Foreign Students and Democracy[1]

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Abstract

Do foreign educated individuals play a role in fostering democracy in their home country? Private foundations, including the Ford and Fulbright foundations, finance a large number of fellowships on the assumption that foreign-educated individuals will foster democracy upon returning home. The German government awards more than 60,000 grants to foreign students annually, the US has allowed more than 6 million foreign students in the last forty years with similar purposes. Despite the large amount of resources, 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 a series of checks, including controlling for reverse causality, country-specific time-constant omitted variables, different sample, and inclusion of a variety of control variables.

I. INTRODUCTION

Do foreign educated individuals play an important role in fostering democracy in their home country? 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 data set of foreign students, which includes almost all receiving and sending countries.

The idea that foreign-educated students promote democracy in their own origin country has motivated a number of important policy initiatives and large investment in the US and elsewhere. Through the Fulbright Program, the US government has financed more than 158,000 foreigners studying in the US.[2] With an endowment of over $12 billion, also the Ford Foundation, which was established in 1936, pursues the goal of: "strengthening democratic values, reducing poverty and injustice, promoting international cooperation, and advancing human achievement."[3]

The idea that foreign education is an important instrument of foreign policy has received new attention recently as the US president has repeatedly stated that foreign education is a pillar of his strategy in the so-called "war on terror."[4] The US government not only actively finances education of foreign students in the US but also issues annually more than 600,000 nonimmigrant visas for foreign students, one of the main way of entering the country; Since 1971, more than 5 million individuals have received visa to study in the US.[5] The US efforts to educate foreign student (and future leaders) have produced impressive results. It is estimated that 46 current and 165 former heads of governments are products of American higher education.[6]

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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] "$474 million [are allocated] for Educational and Cultural Exchange programs, an increase of approximately $48 million over the 2006 level, with an emphasis on the Muslim world. These programs seek to improve the world's understanding of the United States and Americans' understanding of the world …" Excerpts from the document "Winning the War on Terror and Spreading Freedom" delineating budget priorities from the White House's OMB website (http://www.whitehouse.gov/OMB/pdf/Diplomacy-07.pdf).

[5] INS estimates that in any given day in 2004 more than 600,000 foreign students were present in the US; from the INS website http://www.uscis.gov/graphics/shared/statistics/publications/NIM_2004.pdf.

[6] From the website of the "American Immigration Law Foundation" (http://www.ailf.org/). Well-known foreign leaders who studied in the US include among many others: Benazir Bhutto (Pakistan), Carlos

In addition to the US, a number of 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" and has as goals "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 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."[7]

Beside Western countries, many governments have actively financed foreign education in the hope of forming the future ruling class 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 Mbeki considers 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 that governments invest in foreign education and the anecdotic evidence on the 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. While there are many issues involved in foreign education, this paper focuses only on the question if foreign education is associated with the spreading of democracy in sending countries.

Not all foreign education is the same with respect to democracy. Students who were educated at Patrice Lumumba University or who got religious education in Pakistan brought very different concepts of democracy to their home country than students educated in US or UK. This suggests that any analysis must control for the quality of the institutions in host countries.

This paper makes also a contribution to the literature on the role of leaders on nations' economic and political outcome. Foreign educated individuals are at best a small minority of the population – in recent years the foreign students is between 2 and 3 individual per million of native population on average, see Figure1-; nevertheless, they seem to matter in the transition

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Salinas de Gortari, Vicente Fox (Mexico), Ehud Barak (Israel), Corazon Aquino (Philippines), Hamid Karzai (Afghanistan), and Michelle Bachelet (Chile).

[7] 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 (Vice-Secretary of the Environment, Kenya).

toward democracy. 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.

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 presents robustness tests, including the presence of omitted variables, which could explain the correlation between democracy and foreign education, heterogeneity of the sample, reverse causality, and stay rates of foreign students. Section VI 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, especially, on the interpretation of this correlation.

Glaeser, Ponzetto, and Schleifer (2006) claims that there is a good deal of empirical support showing that higher level of education leads to more democratic politics.[8] According to Glaeser et al. (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 et al. (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

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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.

relationship. In a companion paper, Acemoglu et al. (2005b) argues that long-term parallel evolution of both democracy and education may be explained by institutional developments, including settlers' mortality in the colonies, density of indigenous population as well as early experiences with democracy. Beside the specific conclusions, these papers make important methodological points, which are relevant for this paper. First, showing the correlation between level of democracy and (lagged) level of education 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 differences may also be used to explore causation.

Despite their different conclusions, both Glaeser et al. (2006) and Acemoglu et al. (2005a) share some common features. First, both studies assume that the quality of education is the same in all countries (so educational attainment or enrollment 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, which are not all equally reliable and may have bias in providing education data. Third, the data on educational attainment give 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 across the world. Second, data on international students are collected by host universities and countries, which often require VISA to admit foreign students, so that the quality of the data is better. In addition, host countries do not have any incentive to misreport 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. Being the US the largest recipient country of foreign students, most studies focus on the US (for a recent review, see Aslambeigui and Montecinos, 1998). The increasing number of foreign students has also its critics. Borajs (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. 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 here the advantages and the limits of various indices or the vast literature which uses them.[10] The only point that it is important to make 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 UNESCO database on foreign students.[11] This database reports the bilateral students' flows at 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 a share of enrollment in tertiary education (Figure 1).

The steady increase in the aggregate data masks some noticeable changes in the origin and host countries (Figure 2). The US has traditionally been the main host country with a share of approximately 30 percent. The second tier destination countries, which include France, Germany, and UK have each a share of about 10 percent; in the last twenty years, there was a marked increase in the shares of Germany and UK, 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 thirty years. Finally, the countries belonging to the former Soviet bloc commanded a share of almost 10 percent between 1970 and 1990.

The origin 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 only recently surpassed 6,000 while Iranian students abroad reached almost 80,000 at their peak in 1978 but it was below 20,000 in 2000.

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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).

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 in 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] The average level of democracy in host countries is much higher than in home countries, a sign that on average democratic countries attract more students (Table 8). Curiously, 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 8).

The bottom panels of figures 3 to 6 show the index of democracy at home and in host countries for Chile, Argentina, Iran, and Korea. These countries have very different profiles with respect to democracy. Chile started as very democratic country until the coup d'état in 1973; after that, democracy came back in the late 1980s. It is interesting that average democracy in foreign countries seems to anticipate domestic democracy. 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 is 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 number of students abroad remained constant till 2000 but the Chilean students shifted even more toward democratic countries. In the early 80s, five years before the change of regime at home, Chilean students started going to more democratic countries. A similar pattern happened in Argentina and 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. Foreign education, even in democratic countries, does not always lead to democratic ideas.

The four countries discussed above 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, 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 education attainment.[13] All explanatory variables are lagged five years. 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.

My specification follows Acemoglu et al. (2005) with the addition of the two new variables of interest – student abroad normalized by population in sending countries and average quality of democracy in the host countries. 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.

The basic specification is as follows:

$$d_{it} = \alpha d_{it-5} + \beta \text{ education attainment}_{it-5} + \gamma \text{ students abroad}_{it-5}$$
$$+ \delta \text{ index of democracy in receiving countries}_{it-5}$$
$$+ \text{country fixed effects}_i + \text{time fixed effects}_t + \varepsilon_{it}$$

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

I use four different estimation techniques: pooled OLS, fixed effects OLS, System GMM, and Difference 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

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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.

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).

The first four 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 .722 in pooled OLS, which usually has upward bias, and .367, which usually displays downward bias. As expected, GMM estimators provide estimates which are within this range. Student abroad is not significant in any specification but democracy in host countries is always positive and highly significant across different estimation techniques. The coefficient on education attainment is generally positive and significant but is not robust across estimation techniques.

Column (5) excludes the variable educational attainment, which is available only for a sub-sample of countries for which students abroad are available. In this specification, both the quality of democracy in host country and the number of students abroad are strongly significant.

All specifications, except the pooled OLS, include fixed country and fixed time effects so 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 unreported regressions, I have also experimented with slightly different specifications of the foreign students' variables. Adding an interaction term of the number of students abroad times the index of democracy abroad does not change the basic results and the interaction term is generally insignificant. In a specification which uses only the interaction term (and not the number of students abroad and the index of democracy abroad), the interaction term is always significant; I prefer the proposed specification because it clearly separates the effects of the quantity of foreign students from the quality of democracy abroad.

These results are very similar using the polity II index of democracy and the Przeworski et al. democracy index (results reported in tables 2a and 3a respectively). Glaeser et al. (2004) note that several measures of democracy, including the polity 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.

V. ROBUSTNESS

The robustness tests focus on five areas: omitted variables, long-run differences, heterogeneity of the sample, reverse causality, and stay rates of foreign students.

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 some omitted variables may be responsible for this correlation. While the existence of *country-specific time-varying* omitted variables cannot be ruled out, I present evidence that the correlation is robust to a variety of tests, including the use of variables controlling for commercial ties and tertiary enrollment, country specific trends, long differences (10 years), very long differences (40 years).

One relevant 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 (6) of Table 1a presents the results of a regression in which this variable is used as a control. Democracy in host country remains positive significant using the other two indices of democracy. 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 remain significant, indicating that foreign education plays a role even controlling for international trading ties.[14]

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, the baseline regressions control only for the *stock* of education (education attainment) and not for the *flow* (tertiary enrollment).[15] Column (7) presents results of a regression which controls also for the flow of domestic tertiary education. The coefficient on democracy in host countries remains positive and significant also including domestic enrollment.

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

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[14] 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 for education using system GMM and I found that democracy in trading partners becomes significant.

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

income per capita, the results do not change (Column (8) of Table 1a).[16] The same results hold using the other definition of democracy (Tables 2a and 3a).

In addition to these variables, in order to explore the existence of other omitted factors which may explain (past) level of democracy in host countries and present democracy in sending country, I also estimate the following specifications:

$$\Delta d_{it} = \gamma \ \Delta students \ abroad_{it-5} + \delta \ \Delta quality \ of \ institutions \ in \ receiving \ countries_{it-5} + \varepsilon_{it}$$

and

$$\Delta d_{it} = \gamma \ \Delta students \ abroad_{it-5} + \delta \ \Delta quality \ of \ institutions \ in \ receiving \ countries_{it-5}$$
$$+ country \ fixed \ effects_{i} + \varepsilon_{it}$$

The first specification controls for country fixed effects; the second specification controls also for country specific change in trend (the fixed effects in differences). I try differences of 5 and 10 years. To avoid simultaneity bias, also in this specification the explanatory variables are lagged five or ten years. The results are displayed in the first four columns Table 1b. The coefficients on democracy in host countries remain positive and strongly significant. Tables 2b and 3b report the results with the same specification using different definition of democracy. While always positive the coefficient on democracy in trading partners loses significance in the regressions that use the index by Przeworski et al.

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:

$$\Delta d_{i,2000-1960} = \alpha + \gamma \ \Delta students \ abroad_{i,2000-1960} + \delta \ \Delta quality \ of \ institutions \ in \ receiving \ countries_{i,2000-1960} + \varepsilon_{it}$$

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 considerably reduced and the coefficient on democracy loses significance in the regression which uses polity II (Table 2b).

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[16] Note that the specification of column (8) does not include educational attainment, which is highly correlated with income per capita and is available for fewer countries.

Figures 7 and 8 present the scatter plot of changes in domestic democracy and changes in host countries' average democracy. The figures confirm that the significant correlation found in the regressions is not due to outliers.

Heterogeneity in the sample

The sample in the regressions discussed above includes all countries for which data are available. However, the countries in the sample are heterogeneous in many respects. In order to check that the results are not driven by the choice of the sample, I re-run the benchmark regressions for the three different indices of democracy excluding socialists countries (Table 4), and excluding countries with a population larger than 3 million (Table 5). In both cases, the results are confirmed. In unreported regressions, I also obtain similar results excluding OECD countries or countries with a higher level of income. The results for small countries are particularly interesting because the variable "students abroad" is positive and strongly significant for two of the three indices of democracy.

Reverse Causality and destination countries

Finally, the results 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 eighties 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 80s to go abroad in anticipation of the return of democracy at home. If this channel is important, the composition of host countries and, so, the average quality of institutions in host countries should be `anticipated' by the foreign student flows. In other words, the destination of students could be endogenous if students decide where to go somewhere anticipating the level of democracy in their own home country in few years. In this case, the significant coefficient on the variable "average democracy in the host countries" is a good predictor of future democratic changes but no causal link could be inferred.[17]

To address this issue I have run the following regression:

$$Quality\ of\ institutions\ in\ receiving\ countries_{it} = \alpha d_{it-5} + \beta\ education\ attainment_{it-5} +$$
$$+ \gamma\ students\ abroad_{it-5} + \lambda\ quality\ of\ institutions\ in\ receiving\ countries_{it}$$
$$+ country\ fixed\ effects_i + time\ fixed\ effects_t + \varepsilon_{it}$$

Table 6 reports the results using the three different measures of democracy. As expected, average democracy in the host countries is very persistent. Democracy in home country is not a

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[17] 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.

good predictor of the average democracy in the destination of students for the freedom house and the polity II indices while it is slightly significant using the Przeworski et al. index.[18]

In addition to these regression results, several studies point out at different explanations for student destination choices. Using two cross-sections of student data for 1969 and 1985, Kim (1998) finds a non linear relationship between foreign students and difference in income and that bilateral students' flow 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) finds the existence of changing clusters; while "some western developed countries have remained at the center of the network, Asian and Middle Eastern countries have become more central." These studies further confirm that the choice of destination countries is quite complex and seems mostly motivated by long-term time-constant bilateral links, including colonial ties, language in common, religion, proximity, which are already taken care of in the regressions by fixed effects. Finally, 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 further confirms that the decision to study abroad is mostly due to economic factors.

Overall, there is no clear evidence that destination of students abroad is determined by the level of future democracy at home once I control for country fixed effects. This suggests that possibility of reverse causality is limited.

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. 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 home country is probably larger when students come back to their own country.

Unfortunately, there is no systematic dataset on return rates of foreign students but several studies 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 VISA but only 393,000 received a permanent VISA status.[19] These estimates probably are the most accurate available.

In addition to the VISA counting, there are three methods to estimate stay rates, which however, have several limitations. First method is looking at the level of education of foreign born

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[18] Note however, that is quite difficult to find a set of instrument which passes the AR test. In particular the regression presented does not pass the AR(2) test.

[19] 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.

individuals from the US 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 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 US in 1994/95 paid taxes in 1999 with peak at 63 percent for computer science and engineering and much less for other disciplines. Finn (2001) provides estimates of stay rates by country of origin (see Table 7). China and India, the two most populous countries, have by far the highest rate 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 US Universities, 2004) and is probably the most imprecise because is based on intentions. Column (3) of Table 7 reports the staying intentions of non-US citizen doctorate recipients from different countries; despite the fact that intentions of staying are always higher than actual 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. There is evidence that the stay rate has been increasing till the mid-nineties and has recently leveled off (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 7 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 in relatively small countries where they can `make the difference' participating in the political life while there may be only an economic incentive to go back to a very large country.

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

VI.   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 leader, 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 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 definition 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 country. In addition, 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? 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 small group in history. The idea that elites are responsible for important changes has a long tradition in sociology; for instance, Parson (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.[20] More recently, this idea has been tested also in economics by Jones and Olken (2005) who find that leaders do matter for countries' income growth. This paper adds to this intellectual tradition another piece of evidence of how the education of the elites may explain the course of history. Table 9 presents the level of education and the location where a selection of world leaders studied. The majority of leaders had exposure to foreign education, especially at tertiary level.

The second issue is how my findings contribute to the current debate on the relationship between education and democracy (see Glaeser et al., 2006, and Acemoglu et al., 2005). The evidence presented shows that quality of foreign education matters for democracy. I have also shown that foreign education is not due to long-term omitted variables, by incorporating fixed effects and showing long-run differences. 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 the domestically educated people. Second, I have shown that quality of foreign education matters, so I do not find evidence of the hypothesis that education per se matters because it teaches the value cooperation and lower the cost of organization of civil society. This leaves open the question of how important is the educational level of the elites in explaining economic and political outcomes.

The third issue is 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

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[20] 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).

countries that they can impose their own preferences in favor of democratic regimes; in other words, there are no alternatives than hiring a foreign educated minister who accepts the job only if a country has a reasonable level of democracy.[21] 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.[22] Third, foreign educated individuals make the dictatorial regimes more difficult to maintain repression by spreading new ideas. Fourth, foreign educated individuals can make more costly for a dictatorial regime to continue repressive activities as they have easier access to external media. Future work may study which specific channels are at work.

The conclusions of this paper have also implication for the debate on nation-building. Education of foreigners has always being a cornerstone of US's foreign policy starting with missionary thrust in Latin America to the cold war efforts (Bu, 2003). Foreign-educated elites played a crucial role in former socialist countries. Recent attempts of introducing democracy have relied heavily on foreign educated leaders, including in Iraq and Afghanistan. This paper provides evidence that these are not isolated cases and foreign education does indeed play a role.

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 level and, more generally, other characteristics, including attitudes toward markets, religion, and values.

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[21] In some sense, this happened where Gorbachev decided to reform the soviet system and during the 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.

[22] Studying a survey on the motivation for pursuing a PhD in the US, Aslambeigui and Montecinos (1998) find that "the significance attributed to a PhD in careers in politics seemed especially strong among students from Latin America, where economists are currently playing very important political roles."

Data Appendix

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.[23] 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.[24] 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 50s, the data are available for only few receiving countries including Australia, Austria, Belgium, Egypt, France, Germany, India, Japan, Netherlands, Spain, Switzerland, UK, and US –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;[25] 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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[23] The data are available from the Freedom House's website (http://www.freedomhouse.org/).

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

[25] 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, and **democracy in trading partners**. The last variable 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 j to country I over all exports from country j:

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

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

Table 8 presents the summary statistics.

FIGURES
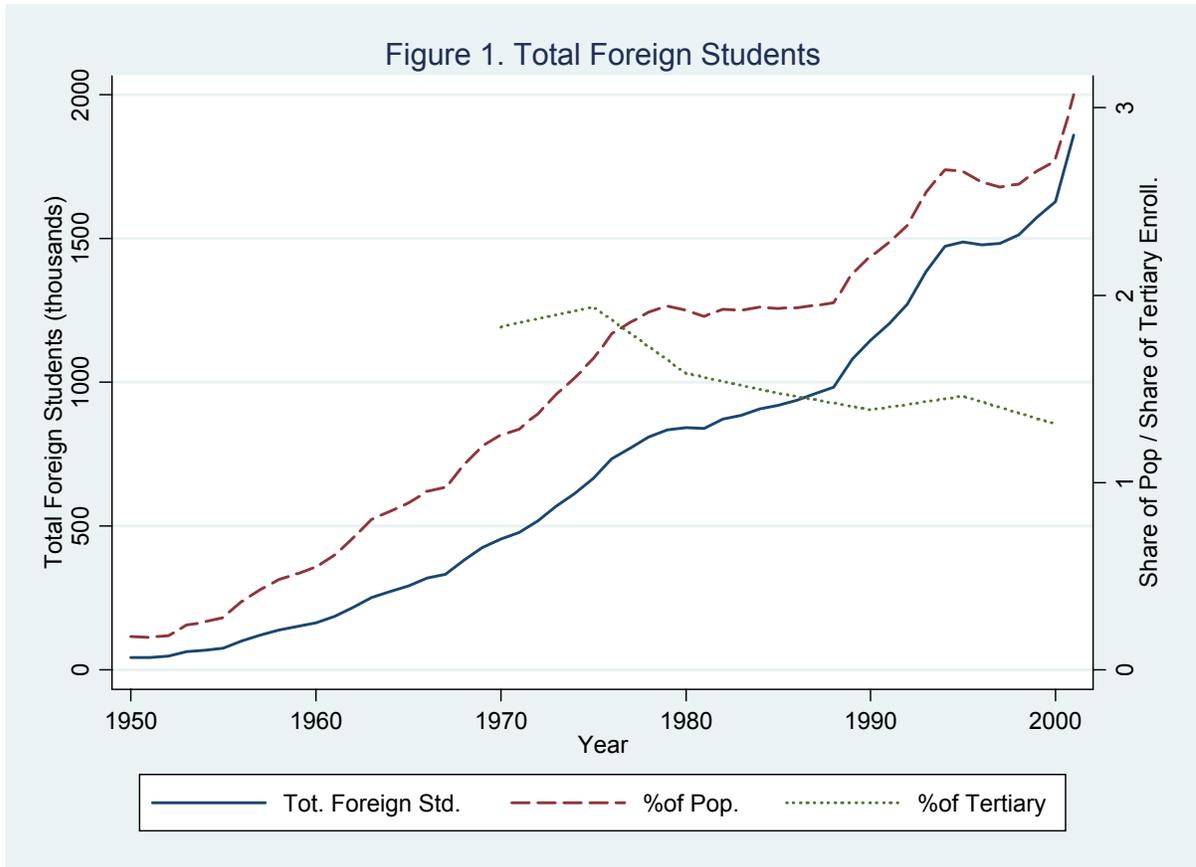
Figure 1. Total Foreign Students

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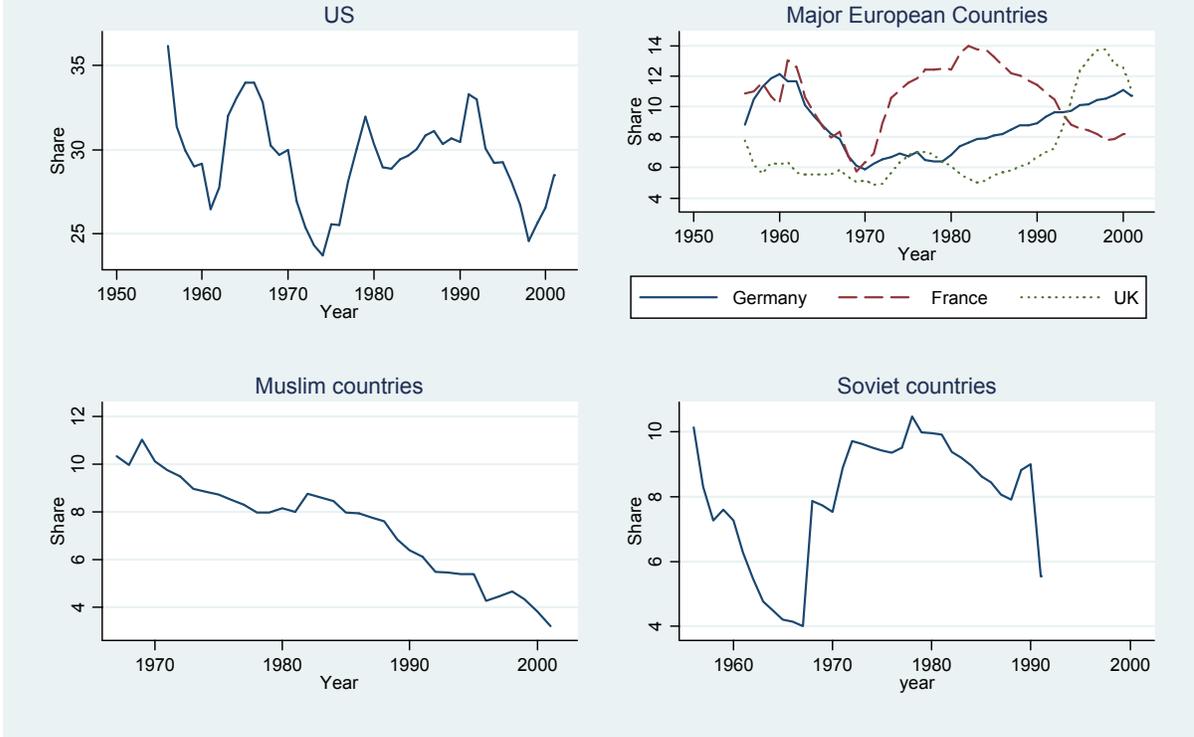
Note: the original data come from the UNESCO dataset revised as described in the Data Appendix..

Figure 3. Chile

Total students abroad
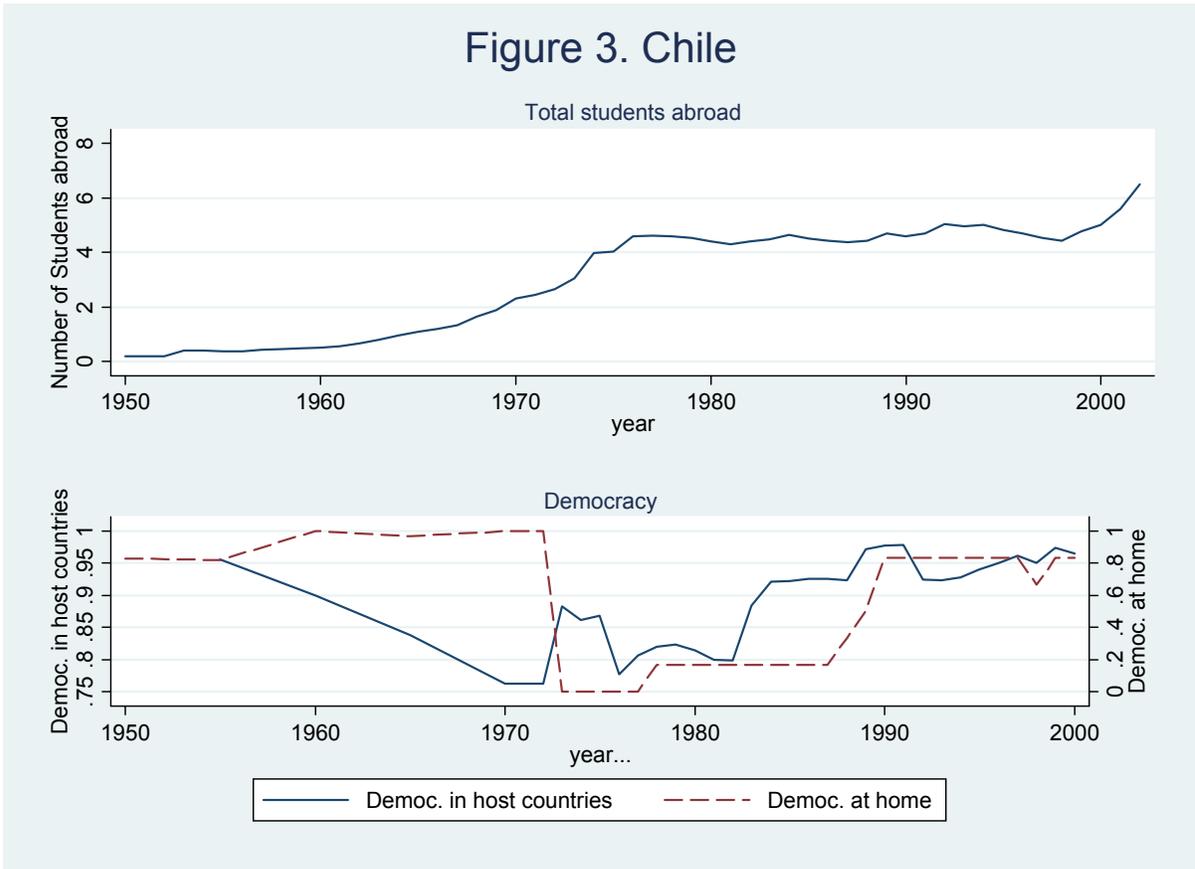
Democracy

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

Total students abroad (thousands)
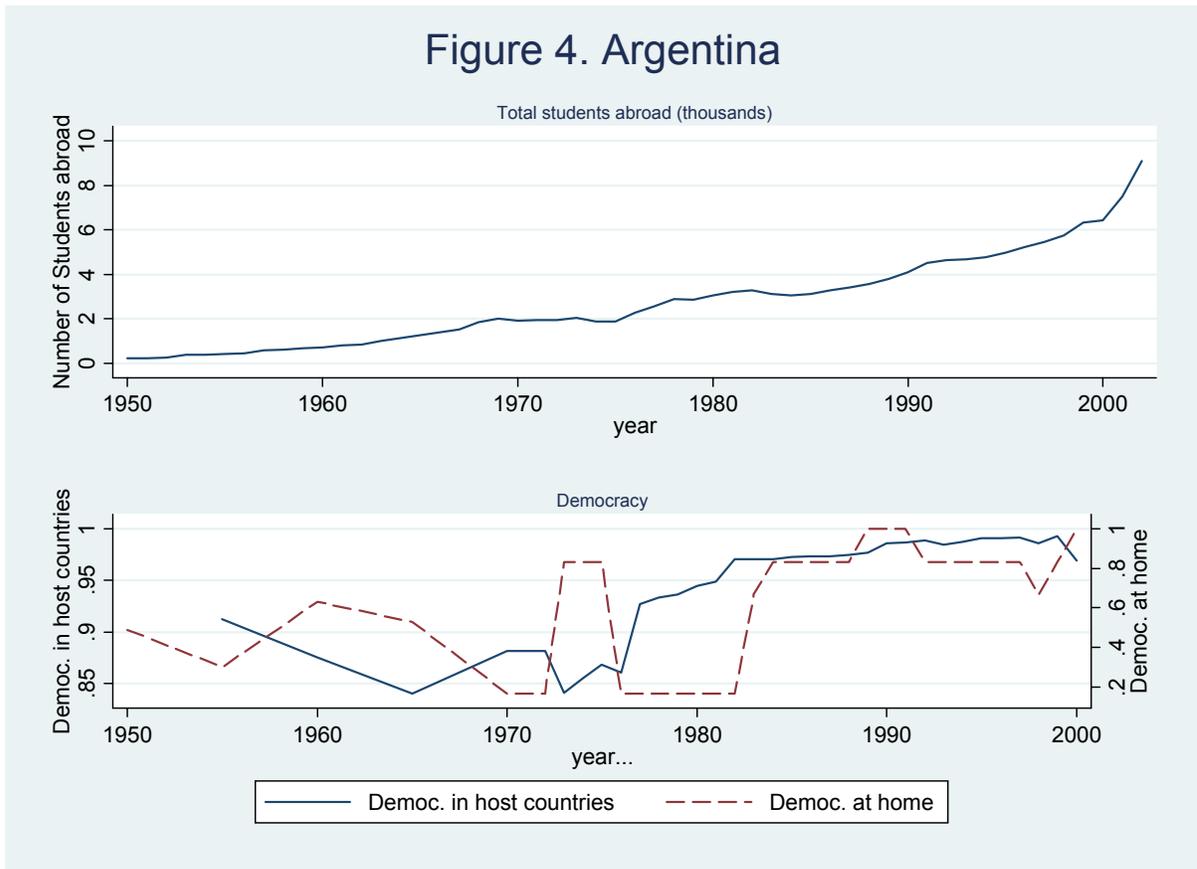
Democracy

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

Total students abroad (thousands)

Democracy

Democ. in host countries ——— Democ. at home - - - -
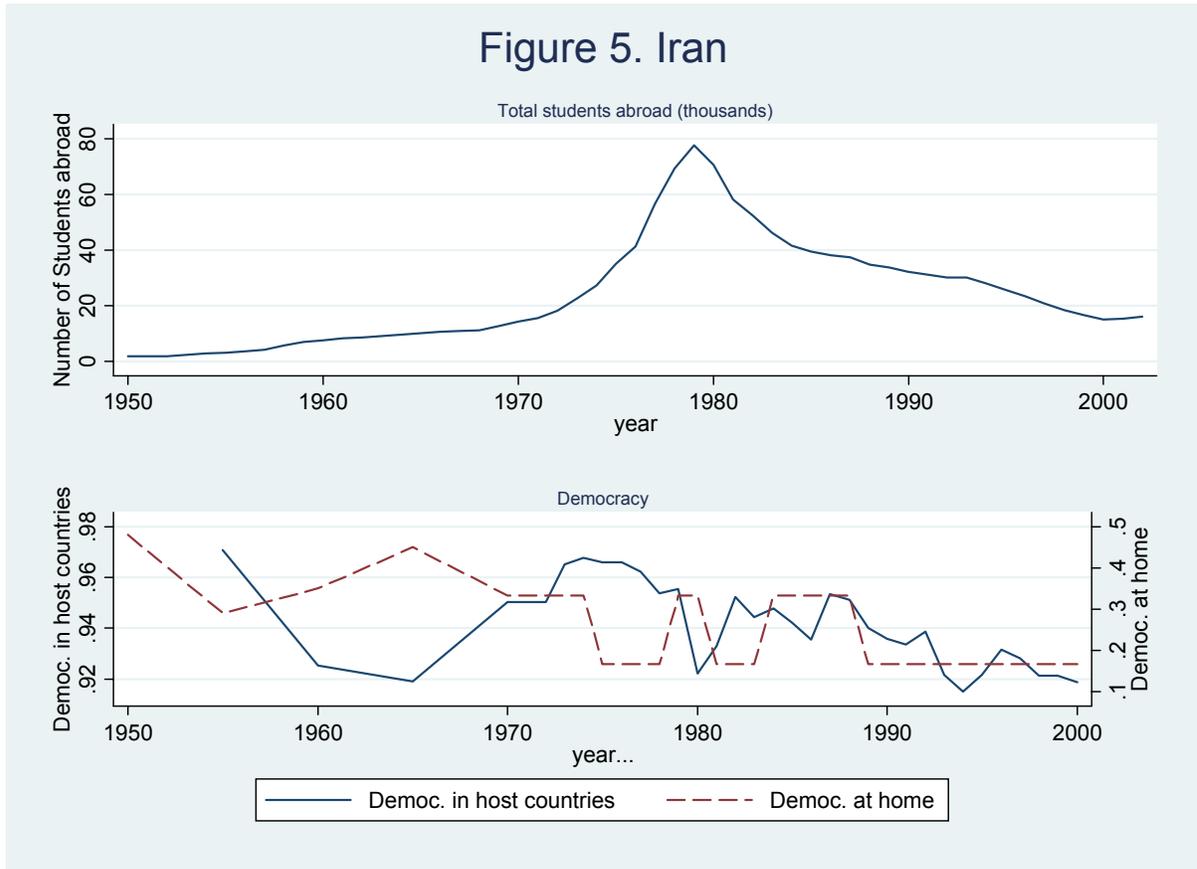
Note: the top panel shows total number of Iranian students abroad in expressed in thousands. The bottom panel shows the level of democracy in home country and in students' host countries, i.e. the average level of democracy in countries where Iranian students are. Both indices are constructed using the 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. Korea

Total students abroad (thousands)

Democracy

| | Democ. in host countries | | Democ. at home |
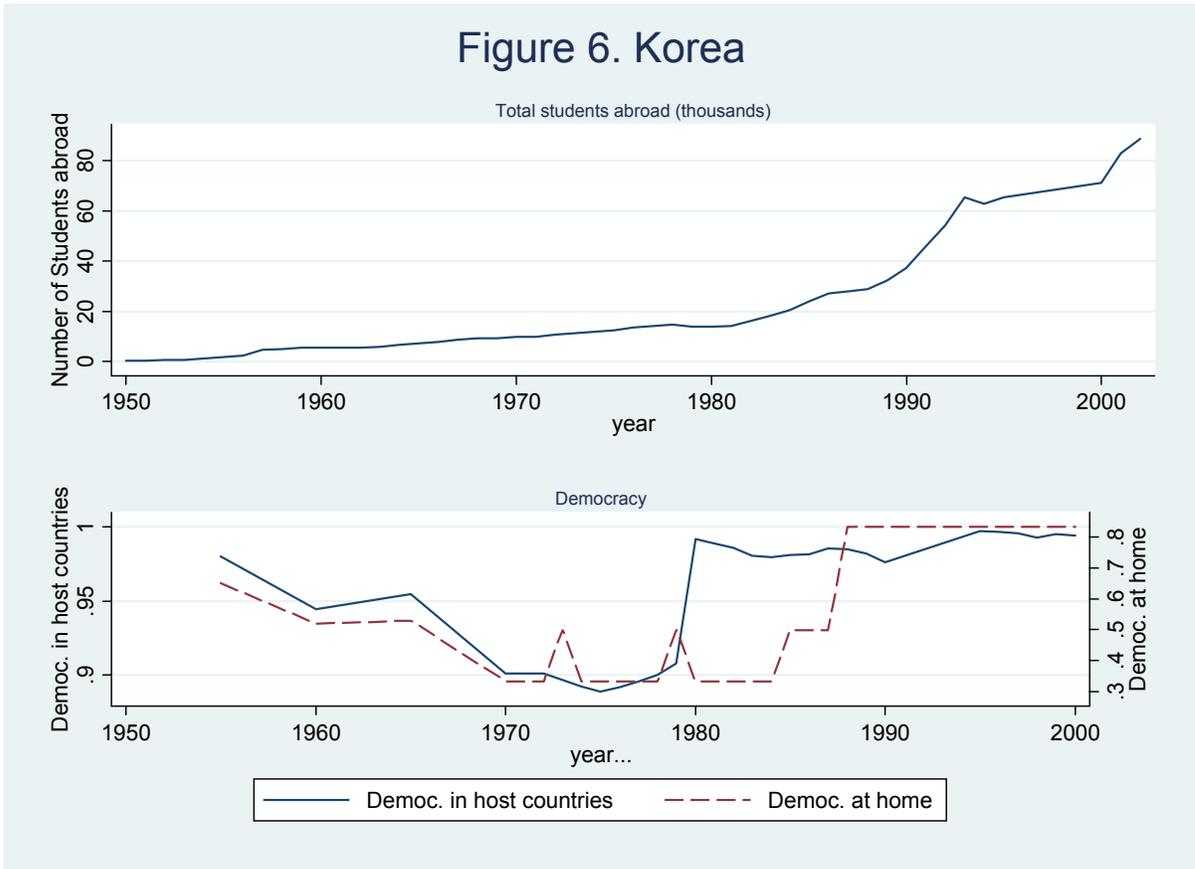
Note: the top panel shows total number of Korean students abroad in expressed in thousands. The bottom panel shows the level of democracy in home country and in students' host countries, i.e. the average level of democracy in countries where Korean students are. Both indices are constructed using the 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 vs. Host countries
Long-run Differences. Freedom House

Note: the differences are taken in both cases between 1960 and 2000, the longest available interval.

Figure 8. Democracy in Home vs. Host countries
Long-run Differences. Polity II
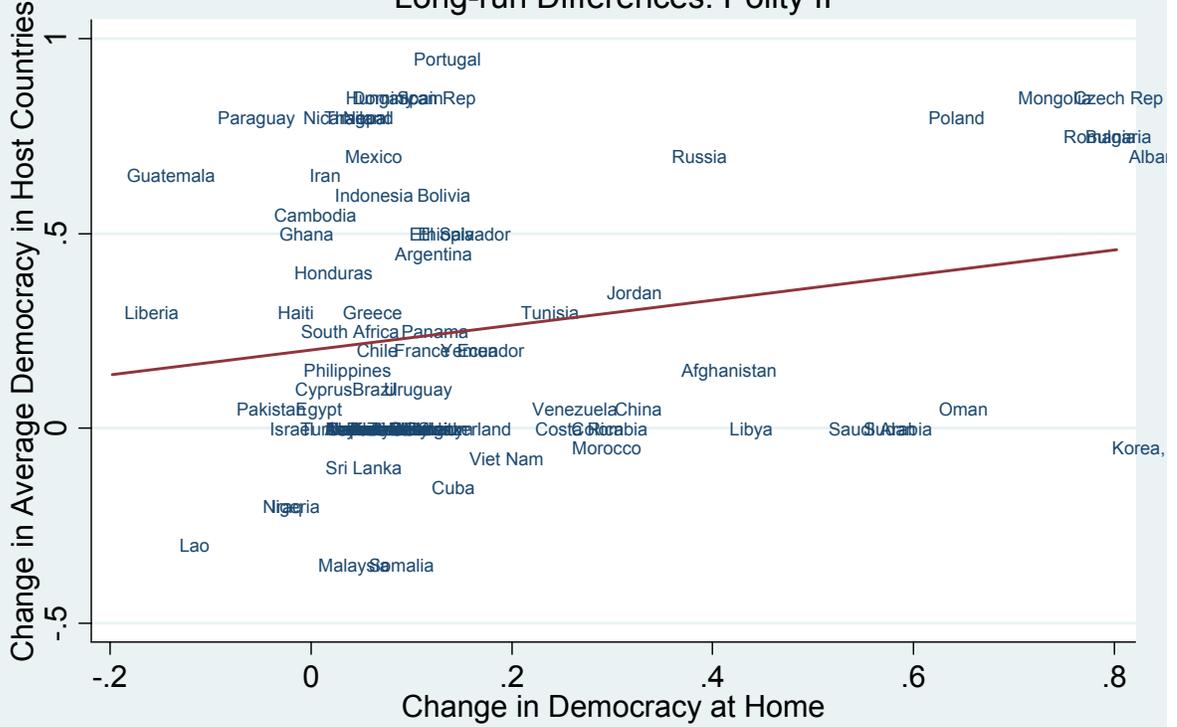
Table 1a.
Dependent variable: Freedom house index of political freedom – Level

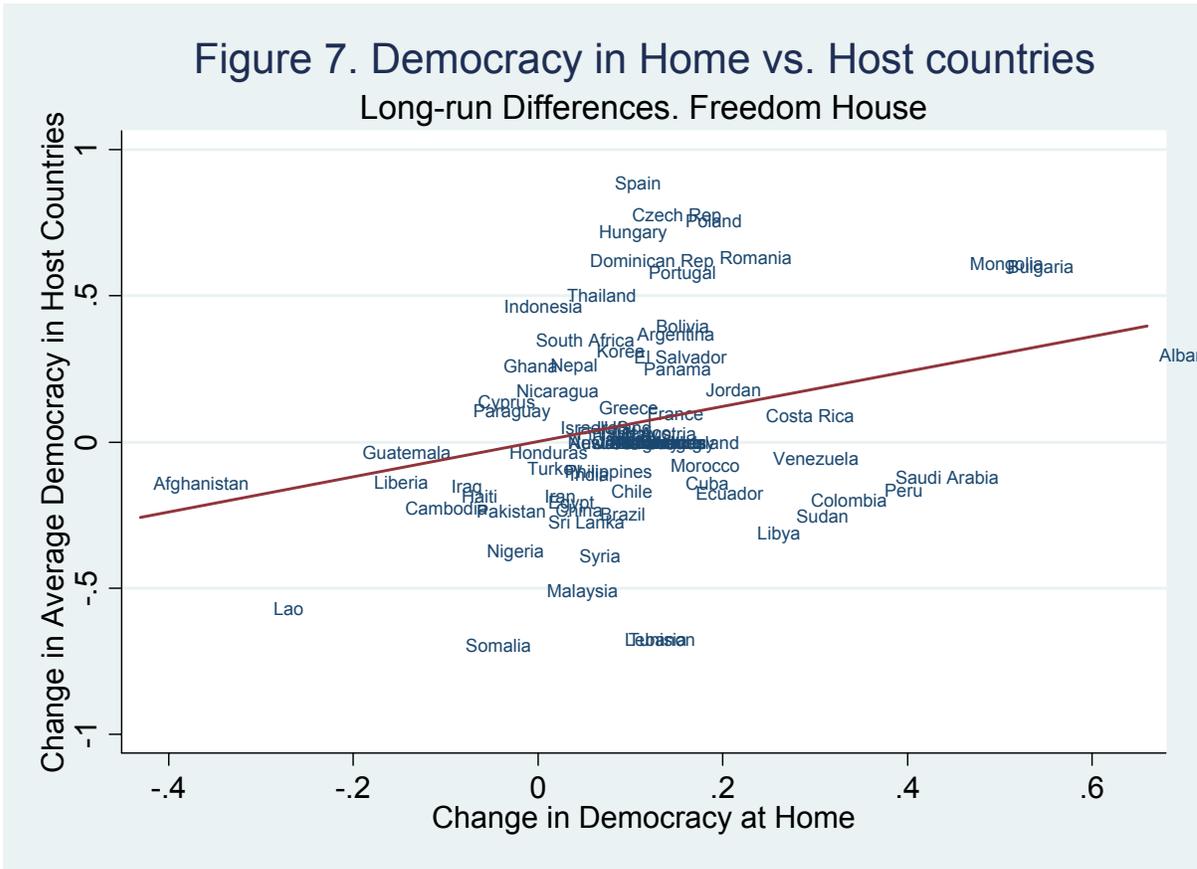|	Pooled OLS	Fixed Effects OLS	System GMM	Difference GMM	System GMM	System GMM	System GMM	System GMM
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Democracy$_{t-5}$	.722***	.367***	.608***	.505***	.715***	.651***	.613***	.698***
	(.037)	(.049)	(.061)	(.080)	(.046)	(.081)	(.065)	(.054)
Students Abroad$_{t-5}$	1.306	-3.450	-1.717	-4.757	6.093*	8.094**	2.152	11.527*
	(2.438)	(4.682)	(4.282)	(7.980)	(3.225)	(4.096)	(4.068)	(6.938)
Democracy in host countries$_{t-5}$	.190***	.348***	.177**	.272*	.365***	.399***	.191*	.291***
	(.060)	(.105)	(.090)	(.147)	(.086)	(.152)	(.110)	(.104)
Education Attainement$_{t-5}$	2.025***	-.969	3.377***	1.644		.562	3.110***	
	(.344)	(1.509)	(.909)	(2.872)		(.811)	(1.118)	
Democracy in trading partners$_{t-5}$						-.029		
						(.238)		
Tertiary enrollment$_{t-5}$							.276	
							(1.145)	
GDP per capita$_{t-5}$								2.074
								(2.402)
Time effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country effects		Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR(1) Test			.00	.00	.00	.00	.00	.00
AR(2) Test			.63	.76	.44	.38	.67	.35
Hansen's J test			.41	.12	.20	.76	.48	.11
No. of Instruments			121	87	119	119	116	96
No. of countries	119	119	119	105	173	111	113	167
Observations	779	779	779	660	1134	664	589	921
R-squared	0.71	0.83						

* significant at 10%; ** significant at 5%, *** significant at 1%. 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, education attainment, democracy in trading partner, and tertiary enrollment are considered predetermined and are instrumented for using their own lag, starting from the second lag. The set of instrument is selected so to minimize the number of instruments while passing the standard tests.

Table 1b.
Dependent variable: Freedom house index of political freedom – Differences

	Change in Democracy$_t$ (5 years) OLS	Change in Democracy$_t$ (5 years) Fixed Effects	Change in Democracy$_t$ (10 years) OLS	Change in Democracy$_t$ (10 years) Fixed Effects	Change in Democracy$_t$ (40 years) OLS	Change in Democracy$_t$ (40 years) OLS
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
(Lagged) Change in Students Abroad$_{t-5}$	-9.303* (4.952)	-10.567* (5.795)				
(Lagged) Change Democracy in host countrie$_{t-5}$	.145** (.060)	.132** (.066)				
(Lagged) Change in Students Abroad$_{t-10}$			-2.297 (6.522)	-3.810 (8.227)		
(Lagged) Change Democracy in host countries$_{t-10}$			.317*** (.101)	.282** (.112)		
Change in Students Abroad$_{t-40}$					7.231* (4.127)	6.915 (4.305)
Change Democracy in host countries$_{t-40}$					.604*** (195)	.451* (.272)
Change in Education Attainement$_{t-40}$						-1.729 (2.864)
No. of countries	152	152	151	151	81	67
Observations	992	999	718	718	81	67
R-squared	0.01	0.01	0.02	0.04	0.08	0.04

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

Table 2a.
Dependent variable: Polity2 – Level

	Pooled OLS	Fixed Effects OLS	System GMM	Difference GMM	System GMM	System GMM	System GMM	System GMM
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
Democracy$_{t-5}$	.736***	.423***	.640***	.579***	.776***	.634***	.688***	.685***
	(.033)	(.053)	(.071)	(.086)	(.050)	(.074)	(.070)	(.064)
Students Abroad$_{t-5}$	-1.534	-1.858	.265	-4.120	1.920	-.649	-3.885	2.125
	(3.397)	(5.438)	(4.395)	(8.623)	(3.391)	(4.787)	(4.068)	(6.659)
Democracy in host countries$_{t-5}$	.139***	.203***	.272***	.127	.168**	.339***	.183*	.174*
	(.047)	(.0766)	(.084)	(.112)	(.074)	(.087)	(.112)	(.098)
Education Attainement$_{t-5}$	1.522***	-1.589	1.971***	-4.996		2.500***	2.290**	
	(.282)	(1.744)	(.636)	(4.330)		(.636)	(1.016)	
Democracy in trading partners$_{t-5}$						-.163		
						(.169)		
Tertiary enrollment$_{t-5}$							-.714	
							(1.214)	
GDP per capita$_{t-5}$								-.271
								(1.542)
Time effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country effects		Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR(1) Test			.00	.00	.00	.00	.00	.00
AR(2) Test			.53	.63	.54	.52	.25	.45
Hansen's J test			.46	.09	.31	.47	.52	.05
No. of Instruments			121	87	119	103	116	64
No. of countries	113	113	113	105	153	109	112	147
Observations	766	766	766	652	1050	740	581	845
R-squared	0.75	0.82						

* significant at 10%; ** significant at 5%, *** significant at 1%. 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, education attainment, democracy in trading partner, and tertiary enrollment are considered predetermined and are instrumented for using their own lag, starting from the second lag. The set of instrument is selected so to minimize the number of instruments while passing the standard tests.

Table 2b.
Dependent variable: Polity2 – Differences

	Change in Democracy$_t$ (5 years)	Change in Democracy$_t$ (5 years)	Change in Democracy$_t$ (10 years)	Change in Democracy$_t$ (10 years)	Change in Democracy$_t$ (40 years)	Change in Democracy$_t$ (40 years)
	OLS	Fixed Effects	OLS	Fixed Effects	OLS	OLS
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
(Lagged) Change in Students Abroad$_{t-5}$	-1.237 (4.556)	-.444 (3.664)				
(Lagged) Change Democracy in host countrie$_{t-5}$	.095** (.040)	.089** (.041)				
(Lagged) Change in Students Abroad$_{t-10}$			-5.475 (4.442)	-7.033 (4.351)		
(Lagged) Change Democracy in host countries$_{t-10}$			.117** (.057)	.098 (.067)		
Change in Students Abroad$_{t-40}$					-9.757 (6.538)	-12.907* (7.576)
Change Democracy in host countries$_{t-40}$					.399** (.167)	.340 (.225)
Change in Education Attainement$_{t-40}$						.003 (3.141)
No. of countries	133	133	133	133	81	65
Observations	912	912	655	655	81	65
R-squared	0.004	0.03	0.01	0.01	0.07	0.05

* significant at 10%; ** significant at 5%, *** significant at 1%. 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 et al. democracy index- Level

	Pooled OLS	Fixed Effects OLS	System GMM	Difference GMM	System GMM	System GMM	System GMM	System GMM
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
Democracy$_{t-5}$	.709***	.280***	.564***	.303***	.705***	.575***	.590***	.599***
	(.044)	(.062)	(.067)	(.101)	(.072)	(.070)	(.071)	(.062)
Students Abroad$_{t-5}$	2.080	23.988*	4.449	13.400	10.773*	3.944	8.143	35.272**
	(6.223)	(14.028)	(5.902)	(21.120)	(6.656)	(6.877)	(8.378)	(14.659)
Democracy in host countries$_{t-5}$	.130**	.254**	.419***	.311*	.374**	.492***	.281**	.349**
	(.060)	(.112)	(.102)	(.185)	(.155)	(.123)	(.140)	(.149)
Education Attainement$_{t-5}$	2.617***	1.034	3.525***	.479		3.358***	2.818*	
	(.454)	(2.808)	(1.167)	(5.384)		(1.204)	(1.446)	
Democracy in trading partners$_{t-5}$						-.343*		
						(.201)		
Tertiary enrollment$_{t-5}$							3.174	
							(2.721)	
GDP per capita$_{t-5}$								2.133
								(3.362)
Time effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country effects		Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR(1) Test			.00	.00	.00	.00	.00	.00
AR(2) Test			.13	.20	.17	.12	.04	.19
Hansen's J test			.19	.04	.21	.22	.26	.31
No. of Instruments			106	75	83	89	97	58
No. of countries	113	113	113	107	146	108	109	137
Observations	680	680	680	571	968	655	485	752
R-squared	0.67	0.83						

* significant at 10%; ** significant at 5%, *** significant at 1%. 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, education attainment, democracy in trading partner, and tertiary enrollment are considered predetermined and are instrumented for using their own lag, starting from the second lag. The set of instrument is selected so to minimize the number of instruments while passing the standard tests.

Table 3b.
Dependent variable: Przeworski et al. democracy index – Differences

	Change in Democracy$_t$ (5 years) OLS	Change in Democracy$_t$ (5 years) Fixed Effects	Change in Democracy$_t$ (10 years) OLS	Change in Democracy$_t$ (10 years) Fixed Effects
	(1)	*(2)*	*(3)*	*(4)*
(Lagged) Change in Students Abroad$_{t-5}$	6.912 (8.510)	4.466 (7.280)		
(Lagged) Change Democracy in host countrie$_{t-5}$	.071 (.061)	.092 (.062)		
(Lagged) Change in Students Abroad$_{t-10}$			13.621 (12.588)	16.744 (13.172)
(Lagged) Change Democracy in host countries$_{t-10}$			.019 (.085)	.131 (.126)
No. of countries	146	146	142	142
Observations	841	841	559	559
R-squared	0.00	0.02	0.00	0.00

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

Table 4.
Excluding Socialist countries

	Freedom House	Freedom House	Polity II	Polity II	Przeworski et al.	Przeworski et al.
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Democracy$_{t-5}$	.720***	.562***	.732***	.629***	.659***	.584***
	(.046)	(.061)	(.058)	(.080)	(.054)	(.074)
Students Abroad$_{t-5}$	6.150**	-4.631	2.950	-1.963	11.352**	4.413
	(3.192)	(4.712)	(3.648)	(4.871)	(5.224)	(7.009)
Democracy in host countries$_{t-5}$	.418***	.176**	.307***	.245**	.518***	.339**
	(.093)	(.089)	(.104)	(.102)	(.114)	(.144)
Education Attainement$_{t-5}$		4.197***		2.986***		3.491**
		(0.936)		(.787)		(1.684)
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
AR(1) Test	.00	.00	.00	.00	.00	.00
AR(2) Test	.36	.57	.59	.58	.11	.13
Hansen's J test	.16	.19	.10	.19	.19	.12
No. of Instruments	107	96	107	84	119	73
No. of countries	151	109	131	103	136	104
Observations	1047	723	950	703	888	626

* significant at 10%; ** significant at 5%, *** significant at 1%. 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, education attainment, democracy in trading partner, and tertiary enrollment are considered predetermined and are instrumented for using their own lag, starting from the second lag. The set of instrument is selected so to minimize the number of instruments while passing the standard tests. Instruments include lags of all predetermined variables, starting from the second lag.

Table 5.
Small countries (population less than 3 million)

	Freedom House	Freedom House	Polity II	Polity II	Przeworski et al.	Przeworski et al.
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Democracy$_{t-5}$	.817***	.761***	.811***	.795***	.765***	.712***
	(.038)	(.076)	(.054)	(.082)	(.063)	(.085)
Students Abroad$_{t-5}$	6.626**	6.886**	2.542	4.719	13.878**	17.413***
	(2.769)	(2.898)	(3.283)	(3.578)	(7.077)	(6.351)
Democracy in host countries$_{t-5}$	.222**	.341***	.260**	.353*	.304**	.373***
	(.093)	(.120)	(.133)	(.190)	(.123)	(.182)
Education Attainement$_{t-5}$		1.178		.786		1.671
		(1.041)		(1.821)		(2.347)
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
AR(1) Test	.00	.01	.00	.01	.02	.03
AR(2) Test	.59	.22	.71	.90	.07	.40
Hansen's J test	.40	1.00	1.00	1.00	.94	1.00
No. of Instruments	59	94	90	64	70	97
No. of countries	70	40	50	33	59	36
Observations	331	163	234	142	270	145

* significant at 10%; ** significant at 5%, *** significant at 1%. 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, education attainment, democracy in trading partner, and tertiary enrollment are considered predetermined and are instrumented for using their own lag, starting from the second lag. The set of instrument is selected so to minimize the number of instruments while passing the standard tests.

Table 6.
Reverse causality
Dependent variable: Democracy in host countries

	Freedom House Index	Polity II	Przeworski et al.
	(1)	*(2)*	*(3)*
Democracy$_{t-5}$	.036	.020	.067**
	(.025)	(.034)	(.033)
Students Abroad$_{t-5}$	-6.436**	-3.230	-4.634
	(2.893)	(3.173)	(3.092)
Democracy in host countries$_{t-5}$	.661***	.667***	.595***
	(.072)	(.073)	(.033)
Education Attainement$_{t-5}$	.553	-.111	-.738
	(.369)	(.323)	(.448)
Time fixed effects	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes
AR(1) Test	.02	.01	.00
AR(2) Test	.12	.05	.06
Hansen's J test	.23	.34	.19
No. of Instruments	110	110	110
No. of countries	119	113	117
Observations	779	768	788

* significant at 10%; ** significant at 5%, *** significant at 1%. 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. The set of instrument is selected so to minimize the number of instruments while passing the standard tests.

Table 7.
Stay Rates of Foreign Doctorate Recipients in US

Country of origin	Foreign Doctorate Recipients in 1994/95	Estimated stay rates in 1999	Percentage of non-US Doctorate recipients intending to stay in US (1average 1999-2001)
	(1)	(2)	(3)
Taiwan	2,268	42.4	57.3
India	1,995	87.5	88.2
South Korea	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 US universities (2005), and author's elaboration.

Table 8.
Summary Statistics

	Obs.	Mean	Std. Dev.	Min.	Max.
Foreign students as a share of population (X 1000)	1,134	1.04	2.04	0	21.01
Freedom House Index	1,134	.51	.37	0	1
Freedom House Index in host countries	1,134	.87	.15	.11	1
Freedom House Index in trading partners	935	.92	.09	.36	1
Polity II Index	1,025	.52	.38	0	1
Polity II Index in host countries	1,134	.86	.17	.15	1
Polity II Index in trading partners	1,043	.93	.08	.26	1
Przeworski Index	947	.39	.49	0	1
Przeworski Index in host countries	1,130	.85	.22	0	1
Przeworski Index in trading partners	1,041	.94	.09	.19	1
Education attainment (X 100)	837	5.12	2.79	.17	12.05
Enrollment (X 1000)	826	1.49	1.64	0	9.31
GDP per capita	1,003	5,242	7,532	44.64	46,473

Table 9. (continues)
Sample of 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	**UK**
Austria	Vranitzky	Franz	Austria	Austria	Austria	
Bangladesh	Ershad	Hossain Mohammad	Bangladesh	Bangladesh	Bangladesh	**India**
Barbados	Sandiford	Lloyd Erskine	.	.	**Jamaica**	**UK**
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 and France**
Costa Rica	Sanchez	Oscar Rafael de Jesus Arias	Costa Rica	Costa Rica	**US**	Costa Rica
Cote d'Ivoire	Houphouet-Boigny	Felix	Cote d'Ivoire	Cote d'Ivoire	**Senegal**	.
Denmark	Schluter	Poul Holmskov	.	.	Denmark	Denmark
Dominica	Charles	Mary Eugenia	Dominica	Dominica	**Canada**	**UK and 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	**US**	

Source: Author's research. The list of leaders is a sub-sample from the list of world leaders from Jones and Olken (2005) for which data were available. The table includes a selection of leaders who were in power in 1990.

Table 9. (Continuation)
Sample of education of world leaders in 1990

Country	Last name	First name	primary	Secondary	tertiary	other
Equatorial Guinea	Obiang Nguema	Teodoro	Equatorial Guinea	Equatorial Guinea	**Spain**	
Ethiopia	Haile Mariam	Mengistu	Ethiopia	Ethiopia	Ethiopia	
Fiji	Mara	Kamisese	.	.	**New Zealand**	**UK**
Finland	Koivisto	Mauno Henrik	Finland	Finland	Finland	Finland
France	Mitterrand	Francois	France	France	France	.
Gabon	Bongo	Omar	**Congo, Rep.**	**Congo, Rep.**	**.**	**Chad**
Gambia, The	Jawara	Sir Dawda	.	.	**UK**	.
Ghana	Rawlings	Jerry	Ghana	Ghana	.	Ghana
Greece	Mitsotakis	Konstantinos Kiriakou	.	.	Greece	.
Guatemala	Arevalo	Marco Vinicio Cerezo	Guatemala	Guatemala	Guatemala	.
Guinea	Conte	Lansana		**Cote d'Ivoire**		
Honduras	Romero	.	.	.	**US**	
Hungary	Antall	Jozsef	Hungary	Hungary	Hungary	
Iceland	Hermannsson	Steingrimur	Iceland	Iceland	**US**	**US**
Togo	Eyadema	Gnassingbe	Togo	Togo	.	.
Trinidad & Tobago	Robinson	Arthur Napoleon	Trinidad & Tobago	Trinidad & Tobago	**UK**	**UK**
Tunisia	Ali	Zine El Abidine Ben	.	.	**France**	**US**
Turkey	Ozal	Turgut	Turkey	Turkey	Turkey	**US**
USA	Bush	George H.	USA	USA	USA	.
Uganda	Museveni	Yoweri	Uganda	Uganda	**Tanzania**	.
United Kingdom	Major	John Roy	UK	UK	.	.
United Kingdom	Thatcher	Margaret Hilda	UK	UK	UK	.
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**	**UK**

Source: Author's research. The list of leaders is a sub-sample from the list of world leaders from Jones and Olken (2005) for which data were available. The table includes a selection of leaders who were in power in 1990.

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