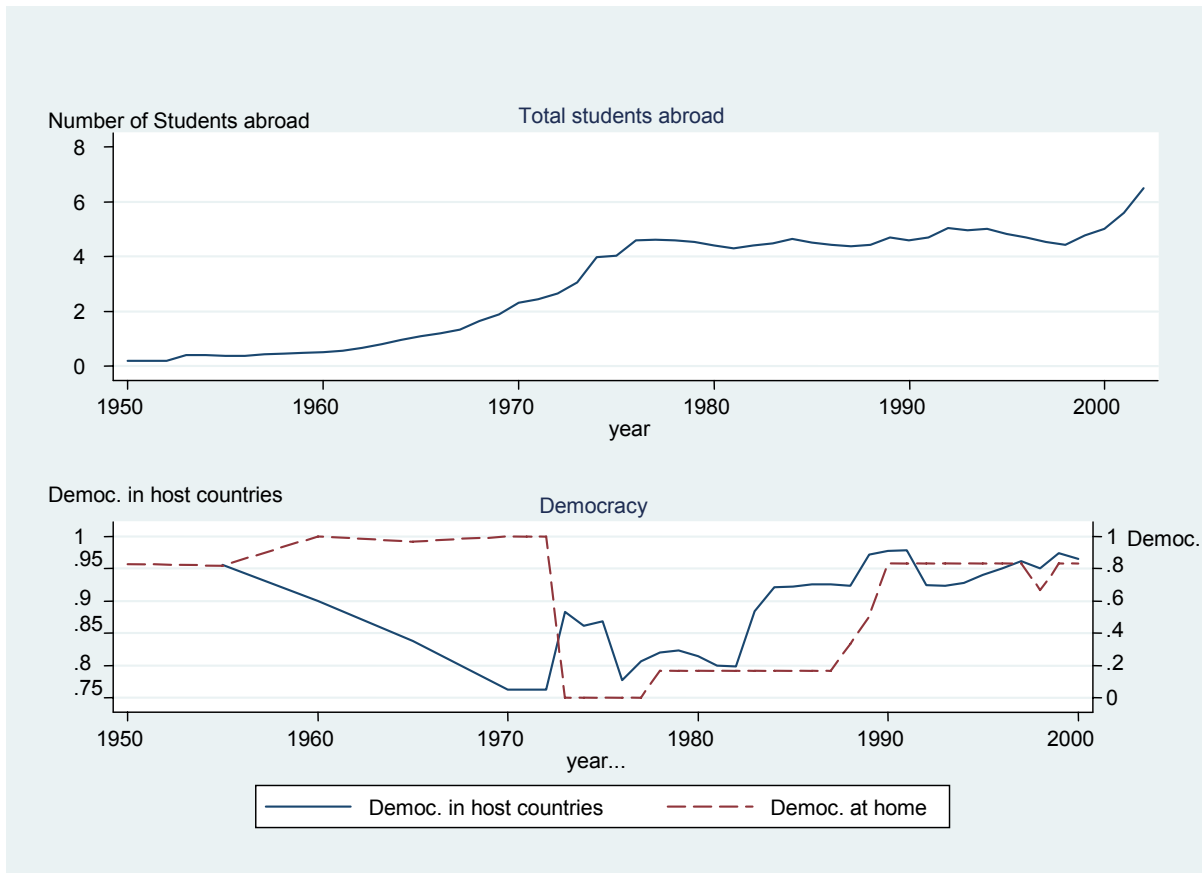
Note: the top panel shows total number of Chilean students abroad in expressed in thousands. The bottom panel shows the level of democracy in home country and in students' host countries, i.e. the average level of democracy in countries where Chilean students are. Both indices are constructed using the Freedom House index of democracy normalized so it lies between 0 and 1. The construction of the data is described in the data appendix.

Figure 4. Argentina
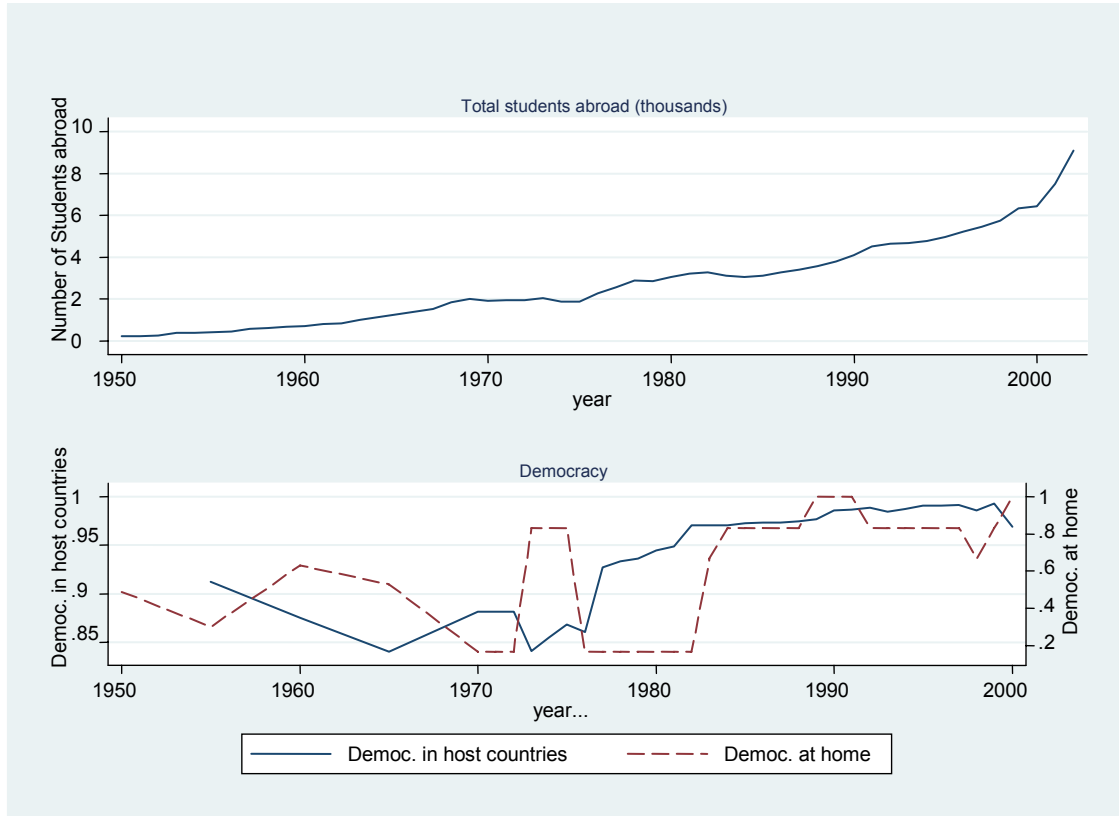
Note: the top panel shows total number of Argentinean students abroad in expressed in thousands. The bottom panel shows the level of democracy in home country and in students' host countries, i.e. the average level of democracy in countries where Argentinean students are. Both indices are constructed using the Freedom House index of democracy normalized so it lies between 0 and 1. The construction of the data is described in the data appendix.

Figure 5. Iran
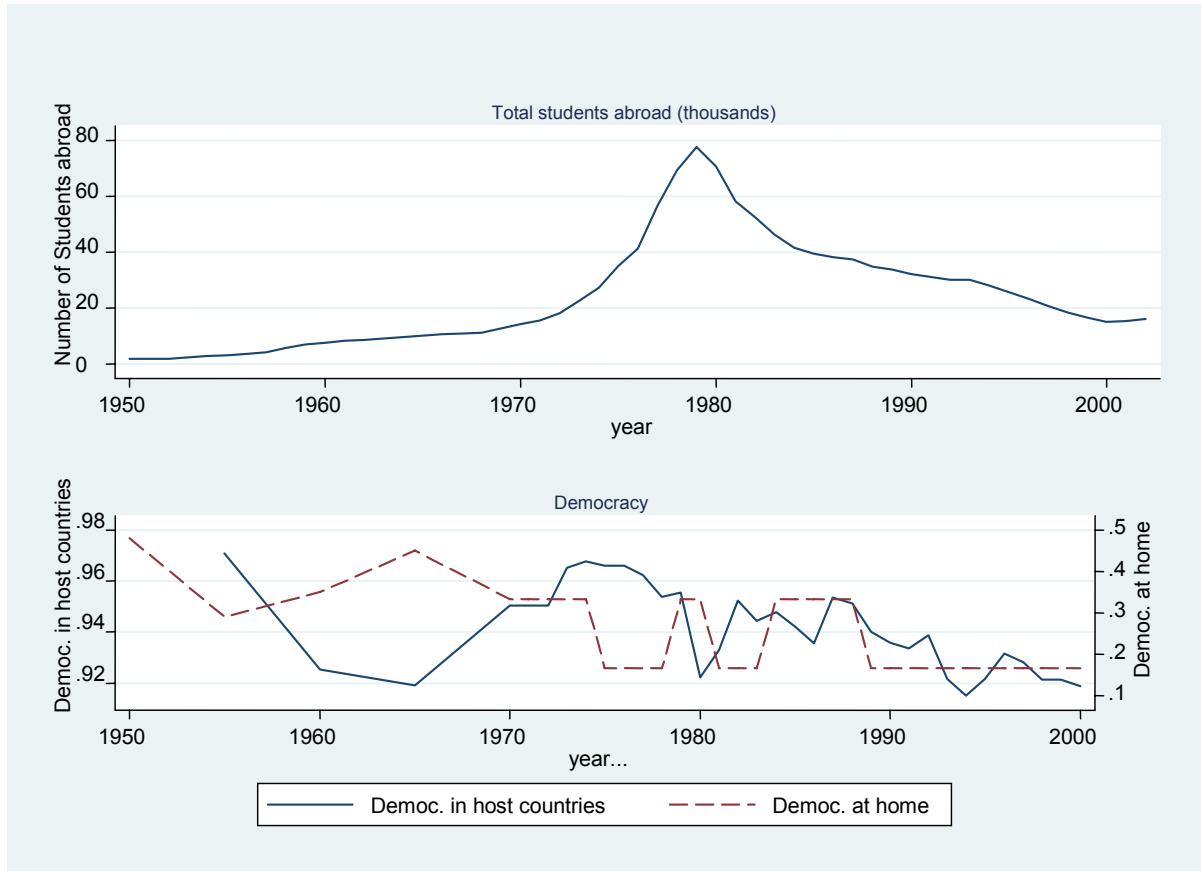
Note: the top panel shows total number of Iranian students abroad in expressed in thousands. The bottom panel shows the level of democracy in home country and in students' host countries, i.e. the average level of democracy in countries where Iranian students are. Both indices are constructed using the Freedom House index of democracy normalized so it lies between 0 and 1. The construction of the data is described in the data appendix.

Figure 6. Republic of Korea
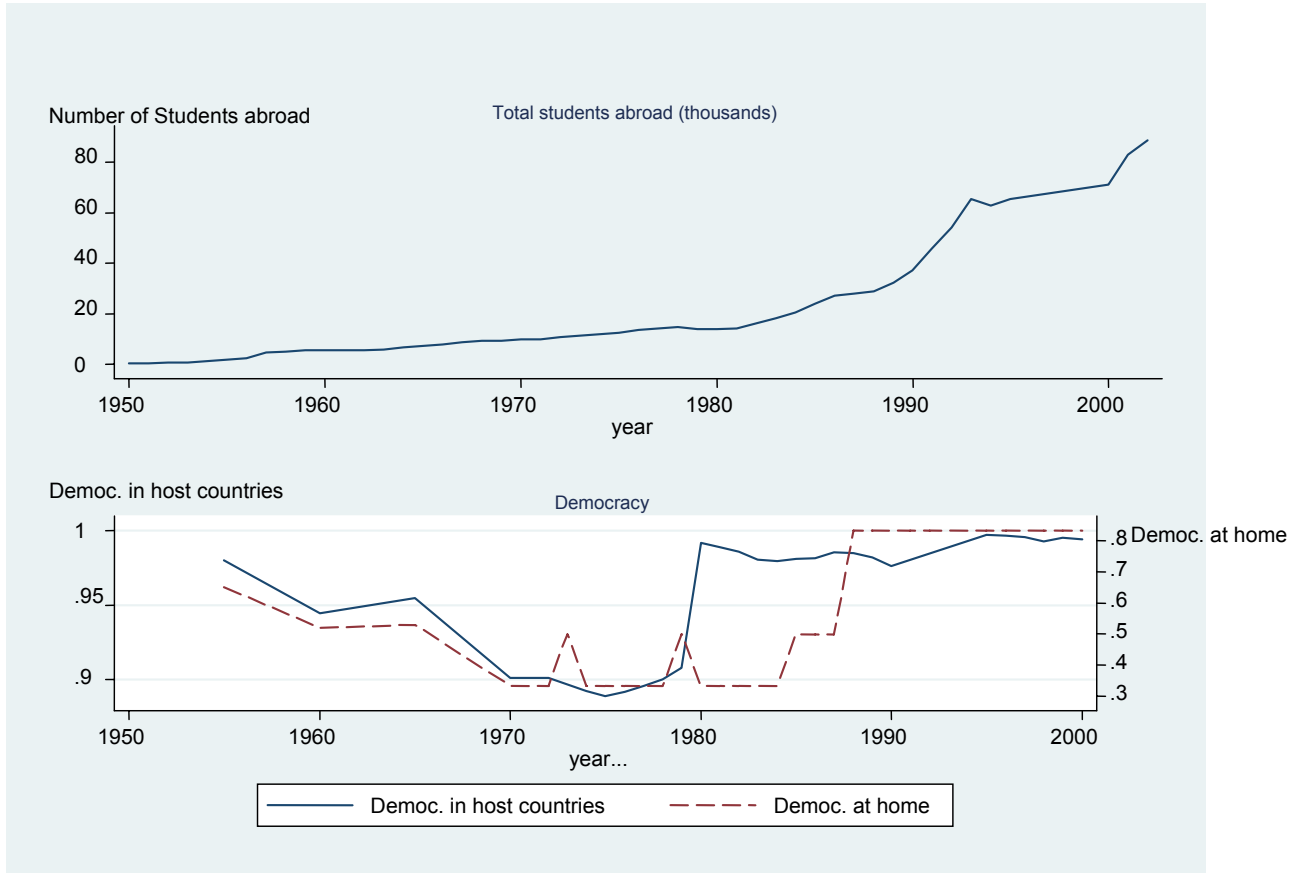
Note: the top panel shows total number of Korean students abroad in expressed in thousands. The bottom panel shows the level of democracy in home country and in students' host countries, i.e. the average level of democracy in countries where Korean students are. Both indices are constructed using the Freedom House index of democracy normalized so it lies between 0 and 1. The construction of the data is described in the data appendix.

Figure 7. Democracy in Home Versus Host Countries
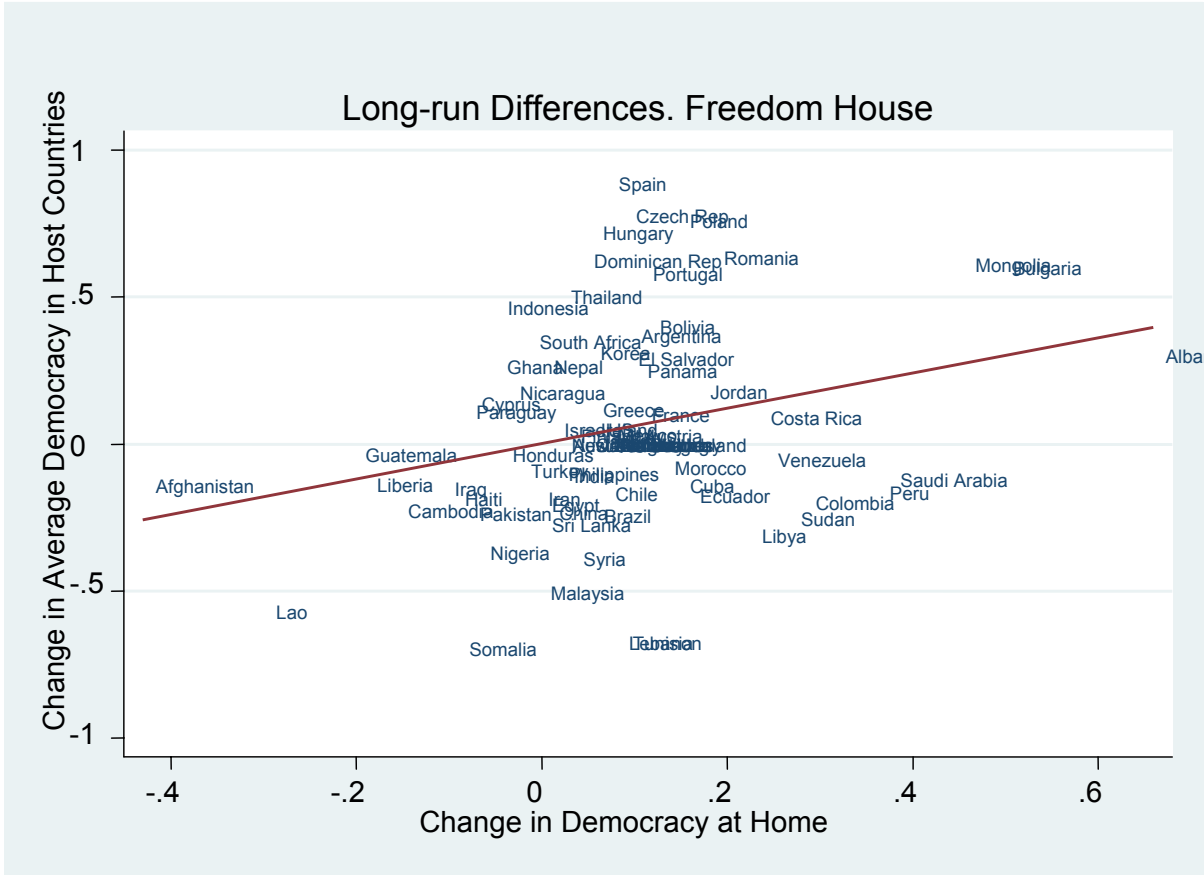
Note: the differences are taken in both cases between 1960 and 2000.

Table 1a. Dependent Variable: Freedom House Index of Political Freedom—Level

	Pooled OLS (1)	Fixed Effects OLS (2)	System GMM (3)	System GMM (4)	System GMM (5)	System GMM (6)	System GMM (7)	System GMM (8)	System GMM (9)	System GMM (10)
Democracy$_{t-5}$	.847*** (.021)	.442*** (.039)	.541*** (.044)	.481*** (.048)	.573*** (.044)	.331*** (.052)	.555*** (.048)	.403*** (.069)	.466*** (.063)	.241*** (.075)
Students Abroad$_{t-5}$	6.821 (7.341)	15.827 (14.273)	-8.894 (9.806)	-6.699 (25.879)	-1.658 (10.390)	-2.881 (9.767)	-7.879 (9.597)	-15.462 (15.272)	29.063 (30.541)	9.372 (17.369)
Democracy in host countries$_{t-5}$	.082** (.033)	.166*** (.041)	.202*** (.059)	.208*** (.063)	.170*** (.062)	.325*** (.076)	.229*** (.061)	. 257*** (.099)	.219*** (.089)	.282** (.123)
Students Abroad$_{t-5}$ * Democracy in host countries$_{t-5}$	-3.439 (8.422)	-25.357 (18.569)	28.458*** (11.889)	30.493 (28.100)	17.839 (12.270)	3.739 (15.483)	24.666* (13.245)	36.875* (21.133)	-22.509 (34.810)	-18.579 (22.806)
Democracy in Neighboring countries$_{t-5}$					.133** (.064)					.264*** (.100)
Education Attainement$_{t-5}$						5.600*** (1.015)				5.868*** (1.068)
Democracy in trading partners$_{t-5}$							.000 (.109)			.076 (.220)
Tertiary enrollment$_{t-5}$								6.741*** (1.032)		-.371 (1.203)
GDP per capita$_{t-5}$									11.145*** (2.583)	2.455 (2.128)
Time effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country effects		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Instr. for students				Yes						
AR(1) Test			.00	.00	.00	.00	.00	.00	.00	.00
AR(2) Test			.53	.63	.54	.82	.39	.53	.46	.89
Hansen's J test			.10	.27	.23	.31	.31	.05	.38	.39
No. of Instr.			153	175	177	120	158	127	166	108
No. of countries		183	183	183	181	120	160	163	169	108
Observations	1,379	1,379	1,379	1,379	1,358	899	1,166	877	1,093	614
R-squared	0.75	0.30								

* Significant at 10 percent; ** significant at 5 percent, *** significant at 1 percent. 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 interval between 1955 and 2005. Students abroad, democracy in host countries, and all other control variables are treated as predetermined and are instrumented for using their own first to third lags. Specification 4 uses instrumental variables as described in the text.

Table 1b. Dependent Variable: Freedom House Index of Political Freedom—Differences

	Change in Democracy$_t$ (5 years) OLS (1)	Change in Democracy$_t$ (5 years) Fixed Effects (2)	Change in Democracy$_t$ (10 years) OLS (3)	Change in Democracy$_t$ (10 years) Fixed Effects (4)	Change in Democracy$_t$ (40 years) OLS (5)	Change in Democracy$_t$ (40 years) OLS (6)
5-Year Change in Students Abroad$_{t-5}$	6.699 (7.609)	6.947 (8.420)				
5-Year Change Democracy in Host countries$_{t-5}$	.077** (.039)	.071* (.040)				
5-Year Change in (Students Abroad$_{t-5}$ * Democ. in host countries$_{t-5)}$	-10.357 (13.635)	-12.056 (17.494)				
10-Year Change in Students Abroad$_t$			38.209 (23.777)	37.265 (23.269)		
10-Year Change in Democ. in Host Countrie$_t$			.209*** (.077)	.188** .082		
10-Year Change in (Students Abroad$_{t-10}$ * Democ. in Host Countries$_{t-10)}$			-46.076* (26.131)	-48.623* (29.337)		
40-Year Change in Students Abroad$_t$					26.308 (75.369)	67.556 (115.848)
40-Year Change Democracy in Host Countries$_t$					.652*** (.139)	.522*** (.162)
40-Year Change in (Students Abroad$_t$ * Democ. in Host Countries$_{t)}$					-19.934 (79.571)	-64.065 (127.287)
40-Year Change in Education Attainment$_t$						-1.181 (2.969)
Country Effects		Yes		Yes		
No. of countries	160	160	159	159	85	68
Observations	1,073	1,073	513	513	85	68
R-squared	.00	.00	.02	.02	.21	.11

* Significant at 10 percent; ** significant at 5 percent, *** significant at 1 percent. Robust standard errors clustered by country in parentheses. The sample is an unbalanced panel, comprising data between 1955 and 2005.

Table 2a. Dependent Variable: Polity2

	Pooled OLS (1)	Fixed Effects OLS (2)	System GMM (3)	System GMM (4)	System GMM (5)	System GMM (6)	System GMM (7)	System GMM (8)	System GMM (9)	System GMM (10)
Democracy$_{t-5}$	.830*** (.022)	.452*** (.047)	.409*** (.064)	.445*** (.058)	.491*** (.061)	.288*** (.073)	.424*** (.065)	.338*** (.078)	.497*** (.085)	.300*** (.082)
Students Abroad$_{t-5}$	2.487 (5.964)	24.229*** (8.621)	-12.382 (12.116)	-3.112 (18.947)	-9.658 (11.136)	-18.645 (12.150)	-15.735 (13.321)	-35.058*** (12.645)	-15.377 (19.694)	-53.085** (25.672)
Democracy in host countries$_{t-5}$	.100*** (.036)	.116** (.052)	.355*** (.071)	.367*** (.086)	.310*** (.074)	.409*** (.098)	.349*** (.074)	.327*** (.110)	.298*** (.087)	.416*** (.125)
Students Abroad$_{t-5}$ * Democracy in host countries$_{t-5}$	-3.880 (7.044)	-33.712*** (12.458)	25.658** (12.904)	2.827 (25.545)	20.544* (12.274)	25.473* (13.190)	29.379** (14.635)	51.619*** (18.916)	22.729 (22.992)	56.921* (29.623)
Democracy in Neighboring countries$_{t-5}$					.015 (.076)					.113 (.120)
Education Attainment$_{t-5}$						4.064*** (.844)				5.169*** (1.184)
Democracy in trading partners$_{t-5}$							-.031 (.138)			-.385 (.242)
Tertiary enrollment$_{t-5}$								6.482*** (1.306)		.219 (1.612)
GDP per capita$_{t-5}$									7.519** (3.303)	-1.858 (2.739)
Time effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country effects		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Instr. for students				Yes						
AR(1) Test			.00	.00	.00	.00	.00	.00	.00	.00
AR(2) Test			.76	.70	.66	.73	.73	.49	.51	.49
Hansen's J test			.15	.24	.20	.32	.18	.05	.27	.44
No. of Instr.			139	143	142	114	135	110	132	106
No. of countries		158	158	158	157	114	150	152	147	106
Observations	1,107	1,107	1,107	1,107	1,084	781	976	724	861	528
R-squared	.76	.41								

* Significant at 10 percent; ** significant at 5 percent, *** significant at 1 percent. 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 interval between 1955 and 2000. Students abroad, democracy in host countries, and all other control variables are treated as predetermined and are instrumented for using their own first to third lags. Specification 4 uses instrumental variables as described in the text.

Table 2b. Dependent Variable: Polity2—Differences

	Change in Democracy$_t$ (5 years) OLS (1)	Change in Democracy$_t$ (5 years) Fixed Effects (2)	Change in Democracy$_t$ (10 years) OLS (3)	Change in Democracy$_t$ (10 years) Fixed Effects (4)	Change in Democracy$_t$ (40 years) OLS (5)	Change in Democracy$_t$ (40 years) OLS (6)
5-Year Change in Students Abroad$_{t-5}$	-2.913 (3.625)	-2.808 (3.580)				
5-Year Change Democracy in Host countries$_{t-5}$	.052 (.039)	.057 (.041)				
5-Year Change in (Students Abroad$_{t-5}$ * Democ. in host countries$_{t-5)}$	-2.846 (6.881)	-4.231 (5.781)				
10-Year Change in Students Abroad$_t$			-2.260 (5.757)	1.027 (7.847)		
10-Year Change in Democ. in Host Countrie$_t$			.184** (.076)	.285*** (.107)		
10-Year Change in (Students Abroad$_{t-10}$ * Democ. in Host Countries$_{t-10)}$			-4.678 (10.700)	-11.803 (13.370)		
40-Year Change in Students Abroad$_t$					-179.260 (189.415)	189.408 (265.104)
40-Year Change Democracy in Host Countries$_t$					.320* (.172)	.293 (.238)
40-Year Change in (Students Abroad$_t$ * Democ. in Host Countries$_{t)}$					173.318 (195.401)	-207.936 (274.063)
40-Year Change in Education Attainment$_t$						-1.931 (2.958)
Country Effects		Yes		Yes		
No. of countries	138	138	135	135		
Observations	846	846	340	340	97	74
R-squared	.00	.00	.01	.03	.06	.04

* Significant at 10 percent; ** significant at 5 percent, *** significant at 1 percent. Robust standard errors clustered by country in parentheses. The sample is an unbalanced panel, comprising data between 1955 and 2000.

Table 3a. Dependent Variable: Przeworski and others (2000), Democracy Index

	Pooled OLS (1)	Fixed Effects OLS (2)	System GMM (3)	System GMM (4)	System GMM (5)	System GMM (6)	System GMM (7)	System GMM (8)	System GMM (9)	System GMM (10)
Democracy$_{t-5}$	.794*** (.032)	.281*** (.060)	.286*** (.063)	.279*** (.065)	.353*** (.066)	.128* (.074)	.286*** (.066)	.188** (.087)	.412*** (.094)	.210** (.096)
Students Abroad$_{t-5}$	-3.810 (5.987)	5.975 (9.490)	-18.805** (8.646)	-20.800 (28.838)	-17.258** (8.601)	-30.557** (13.853)	-28.516** (11.985)	-36.592** (15.701)	-32.759 (52.128)	-104.616*** (25.857)
Democracy in host countries$_{t-5}$	.078* (.040)	.082 (.060)	.234*** (.076)	.176* (.098)	.192** (.082)	.184 (.134)	.368*** (.083)	.224* (.129)	.191* (.110)	.140 (.169)
Students Abroad$_{t-5}$ * Democracy in host countries$_{t-5}$	14.059 (11.167)	12.480 (30.375)	45.540** (18.038)	55.585 (36.512)	40.499** (18.266)	42.946* (24.865)	56.304*** (21.157)	69.844*** (25.626)	41.014 (64.128)	131.429*** (36.506)
Democracy in Neighboring countries$_{t-5}$					.037 (.107)					.278* (.161)
Education Attainement$_{t-5}$						7.228*** (1.702)				4.881** (2.066)
Democracy in trading partners$_{t-5}$							-.431** (.188)			-.362 (.317)
Tertiary enrollment$_{t-5}$								17.245*** (3.518)		9.358* (5.321)
GDP per capita$_{t-5}$									15.792** (6.307)	-2.343 (3.879)
Time effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country effects		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Instr. for students				Yes						
AR(1) Test			.00	.00	.00	.00	.00	.00	.00	.01
AR(2) Test			.24	.25	.19	.52	.34	.37	.24	.64
Hansen's J test			.02	.11	.22	.25	.15	.03	.17	.26
No. of Instr.			124	143	152	114	133	91	133	102
No. of countries	157	157	157	157	154	114	137	138	143	102
Observations	1,022	1,022	1,022	1,022	995	688	863	603	768	436
R-squared	.66	.15								

* Significant at 10 percent; ** significant at 5 percent, *** significant at 1 percent. 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 interval between 1955 and 2000. Students abroad, democracy in host countries, and all other control variables are treated as predetermined and are instrumented for using their own first to third lags. Specification 4 uses instrumental variables as described in the text.

Table 3b. Dependent Variable: Przeworski and others (2000), Democracy Index—Differences

	Change in Democracy$_t$ (5 years) OLS (1)	Change in Democracy$_t$ (5 years) Fixed Effects (2)	Change in Democracy$_t$ (10 years) OLS (3)	Change in Democracy$_t$ (10 years) Fixed Effects (4)	Change in Democracy$_t$ (40 years) OLS (5)	Change in Democracy$_t$ (40 years) OLS (6)
5-Year Change in Students Abroad$_{t-5}$	21.296 (21.635)	22.998 (22.022)				
5-Year Change Democracy in Host countries$_{t-5}$	.036 (.064)	.046 (.069)				
5-Year Change in (Students Abroad$_{t-5}$ * Democ. in host countries$_{t-5)}$	-12.258 (14.066)	-12.880 (14.442)				
10-Year Change in Students Abroad$_t$			3.020 (6.592)	12.684 (10.782)		
10-Year Change in Democ. in Host Countrie$_t$			.047 (.112)	.209 (.181)		
10-Year Change in (Students Abroad$_{t-10}$ * Democ. in Host Countries$_{t-10)}$			11.734 (15.306)	5.494 (20.419)		
35-Year Change in Students Abroad$_t$					-238.231*** (88.980)	-120.223 (126.345)
35-Year Change Democracy in Host Countries$_t$					.466** (.182)	.413 (.282)
35-Year Change in (Students Abroad$_t$ * Democ. in Host Countries$_{t)}$					251.348*** (90.284)	149.662 (130.489)
35-Year Change in Education Attainment$_t$						-3.973 (3.498)
Country Effects		Yes		Yes		
No. of countries	157	157	146	146		
Observations	764	764	361	361	103	78
R-squared	.00	.00	.01	.02	.08	.07

 * Significant at 10 percent; ** significant at 5 percent, *** significant at 1 percent. Robust standard errors clustered by country in parentheses. The sample is an unbalanced panel, comprising data between 1955 and 2000.

Table 4. Flows of International Students: Dependent Variable Ln
(Bilateral student flow)

	Ln (Bilateral Student Flows$_t$) OLS (1)	Ln (Bilateral Student Flows$_t$) OLS (2)	Ln (Bilateral Student Flows$_t$) OLS (3)
Ln (population origin country$_t$)	.379*** (.010)	.360*** (.010)	.284*** (.012)
Ln (population receiving country$_t$)	.028 (.078)	-.063 (.075)	-.261*** (.082)
Ln (total students to receiving country excluding sending country$_t$)	.229*** (.026)	.247*** (.027)	.077** (.032)
Ln (distance)	-.732*** (.022)	-.723*** (.023)	
Contiguity	.570*** (.108)	.626*** (.113)	
Colonial ties	1.429*** (.116)	1.358*** (.118)	
Common official language	.692*** (.079)	.701*** (.077)	
Common spoken language (at least 9 percent)	.418*** (.077)	.477*** (.075)	
Democracy in receiving country (freedom house index)	-.897*** (.046)		
Democracy in origin country (freedom house index)	-.350*** (.050)		
Absolute difference in democracy in sending and receiving countries (freedom house index)	-.328*** (.044)		
Receiving Country Effects	Yes	Yes	Yes
Year Effects	Yes	Yes	Yes
Number of country origin couples	9,472	9,843	10,111
Observations	144,273	170,677	173,318
R-squared	.54	.51	.30

* Significant at 10 percent; ** significant at 5 percent, *** significant at 1 percent. Robust standard errors clustered by sending and origin country in parentheses. The sample is an unbalanced panel, comprising yearly data between 1951 and 2005. Democracy is measured using the Freedom House index.

Table 5. Alternative Specification of Student Variables
(Dependent Variable: Democracy Indices)

	Freedom House GMM (1)	Freedom House GMM (2)	Polity II GMM (3)	Polity II GMM (4)	Przeworski et al., GMM (5)	Przeworski et al., GMM (6)
Democracy$_{t-5}$	.469***	.403***	.371***	.304***	.164**	.120*
	(.051)	(.054)	(.078)	(.076)	(.067)	(.063)
Students to democratic countries$_{t-5}$	30.438***	28.074***	28.924*	-25.458	40.841***	56.985**
	(6.039)	(6.892)	(17.176)	(33.239)	(11.830)	(24.791)
Students to Nondemocratic countries$_{t-5}$	-4.701	25.842	-12.257	8.893	-48.038***	-6.457
	(7.355)	(26.521)	(18.199)	(20.466)	(13.484)	(34.135)
Time effects	Yes	Yes	Yes	Yes	Yes	Yes
Country effects	Yes	Yes	Yes	Yes	Yes	Yes
Instr. for students		Yes		Yes		Yes
AR(1) Test	.00	.00	.00	.00	.00	.00
AR(2) Test	.41	.56	.74	.93	.48	.56
Hansen's J test	.12	.08	.66	.33	.14	.20
No. of Instr.	117	117	106	106	95	95
No. of countries	184	184	158	158	157	157
Observations	1,385	1,385	1,099	1,099	1,017	1,017

* Significant at 10 percent; ** significant at 5 percent, *** significant at 1 percent. Robust standard errors clustered by country in parentheses. The sample is an unbalanced panel, comprising data between 1955 and 2005 for specifications 1 and 2, and between 1955 and 2000 for the other specifications. Students abroad are treated as predetermined and are instrumented for using their own first to third lags. Instrumental variables are described in the text.

Table 6. Earlier Versus Later Periods (Cutoff 1985)

	Freedom House Year ≤1985 (1)	Freedom House Year >1985 (2)	Polity II Year ≤1985 (3)	Polity II Year >1985 (4)	Przeworski and others (2000) Year ≤1985 (5)	Przeworski and others (2000) Year >1985 (6)
Democracy$_{t-5}$	.528***	.644***	.401***	.525***	.172**	0.590***
	(.064)	(.043)	(.091)	(.057)	(0.084)	(.061)
Students Abroad$_{t-5}$	-22.946**	4.739	-19.066	-34.188	-20.656*	-24.980
	(9.941)	(17.856)	(11.958)	(20.196)	(11.623)	(26.032)
Democracy in host countries$_{t-5}$	.315***	.061	.383***	.222**	.389***	.072
	(.071)	(.084)	(.086)	(.105)	(0.086)	(.119)
Students Abroad$_{t-5}$ * Democracy in host countries$_{t-5}$	52.690***	9.147	39.678**	44.768*	60.147***	39.111
	(16.305)	(19.340)	(15.575)	(23.727)	(23.046)	(30.758)
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
AR(1) Test	0	0	0	0	0	0
AR(2) Test	.97	.51	.63	.18	.26	.25
Hansen's J test	.01	0	.03	0	0	.04
No. of Instruments	90	92	90	78	90	65
No. of countries	154	182	136	156	147	156
Observations	707	672	685	422	719	303

* Significant at 10 percent; ** significant at 5 percent, *** significant at 1 percent. 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 interval between 1955 and 1985 for specifications (1), (2), and (3), between 1990 and 2005 for specification (2), and between 1990 and 2000 for specifications (4) and (6). Students abroad and democracy in host countries are considered predetermined and are instrumented for using their own first and second lags.

Table 7. Small Versus Large Countries (Cutoff 2 million)

	Freedom House Population < 2 mil (1)	Freedom House Population > 2 mil (2)	Polity II Population < 2 mil (3)	Polity II Population > 2 mil (4)	Przeworski et al., Population < 2 mil (5)	Przeworski et al., Population> 2 mil (6)
Democracy$_{t-5}$	.652***	.547***	.766***	.439***	.508***	.364***
	(.072)	(.052)	(.085)	(.063)	(.096)	(.070)
Students	-11.936	7.463	-2.467	-20.624	-10.512	7.542
Abroad$_{t-5}$	(10.872)	(16.118)	(8.472)	(22.508)	(6.957)	(19.879)
Democracy in host	.164**	.238***	.091	.365***	.196*	.367***
countries$_{t-5}$	(.077)	(.064)	(.066)	(.074)	(.104)	(.087)
Students Abroad$_{t-5}$ *	30.384**	-4.904	11.826	29.739	50.415***	-36.169
Democracy in host	(14.633)	(26.627)	(10.079)	(40.415)	(11.101)	(54.140)
countries$_{t-5}$						
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
AR(1) Test	.00	.00	.01	.00	.07	.00
AR(2) Test	.52	.78	.80	.67	.04	.18
Hansen's J test	1.00	.38	1.00	.53	1.00	.35
No. of Instruments	140	155	137	141	117	128
No. of countries	60	180	39	138	55	121
Observations	266	1,113	160	947	204	818

* Significant at 10 percent; ** significant at 5 percent, *** significant at 1 percent. 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 interval between 1955 and 2005. Students abroad and democracy in host countries are considered predetermined and are instrumented for using their own first and second lags and their differences.

Table 8. Stay Rates of Foreign Doctorate Recipients in United States

Country of origin	Foreign Doctorate Recipients in 1994/95 (1)	Estimated stay rates in 1999 (2)	Percentage of non-U.S. Doctorate recipients intending to stay in United States (average 1999-2001) (3)
Taiwan Province of China	2,268	42.4	57.3
India	1,995	87.5	88.2
South Korea, Republic of	1,943	15.1	59.0
China	1,649	91.1	90.8
Brazil	255	21.1	36.0
Mexico	223	30.8	39.8
Chile	57	26.1	54.5
Turkey	252	43.7	55.3
Indonesia	119	16.4	...
Italy	106	37.1	62.0
Greece	276	49.1	70.0
Spain	87	34.0	62.0
Canada	430	55.1	64.2
Argentina	67	44.7	62.5
Colombia	66	28.5	57.5
Total, all countries	14,189	53.5	69.1
Total, all countries Excluding China and India	10,545	38.8	59.5

Source: Finn (2001), Table 32 from the doctorate recipients from U.S. universities (2005), and author's elaboration.

Table 9. Summary Statistics

	Obs.	Mean	Std. Dev.	Min.	Max.
Foreign students as a share of population (X 1000)	1,379	1.031	2.151	0.001	20.130
Freedom House Index	1,379	.521	.376	0	1
Freedom House Index in host countries	1,379	.838	.201	.001	1
Freedom House Index in trading partners	1,166	.922	.089	.324	1
Freedom House Index in neighboring countries	1,358	.759	.160	.001	1
Polity II Index	1,107	.499	.380	0	1
Polity II Index in host countries	1,107	.826	.197	.150	1
Polity II Index in trading partners	976	.921	.092	.150	1
Polity II in neighboring countries	1,084	.774	.157	.150	1
Przeworski Index	1,022	.371	.483	0	1
Przeworski Index in host countries	1,022	.81	.243	.003	1
Przeworski Index in trading partners	863	.926	.101	.058	1
Przeworski Index in neighboring countries	995	.752	.190	.045	1
Education attainment (X 100)	899	5.055	2.837	.120	12.050
Enrollment (X 100)	877	1.502	1.651	.002	9.312
GDP per capita (X1000)	1,093	5,056	7,541	.045	46,473

The statistics refer only to the sample used in the regressions.

Table 10. Education of World Leaders in 1990

Country	Last Name	First Name	Primary	Secondary	Tertiary	Other
Angola	Dos Santos	Jose Eduardo	.	.	**Russia**	.
Argentina	Menem	Carlos	Argentina	Argentina	Argentina	.
Australia	Hawke	Robert James Lee	Australia	Australia	Australia	**United Kingdom**
Austria	Vranitzky	Franz	Austria	Austria	Austria	
Bangladesh	Ershad	Hossain Mohammad	Bangladesh	Bangladesh	Bangladesh	**India**
Barbados	Sandiford	Lloyd Erskine	.	.	**Jamaica**	**United Kingdom**
Belgium	Martens	Wilfried	.	.	Belgium	.
Benin	Kerekou	Mathieu			**France**	
Bolivia	Paz (Zamora)	Jaime	Bolivia	Bolivia	**Chile**	.
Brazil	Sarnay	Jose	Brazil	Brazil	Brazil	.
Cameroon	Biya	Paul	.	.	**France**	.
Canada	Mulroney	Martin Brian	Canada	Canada	Canada	
Chad	Habre	Hissene	Chad	Chad	**France**	.
Chile	Pinochet (Ugarte)	Augusto	Chile	Chile	.	Chile
China	Xiaoping	Deng	China	China	**France**	**Russia**
Colombia	Gaviria(Trujillo)	Cesar	.	.	Colombia	.
Congo, Dem. Rep.	Seko	Mobutu Sese (Joseph)	Congo, Dem. Rep.	Congo, Dem. Rep.	.	**Belgium**
Congo, Republic of	Sassou-Nguesso	Denis	.	.	.	**Algeria France**
Costa Rica	Sanchez	Oscar Rafael de Jesus Arias	Costa Rica	Costa Rica	**United States**	Costa Rica
Côte d'Ivoire	Houphouet-Boigny	Felix	Côte d'Ivoire	Côte d'Ivoire	**Senegal**	.
Denmark	Schluter	Poul Holmskov	.	.	Denmark	Denmark
Dominica	Charles	Mary Eugenia	Dominica	Dominica	**Canada**	**United Kingdom Grenada**
Dominican Republic	Balaguer y Ricardo	Joaquin Amparo	Dominican Republic	Dominican Republic	Dominican Republic	**France**
Ecuador	Borja (Cevallos)	Rodrigo	Ecuador	Ecuador	Ecuador	Ecuador
Egypt	Mubarak	Hosni	Egypt	Egypt	Egypt	
El Salvador	Burkard	Alfredo Felix Cristiani	El Salvador	El Salvador	**United States**	
Equatorial Guinea	Obiang Nguema	Teodoro	Equatorial Guinea	Equatorial Guinea	**Spain**	
Ethiopia	Haile Mariam	Mengistu	Ethiopia	Ethiopia	Ethiopia	
Fiji	Mara	Kamisese	.	.	**New Zealand**	**United Kingdom**
Finland	Koivisto	Mauno Henrik	Finland	Finland	Finland	Finland
France	Mitterrand	Francois	France	France	France	.
Gabon	Bongo	Omar	**Congo, Rep. of**	**Congo, Rep. of**		**Chad**

Table 10 (Continued). Education of World Leaders in 1990

Country	Last Name	First Name	Primary	Secondary	Tertiary	Other
Gambia, The	Jawara	Sir Dawda	.	.	**United Kingdom**	.
Ghana	Rawlings	Jerry	Ghana	Ghana	.	Ghana
Greece	Mitsotakis	Konstantinos Kiriakou	.	.	Greece	.
Guatemala	Arevalo	Marco Vinicio Cerezo	Guatemala	Guatemala	Guatemala	.
Guinea	Conte	Lansana		**Côte d'Ivoire**		
Honduras	Romero	.	.	.	**United States**	
Hungary	Antall	Jozsef	Hungary	Hungary	Hungary	
Iceland	Hermannsson	Steingrimur	Iceland	Iceland	**United States**	**United States**
India	Shekhar	Chandra	.	.	.	India
Indonesia	Suharto		.	.	Indonesia	.
Iran	Khamenei	Sayyed Mohammad Ali Hoseyn	Iran	Iran	Iran	
Ireland	Haughey	Charles James	Ireland	Ireland	Ireland	.
Israel	Shamir	Yitzhak	.	**Poland**	**Palestine**	
Italy	Andreotti	Giulio	.	.	Italy	
Jamaica	Manley	Michael Norman	.	.	**United Kingdom**	
Japan	Kaifu	Toshiki	.	.	Japan	
Jordan	al-Hashimi	Hussein ibn Talal	.	**United Kingdom**	**United Kingdom**	
Kenya	Moi	Daniel Arap	.	Kenya	Kenya	
Korea, Republic of	Roh	Tae Woo	.	Korea, Republic of	Korea, Republic of	
Lesotho	Lekhanya	Justin	.	.	.	
Liberia	Doe	Samuel K.	.	.	.	
Liberia	Sawyer	Amos	.	.	.	**United States**
Luxembourg	Santer	Jacques	.	.	**France**	**France**
Madagascar	Ratsiraka	Didier	.	Madagascar	**France**	
Malawi	Banda	Hastings K.	.	**United States**	**United States**	**United Kingdom**
Malaysia	Mohamad	Datuk Ser Mahathir Bin	.	.	Malaysia	**Singapore**
Mali	Traore	Moussa	.	Mali	**France**	.
Mauritania	Taya	Maaouya Ould Sid'ahmed	Mauritania	Mauritania	Mauritania	
Mauritius	Jugnauth	Aneerood	.	.	**United Kingdom**	.

Table 10 (Continued). Education of World Leaders in 1990

Country	Last Name	First Name	Primary	Secondary	Tertiary	Other
Mexico	de Gortari	Carlos Salinas	.	.	Mexico	**United States**
Morocco	Mohammed	Mawlay al-Hasan II ibn	.	.	Morocco	**France**
Mozambique	Chissano	Joaquim	Mozambique	Mozambique	**France**	**Portugal**
Namibia	Nujoma	Sam	Namibia	Namibia	.	.
Nepal	Birendra	Mohan Shumshere J.B.	.	**United Kingdom**	**United States**	**Japan**
Netherlands	Lubbers	Rudolphus Frans Marie (Ruud)	.	.	Netherlands	.
New Zealand	Palmer	Geoffrey Winston Russel	.	New Zealand	New Zealand	**United States**
Nicaragua	Saavedra	Jose Daniel Ortega	Nicaragua	Nicaragua	Nicaragua	.
Niger	Seibou	Ali	.	**Senegal**	Niger	.
Nigeria	Babangida	Ibrahim	Nigeria	Nigeria	**United Kingdom**	.
Norway	Brundtland	Gro Harlem	.	.	Norway	**United States**
Pakistan	Sharif	Nawaz	.	Pakistan	Pakistan	Pakistan
Pakistan	Bhutto	Benazir	Pakistan	Pakistan	**United States**	**United Kingdom**
Panama	Galimany	Guillermo David Endara	.	.	Panama	**United States**
Papua New Guinea	Namaliu	Rabbie	.	.	Papua New Guinea	**Canada**
Paraguay	Rodriguez (Pedotti)	Andres	.	.	.	.
Peru	Garcia (Perez)	Alan	Peru	Peru	Peru	**Spain**
Philippines	Aquino	Corazon	**United States**	**United States**	**United States**	Philippines
Poland	Walesa	Lech	Poland	.	.	.
Portugal	Silva	Anibal Cavaco	.	.	**United States**	**United Kingdom**
Romania	Iliescu	Ion	Romania	Romania	**Russia**	.
Rwanda	Habyarimana	Juvenal	.	.	**Zaïre**	**Zaïre**
São Tomé and Príncipe	Costa	Manuel Pinto Da	.	.	.	.
Senegal	Diouf	Abdul	.	.	.	.
Seychelles	Rene	France Albert	.	.	**United Kingdom**	**United Kingdom**
Sierra Leone	Momoh	Joseph Saidu	.	.	.	**Ghana, Nigeria, United Kingdom**
Singapore	Lee	Kuan Yew	Singapore	Singapore	Singapore	**United Kingdom**
Singapore	Goh	Chok Tong	.	.	Singapore	**United States**

Table 10 (Concluded). Education of World Leaders in 1990

Country	Last name	First name	primary	Secondary	tertiary	other
Somalia	Barre	Mohammed Siad				**Italy**
South Africa	de Klerk	F.W.	.	.	South Africa	.
Spain	Marquez	Felipe Gonzales	.	.	Spain	Spain
Sri Lanka	Premadasa	Ranasinghe	.	.	Sri Lanka	.
St. Kitts & Nevis	Simmonds	Kennedy	St. Kitts & Nevis	St. Kitts & Nevis	**Jamaica**	**Bahamas**
St. Lucia	Compton	John	.	.	.	**United Kingdom**
St.Vincent & Grenadines	Mitchell	James Fitz-Allen	.	.	**Trinidad &Tobago**	**Canada**
Sudan	Al-Bashir	Omar	.	.	.	**Egypt**
Sweden	Carlsson	Ingvar Gosta	Sweden	Sweden	**United States**	.
Switzerland	Koller	Arnold	.	.	.	.
Syria	al-Assad	Abu Sulayman Hafiz	Syria	Syria		Syria
Taiwan, Province of China	Teng-Hui	Lee	Taiwan, Province of China	Taiwan, Province of China	**Japan**	Taiwan, Province of China
Tanzania	Mwinyi	Ali Hassan	Tanzania	Tanzania	Tanzania	**United Kingdom**
Thailand	Choonhavan	Chatichai	Thailand	Thailand	Thailand	**United States**
Togo	Eyadema	Gnassingbe	Togo	Togo	.	.
Trinidad & Tobago	Robinson	Arthur Napoleon	Trinidad & Tobago	Trinidad & Tobago	**United Kingdom**	**United Kingdom**
Tunisia	Ali	Zine El Abidine Ben	.	.	**France**	**United States**
Turkey	Ozal	Turgut	Turkey	Turkey	Turkey	**United States**
Uganda	Museveni	Yoweri	Uganda	Uganda	**Tanzania**	.
United Kingdom	Major	John Roy	United Kingdom	United Kingdom	.	.
United Kingdom	Thatcher	Margaret Hilda	UK	United Kingdom	United Kingdom	.
United States	Bush	George H.	United States	United States	United States	.
Uruguay	Lacalle	Luis	.	.	Uruguay	.
Uruguay	Sanguinetti (Cairolo)	Julio	.	.	Uruguay	.
Venezuela	Perez	Carlos Andres	.	Venezuela	Venezuela	.
Yemen	al-Hashidi	Ali 'Abd Allah Saleh	Yemen	Yemen	Yemen	.
Zimbabwe	Mugabe	Robert	.	.	**South Africa**	**United Kingdom**

Source: Author's research. The list of leaders is from the list of world leaders from Jones and Olken (2005). The table includes leaders who were in power in 1990. The information was collected by checking biography of each leader. If no information was available a missing value is indicated.

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