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Soft, hard or smart power? International students and investments abroad

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Soft, hard or smart power?
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Abstract. This paper analyses the impact of education networks on the FDI from the United States and United Kingdom to 167 countries during 1999-2011. Proxies of networks are international students in the US and UK and alumni associations abroad. Results show that international students boost the British FDI to their home countries, while their influence on American FDI is weak, except for students from developing economies and for international students who attended university during the Cold War. Alumni associations have a substantial impact on both American and British FDI, but especially on the latter. The stronger impact of education networks on British FDI is partly related to the different political and economic roles played by the US and UK on the world stage, and to their different use of soft and hard power. Results are robust to different econometric specifications.

JEL classification: F14, F20, I23, J24,

International students, alumni, bilateral FDI, education networks.

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1. Introduction.

Commanding a squadron of American warships, Commodore Matthew C. Perry entered Japanese waters in 1852 and threatened to use force if the country refused to open to trade. The move was dictated by the country's hermetic closure to the rest of the world over the previous two centuries and the rich profits anticipated from its opening to free economic exchanges. As a response, the Japanese authorities agreed to sign a treaty that seemingly conceded what the United States and other Western nations wanted but, in fact, left the country's gates essentially closed. In 1863, a small group of British merchant vessels quietly helped five young noblemen to escape the country and reach the United Kingdom, where they studied at University College London. After completing their studies, the five returned home, held important political and administrative positions and, more importantly, supported a change of imperial dynasty and mentality that eventually opened the country to the international flows of goods and peoples.¹ This is just one example of the roles of force – or the threat of it – and persuasion in the history of trade and international politics; but many others could be made, even with the same countries playing different parts.

That outcome was remarkable, but it was neither entirely fortuitous nor unique. The five young Japanese students were only a tiny fraction of the foreign students studying at British universities at that time, and represented only a few of those who during their adult lives actively sought to build links between their homeland and the United Kingdom. British authorities were aware of this potential result, as well as its underlying mechanisms. They knew that during the years at university students typically develop strong and enduring ties of friendship among themselves and an attachment with their university and host country, and that together this could help Britain to improve relations with their respective home economies.

The bridging potential of foreign students is now considered a form of soft power. Nye (2005) defines soft power as the capacity of influencing the preferences of others through persuasion and attraction, rather than through coercion or payment. International students and scholars, literature, and classical music, are forms of soft power that can influence the preferences of elites, while pop music, cinema, TV, and economic aid, are more likely to influence the tastes of the masses. The soft power aimed at the elites is supposedly the most efficacious in influencing the political orientation and economic policies of a foreign country. At the other extreme, hard power is the use of force through wars, military coercion, or economic blockades. Espionage and covert action are usually classified as hard power, even though their influence on the masses is less clear, as it depends on

¹ The five young Japanese, known as “the Choshu-Five”, studied at University College London (UCL) and were hosted at the home of a UCL's professor. Today, two monuments celebrate their enterprise, one in the grounds of UCL, and another at Yamaguchi University, Japan.

how much is perceived. Hard power is thought to deploy its consequences in the short run, while the effects of soft power are long lasting. An often debated point is whether or not soft power without the backing of force can actually be effective. Nye (2005) has named smart power the wise combination of the two.

Since the times of the British and European empires, the number students moving abroad for their studies and the number of countries involved in their flows have greatly increased. According to UNESCO's definition and statistics, international students are students who move to a foreign country for the purpose of tertiary studies. They were 50.000 in 1950, 2.1 million in 2002 and 3.4 million in 2010. This huge growth in numbers has stimulated research and debate, but the full implications of the movements of students across countries are still poorly understood. International students are mostly considered as a subgroup of skilled migrants, and hence as human capital, or productive factors, while the important political, cultural and economic links between countries that they can generate tend to be overlooked. In particular, the economic research focuses on the incentives of students to move abroad, the reasons for universities to attract students (Bessey, 2012; Beine, 2012; Kahanec and Králiková, 2011; Haupt et al., 2011; Van Bouwel and Veugelers, 2010), or the brain gains and losses for receiving and sending countries (Le, 2010; Chellaraj et al., 2008; Freeman, 2010). Only very few studies examine the impact of international students on the relations between countries. Among these, Spilimbergo (2009) tests the influence of foreign students on political systems, and (Murat, 2014) on bilateral trade.

The main thesis of this paper is that the positive influence of foreign students on the economic exchanges between countries that was believed to work in the past is still active. Specifically, I measure the impact of university ties on the foreign direct investments (FDI) of today's two main receiving countries, the United States and United Kingdom, in 167 students' home countries during the years 1999-2011. In 2010, 21% and 12% of international students were attending American and British universities (UNESCO). To this end, I use different proxies of education ties. One concerns the number of international students attending American and British universities during the years 1999-2011. Data are taken from the statistics on international students published by UNESCO as a homogeneous series since 1998. Secondly, I utilize data on foreign students that attended university at the beginning of the seventies, in particular during the academic year 1970/71. On average these former students are in their fifties and early sixties during the database timespan. These data are published by the *UNESCO Statistical Yearbook*. A third, more direct, indicator of active education ties is the number of alumni associations of US and UK universities in each foreign country. Alumni associations are a common phenomenon of universities of English-speaking countries. Their central offices generally are on the university premises, while branches spread to many other

locations in the country and abroad. As no official statistics on their numbers exist, I collected the evidence available on the universities websites or kindly provided by the universities themselves and built two novel databases on the alumni associations of American and British universities in the 167 partner countries considered.

The main findings of this paper are that the impact of education links on is positive and strong on the British and weak on the American investments in the students' home countries. This difference is robust to different regressors and dependent variables. Further controls including indicators of the different roles played by the US and UK on the world scenario – the US a superpower, the UK a former empire – partially explain but do not change the main results. The remainder of the paper is structured as follows: section 2 presents some facts and the literature on social and education networks. Section 3 presents the statistics of the variables of interest and indicates the data sources. The estimation strategy is developed in successive steps is in Section 4. Section 5 presents and discusses the results. Section 6 gives the conclusions.

2. Facts and literature

Back in the nineteenth and early twentieth century, Britain hosted students from all over the world: Europe, settlement countries, colonies and other nations and states. There weren't as many students from poor countries as from rich ones, but their bridging potential with the homeland was thought to be the most important and precious, since relations with rich and settlement countries were already well established (Pietsch, 2009). On the other hand, students from poor countries were eager to move to Britain for their studies, as this could secure prestigious jobs after graduation, especially in the professions, commerce and bureaucracy. In later decades, with decolonization, some former international students became leaders of independence movements and heads of state in their homelands (Spilimbergo, 2009, Perraton, 2014).

After the second world war, the economic and political influence of the United States overcame that of the United Kingdom, making it a 'superpower' and, naturally, the preferred destination of international students. There was, however, another superpower that competed with the US at all levels, and was also interested into attracting students from abroad, the USSR. Ideally and effectively they divided the world into two separate blocks, and each offered scholarships and fellowships to foreign students and scholars (Perraton, 2014; Spilimbergo, 2009; Pietsch, 2009). Of special interest were students originating from the Third World and politically nonaligned countries, which were at risk of establishing alliances with the rival superpower. As in earlier times, the main goal was an improvement in the relations with students' home countries but, more than before, political and strategic considerations came first, over immediate economic convenience (Brawner

and Lucas, 2007). The Cold War, and the ever-present possibility of a devastating armed confrontation between the two superpowers, had made the use of persuasion and soft power more important than ever.

After the fall of the Berlin Wall and the end of the division of the world into two contending blocks, the political and economic world scenario gradually became more heterogeneous and fragmented. During the nineties, perhaps because of its unique role of leading nation, the direct interest of the United States in attracting foreign students faded, and the funds dedicated to international scholarships gradually shrank (Brawner and Lucas, 2007). Later, the terrorist attacks of September 2001 made the government's position definite again, but this time against the growing inflows of foreign students. First and foremost came the security of the country, and students from abroad were seen as potential carriers of peril, especially when originating from certain world areas. For a few years after 2001, total inflows in the US stagnated, and those from Arab and some African countries fell (Figure A.1).

On the other side of the Atlantic, the British attitude with respect to international students has been more constant throughout time. The interest on international students as a way of improving international relations has never completely faded and, rather, perhaps because of the lost supremacy and diminished military potential after the second world war, has even increased, at least until very recent times. Since 2010, UK policies on international students' entry visas, grants and scholarships have become more restrictive (Perraton, 2014), but these measures, with their long term implications, are frequently debated in newspapers, magazines and specific studies. Among others, Hurn and Tomalin (2013) stress the importance of attracting international students to strengthen Britain's soft power, and, consequently, improve relations with areas of the world that can be crucial for the future development of the economy.

By moving to study abroad, and through their university ties and networks, students build links between countries. A branch of the literature analyses the effect of social networks on the economic exchanges. The base assumption of networks' theory is that the interactions between individuals lower the fixed costs of market transactions. At the international level, these costs are generated by social, cultural, and institutional dissimilarities between countries. By smoothing out these dissimilarities, networks boost bilateral trade and FDI (Rauch, 1999; 2001). Several empirical studies, focusing mostly on the social networks of migrants, provide support for this hypothesis. Some authors test the impact of migrant ties on the bilateral trade exchanges between the host and the origin countries; among these: Gould, 1994; Head and Ries, 1998; Rauch and Trindade 2002; Wagner et al., 2002; Combes et al., 2005; Herander and Saavedra, 2005; Blanes and Martín-Montaner, 2006; White, 2007; Tadesse and White, 2008; Bandyopadhyay et al., 2008; Buch et al.

2006; Peri and Requena 2010; Aleksynska and Peri, 2012; Egger et al., 2012; Felbermayr and Toubal, 2012. Other studies focus on the relation between international networks and FDI, (among others: Gao, 2003; Tong, 2005; Docquier and Lodigiani, 2010; Javorcik et al., 2011; Flisi and Murat, 2011) finding, in some cases, that FDI are more likely than trade to be promoted by networks of skilled individuals. Both regarding bilateral trade and FDI, and in agreement with the base assumption of networks theory, some studies find that the effects of social transnational links tend to be stronger as countries are more dissimilar (Girma and Yu, 2002; Dunlevy, 2006; Kugler and Rapoport, 2007; Tong, 2005).

Another branch of the literature studies the characteristics of the network ties of university students. Using data on American colleges and universities, Marmaros and Sacerdote (2006), Mayer and Puller (2008), Arcidiacono et al. (2011), Baker et al. (2011), Neri and Ville (2008) find that some links are particularly robust. Cohen et al. (2008) test the investment decisions of adult individuals who have the choice of placing their investments with former university mates or with anonymous partners, and find that university mates are significantly preferred. This suggests that university links can be long-lasting, and evolve sometimes into business ties.

3. Data and descriptive statistics.

This paper uses three proxies for education networks: *International students*, who are students that attended American and British universities during 1999-2011, *International students₁₉₇₀*, who attended university during the academic year 1970/71, and the number of *Alumni associations* of American and British universities in foreign countries. The first two variables concern stocks of international students registered during each academic year. *Alumni associations*, is a time-invariant variable, and the more direct proxy of networking activity. It reports the decision of former students to create a formal group, to remain linked to the alma mater, to meet with each other on regular basis, and to exchange news and information. More than for international students, these exchanges are likely to convey valuable economic knowledge and information, which can influence FDI. The evidence available shows that the representatives of associations – often denominated ‘ambassadors’ – held a degree in Economics, Business, Engineering or a scientific discipline more frequently than in the Humanities.

For the purpose of this investigation, I collected the information available on alumni associations on the universities websites during year 2012, with which I built two variables, one concerning 1759 American, and the other 1895 British associations, which are the foreign branches

of the associations of alumni of 62 American and 50 British universities.² These data show that associations are present in many countries and in all continents. Figures on the number of members of each association were not always available, but some universities websites reveal that their alumni are hundreds or tens of thousands. For example, in the alumni website of Oxford University is written ‘There are currently more than 200,000 Oxford alumni in over 88 countries (about one-third are based overseas)’. Interestingly, the alumni associations of business schools are often kept distinct from all other alumni associations, and have separate offices within university premises.³ The spread and importance of all kind of alumni associations abroad is related to the long history of university alumni in the US and, more recently, in the UK. Some American associations of alumni are as old as or older than their alma mater.⁴

In 1970 there were less international students than in 1999-2011, but, more importantly, the distribution of their countries of origin was different. During 1970, and in general during the Cold War, students from communist economies were just a tiny fraction of the total number of foreign students, while they are an important proportion of all international students in American and British universities, especially if originating from China, Vietnam and (mainly in the UK) Eastern European countries (Table A.1).

Overall, since the early seventies, and especially since the beginning of the nineties the aggregate number of international students has constantly grown. Figures 1-3-5 show that the increase concerns especially students from Asia – going to the United States, the United Kingdom and to the world –. The flows of students from Africa and Latin America register a halt since the

² Data on associations abroad were collected from all university websites that provided this information during year 2012. The staff of Manchester University (UK) kindly provided data. The databases on the US and UK foreign branches of alumni associations are available from the author on request.

³ Business alumni associations of Harvard, Stanford, Oxford, Rutgers, Penn state and several other universities have their distinct offices and websites. On the Alumni website of Penn State University is written: ‘The Penn State community includes more than 610,000 alumni located in every corner of the world. Within that network, graduates of the Smeal College of Business number more than 74,000.’ More specifically, the number of Penn State Alumni with Penn State Alumni Association *Membership* is more than 172,000, about 30.% of the total’. If the same proportion is applied to Smeal College, then registered *members* of business alumni associations are about 23.000. If only one third of all associate alumni are abroad (using the proportion of Oxford alumni abroad), then there are 52,460 associated alumni, of whom 6,780 *business* alumni, of Penn State University alone in foreign countries. Some Alumni associations of the London Business School membership numbers are: 2,399 in China, 4,307 in India, 3,900 in other Asian countries, 1,275 in Australia and New Zealand, 2,158 in Brazil, 2,782 in other Latin American countries, 2,502 in Africa, over 1,300 in the Middle East, 1,694 in eastern Europe, 1,930 in France, 544 in Greece.

⁴ The following alumni associations exist since: 1792, Yale (<http://aya.yale.edu/content/history>); 1840, Harvard, (<http://alumni.harvard.edu/about-haa/history>); 1875, MIT (<http://libraries.mit.edu/sites/mithistory/institute/committees/association-of-alumni-and-alumnae-of-the-massachusetts-institute-of-technology/>); 1870, Penn State University (http://alumni.psu.edu/about_us/history); 1872, University of Berkeley(<http://alumni.berkeley.edu/about-caa>); 1889, University of Washington (<http://www.washington.edu/alumni/about/history.htm>); 1897, California Institute of Technology (<https://alumni.caltech.edu/history>); 1906, University of Florida (<http://www.ufalumni.ufl.edu/about/>); 1927, Texas Tech (<http://www.texastechalumni.org/s/1422/3col.aspx?sid=1422&gid=1&pgid=449>); 1875, Virginia Tech (<http://www.alumni.vt.edu/about/history.html>); 1925, UCLA (<http://alumni.ucla.edu/alumni-association/history/default.aspx>); 1907, Cal Poly (http://alumni.calpoly.edu/content/about_cpaa/cpaa_history); 1878, Iowa State University (http://www.isualum.org/en/about_us/association_history/).

mid-seventies and beginning of eighties for about a decade, while those from Europe and North America grow more constantly. The presence of international students in the United States decreases for some years after 2001, especially if originating from Arab countries (Figure A.1), and except for students originating from Asia (Figure 1). Patterns are different in the United Kingdom, where since the end of the sixties the presence of students from all regions, except Africa, increases more or less steadily. After the fall of the Berlin Wall, numbers from Asia and Eastern Europe increase more rapidly than average. British investments abroad also follow a more regular pattern than those of the United States (Figures 3-4).

Figure 6 shows that the proportion of international students in the United States on world totals decreases constantly since the end of the eighties, and that the contraction becomes more rapid after 2002. This can be explained by the diminished interest of the country on international students after the fall of the Berlin Wall, and since 2001, by the adoption of more restrictive policies on students' visas. The same shares in the United Kingdom follow a quite different path: it increases until the end of the nineties, to become flat or decreases only slightly afterwards. Given the rapid increase in world numbers, the latter is accompanied by the high and positive growth in levels of Figure 3.

Up to this point, geographic areas rather than the level of development of countries have been considered. However, the latter becomes relevant when the hypothesis of networks theory that social links matter especially when countries are dissimilar is taken into account. As a differentiation between rich countries with similar institutions – OECD economies – and other countries – non-OECD - will be part of the empirical testing in this paper, some statistics on these two aggregates are of interest. Table 1, based on this paper's dataset, shows that during 1999-2011 the majority of international students in American and British universities originate from other developed, or OECD, countries, but also that numbers from non-OECD economies register the most rapid growth rates. Specifically, the average number of students from OECD economies in the US was more than twice the inflow of students from emerging and developing (non-OECD) countries, while in the UK this proportion was about four to one. The number of students from developing countries increased at a rate of 11.2% per year in the United States and 9.75% in the United Kingdom, while the growth rates from developed countries have been of about 3% for both the US and UK. The distributions of *Alumni associations* and *International students*₁₉₇₀ follow a similar pattern: the largest numbers are in OECD countries.

The outward American and British FDI, depicted in Figures 2 and 4, grow significantly since the end of the eighties, especially toward Asian countries and the Western Economies (North

Figure 1. - International students in United States. 1968-2011

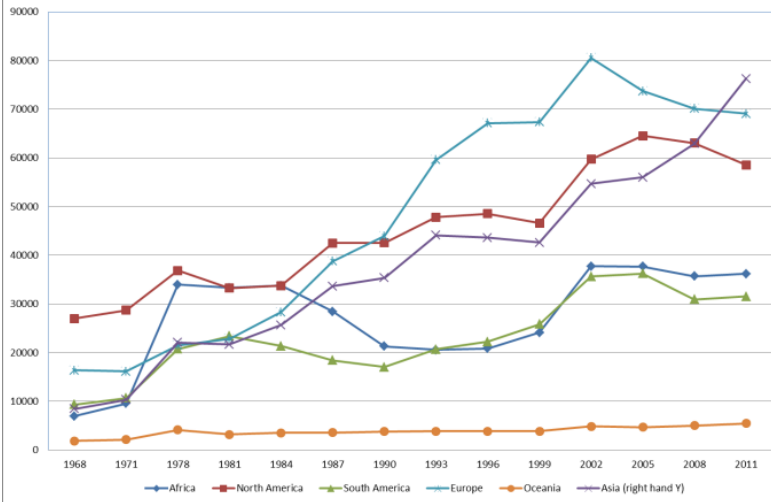


Figure 2. - FDI outward. United States. 1987-2011

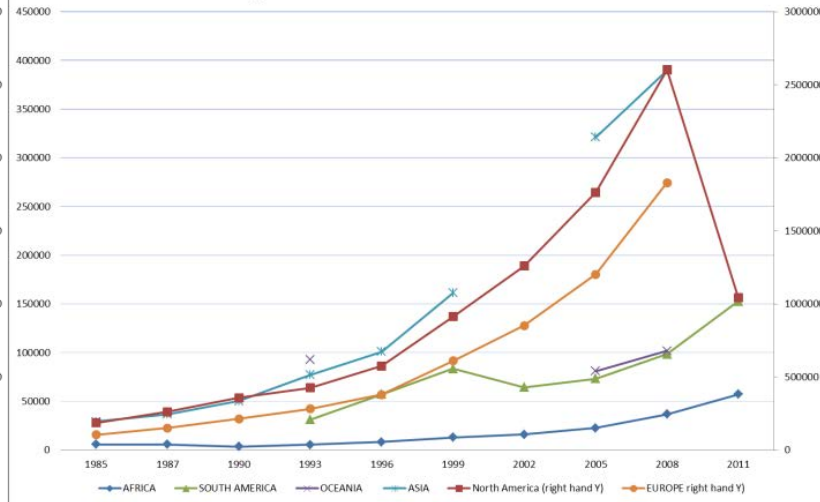


Figure 3. - International students in United Kingdom. 1968-2011

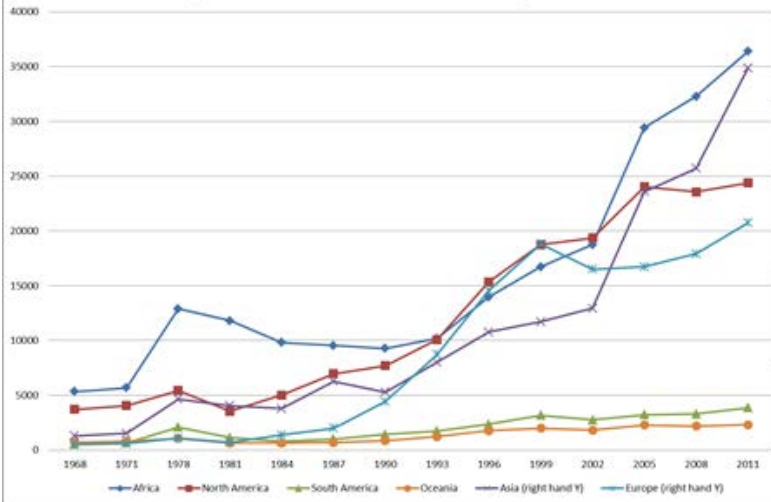
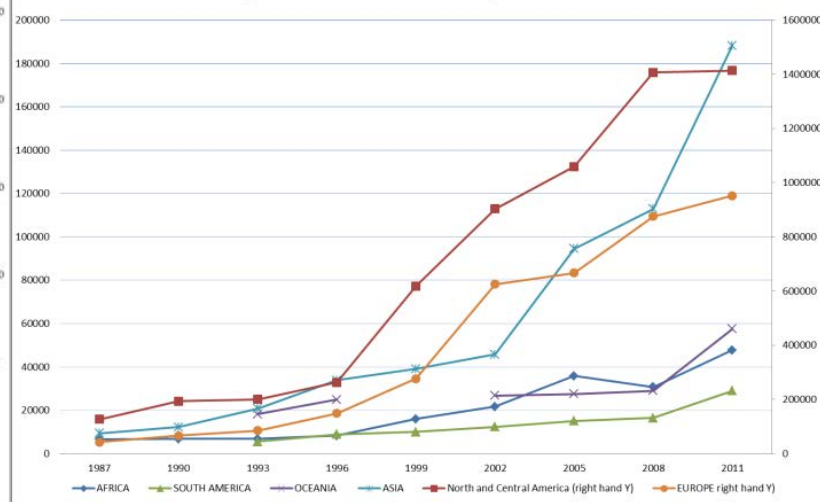


Figure 4. - FDI outward. United Kingdom. 1987-2011



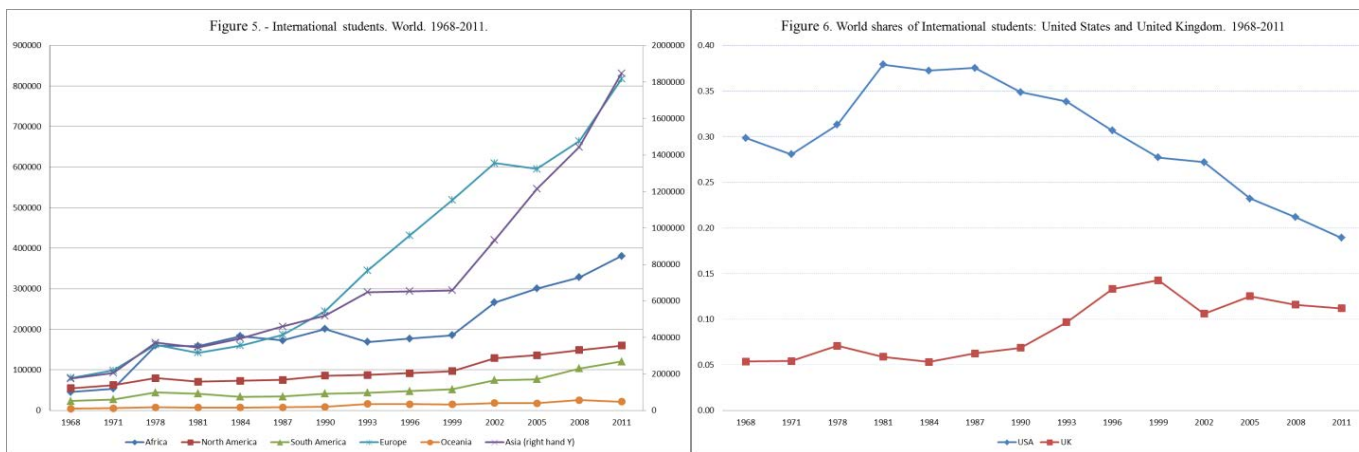


Table 1. - Summary statistics of some variables of interest

| | | United States | | | | United Kingdom | | | |
|---|------------|---------------|-----------|----------|-----------|----------------|-----------|----------|----------|
| | | OECD | | non-OECD | | OECD | | non-OECD | |
| | | mean | std.dev | mean | std.dev | mean | std.dev | mean | std.dev |
| Outward FDI | Overall | 60,743.50 | 93,662.00 | 3,324.80 | 9,543.30 | 38,321.01 | 73,149.00 | 1,905.70 | 5,231.50 |
| | Between | | 85,045.00 | | 7,836.10 | | 70,936.00 | | 3,669.10 |
| | Within | | 41,293.00 | | 3,980.40 | | 20,781.00 | | 2,774.40 |
| | Growth (%) | | 12.17 | | 22.15 | | 17.32 | | 47.01 |
| International Students ₁₉₉₉₋₂₀₁₁ | Overall | 6,926 | 12,680.00 | 2,599 | 10,169.00 | 4,623 | 5,357.40 | 1,127 | 4,090.90 |
| | Between | | 12,581.00 | | 9,719.50 | | 5,227.90 | | 3,583.00 |
| | Within | | 2,741.40 | | 3,031.20 | | 1,495.50 | | 1,995.70 |
| | Growth (%) | 3.1 | | 11.2 | | 3.56 | | 9.75 | |
| International students ₁₉₇₀ | Overall | 1339 | 2055.33 | 657 | 1735 | 838 | 975.70 | 374 | 852.64 |
| | Overall | 25.62 | 18.56 | 7.36 | 14.2 | 31.17 | 51.45 | 7.18 | 13.59 |

Notes: OECD, non-OECD economies in 1999. FDI: outward stocks in partner countries (mil. of US\$). International students: stocks in USA and UK. Alumni associations: number of alumni associations of USA and UK Universities in partner countries.

America and Western Europe in the Figures). If, instead, the division of countries between OECD and non-OECD is considered, the Table 1 shows that, as for international students, the American and British FDI are directed especially to other developed (OECD) countries, but that they have grown rapidly especially toward the developing economies. The detailed definitions and sources of all variables and data utilized in this paper are listed in Table A.2.

4. Estimation strategy

4.1 Baseline specification

The basic question I seek to examine is whether international students in the United States and United Kingdom and alumni abroad influence the volume of FDI from the two host countries to the students' home countries. To do so, I firstly estimate the following gravity base model (Feenstra, 2004):

$$\ln FDI_{ct} = \alpha + \delta \ln Education\ networks_{ct} + X_{ct}\Pi + \alpha_t + \lambda_c + \varepsilon_{ct} \quad (1)$$

where the dependent variable is the stock of outward FDI of the United States or United Kingdom in country c at time t . The two countries' regressions are run separately. The explanatory variable of interest is *Education networks*. Its proxies are, respectively, the stocks of *International students* from country c at time t present in the United States or United Kingdom during the period 1999-2011, *International students*₁₉₇₀, students who attended university during the academic year 1970/71, and the stocks of *Alumni associations* of American or British universities in country c . The information on FDI is available for years 1999 to 2011.

X_{ct} is a vector including several variables, specific to the partner country c , commonly used in the literature on FDI determinants. They are: *GDP*, a proxy for the purchasing power of consumers in the partner country; *Population* size to capture the potential market size of the country; *Distance* of the country from the United States or United Kingdom to account for transaction costs related to travel, communications and cultural distance; the average *Inflation* in country c at time t to control for macroeconomic stability; a time-varying index of the *Quality of institutions*, to proxy the bureaucratic and political costs of transactions; the proportion of people speaking *English*, to denote cultural similarities and possibility of obtaining information about business conditions; the *Free trade agreements* between the United States or the United Kingdom and the partner country. The model includes time dummies, α_t , and countries' fixed effects, λ_c . All variables, except dummies and percentages are in logarithms.

4.2. Endogeneity

Coefficients on *International students* (concerning the period 1999-2011), and *Alumni associations* abroad can suffer from reverse causality, omitted variable bias, or measurement error, while international students of 1970/71 can be safely thought to be uncorrelated with the error terms of equation (1). To try to obviate for endogeneity problems, I use the Blundell-Bond (1998) System GMM estimator when the proxy of education networks is *International students*, and the GMM instrumental variables approach (IV-GMM) when the variable of interest is *Alumni associations*. The latter variable is time-invariant and could not be instrumented with its own lags as required in the GMM specification.

In both the US and UK regressions the *Alumni associations* variable is instrumented with the alumni associations of the *other* receiving economy (i.e. the British *Alumni associations* are instrumented with the American *Alumni associations*, and vice versa), and with the level of democracy in the students' home country (democracy as defined by Cheibub et al., 2010). The rationale for these two instruments is, regarding the first, that a higher number of alumni associations from a given country can determine, through a 'contagion' effect, the formation of new alumni associations from another country. Specifically, more associations of alumni from American universities can be an incentive for returning students from British universities to establish their own associations, and vice versa. Regarding the second instrument, democracy, more democratic nations tend to be more open to cross-country cultural exchanges (Spilimbergo, 2009) and to provide a more favourable environment for intellectual associative activities (Freitag, 2006), and alumni associations. Both instruments are expected to be uncorrelated with the error terms of the baseline equation.

4.3. Soft, covert and hard power.

Up to this point, the specific roles of the US and the UK on the international stage have not been considered, but in the real world the two countries differ in significant ways. An obvious difference between the two is that the US is a superpower with a strong political, economic, cultural and military impact on several world areas and countries, while the UK is a former empire, with a much more limited military and economic power, but with a still significant political and cultural influence around the globe. All this can affect not only the capacity of American and British multinationals to access foreign markets but also the relative weight that persuasion or force may have in the process. In general, countries with stronger military and intelligence capacities may depend less on the use of persuasion, while those with less military power may have more incentives to invest comparatively more resources in soft power, cultural diplomacy and other peaceful ways of establishing relations with foreign nations. Consequently, potential omitted

variables in the above specification should relate to different forms of power or persuasion used by the US and UK in their interactions with other countries.

Hence, too the above specification, I first add two covariates related to the use of either soft power or force. One is the amount of economic aid (in millions of US\$) provided to the partner country, the other is the number of wars fought with it since the end of the second world war. As aid can improve the trust of people in the foreign on the donor country, it can be considered a form of soft power. Guiso et al. (2009) find that higher levels of trust between people of two different countries positively affect the bilateral economic exchanges between the countries. At the same time, aid can also affect FDI more directly by positively influencing the preferences of consumers for the goods of the donor country. Moreover, aid provisions are often accompanied by bilateral trade and, in some cases, investment treaties (Selaya and Sunesen, 2012). For similar and opposite reasons, the number of wars fought with the foreign country are expected to have a direct disruptive influence on trade and FDI (Barbieri and Levy, 1999; Martin et al., 2008) and an indirect effect through the weakening of trust and social ties – including education ties – between the people of the two countries. However, after the second world war, wars have been increasingly fought for political or humanitarian reasons, rather than for a military victory over the ‘enemy country’, and have been fought, especially by the UK, as part of a wide coalition of countries. The effects on bilateral FDI of these locally and temporarily limited wars can therefore be less disruptive than those of more traditional ones. This makes the coefficient on the *Wars* variable difficult a priori to sign.

I then add two covariates, one in the regressions concerning the US FDI and the other in those concerning the UK FDI. In the first, I include a variable concerning the use of covert power. Both the US and the UK governments rely on the services of secret intelligence agencies operating in foreign countries, and indicators of their activities for both the US and the UK would be useful for this study, but information have been made available only on past operations of the American Central Intelligence Agency (CIA). Using these data, Berger et al. (2013) find that, during the Cold War years, 1945 to 1989, CIA interventions in foreign countries had a positive impact on US exports. They also find that the effect is higher on less democratic countries. In this paper I use the data made available by Berger et al.(2013) to test the impact of the number of CIA operations in the foreign country since 1945 to 1989 on the American investments abroad during 1999-2011. Hence, I test the effect of CIA on FDI rather than on trade, and in the long run. Following Berger at al.(2013) the coefficient on CIA could be expected to take a positive value, but following Nye (2005) and his thesis on covert intervention being hard power, it should take a negative one.

In the regressions on UK data, I add a proxy for cultural diplomacy: the number of branches of the British Council in the foreign country. The British Council is an institution having a

reputation and importance are well-established all over the world. Its goal is that of disseminating abroad the culture and language of the United Kingdom, and of building trust between people of the UK and other countries. It provides useful information and practical services to foreign students wishing to study in Britain, and to other people wanting to know the United Kingdom. Other countries with similar institutions are, among others, France with the Alliance Française, Germany, with the Goethe Institut, Italy, with the Dante Alighieri association, Spain, with the Instituto Cervantes, China, with the Confucius Institute. In this case, there are no data available on the branches of an equivalent American institution because it does not exist: there is no equivalent US institution representing the United States culture, language, history and cultural traditions abroad. The coefficient on the *British Council* variable is expected to be positive. *Aid*, *Wars*, *CIA* and *British Council* are control variables that, by being expression of soft, hard and covert power, can also be potentially correlated with *International students*. It can be reasonably expected that the positive effects of education networks on FDI are weakened by the use of hard and covert power, and complemented by other forms of soft power, as *Aid*.

5. Results

5.1. Baseline specification: OLS and FE.

Tables 2.a and 2.b. depict the coefficients of the baseline regressions and evidence three main results. First, the impact of *International students* is stronger and more robust on British than on American bilateral FDI. Second, international students who attended American and British universities during the beginning of the seventies (*International students*₁₉₇₀), senior workers and professionals during the database timespan, have a positive and significant influence on both American and British outward FDI. Third, *Alumni associations* have a higher and more significant influence than international students. Also in this case, alumni associations have a higher influence on the British FDI.

More specifically, *International students* affect the American FDI in Model 1 (Table 2.a.), but the relation loses significance once other control variables are added to the model. Differently, coefficients on *International students* in UK are positive, higher than those in the US regressions, and significant in all specifications. In Model 2 of Table 2.b., a 1% increase in the number of students originating from country *c* increases the British FDI in country *c* by 0.32%; with significance at 1%. The result is confirmed when the lagged dependent variable is included among the regressors (Model 5); in this case, the long run value of the coefficient on international students

Table 2.a. - Investments abroad. Dependent variable: outward FDI of the United States

| | OLS (1) | OLS (2) | OLS (3) | OLS (4) | OLS LDV (5) | OLS LDV (6) | FE (7) | FE LDV (8) |
|--|----------------------|----------------------|----------------------|----------------------|---------------------|---------------------|-------------------|---------------------|
| FDI _{t-1} | | | | | 0.955*** (0.015) | 0.950*** (0.015) | | 0.650*** (0.056) |
| International students | 0.283** (1.123) | 0.167 (0.116) | | | -0.002 (1.020) | | -0.035 (1.152) | -0.031 (1.074) |
| International students ₁₉₇₀ | | | 0.256*** (0.082) | | | | | |
| Alumni associations | | | | 0.817*** (0.180) | | 0.051 (0.031) | | |
| GDP | 1.524*** (0.087) | 1.386*** (0.135) | 1.349*** (0.140) | 1.143*** (0.160) | 0.054* (0.033) | 0.041 (0.033) | 0.445* (0.233) | 0.354*** (0.100) |
| Population | -0.724*** (0.123) | -0.398** (0.182) | -0.499*** (0.180) | -0.467*** (0.174) | 0.02 (0.033) | 0.007 (0.032) | -1.606 (1.202) | -0.813 (0.580) |
| Distance | -1.118*** (0.209) | -0.810*** (0.225) | -0.689*** (0.223) | -0.811*** (0.207) | 0.011 (0.038) | 0.012 (0.038) | | |
| Free trade agreements | | 0.751*** (0.287) | 0.504* (0.293) | 0.25 (0.272) | 0.079 (0.051) | 0.043 (0.051) | | |
| Inflation | | 0.016*** (0.004) | 0.017*** (0.004) | 0.016*** (0.005) | 0.002* (0.001) | 0.002** (0.001) | 0.001 (0.002) | 0.001 (0.001) |
| Quality of institutions | | 0.13 (0.283) | 0.178 (0.298) | -0.07 (0.271) | 0.053 (0.054) | 0.041 (0.053) | 0.123 (0.397) | -0.199 (0.206) |
| English language -% population | | 0.016*** (0.005) | 0.011** (0.005) | 0.015*** (0.004) | 0.001 (0.001) | 0.001 (0.001) | | |
| Observations | 1,723 | 1,712 | 1,671 | 1,716 | 1,442 | 1,444 | 1,711 | 1,442 |
| R-squared | 0.716 | 0.734 | 0.737 | 0.751 | 0.966 | 0.966 | 0.082 | 0.486 |
| Number of countries | 164 | 164 | 164 | 164 | 163 | 163 | 164 | 163 |

Notes: all variables are in logs except dummies and percentages. HAC robust standard errors in parentheses. Time dummies and constant in all regressions. The panel is an unbalanced panel comprising data between 1999-2011. *** p<0.01, ** p<0.05, * p<0.1.

is 0.44, with significance at 1%.⁵ The magnitude of the coefficient shrinks to 0.18 when countries' fixed effects are added to the model (Model 7) and remains constant when the lagged dependent variable is included (the long run value of the coefficient on *International students* in Model 8 is 0.18). Hence, the relation between international students in the UK and UK FDI investments in the students' home countries is positive and significant, with a magnitude varying between 0.18 and 0.44.

⁵ From $y_t = \hat{a}y_{t-1} + \hat{b}x_t$, $\hat{b}_{long\ run} = \frac{\hat{b}}{1-\hat{a}}$

*International students*₁₉₇₀ have a similar, positive and significant influence on both the American and British investments abroad. Specifically, a 1% increase in *International students*₁₉₇₀

Table 2.b. - Investments abroad. Dependent variable: outward FDI of the United Kingdom

| | OLS (1) | OLS (2) | OLS (3) | OLS (4) | OLS LDV (5) | OLS LDV (6) | FE (7) | FE LDV (8) |
|--|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|-------------------|---------------------|
| FDI _{t-1} | | | | | 0.859*** (0.045) | 0.848*** (0.047) | | 0.253*** (0.088) |
| International students | 0.723*** (0.127) | 0.325*** (0.080) | | | 0.061*** (0.024) | | 0.178* (0.096) | 0.135* (0.075) |
| International students ₁₉₇₀ | | | 0.224*** (0.064) | | | | | |
| Alumni associations | | | | 0.718*** (0.152) | | 0.151*** (0.052) | | |
| GDP | 0.698*** (0.167) | 0.235* (0.123) | 0.305** (0.128) | 0.213** (0.107) | 0.028 (0.024) | 0.025 (0.023) | 0.188 (0.167) | 0.250** (0.126) |
| Population | -0.226 (0.157) | 0.791*** (0.170) | 0.827*** (0.175) | 0.659*** (0.167) | 0.116** (0.050) | 0.092** (0.047) | 0.490 (1.073) | 0.836 (0.690) |
| Distance | -0.137 (0.169) | 0.013 (0.144) | -0.103 (0.144) | -0.183 (0.148) | -0.015 (0.029) | -0.057* (0.033) | | |
| Free trade agreements | | 0.009 (0.297) | -0.194 (0.275) | -0.102 (0.295) | -0.021 (0.071) | -0.039 (0.072) | -0.282 (0.229) | -0.329 (0.239) |
| Inflation | | -0.002 (0.004) | -0.001 (0.004) | -0.003 (0.004) | 0.003 (0.003) | 0.003 (0.003) | -0.003 (0.005) | -0.007 (0.007) |
| Quality of institutions | | 1.554*** (0.236) | 1.622*** (0.249) | 1.291*** (0.233) | 0.253*** (0.083) | 0.207*** (0.075) | 0.455 (0.318) | 0.475* (0.286) |
| English language -% population | | 1.768*** (0.435) | 1.519*** (0.514) | 1.695*** (0.450) | 0.117 (0.156) | 0.109 (0.153) | | |
| Observations | 1,186 | 1,178 | 1,178 | 1,178 | 987 | 987 | 1,167 | 975 |
| R-squared | 0.595 | 0.728 | 0.729 | 0.738 | 0.925 | 0.926 | 0.176 | 0.243 |
| Number of countries | | | | | | | 129 | 112 |

Notes: all variables are in logs except dummies and percentages. HAC robust standard errors in parentheses. Time dummies and constant in all regressions. The panel is an unbalanced panel comprising data between 1999-2011. *** p<0.01, ** p<0.05, * p<0.1.

in the partner country improves the American FDI by 0.26% and the British FDI by 0.22%. Significance in both cases is at 1% (Models 3 in Tables 2.a. and 2.b.). Hence, the university ties built at the beginning of the seventies have strong and long lasting effects, which, on the US FDI, are stronger and more significant than those of the more recent cohorts (coefficient on *International students*₁₉₇₀ in Model 3 vs. coefficient on *International students* in Model 2, Table 2.a). An explanation for this difference in the US results might be based on the change occurred in the

composition of the students' countries of origin: there were very few students from communist economies during the Cold War while now they are an important presence in American universities, but a similar change has also taken place in British universities, without leading to the same result. All the opposite, as Table 2.b. shows, the UK bilateral FDI are positively and significantly influenced by both the old and recent cohorts of international students. A more likely explanation of the non-significant effect of recent networks on the US FDI is the stagnation in student inflows in the US for some years after 2001, when in the UK and worldwide international student numbers were growing rapidly (Figures 1 and 6).

As expected, the *Alumni associations* of US and UK universities exert a strong power of attraction on FDI in the alumni home countries. Specifically, a 1% increase in *Alumni associations* boosts the American FDI by almost 0.82%, but the result loses significance when the lagged dependent variable is added to the regression (Models 4-5, Table 2.a.), while a similar increase in the number of alumni associations of British universities increases the British FDI by 0.72% in the OLS regressions and by 0.15% (short run value) in the OLS-LDV specification, with significance, in both cases, at 1% (Models 4-5, Table 2.b). Also in this case, results on UK data are more robust.

Control variables as *GDP*, *Population* and *Distance* have the expected signs. *Inflation* appears to be uncorrelated to the British investments abroad, but has a positive and significant correlation with American FDI, due perhaps to the relatively greater amount of investments from the this country into Latin American and other economies characterized by low macroeconomic stability. The *Quality of institutions* is strongly correlated with the UK investments abroad and not significant for the US FDI. This may be due to the relatively high amount of British investments in the European Union and in countries of the Commonwealth, a factor that is controlled for in the fixed effects regressions of Models 7 and 8 of Table 2.b. In both Tables 2.a. and 2.b. a higher percentage of people speaking English in the foreign country makes the country more attractive for American and British FDI.

A usual matter of concern in the literature on FDI is that the variable may contain many zeroes. In this case, FDI are stocks rather than flows, and the proportion of zeroes is not very high: about 20% of all observations, both for the UK and the US FDI. However, a consequence of taking logs is that the conversion of zero FDI into missing values may introduce selection bias and cause loss of valuable information. To deal with this problem, as several other authors, I sum one to all FDI values before taking logs. As this procedure, in turn, may inflate coefficients, I re-ran all regressions without the adjustment. Results do not change significantly and are available upon request.

5.2. Endogeneity: System GMM

TABLE 3 - USA and UK outward FDI. System GMM and IV GMM
Dependent variable: USA and UK Outward FDI

| | USA | | | UK | | |
|----------------------------------|---------------------|--|--|---------------------|--|--|
| | Sys GMM | USA IV GMM IV: Democracy UK- Alumni | USA IV GMM IV: Democracy UK- Alumni | Sys GMM | UK IV GMM IV: Democracy USA- Alumni | UK IV GMM IV: Democracy USA- Alumni |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| FDI _{t-1} | 0.993*** (0.024) | | 0.942*** (0.018) | 0.828*** (0.062) | | 0.837*** (0.056) |
| International students | 0.113 (0.083) | | | 0.288** (0.115) | | |
| Alumni associations | | 1.040** (0.405) | 0.154* (0.093) | | 1.338*** (0.455) | 0.239* (0.136) |
| GDP | -0.020 (0.050) | 1.048*** (0.231) | 0.017 (0.041) | -0.024 (0.035) | 0.099 (0.199) | 0.005 (0.033) |
| Population | -0.060 (0.063) | -0.507** (0.214) | -0.016 (0.041) | 0.017 (0.066) | 0.420 (0.265) | 0.075 (0.062) |
| Distance | 0.088* (0.051) | -0.746*** (0.237) | 0.013 (0.043) | 0.019 (0.044) | -0.323 (0.203) | -0.077 (0.047) |
| Free trade agreements | -0.031 (0.078) | 0.059 (0.410) | -0.029 (0.074) | 0.081 (0.117) | -0.036 (0.365) | -0.035 (0.081) |
| Inflation | 0.002 (0.004) | 0.017*** (0.006) | 0.003** (0.001) | 0.003 (0.004) | -0.003 (0.005) | 0.003 (0.003) |
| Quality of institutions | -0.010 (0.058) | -0.099 (0.308) | 0.018 (0.055) | 0.189* (0.098) | 0.928** (0.361) | 0.185** (0.085) |
| English language - percentage | 0.001 (0.001) | 0.014** (0.006) | 0.001 (0.001) | -0.001 (0.002) | 1.269** (0.589) | 0.087 (0.159) |
| AR(2) test | 0.281 | | | 0.892 | | |
| Hansen J test | 0.113 | 0.3076 | 0.6231 | 0.564 | 0.3379 | 0.8581 |
| Hansen diff- J test | 0.391 | | | 0.966 | | |
| A-P F test | | 21.9 | 16.96 | | 16.43 | 10.42 |
| Number of instruments | 110 | | | 121 | | |
| Number of countries | 162 | 164 | 164 | 124 | | |
| Observations | 1,088 | 1703 | 1,432 | 987 | 1,165 | 975 |
| R-squared | | 0.742 | 0.965 | | 0.705 | 0.922 |

Notes: all variables are in logs except dummies and percentages. Robust standard errors clustered by country in parentheses. Time dummies, constant and country effects in all regressions. AR(2): Arellano and Bond tests for serial correlations. The panel is an unbalanced panel comprising data between 1999-2011. In SYS-GMM models control variables are all treated as predetermined and are instrumented for using their own lags in level and differences. Instruments in Models 3- 4 and 7-8: Democracy and Alumni associations of the other receiving country. *** p<0.01, ** p<0.05, * p<0.1.

Given that the above coefficients on *International students* and on *Alumni associations* could potentially suffer from endogeneity bias, I use the Blundell-Bond System GMM estimator in levels and differences. Results obtained with these regressions confirm and reinforce previous findings (Table 3). *International students* have a high and significant impact on the British FDI to their home economies, and a lower and weaker influence on the American investments abroad. The coefficient in Model 4, regarding the UK FDI, shows that a 1% increase in the number of international students in the United Kingdom leads to an improvement of 0.29% of the British FDI to the students' home countries. The value of this GMM coefficient lies between the OLS values of Table 2.b, which were 0.18 and 0.44. The same coefficient in the regression concerning the US FDI is positive but not significant (Model 1).

I use the Two Stage GMM estimator variable when the potentially endogenous variable is *Alumni associations*. Instruments are democracy in the partner country and Alumni associations of UK universities in the regressions on the US data and Alumni of US universities in the regressions on the UK dataset. Tests show that instruments perform well, their exogeneity and validity are not rejected (Table 3). First stage coefficients on Democracy and on the alumni associations of the other receiving country are all positive and significant. Second stage coefficients show that, as expected, the impact of *Alumni associations* on the FDI originating from the country of university studies are positive, strong and significant, even when the lagged dependent variable is included among the regressors. Specifically, the impact of a 1% increase in the number of *Alumni associations* in the partner country boosts American FDI to the country by 1% and British FDI by 1,34%. (Models 2 and 5, Table 3), with significance at 10% in the US regressions and, respectively, 1% and 10% in the UK regressions. Both in the regressions on US and UK data, the IV-GMM coefficients are higher than the OLS coefficients of Table 2, suggesting that American and British FDI in the partner country do not significantly promote the formation of associations.

5.3 Soft, covert and hard power.

Up to now, the different roles played by the US and UK on the international stage have not been considered, but they can affect the way in which American and British multinationals enter foreign markets, and the importance of education networks in this process. Hence, I add to the above specification two covariates. The first, *Aid*, meant as soft power, is the quantity of aid in US\$ provided to the foreign country, and the second, *Wars*, indicating the use of force, is the number of wars fought with the foreign country since 1945. Subsequently, in the regressions on US data, I test the impact on FDI of the use of covert power – the number of *CIA* interventions in the partner country during the period 1945-1989 – and, in the regressions concerning the British FDI, I add the

number of *British Council* branches in the foreign country, an indicator of cultural diplomacy.

Table 4 - Soft power, covert power and war

| | Dependent variable: outward USA FDI | | | | | Dependent variable: outward UK FDI | | | | |
|---|-------------------------------------|---------------------|---------------------|---------------------|---------------------|------------------------------------|---------------------|---------------------|---------------------|---------------------|
| | Sys. GMM | Sys. GMM | Sys. GMM | Sys. GMM | Sys. GMM | Sys GMM | Sys GMM | Sys GMM | Sys GMM | Sys. GMM |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| FDI _{t-1} | 0.949*** (0.019) | 0.958*** (0.017) | 0.932*** (0.029) | 0.958*** (0.016) | 0.947*** (0.020) | 0.808*** (0.069) | 0.794*** (0.073) | 0.824*** (0.064) | 0.810*** (0.070) | 0.781*** (0.083) |
| International students | -0.138 (0.154) | 0.146* (0.076) | 0.406** (0.186) | 0.115 (0.086) | 0.158* (0.093) | 0.523*** (0.181) | 0.475*** (0.172) | 0.341** (0.135) | 0.422** (0.172) | 0.450** (0.198) |
| Aid | -0.366 (0.221) | | | 0.021 (0.017) | (0.020) -0.015 | 0.375** (0.183) | | | -0.050 (0.035) | -0.080 (0.050) |
| Wars | | 0.077 (0.082) | | 0.002 (0.009) | 0.002 (0.011) | | 0.791** (0.391) | | 0.011 (0.018) | 0.041 (0.094) |
| CIA | | | 0.756* (0.425) | 0.002 (0.017) | 0.016 (0.023) | | | | | |
| British Council | | | | | | | | 0.085 (0.115) | -0.033 (0.033) | -0.032 (0.051) |
| International students x Aid | 0.054* (0.032) | | | | | -0.061** (0.028) | | | | |
| International students x Wars | | -0.009 (0.010) | | | | | -0.085** (0.042) | | | |
| International students x CIA | | | -0.104* (0.058) | | | | | | | |
| International students x British Council | | | | | | | | -0.013 (0.013) | | |
| Total effect of International students | -0.001 (0.094) | 0.143* (0.074) | 0.325** (0.145) | | | 0.373** (0.128) | 0.411** (0.156) | 0.278** (0.104) | | |
| Total effect of Aid | -0.006 (0.019) | | | | | 0.032 (0.036) | | | | |
| Total effect of Wars | | 0.014 (0.019) | | | | | 0.311* (0.153) | | | |
| Total effect of CIA | | | 0.072 (0.047) | | | | | | | |
| Total effect British Council | | | | | | | | 0.025 (0.044) | | |
| Other control variables | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes |
| AR (2) test | 0.334 | 0.344 | 0.351 | 0.343 | 0.344 | 0.882 | 0.894 | 0.888 | 0.916 | 0.862 |
| Hansen J test (P-value) | 0.102 | 0.791 | 0.141 | 0.076 | 0.094 | 0.608 | 0.688 | 0.434 | 0.522 | 0.838 |
| Hansen diff. J test (P-value) | 0.615 | 0.994 | 0.776 | 0.456 | 0.443 | 0.709 | 0.957 | 0.455 | 0.876 | 0.869 |
| Number of instruments | 123 | 99 | 95 | 100 | 100 | 110 | 110 | 110 | 101 | 74 |
| Number of countries | 163 | 163 | 163 | 163 | 134 | 124 | 124 | 124 | 124 | 96 |
| Observations | 1,442 | 1,442 | 1,442 | 1,442 | 1,113 | 983 | 987 | 987 | 983 | 673 |

Notes: all variables are in logs except dummies and percentages. Robust standard errors clustered by country in parentheses. Time dummies, constant and country effects in all regressions. AR(2): Arellano and Bond tests for serial correlations. The panel is an unbalanced panel comprising data between 1999-2011. In SYS-GMM models control variables are all treated as predetermined and are instrumented for using their own first to third lags in level and differences. The total effect of *International students* is calculated summing the coefficients on *International students* and on the interaction term, evaluated, respectively, at average *CIA*, *Wars* and *Aid*. The total effect of *CIA*, *Wars* and *Aid* are calculated summing the coefficients on, respectively, *CIA*, *Wars* and *Aid* and on the interacted term, calculated at average level of *International students*. *** p<0.01, ** p<0.05, * p<0.1.

These variables are expected to affect FDI directly, but of special interest are their interactions with the effects of *International students*.

The results of Table 4 show that the total effect of *Aid* on FDI is non-significant, both in the US and UK regressions (Models 1 and 6). However, aid to other countries appears to have an effect on FDI that is complementary to that of international students: coefficient on the interacted variable *International students* \times *Aid* in the US regression is low but positive and significance at the 10% level. The coefficient of the same interaction is instead negative when the dependent variable is the British FDI: a unit increase of international students in UK together with a unit increase in *Aid* from the UK to the foreign country tends to curtail the separate effects of International students and *Aid* on FDI, suggesting that, in this case, the two forms of soft power substitute each other.

Wars are the opposite of soft power: they are expected to disrupt economic relations (Martin et al., 2008) and social ties between countries. Differently than expected, the total effect of *Wars* on UK FDI is positive and significant (Model 7, Table 4), perhaps because after the second world war the UK has mostly participated into armed conflicts having political and humanitarian goals, while the same coefficient is not significant when the dependent variable is US FDI (Model 2). The interaction between wars and international students, however, is as expected: armed conflict reduces the positive effects of education ties on investments. The networks of international students from countries with which there has been armed conflict have a weaker influence on FDI. The coefficient on the interacted variable *International students* \times *Wars* is negative both for the US and the UK, while it is significant only for the latter. Interestingly, the US coefficient on the interacted term becomes negative and significant if Vietnam (an outlier in terms of years of war, but among the top fifteen countries in terms of foreign students in American universities) is excluded from the panel, evidencing that students from Vietnam are compensating for the disruptive effects of war on the relations between the two countries. The negative effect of wars on education networks is even more reinforced if two countries, Vietnam and Korea, are excluded from the sample.

The total impact on US FDI of CIA interventions in the partner country is non-significant (Model 3, Table 4). This differs from Berger et al. (2013), who find a positive effect of CIA on exports. This paper's result measures the impact on FDI and not on trade, but, in this respect, effects could be expected to be similar. Rather, Berger et al. measure the effect of CIA interventions on trade flows occurring during the Cold War period, while this paper's result concerns FDI and a longer run. It shows that CIA interventions of 1945-89 have not had long lasting effects on the US FDI of 1999-2011. On the other hand, as expected, the joint impact of CIA with education networks, *International students* \times *CIA*, is negative and significant (Model 3). The positive

influence of student networks on FDI shrinks as the partner country experience more CIA interventions. More generally, the use of covert power can weaken the positive effects of persuasion and soft power. Finally, Models 4 and 9 in Table 4 report the results of the regressions including all covariates: an increase of 1% in *International students* from country c increases the UK FDI in country c by 0.42% (Model 9). This result is similar to previous coefficients, showing that results on UK data are quite robust. The same regression shows that International students have no significant effect on the American FDI (Model 4). However, when the full equation is re-run with a reduced sample including only non-OECD countries, the coefficient on international students does not change significantly in the UK regression (Model 10), while it becomes significant at the 10% level in the US regressions. International student ties affect the American investments in developing countries.

The overall magnitude of these effects can now be taken into consideration. The number of international students from the average country in the United Kingdom is 1791. A 10% increase in the average number of registered students would amount to an increase of 179 students per country. The stocks of British investments in the average foreign country amount to \$12,573 million. Then, the 10% increase in students would lead to a 4.22% increase in the stock of FDI (coefficient on *International students*, Model 9), or to an extra value of \$531 million. This means that one additional average student would generate an increase of \$2.96 million in the British stock of FDI in his home economy.

As above, the magnitude of the impact of non-OECD students on the United States investments abroad can be calculated by considering that a 10% increase in students from the average non-OECD country (Table 1) amounts to 260 more students, and that this increase leads to 1.58% more US FDI in the non-OECD country (Model 5, Table 4). The value of the average US investment in the non-OECD country is \$3,324.80 (Table 1), and 1.58% of it is \$52.53 million. Hence, an extra student from a non-OECD country generates an increase in the stock of FDI from the United States in the student's home economy of \$202,057. The substantial difference between the impact of international students on British and American FDI depends on the smaller magnitude of the coefficient on *International students* in the US regressions, and on its significance being restricted to non-OECD economies, where the average value of the American FDI is about twenty times smaller than in OECD countries (Table 1). Interestingly, the coefficient on *International students* in the United States further increases to 0.26 if also Arab countries are excluded from the

dataset. As shown in Figure A.1, the number of students in American universities originating from Arab countries markedly fall for a few years after 2001.⁶

Similar calculations can help to make clear the magnitude of the effect of Alumni associations. As the number of associations of American universities in the average country is 10.23, an increase of 10% would lead to 1.02 more association per country. The average value of US FDI per country is \$15,943 million. From Model 2 in Table 3, the increase in associations would lead to a 10% increase in US investments abroad, which is \$1,594 million. Hence, one more association of alumni in the foreign country would boost the American FDI in the country by \$1,563 million. Similar calculations can be performed for the United Kingdom. As the average number of alumni associations of British universities in the foreign country is 11.35, a 10% increase would lead to 1.13 more associations. From Model 5 in Table 3, this would determine a 13.38% increase in the British FDI, and, given that the average value of British FDI is \$12.573 million, to an increase of \$1,488 million. Hence, an extra alumni association in the partner country would increase the stock of British FDI in the country by \$1,489 million. The huge magnitude of these effects depend on the variable *Alumni associations* being an indicator of the effective networking activity of a vast number of alumni, who, moreover, often are influential professionals, businessman, managers, politicians or policy makers.

5.4. Robustness.

Previous results show that students registered in the early seventies still have a strong effect on US and UK FDI, but that the effect on US FDI vanishes with the more recent cohorts of students. As a further check of robustness, I test the effect on FDI of foreign students registered in US universities fifteen years after 1970, in 1985, still during the Cold War period. Results, in Model 1 of Table 5, show that *International students*₁₉₈₅ also have a positive and significant impact on the US FDI of 1999-2011. The magnitude of the coefficient is similar to that of *International students*₁₉₇₀ (of Table 2). Furthermore, the coefficient is robust to the introduction of the *CIA* variable among the covariates, while, as in previous tests, *CIA* interventions have no direct effect on FDI (Model 2, Table 5). The coefficient on the interacted variable *International students*₁₉₈₅ × *CIA*, is negative and significant, supporting previous findings suggesting that the use of covert power has a negative influence on international education ties (Model 3). The same exercise is performed with students registered during 1993/94, *International students*₁₉₉₃, and results are overall the same (Models 4-6, Table 5). The year 1993 has been chosen because it is the first in which UNESCO

⁶ The magnitude of the impact is much higher than that of an average business immigrants in the USA on USA imports (\$61,637) in Aleksynska and Peri (2014), or that of an average international student on British imports (\$56,028) and exports (\$31,430) in Murat (2014), but the average flow of American and British imports and exports is also several times smaller than the stocks of these countries' investments abroad.

statistics clearly capture the new world order, after the fall of the Berlin wall, and supplies distinct figures for students from countries of the former Soviet Unions. These findings provide support to two previous results: the first is that international students of the Cold War period, and immediately after, have a positive and significant effect on the US FDI, an effect that is lost with the cohorts of the last decade. The second is that CIA interventions have a disruptive impact on international education ties and a weak or non-robust direct influence on FDI. Finally, the above regressions have been rerun with other institutional and cultural covariates, among which the proportion of people of Christian religion in the partner country and, regarding the UK FDI, the status of ex-colony or Commonwealth member of the partner country. Results do not change significantly.

Table 5. - International students in the United States and CIA interventions.

| | Dependent variable: US outward FDI (OLS) | | | | | |
|--|--|---------------------|---------------------|---------------------|---------------------|---------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| International students ₁₉₈₅ | 0.245*** (0.074) | 0.202*** (0.076) | 0.221*** (0.074) | | | |
| International students ₁₉₈₅ x CIA | | | -0.140** (0.068) | | | |
| International students ₁₉₉₃ | | | | 0.361*** (0.106) | 0.295*** (0.108) | 0.323*** (0.109) |
| International students ₁₉₉₃ x CIA | | | | | | -0.100** (0.050) |
| CIA | | 0.139 (0.089) | 1.156** (0.490) | | 0.162* (0.088) | 0.887** (0.371) |
| Control variables | yes | yes | yes | yes | yes | yes |
| Observations | 1,632 | 1,632 | 1,632 | 1,657 | 1,657 | 1,657 |
| R-squared | 0.747 | 0.749 | 0.753 | 0.746 | 0.749 | 0.752 |

Notes: all variables are in logs except dummies and percentages. HAC robust standard errors in parentheses. Time dummies and constant in all regressions. The panel is an unbalanced panel comprising data between 1999-2011. *** p<0.01, ** p<0.05, * p<0.1.

6. Conclusions

This paper investigated the influence of education networks on the investments abroad of the United States and the United Kingdom during 1999-2011. Proxies for education networks were international students, alumni associations of American and British universities in foreign countries and former students, who attended university during the Cold War period.

Results show that education ties tend to have strong, robust and long-lasting effects on the foreign investments of the United Kingdom in the students' home countries and a weak impact on

the American FDI. Specifically, international students have a positive and significant influence only on the American investments going to non-developed and non-Arab economies, but even in this restricted set of countries, their influence on FDI is weak compared to that of international students who attended British universities. The impact of the latter on FDI is about three times that of international students of American universities, and is more evenly distributed among developed and developing economies. Differently, former international students who attended university in the early seventies have a similar positive impact on both British and American investments into their home economies. The associations of alumni abroad attract very substantial amounts of both American and British FDI into the alumni home countries, but, also in this case, the alumni associations of British universities have the highest influence on FDI.

International students may act as ‘ambassadors’, who facilitate the transfer of the culture, institutions and economic norms of the host country into their country of origin. The recent literature identifies them as effective channels of soft power directed to the elites (Nye, 2005). This paper’s findings provide support for this view, especially in relation to the United Kingdom. To better investigate the reasons for the differing effects between United States and United Kingdom, other expressions of power – economic aid and cultural diplomacy, wars, and covert action, in the form of CIA interventions in the foreign country during the cold war – have also been tested. Results are that the interactions between the different forms of soft power are mixed, but those between international students and wars, or international students and covert action are negative: wars and CIA interventions disrupt the positive effects on FDI of international education ties. At the same time, the direct effects of wars and covert actions on the American FDI appear to be non-significant. The recent debate seems to suggest that soft power that is not backed by hard power can be totally ineffective; this paper’s results suggest that hard and covert power without the contemporary use of persuasion can also be unsuccessful.

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APPENDIX

Figure A1. - International students from Arab States in US and UK

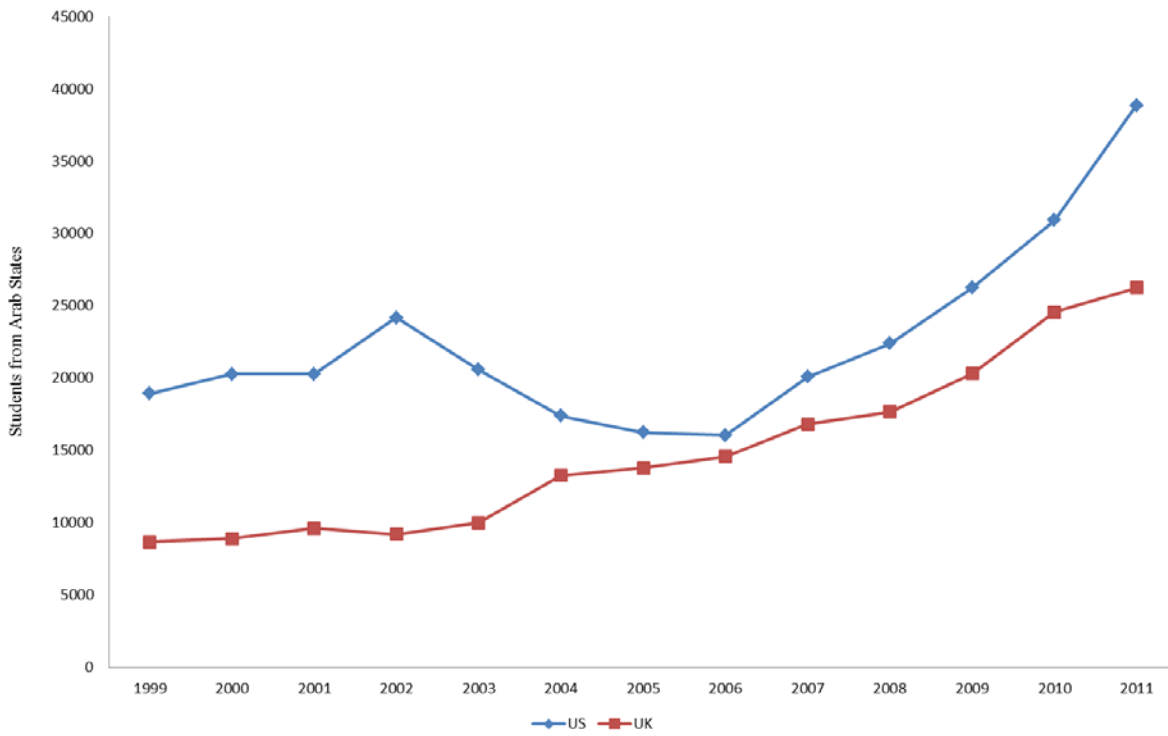


Table A.1. - Top 20 non-OECD countries.

| FDI | | Students | | Alumni associations | |
|----------------------|---------|----------------------|-------|----------------------|-----|
| US | | | | | |
| Singapore | 64737.3 | China | 86593 | China | 110 |
| Brazil | 39087.6 | India | 74277 | India | 81 |
| Hong Kong | 37197.8 | Thailand | 9592 | Hong Kong | 46 |
| China | 25790.8 | Indonesia | 9003 | Brazil | 42 |
| Chile | 13853.4 | Brazil | 7934 | Singapore | 38 |
| Bahamas | 13805.5 | Hong Kong | 7731 | Thailand | 36 |
| Argentina | 13147.9 | Colombia | 6812 | Argentina | 30 |
| Indonesia | 11489.3 | Malaysia | 6766 | Philippines | 27 |
| Venezuela | 10369.4 | Saudi Arabia | 6663 | United Arab Emirates | 27 |
| India | 9968.6 | Pakistan | 6249 | Israel | 26 |
| Malaysia | 9718.2 | Kenya | 6234 | Malaysia | 24 |
| Thailand | 8356.7 | Nepal | 5712 | Colombia | 23 |
| Russian Federation | 8106.2 | Russian Federation | 5555 | Saudi Arabia | 23 |
| Israel | 7317.2 | Nigeria | 5311 | Indonesia | 21 |
| Philippines | 5694.9 | Vietnam | 5239 | Russian Federation | 21 |
| Panama | 5577.7 | Venezuela | 4965 | Chile | 21 |
| Kazakhstan | 5483.3 | Jamaica | 4024 | Pakistan | 20 |
| Egypt | 5394.7 | Singapore | 3935 | Vietnam | 18 |
| Saudi Arabia | 5109.9 | Philippines | 3508 | Peru | 18 |
| Algeria | 4691.8 | Peru | 3235 | South Africa | 17 |
| UK | | | | | |
| Hong Kong | 30045.1 | China | 34801 | India | 100 |
| South Africa | 15973.2 | India | 16762 | China | 77 |
| Singapore | 11865.5 | Malaysia | 11218 | Malaysia | 46 |
| United Arab Emirates | 7919.0 | Hong Kong | 9306 | Hong Kong | 46 |
| Russian Federation | 7052.5 | Nigeria | 7587 | Pakistan | 45 |
| Brazil | 6165.2 | Cyprus | 6297 | Singapore | 39 |
| India | 5378.2 | Pakistan | 5654 | Nigeria | 36 |
| China | 4757.6 | Singapore | 3966 | United Arab Emirates | 31 |
| Argentina | 2965.1 | Thailand | 3645 | Thailand | 28 |
| Egypt | 2823.6 | Saudi Arabia | 2915 | Cyprus | 24 |
| Kazakhstan | 2796.4 | Kenya | 2604 | South Africa | 19 |
| Colombia | 2684.9 | Sri Lanka | 2332 | Kenya | 18 |
| Malaysia | 2510.5 | Zimbabwe | 2230 | Argentina | 18 |
| Malta | 2280.4 | Russian Federation | 1992 | Brazil | 17 |
| Chile | 2177.8 | Ghana | 1974 | Ghana | 16 |
| Nigeria | 2142.8 | Bangladesh | 1930 | Mauritius | 16 |
| Indonesia | 2052.9 | United Arab Emirates | 1743 | Indonesia | 16 |
| Thailand | 2013.0 | Iran | 1694 | Sri Lanka | 15 |
| Saudi Arabia | 1982.3 | Mauritius | 1530 | Saudi Arabia | 14 |
| Mauritius | 1450.1 | South Africa | 1384 | Bangladesh | 14 |

Notes: Averages, 1999-2011.

Table A.2. - Variable definitions and sources

| Variable | Definition | Source |
|--|--|--|
| International students | Students who left their country of origin and moved to another country for the purpose of study. Number of students enrolled refers to the count of students studying in the reference period. | UNESCO. International flows of mobile students at the tertiary level (ISCED 5 and 6) |
| Alumni | Alumni groups and associations in partner countries of graduates, respectively, from US or UK Universities. | Own databases. Data collected during 2012 from US and UK Universities' websites or provided by Central offices of Alumni associations. Includes only officially recognized groups from 50 UK and 62 US universities. |
| International students ₁₉₇₀ | Number of students enrolled during 1970/71 in US or UK. | UNESCO Statistical Yearbook (1973) |
| FDI | Stocks, in US \$, millions. | OECD Statistics. |
| GDP | In US \$, millions. | IMF – Statistics |
| Population | Number of people, millions. | IMF – Statistics |
| Distance | Great circle distance between capital cities and Washington or London (Km). | http://www.cepii.fr/CEPII/en/bdd_modele/bdd.asp |
| Inflation | Rate of change. | IMF – Statistics |
| Language | Proportion of people speaking English over total population. | Melitz and Toubal (2012) <i>CIA World Factbook</i> . |
| Quality of institutions | Worldwide Governance Indicator. Includes six dimensions of governance: Voice and accountability Political stability and absence of violence; Government effectiveness; Regulatory quality; Rule of Law; Control of corruption. | World Bank. Developed by Kaufmann et al. (2009). The six indicators are measured in units ranging from about -2.5 to 2.5, with higher values corresponding to better governance outcomes. |
| Free trade agreements | United States and European Union (for the United Kingdom) free trade agreements with the partner country. | OECD Statistics |
| Democracy | Indicator variable that equals one if an observation is a democracy. Based on objective criteria about the extent to which government positions are filled by contested elections | Cheibub et al (2010). |
| Aid | Total Official Flows: The sum of Official Development Assistance (ODA) and Other Official Flows (OOF) represents the total gross disbursements by the official sector at large to the recipient country. (\$ millions) | OECD Statistics |
| Wars | Years of armed conflict between US or UK and foreign country since 1945. | Correlates of War Project |
| CIA | Number of CIA interventions in foreign country, 1945-1989. | Berger et al. (2013) <i>AER</i> database. |
| British Council | Number of British Council branches in foreign country in 2005. | British Council Annual Report 2005-2006. Measuring Success: http://www.britishcouncil.org/bc-annual-report-2005-2006.pdf |

Countries: Afghanistan Albania Algeria Angola Antigua and Barbuda Argentina Armenia Australia Austria Azerbaijan

Bahamas Bahrain Bangladesh Barbados Belarus Belgium Belize Benin Bolivia Bosnia and Herzegovina Botswana
Brazil Brunei Darussalam Bulgaria Burkina Faso Burundi Cambodia Cameroon Canada Cape Verde Central African
Chile China Colombia Congo, Republic Congo, Dem. Rep Costa Rica Cote d'Ivoire Croatia Cyprus Czech Republic
Denmark Dominica Dominican Republic Ecuador Egypt El Salvador Equatorial Guinea Eritrea Estonia Ethiopia Fiji
Finland France Gabon Gambia Georgia Germany Ghana Greece Grenada Guatemala Guinea Guyana Haiti Honduras
Hong Kong Hungary Iceland India Indonesia Iran Iraq Ireland Israel Italy Jamaica Japan Jordan Kazakhstan Kenya
Korea, Republic Kuwait Kyrgyzstan Latvia Lebanon Lesotho Liberia Libyan Arab Jam Liechtenstein Lithuania
Luxembourg Macao Macedonia FYR Madagascar Malawi Malaysia Maldives Malta Mauritania Mauritius Mexico
Moldova, Rep. Mongolia Morocco Mozambique Myanmar Namibia Nepal Netherlands New Zealand Nicaragua Niger
Nigeria Norway Oman Pakistan Panama Papua New Guinea Paraguay Peru Philippines Poland Portugal Qatar Romania
Russian Federation Rwanda Saint Lucia Saint Vincent Saudi Arabia Senegal Serbia and Montenegro Seychelles Sierra
Leone Singapore Slovak Republic Slovenia Somalia South Africa Spain Sri Lanka Sudan Suriname Swaziland Sweden
Switzerland Syrian Arab Republic Tajikistan Tanzania Thailand Togo Trinidad and Tobago Tunisia Turkey
Turkmenistan Uganda Ukraine United Arab Emirates United States Uruguay Uzbekistan Venezuela Vietnam Yemen
Zambia Zimbabwe.